APPENDIX E

Paleontological Records Search and Preconstruction Assessment, ECORP Consulting, Inc., September 8, 2014.

8 September 2014

Stephanie Coleman
State of California Department of General Services
Real Estate Services Division, Professional Services Branch
Environmental Services Section
707 Third Street, 4th Floor
West Sacramento, CA 95605

RE: Paleontological Records Search and Preconstruction Assessment for the Butte Fire Station and Unit Headquarters Replacement Project (ECORP Project No. 2014-002)

Dear Ms. Coleman:

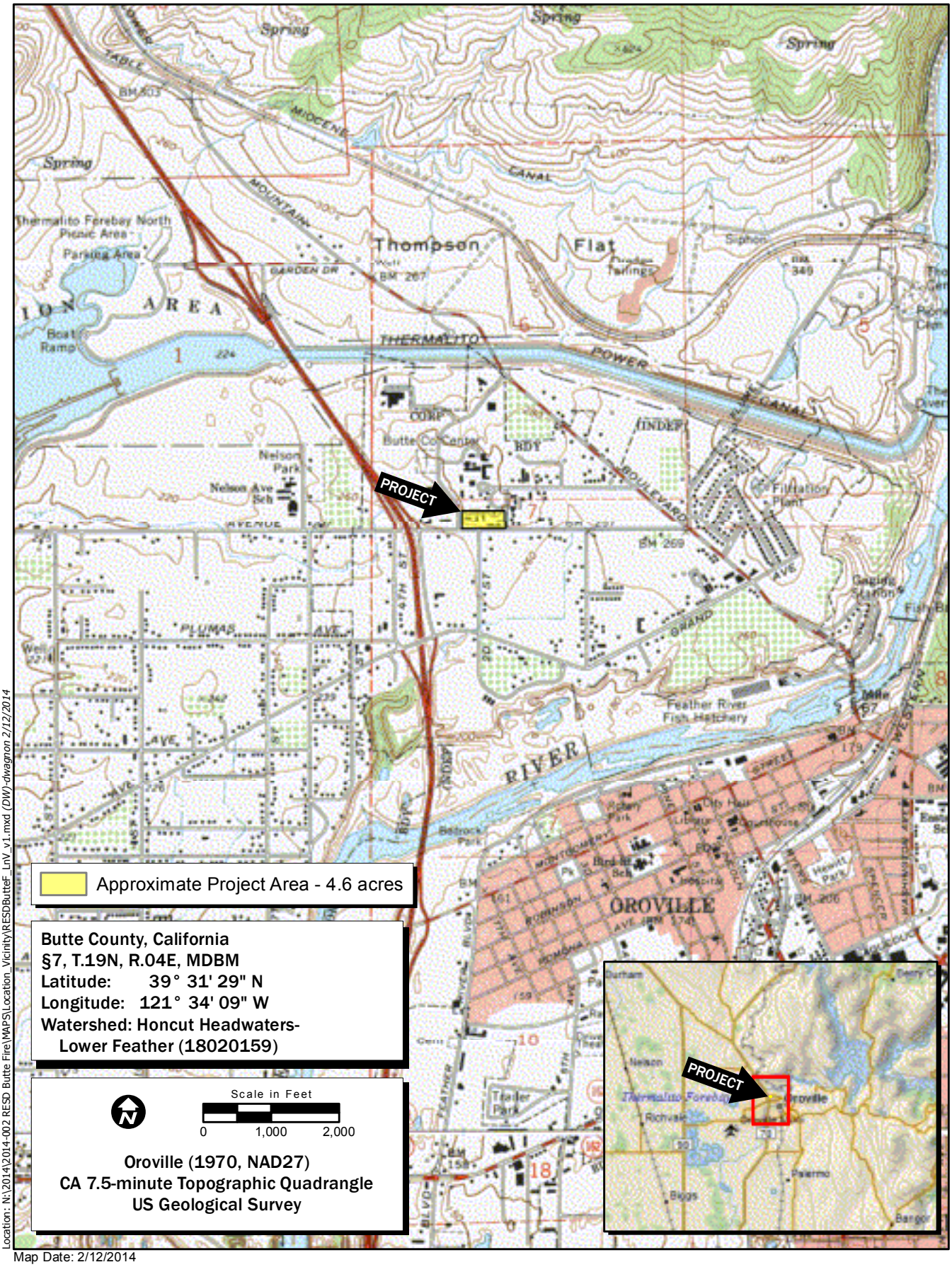
At your request, ECORP carried out a paleontological records search and preconstruction assessment for the Butte Fire Station and Unit Headquarters Replacement Project (Project) to support the preparation of an environmental document under the California Environmental Quality Act (CEQA). The Project is on 4.36 acres of property located west of Highway 70 off Nelson Avenue between County Center Drive and Del Oro Avenue in the City of Oroville within Butte County, California (Figure 1. *Project Location and Vicinity*). The Project proposes to replace all facilities associated with the Butte Fire Station and Unit Headquarters with the exception of the emergency command center (ECC) buildings and ECC tower. Replacement of the facilities will provide necessary fire protection needs to the local area and region for the next 50 years. The maximum depth of ground disturbance will extend approximately eight feet below the surface to accommodate retaining wall construction and grading activities.

METHODS

A paleontological records search was requested from the University of California Museum of Paleontology (UCMP) on 13 June 2014. The search was conducted by Museum Scientist (Microfossil Collections) Ken Finger, Ph.D. The search included a review of their institution's paleontology specimen collection records for the Project area and vicinity. In addition, a query of the UCMP online catalog records, a review of regional geologic maps from the California Geological Survey, and a review of existing literature on paleontological resources of Butte County was conducted by Staff Biologist Marin Meza. The purpose of this paleontological assessment is to determine the sensitivity of the Project area, whether known occurrences of paleontological resources are present within or immediately adjacent to the Project area, and whether implementation of the Project could result in significant impacts to paleontological resources. Paleontological resources include mineralized (fossilized) or unmineralized bones, teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains.

Sedimentary rock units may be described as having (a) high (or known) potential for containing significant nonrenewable paleontological resources; (b) low potential; and (c) undetermined potential (SVP 2014). The determination of a site's (or rock unit's) degree of paleontological potential is first founded on a review of pertinent geological and paleontological literature, as well as locality records of specimens deposited in institutions. The sensitivity of rock units in which fossils occur are divided into three operational categories:

I. <u>High Potential</u>. Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a have potential for containing significant



Location: N:\2014\2014-002 RESD Butte Fire\MAPS\Location_Vicinity\RESDButteF_LnV_v1.mxd (DW)-dwagnon 2/12/2014

Map Date: 2/12/2014

Service Layer Credits: Copyright:© 2012 DeLorme

DRAFT

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Figure 1. Project Location and Vicinity

2014-002 RESD Butte Fire Station

nonrenewable fossiliferous resources. These units include but are not limited to, sedimentary formations, volcanic formations, and some low-grade metamorphic rocks, which contain significant nonrenewable paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace and (b) the importance of recovered evidence for new and significant taxonomic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units that contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units that may contain new vertebrate deposits, traces, or trackways are also classified as significant.

II. Undetermined Potential. Rock units for which little information is available are considered to have undetermined fossiliferous potentials. Field surveys by a qualified vertebrate paleontologist to specifically determine the potentials of the rock units are required before programs of impact mitigation can be developed.

III. Low Potential. Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some rock units have low potentials for yielding significant fossils. Such units will be poorly represented by specimens in institutional collections. These deposits generally will not require protection or salvage operations.

RESULTS

The UCMP has 134 paleontological specimens from 141 localities in Butte County (UCMP 2014a). However, not all specimens in the UCMP collections have been cataloged and digitized, and other specimens have likely been recorded within the vicinity of the Project area. The specific location of all localities is available only to qualified paleontologists, and the location of these occurrences relative to the Project area is unclear without more extensive archival research. Of the 134 specimens recorded within Butte County, 106 are fossil invertebrates, six are plant fossils, and 22 are fossil vertebrates (UCMP 2014a). No fossil specimens are cataloged in or within a 0.5 mile-radius of the Project area (UCMP 2014a, Finger 2014; see Attachment A). The nearest locality is approximately two miles northeast of the Project area and produced a Rancholabrean bird eggshell from the late Pleistocene epoch, but the UCMP records search results did not indicate what geologic unit the specimen came from or if it is the same as the unit underlying the Project area (Table 1, UCMP 2014a).

Table 1 – Previously Recorded Paleontological Specimens near the Project

Spec #	Class	Genus, Species	Period	Epoch	Loc ID#	Locality Name	County
34369	Aves	Not listed	Quaternary	Pleistocene	V3739	Oroville	Butte

According to the *Geologic Map of the Chico Quadrangle, California* (Saucedo and Wagner 1992), the geologic unit that underlies the Project area is classified as Tuffs of Oroville Point (QPto). It is further described as Pliocene and/or Pleistocene sandstone, shale, and gravel deposits that are mostly loosely consolidated (QPc) (Gutierrez *et al.* 2010). The Tuffs of Oroville Point consist of interbedded volcaniclastic deposits of gravel, sand, and tuff (volcanic ash) deposited to the south and west of the town of Oroville during the Pliocene and Pleistocene epochs (USACE 2013). Rock units such as the Oroville Tuffs, for which little information is available, are considered to have undetermined fossiliferous potentials, and a nearby study recommended the Oroville Tuffs to be potentially significant, pending additional field confirmation (Hanson 2005). The *Soil Resource Report for Butte Area, California, Parts of Butte and Plumas Counties* (NRCS 2013) indicates that there is one soil type on-site: Thompsonflat-Oroville, 0-9 percent slopes.

Thompsonflat-Oroville is composed of two units, Thompsonflat and Oroville. Thompsonflat is a fine sandy loam from 0-80 inches (0-6.7 feet) below the ground surface. Beyond 80 inches lies loamy alluvium over clayey alluvium over sandy and gravelly alluvium derived from igneous and metamorphic rock. Oroville is a gravelly fine sandy loam to approximately 20-40 inches (1.7-3.3 feet) below the ground surface due to duripan present at that depth.

The recorded specimen shown in Table 1 is from the Pleistocene epoch and the geology identified within the Project area is from the Plio-Pleistocene. The Pliocene epoch, approximately 5.3 to 2.6 million years ago, was a time when the global climate became cooler and more arid (UCMP 2014b). The beginning of this epoch saw numerous fluctuations in temperature, which gave way to the general cooling trend near the end of the Pliocene. The cooling and drying of the global environment may have contributed to the enormous spread of grasslands and savannas during this time. Additionally, the Panamanian land-bridge between North and South America appeared during the Pliocene, allowing migrations of plants and animals into new habitats. The Pleistocene epoch, beginning after the end of the Pliocene, approximately 2.6 million to 11,700 years ago, included the most recent episodes of global cooling (UCMP 2014c). Much of the world's temperate zones were alternately covered by glaciers during cool periods and uncovered during the warmer interglacial periods when the glaciers retreated. The Pleistocene epoch was characterized by the presence of distinctive large land mammals and birds including the mammoth, mastodons, longhorned bison, saber-toothed cats, and giant ground sloths.

RECOMMENDATIONS

The records search determined that no fossil vertebrate localities are located on or within a 0.5-mile radius of the Project area. The Oroville Tuffs geologic unit present within the Project area has undetermined fossiliferous potentials and could potentially be significant for containing nonrenewable paleontological resources; however, the Project will be developed in areas that have already undergone significant subsurface ground disturbance from the construction of the existing fire station and unit headquarters, reducing the Oroville Tuffs geologic unit's sensitivity to low potentials for yielding significant fossils.

The Draft 2030 City of Oroville General Plan Open Space, Natural Resources, and Conservation Element (General Plan) requires projects to consult with paleontologists to protect paleontological resources. Policy 14.7 of the General Plan requires that if cultural resources, including paleontological resources, are uncovered during grading or other on-site excavation activities, for construction to stop until appropriate mitigation is implemented. Implementation of this policy through the mitigation outlined below would reduce potential impacts to a less-than-significant level.

In compliance with the General Plan, it is recommended that the lead agency implement a standard unanticipated discovery mitigation measure if paleontological resources are encountered during construction activities. If any fossils are recovered, they shall be analyzed by a qualified paleontologist to a point of identification and curated at an established accredited museum repository with permanent retrievable paleontologic storage. A technical report of findings shall be prepared with an appended itemized inventory of identified specimens and submitted with the recovered specimens to the curation facility.

Thank you for the opportunity to assist you in your project planning. If you have any questions, you may contact me by phone at (916) 782-9100 or by email at mmeza@ecorpconsulting.com.

Sincerely,

Marin Meza
Staff Biologist
ECORP Consulting, Inc.

Attachment

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University of California Museum of Paleontology (UCMP)

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2014b The Pliocene Epoch. Electronic document, http://www.ucmp.berkeley.edu/tertiary/pliocene.php, accessed 18 June 2014.

2014c The Pleistocene Epoch. Electronic document, http://www.ucmp.berkeley.edu/quaternary/pleistocene.php, accessed 18 June 2014.

ATTACHMENT A

UCMP Paleontological Records Search Confirmation

From: Kfinger
To: Marin Meza
Subject: Re: Butte Fire Station records search request
Date: Friday, June 13, 2014 12:51:05 PM

Hi Marin,

The UCMP database lists no fossil localities of any kind within a 0.5 mile radius of the project site for the Butte Forest Fire Station Ranger Headquarters Replacement.
The nearest locality (V3739) is about 2 miles to the northeast; it yielded bird eggshell questionable assigned to the late Pleistocene.

An invoice for $250 will be forthcoming for this service.

Ken

On Jun 13, 2014, at 10:58 AM, Marin Meza <MMeza@ecorpconsulting.com> wrote:

> Dr. Finger,
>
> Please find attached a records search request letter and map for the Butte Forest Fire Station Ranger Headquarters Replacement.
>
> Thank you,
>
> *Marin Meza*
> Staff Biologist
> ECORP Consulting, Inc.
>
> <image003.jpg>
>
> 2525 Warren Drive, Rocklin, CA 95677
> Ph: 916.782.9100 ♦ Cell: 916.303.3934 ♦ Fax: 916.782.9134
> mmeza@ecorpconsulting.com ♦ www.ecorpconsulting.com
>
> <UCMP Record Search Letter_Butte Fire.pdf>

APPENDIX F

Geotechnical Report, URS, July 2014.

GEOTECHNICAL REPORT

Butte Fire Station/Unit Headquarters—Replace Facility Project

Contract 3174193

July 2014

Prepared for:

California Department of General Services

707 3rd Street
West Sacramento, CA 95605

Prepared by:

2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833

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Appendix A Geotechnical Drilling and Sampling: Boring Logs
Appendix B Geotechnical Laboratory Testing

Acronyms and Abbreviations

ACI	American Concrete Institute
ASTM	ASTM International
bgs	below existing ground surface
Caltrans	California Department of Transportation
CBC	California Building Code
MCE	maximum considered earthquake
PGA	peak ground acceleration
ppm	parts per million
pcf	pounds per cubic foot
psf	pounds per square foot
S_{DS}	design spectral response acceleration for short period
S_{D1}	design spectral response acceleration for 1-second period
S_{MS}	site adjusted maximum considered earthquake spectral response acceleration for short period

Acronyms and Abbreviations

S_{M1}	site adjusted maximum considered earthquake spectral response acceleration for 1-second period
S_S	mapped spectral acceleration for short period
S_1	mapped spectral acceleration for 1-second period
URS	URS Corporation
USCS	Unified Soil Classification System

1.0 INTRODUCTION

This report presents the results of the geotechnical investigation performed by URS Corporation (URS) for the proposed replacement of the fire station and associated structures (proposed project) at the Butte Fire Station and Unit Headquarters in Oroville, California (site). The location of the proposed project site is shown on Figure 1. The California Department of General Services retained URS to provide architectural and engineering services for the proposed project. This investigation was performed as a part of those services.

This report provides URS' geotechnical recommendations for design and construction of the proposed project. Conclusions and recommendations presented in this report are based on subsurface conditions encountered at the locations of URS' explorations at this site and experience with similar projects. Soil and groundwater data obtained during the field explorations were observed and interpreted at the specific boring locations only. Conditions will vary between boring locations.

1.1 Site and Project Description

The site is located at 176 Nelson Avenue in Oroville, California. County Center Drive is present along the western boundary of the property, and Del Oro Avenue is present along the eastern boundary of the property. The general topography of the vicinity slopes upward and to the north from Nelson Avenue.

The site was developed for an existing fire station. As-built drawings for the grading at the site were not available at the time of this report. Grading appears to have consisted of cuts and fills to create two terraces separated by several retaining walls. No record of the fill placement is available. Existing structures at the site consist of single-story structures with timber frames and masonry walls. Existing foundations are shallow with slabs on grade. No reports of building distress were identified.

Existing pavements on the site include concrete cement in the southwest employee parking lot and at loading areas and docks, gravel parking and driveway in the northwest corner of the site, and asphalt concrete driveways and parking at all other locations. Overhead power lines are present along the eastern boundary of the site, and underground utilities are present throughout the site.

The proposed construction will include demolition of most existing structures, with the exception of the two existing emergency communication center buildings in the northeast portion of the site. Re-grading will include new retaining walls along the north edge of the site and across the middle of the site, and the construction of mechanically-stabilized earth (MSE) wall at the southeast corner and southern edge of the site. The new retaining walls are expected to be up to 8.5 feet tall, and the MSE walls are expected to be up to 7 feet tall. New cuts and fills are expected to be less than 10 feet. The structures will have concrete slabs-on-grade or structural slabs. The structural slabs are to support vehicle loads and will be designed as pavements. There will also be new driveways and parking areas constructed for light vehicles, and new driveway, parking, and maintenance areas for fire trucks and other heavy equipment and vehicles.

New buildings at the site will include the following structures/facilities. They are listed with their approximate square footage.

- 11,000-square-foot auto shop
- 10,000-square-foot administration building
- 10,000-square-foot warehouse
- 7,800-square-foot apparatus/barracks building
- 2,500-square-foot maintenance building
- 2,000-square-foot dozer building
- 1,100-square-foot fitness building
- 700-square-foot wash rack building
- 700-square-foot generator building
- 500-square-foot propane tank pad

1.2 Scope of Services

The purpose of this geotechnical investigation was to explore and evaluate the subsurface conditions at the site to develop geotechnical recommendations for design and construction of the proposed project. The scope of URS' services for this investigation included the following tasks:

- Drilling and sampling twelve borings to depths between 15 and 29 feet below the existing ground surface (bgs)
- Laboratory testing on representative samples obtained during the field investigation to evaluate particle size distribution, plasticity, and corrosivity of the subsurface soils
- Engineering analyses upon which to base geotechnical recommendations for design of the proposed project
- Preparation of this report containing findings and recommendations including:
  - —A brief description of the proposed project and site development
  - —A summary of the field and laboratory testing programs
  - —Site surface and subsurface geotechnical conditions
  - —Site preparation recommendations, including placements of fills and backfills
  - —Discussion of recommended foundation types, allowable bearing capacity, and estimated total and differential settlements
  - —Evaluation of geologic and seismic hazards including seismic design parameter recommendations
  - —Passive earth pressure and friction recommendations for resisting lateral forces
  - —Active earth pressure recommendations for the design of retaining walls
  - —Flexible pavement design recommendations
  - —Corrosion protection design considerations for subsurface ferrous material

—Modulus of subgrade reaction

—Minimum frost depth

—Excavation methods

—Geotechnical construction monitoring recommendations

Environmental assessment, testing, or evaluation is specifically excluded from the above scope of services.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1 Field Exploration

The geotechnical field exploration program at the site was performed between June 11 and June 13, 2014. Exploratory borings were drilled by Cascade Drilling, a subcontractor to URS, using a CME 85 truck-mounted drilling rig equipped with 8-inch-diameter hollow-stem augers. A total of 12 hollow-stem auger borings were advanced at the proposed project site. The locations of the borings were selected by URS to characterize subsurface conditions for the proposed construction, and are shown on Figure 2. The boring locations were marked for Underground Services Alert and cleared for potential utility conflicts prior to drilling by a private utility locator, as well as local Underground Services Alert member utility companies. Samples were collected and logged by a URS Certified Engineering Geologist.

The borings were drilled to depths ranging from 15 to 29 feet bgs. Soil samples were obtained using both a standard penetration test (SPT) sampler and a Modified California sampler. The samples are considered disturbed due to the dynamic sampling procedure and the thickness of the sampler walls. The borings were backfilled after drilling with neat cement grout to the ground surface, and borings advanced through existing asphalt pavement were topped with concrete cement. Geotechnical sections are presented in Figures 3 and 4. A description of the field exploration program, including boring logs and other pertinent information, is in Appendix A.

2.2 Laboratory Testing

Soil samples obtained from the borings were packaged and sealed in the field to reduce moisture loss. The samples were transported to the geotechnical laboratory of Geocon Consultants, Inc. in Rancho Cordova, California, where they were tested for material properties including particle size distribution, plasticity, and corrosivity in accordance with ASTM International (ASTM) and California Department of Transportation (Caltrans) test standards. All test samples were considered disturbed; therefore, unit weight and relative density tests were not performed. A description of the laboratory testing program is in Appendix B. Table 2-1 summarizes laboratory testing results.

Table 2-1. Laboratory Test Results Summary

Sample Information		USCS Soil Type	Moisture Content (%)	Particle Size Analysis			Atterberg Limits		Corrosion Testing			
Boring ID	Depth (ft)			Gravel (%)	Sand (%)	Fines (%)	LL	PI	pH	Min Resistivity (ohm-cm)	Sulfate (ppm)	Chloride (ppm)
BCF-B1	2.5–4	Clayey Gravel with Sand (GC)	9.7	41.8	32.0	26.1	37	15				
	7.5-9	Clayey Gravel (GC)				44.8						
BCF-B2	2.5–4	Sandy Silt (ML)	20.0			62.4	33	5				
	7.5–9	Sandy Silt (ML)				58.7						
	10-11.5	Silty Sand (SM)				48.1						
	13-14	Silty Sand (SM)				26.7						
BCF-B3	5-6.5	Clayey Sand with Gravel (SC)	11.6	26.0	39.5	34.5	35	15				
	8-9	Clayey Sand (SC)				37.9						
	12.5-14	Clayey Sand (SC)				36.4						
BCF-B4	2.5-4	Clayey Sand (SC)	14.5			36.8	38	15				
	5-6	Silty Sand (SM)	13.9			34.3	41	15				
	7.5-8	Lean Clay with Sand (CL)				73.7						
	10-11.5	Silt with Sand (ML)				71.8						
BCF-B5	7.5-9	Clayey Sand with Gravel (SC)				42.0						
BCF-B6	2.5-4	Clayey Sand (SC)	15.2			35.5	40	19				
	11.5-12	Sandy Lean Clay (CL)	17.9			60.7	49	30				
BCF-B7	1-2.5	Sandy Fat Clay (CH)	19.8			66.3	56	37				
	2.5-4	Silty Sand with Gravel (SM)	11.7			21.8	36	11				
	10-11.5	Silty Sand with Gravel (SM)				41.6						
BCF-B8	2.5-3.5	Silty Sand with Gravel (SM)	12.9			25.9	37	8				

Table 2-1. Laboratory Test Results Summary

Sample Information		USCS Soil Type	Moisture Content (%)	Particle Size Analysis			Atterberg Limits		Corrosion Testing			
Boring ID	Depth (ft)			Gravel (%)	Sand (%)	Fines (%)	LL	PI	pH	Min Resistivity (ohm-cm)	Sulfate (ppm)	Chloride (ppm)
	5-6.5	Clayey Sand (SC)				37.8						
	10-11	Clayey Sand (SC)				27.6						
BCF-B9	2.5-4	Clayey Sand with Gravel (SC)	10.4	18.9	35.2	45.9	45	28				
	7.5-9	Clayey Sand (SC)				35.0						
	12.5-14	Clayey Sand (SC)				48.9						
BCF-B10	2.5-4	Silty Sand (SM)	13.8			27.4	34	10				
	7.5-9	Silty Sand (SM)				45.5						
BCF-B11	2.5-4	Sandy Lean Clay (CL)	17.4			55.5	34	20				
	7.5-9	Clayey Sand with Gravel (SC)				24.0						
	12.5-14	Lean Clay with Sand (CL)				74.3						
BCF-B12	2.5-4	Lean Clay with Sand (CL)	18.4			77.4	43	21				
	7.5-9	Lean Clay with Sand (CL)				69.2						
	13-13.5	Sandy Lean Clay				62.0	30	8				

Abbreviations:

LL: Liquid Limit
ohm-cm: Ohm centimeter
PI: Plasticity Index
ppm: parts per million
USCS: Unified Soil Classification System

3.0 SITE AND SUBSURFACE CONDITIONS

The following summary of subsurface conditions is based on site reconnaissance, a review of available geologic and geotechnical documents, and subsurface exploration and laboratory testing program results.

3.1 Topography

A topographic survey for the site was performed by CBC Surveys, a subcontractor to URS. Based on this survey, the elevation at the proposed project site is approximately 300 feet above mean sea level. The general topography of the vicinity slopes upward and to the north from Nelson Avenue. Two concrete retaining walls up to 4 feet tall run east to west across the center of the site. An additional retaining wall, approximately 2 to 3 feet tall, runs across the northern border of the site.

3.2 Geologic Setting

The proposed project site is located in the Great Valley Geomorphic Province, near the foothills of the Sierra Nevada mountain range. The Great Valley is an alluvial plain, about 50 miles wide and 400 miles long, between the Coast Ranges and Sierra Nevada. The eastern border is the west-sloping Sierran Bedrock surface, which continues westward beneath alluvium and older sediments.

Review of the Geologic Map of the Chico Quadrangle (Saucedo and Wanger, 1992) indicates that the site lies within the Plio-Pleistocene Tuffs of Oroville Formation, which consists of interbedded volcaniclastic deposits of gravel, sand and tuff (volcanic ash).

Based on the United States Geological Service Quaternary Faults Database, no faults are mapped within the site boundaries. The site's seismicity is discussed in Sections 4.2 and 4.3.

3.3 Groundwater Conditions

Hollow-stem auger borings were drilled in June 2014 to a maximum depth of 29 feet bgs during the subsurface exploration. Groundwater was not observed during drilling.

Groundwater levels are dependent upon seasonal precipitation, irrigation, land use, and climatic conditions along with other factors. The evaluation of such factors was beyond the scope of this study.

3.4 Soil Conditions

Boring BCF-B7 was located near the center of the site encountered sandy fat clay near the surface to a depth of 2.5 feet, which was underlain by silt, silty clay and clayey sand to the explored depth. Borings drilled in the north to northwest portions of the site generally encountered medium dense to very dense clayey sand and gravel to a depth of 15 to 20 feet, which is underlain by dense to very dense silty sand, sandy silt and gravel. Borings drilled in the south to southwest portion of the site generally encountered medium dense to very dense sandy silt and silty sand over dense to very dense sand and gravel with depth.

Borings BCF-B11 and BCF-B12 were located along the eastern edge of the site, and encountered lean clay to a depth from 15 to 25 feet, which is underlain by dense to very dense silt, sand and gravel. Some loose fill material was encountered near the surface of Boring BCF-B11. Native material at the site was generally medium dense to very dense in consistency for the entire explored depth.

Generally, the clay exhibited comparatively low plasticity with plasticity indices of 15 or less. However, more plastic clay with plasticity indices ranging up to 37 and liquid limits up to 56 were encountered in four of the borings. Materials with greater than 35 percent material passing the No. 200 sieve, liquid limits greater than 40 or plasticity indices greater than 20 should not be present within 5 feet of the base of footings or 3 feet below pavement subgrade due to the potential for distress caused by shrinking and/or swelling of these materials. Where these materials are present underlying proposed structures or pavements, they should be removed and replaced with less plastic materials.

3.5 Soil Engineering Properties

Laboratory testing was performed on selected representative samples collected during the subsurface investigation to determine particle size distribution and plasticity index of the soil. Table 2-1 summarizes laboratory testing results. For a description of the laboratory testing program, refer to Appendix B. Additional discussion of soil properties are presented in Section 4.0.

4.0 DISCUSSION AND RECOMMENDATIONS

The following subsections discuss and summarize conclusions and recommendations concerning the geotechnical conditions of the site based on results of URS' geotechnical investigation and understanding of the proposed project requirements.

4.1 General

Based on the information from the borings drilled at the site, construction of shallow foundations will be possible using conventional construction equipment. Localized deposits of loose fill material and native fat clay material were encountered at shallow depth in the southeast portion of site. These deposits should be removed during construction to the depth encountered.

4.2 Faulting and Seismicity

A geologic and seismic hazard evaluation was performed as part of this investigation. These hazards are described in the following subsections.

4.2.1 Surface Fault Rupture

There are no earthquake fault zones covered under the Alquist-Priolo Earthquake Fault Zoning Act in the vicinity of the site and no active (Holocene time [rupture in about the last 11,000 years]) or potentially active (Quaternary time [rupture in the last 1.6 million years]) faults are mapped crossing the site (California Geological Survey, 2007). The hazard from ground rupture is judged to be negligible.

4.2.2 Earthquake Ground Shaking

The site is located near one known active fault. The Foothills Fault System, northern reach section (Cleveland Hill fault), is located approximately 6 miles to the east. The design peak ground acceleration (PGA) in the vicinity of the site, in accordance with Section 1803.5.12 of the 2013 California Building Code (CBC), is 0.232g (California Geological Survey, 2007).

4.2.3 Liquefaction

Liquefaction is a phenomenon during which loose, saturated, cohesionless soils (generally sands or silts) temporarily lose shear strength during ground shaking. Factors affecting the liquefaction potential of soils include grain size distribution, relative density, degree of saturation, confining stresses acting on the soils, quality of the soil fines fraction, and characteristics of the earthquake, such as the intensity and duration of the ground shaking. Seismic hazard zone maps indicating liquefaction potential have not been published by the California Geological Survey in the area of the site.

URS's review of the data obtained during the geotechnical investigation indicates that the subsurface materials at this site are in a sufficiently stiff and dense condition and are not saturated. These characteristics indicate the on-site soils are likely not susceptible to liquefaction.

4.3 2013 California Building Code Seismic Design Parameters

Based on the subsurface explorations, the CBC site classification is estimated to be a very dense soil and soft rock site in the upper 100 feet below site grade. Table 4-1 lists Seismic Ground Motion Values in accordance with the 2013 CBC.

Table 4-1. 2013 California Building Code Seismic Ground Motion Values

Parameter	Value		
Site Class	D		
Mapped MCE Spectral Response Accelerations	PGA = 0.23	S_S = 0.597g	S_1 = 0.260g
Amplification Factors	F_{PGA} = 1.34	Fa = 1.32	Fv = 1.88
Site Adjusted MCE Spectral Response Acceleration	PGA_M = 0.31	S_{MS} = 0.79g	S_{M1} = 0.49g
Design Spectral Response Acceleration	--	S_{DS} = 0.53g	S_{D1} = 0.33g

Sources
California Building Code, 2013
ASCE/SI 7-10 Standard, 2010

Abbreviations
MCE: Maximum Considered Earthquake
PGA: Peak Ground Acceleration

4.4 Expansive Soils

Potentially expansive, high-plasticity clays were encountered near the surface at the center of the site. Expansive soils, exhibit shrinking-swelling with wetting and drying. The expansion and shrinking can result in differential ground movements beneath foundations. Based on the plasticity index test results, the upper 3 feet of soil underlying the site generally has a potential for shrink-swell behavior. Expansive soils should be removed from structure areas, where encountered and either moved from the site or used in landscape fill areas. Expansive soils should not be used beneath proposed structures, behind retaining walls, or in MSE walls.

4.5 Site Grading and Earthwork

Site preparation, placement of engineered fill, grading, earthwork and drainage should be performed in accordance with the recommendations in the following subsections.

Engineered fill is to consist of approved on-site or import fill soil sources meeting the requirements of Section 4.5.2 of this report and placed in accordance with the Section 4.5.3 of this report. Engineered fill soil sources should be approved prior to placement and engineered fill should be tested and approved by URS during grading.

4.5.1 Site Preparation

URS recommends conducting site preparation, excavation and filling under the observation of URS personnel, and in accordance with the recommendations contained in this report. The extent of site clearing, stripping, subgrade preparation, and placement of engineered fill should extend a minimum of 3 feet outside the perimeter of all structures and paved areas. If site conditions such as property boundaries or existing improvements inhibit over-excavation, URS should be contacted. Site clearing will consist of removal of all construction debris, site improvements, and stripping of all surface vegetation, grass, brush, and organic-rich topsoil.

Following site clearing, the exposed subgrade should be scarified to a minimum depth of 8 inches, moisture conditioned, and compacted as engineered fill. Any soft or disturbed subgrade areas identified during compaction should be excavated further until firm materials are encountered. Following compaction, native soils or approved import soils should be placed as engineered fill to achieve design grades. Loose fill identified during field explorations can be reused as long as the material is removed and recompacted according to the requirements discussed in section 4.5.3. Fat clay identified during field explorations should be excavated to the depth encountered and removed from the site, used as landscape fill, or placed below structural and/or pavement areas at a depth of 5 feet or greater below footings, and at a depth of 3 feet or greater below pavement.

4.5.2 Engineered Fill

The following subsections provide recommendations for engineered fill soils.

On-Site Sources

Potentially expansive plastic clay was encountered during field explorations at shallow depth near the center of the proposed project area. These soils are not suitable for reuse as engineered fill and should be either removed from the site or used as landscape fill. It is anticipated that the remaining native soils to be excavated from the site will be comprised of predominantly sandy lean clays and clayey sands and gravels. These native soils at the site are suitable for reuse as engineered fill for the proposed project from a geotechnical standpoint, provided they are free of organics, debris, particles greater than 3 inches in any dimension, and other deleterious constituents.

Imported Soils

If imported fill soils are necessary to achieve the proposed project's grading plan, the criteria listed here should be followed. All imported fill and backfill soils should be predominantly granular, less than 3 inches in any dimension, free of organic and inorganic debris, and free of any hazardous substances or other deleterious constituents. Imported fill should meet the requirements listed in Table 4-2. All fill and backfill materials should be observed and tested

by the URS geotechnical engineer's representative prior to their placement to evaluate their suitability.

Table 4-2. Imported Fill Requirements

Soil Property	Requirement	Test Method
Percent passing 3-inch sieve	100	ASTM D422
Percent passing No. 200 sieve	Less than 35	ASTM D1140
Plasticity index	Less than 20	ASTM D4318
Expansion index	Less than 40	ASTM D4829
Soluble sulfates	< 150 ppm	ASTM D4327
Soluble chlorides	< 500 ppm	ASTM D4327

4.5.3 Compaction Requirements for Engineered Fill

Engineered fill soils should be moisture conditioned to within -1 to +3 percent of the optimum moisture content, placed in horizontal layers less than 8 inches in loose thickness, and compacted to at least 95 percent relative compaction, according to ASTM D698. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted material divided by the maximum dry density determined in accordance with ASTM D1557. The procedure to achieve proper density of a compacted fill depends on the size and type of compacting equipment, the number of passes, thickness of the layer being compacted, and specific soil properties. When size of the excavation restricts the use of heavy equipment, smaller equipment can be used, but the soil must be placed in thin enough layers to achieve the required compaction.

4.5.4 Excavations and Slopes

No excavation should be performed within the influence zone of existing footings unless the footings are properly underpinned. The influence zone of existing footings may be assumed to extend within a 45-degree line projected downward from the bottom edge of the footing.

During rainy weather, runoff water should be prevented from entering excavations, and collected and disposed of outside the construction limits in accordance with permit requirements. To prevent runoff from adjacent areas from entering the excavation, a perimeter berm should be constructed at the top of the slope. Heavy construction equipment, building materials, excavated soil stockpiles and vehicle traffic should not be allowed near the top of the slope within a horizontal distance equal to the depth of the excavation.

4.6 Foundations

All footing excavations should be finished in a neat condition. Any softened or disturbed soil should be removed from the footing excavations prior to placing reinforcing steel. Foundation excavations should be free of loose, compressible materials or standing water. The bottoms and sides of the excavation should be kept moist prior to concrete placement to minimize sidewall sloughing. The time during which the prepared foundation bearing surface in footing excavations is exposed should be kept to a minimum to reduce the potential for disturbance.

URS recommends observation of footing excavations by a URS engineer prior to placement of steel reinforcement and concrete to verify that the recommendations of this report have been followed.

4.6.1 Allowable Bearing Pressures

Following execution of the site preparation and earthwork requirements discussed in Section 4.5, all spread and continuous footings for support of structures should be founded on approved subgrade, as verified by the URS engineer.

An allowable bearing pressure of 3,000 pounds per square foot (psf) may be assumed for sizing of spread footings. Footings should extend at least 18 inches below the lowest adjacent final soil grade. The allowable bearing pressure is a net value. Therefore, the weight of the footing and the backfill over the foundation may be neglected when computing dead loads. The allowable pressure may be increased by one third for short-term loading due to wind or seismic forces. Footings placed at least 18 inches below the lowest adjacent final soil grade should not be impacted by ground heave due to frost. Footing excavations shall be inspected and approved by a representative of the URS geotechnical engineer prior to placement of steel reinforcement and concrete.

4.6.2 Shallow Foundation Settlement

Based on engineering analysis and experience with similar soils, it is URS' opinion that, if spread or continuous footing foundations bearing on approved subgrade are employed, then total post-construction settlements will be less than 1 inch. Differential settlements, between adjacent footings over a distance of 30 feet, should be less than ½ inch. These settlements should be accommodated by selecting proper structural, architectural and mechanical/plumbing design details, as appropriate.

4.6.3 Foundation Lateral Resistance

Resistance to lateral loads will be provided by frictional resistance between the bottom of concrete footings and the underlying soils and by passive soil pressure against the sides of the footings. The ultimate coefficient of friction between cast-in-place concrete footings and the underlying soils may be taken as 0.35. The ultimate passive pressure available may be taken as equivalent to the pressure exerted by a fluid weighing 350 pcf with a maximum allowable value of 1,500 psf. A minimum factor of safety of 1.5 should be used when combining the frictional and passive resistance to determine the total lateral resistance. The upper 12 inches of subgrade should be neglected when determining the total passive resistance.

4.7 Retaining Walls

Retaining walls may be founded on spread footings designed and constructed in accordance with Section 4.6 of this report. If on-site or imported soils meeting the criteria of Section 4.5.2 are used for backfill, the lateral earth pressure acting on the retaining walls may be taken as equivalent to the pressure exerted by a fluid weighing 35 pcf for active (unrestrained) conditions. Active conditions will develop once the top of the retaining wall is allowed to rotate a distance of 0.001*H* where *H* is the height of the retaining wall. A load of 60 pcf

should be used for at-rest (restrained) conditions for walls up to 10 feet in height. Lateral loads for taller walls should be developed based on specific conditions. Retaining walls should also be designed to resist the effects of any surcharge loads behind the walls, as well as an earthquake load of $7H^2$ (units are in pounds) applied at $0.6H$, where H is the wall height in feet from the bottom of the wall.

Lateral resistance will be provided by the weight of the wall, frictional resistance between the bottom of the concrete footings and the underlying soils, and by passive soil resistance acting against the footings. The lateral resistance parameters provided in Section 4.6.3 are applicable for retaining wall design.

The retaining wall design parameters provided above are based on fully drained conditions. To achieve fully-drained conditions, a 12-inch-thick drainage layer should be placed behind the wall and should extend the full height of the wall to within 12 inches of the ground surface. If the excavated area behind the wall exceeds 12 inches, the void behind the drainage layer should consist of compacted engineered fill or drainage material. The drainage material may consist of Class 2 permeable material that meets Caltrans Specification, Section 68. A 4-inch perforated drain pipe should be installed in the bottom of the drainage layer and should be underlain by at least 4 inches of drainage material. Alternatively, Class 2 permeable material could be replaced with crushed rock with the perforated drain pipe and crushed rock fully encapsulated in geotextile filter fabric (Mirafi 140N or equivalent). A 12-inch cap of native soil material should be placed over the drainage blanket. Piping with adequate gradient should be provided to discharge water that collects behind the walls to an appropriate discharge system away from the retaining wall foundations.

4.8 MSE Walls

Soils used within the reinforced zone should meet the following requirements:

Table 4-3. MSE Wall Backfill Gradation Requirements

Sieve Size	Percent Passing (% by weight)	California Test
2 inch	100	202
No. 4	50-80	202
No. 40	0-30	202
No. 200	0-15	202

The coefficient of sliding resistance used to calculate the frictional resistance at the base of the wall will be the minimum of either the angle of internal friction of the backfill material, or the soil to reinforcement interface angle for the bottom of the lowest soil reinforcement layer.

Backfill for the reinforced soil mass shall consist of material free from organic material and substantially free of soft, poor durability particles, and shall not contain debris or other unsuitable materials. Backfill material used in MSE walls with extensible soil reinforcement (geosynthetics), shall have a maximum plasticity index of 10 and shall conform to the gradation requirements presented in Table 4-3.

On site soils generally do not meet these criteria, and backfill will most likely be imported from off-site locations.

4.9 Slabs-on-Grade

The following subsections provide recommendations for conventional slabs-on-grade.

4.9.1 Conventional Slabs-on-Grade

Areas beneath concrete slabs-on-grade should be prepared in accordance with Section 4.5. Concrete slabs-on-grade should not be founded on plastic clay material not meeting the requirements of Section 4.5.2, and should be removed to the depth encountered prior to construction. Subgrade soils should be scarified to a minimum depth of 8 inches, moisture conditioned to within 2 percent of optimum moisture content, and compacted to at least 90 percent relative compaction according to ASTM D1557. Following installation of footings and underground utilities, subgrades should be moisture conditioned to within 2 percent of optimum moisture content, as it is common for subgrades to dry during this period. The subgrade need not be re-compacted provided it is firm and unyielding under construction equipment.

Slabs-on-grade should be at least 5 inches thick and underlain with an adequate moisture break. The capillary break material should consist of a minimum of 4 inches of free-draining, crushed rock or gravel. The capillary break material should have a maximum particle size of ¾ inch, with no more than 5 percent passing the No. 4 sieve.

In areas where moisture could be detrimental to equipment or floor coverings, a minimum 10-mil-thick polyethylene vapor barrier should be placed over the capillary break material. The vapor barrier should be appropriately sealed at seams and penetrations. An optional approximately 2-inch-thick layer of sand may be placed over the barrier to protect it from damage and to aid in curing of the concrete.

The concrete water-cement ratio should be 0.45 or less to reduce the potential for future moisture migration. The reinforcing details of the slabs-on-grade should be designed by the proposed project structural engineer.

4.10 Site Drainage

Adequate drainage provisions are imperative and it is recommended both short- and long-term drainage measures be incorporated into the proposed project design and construction. Surface runoff can be controlled during construction by careful grading practices. Typically, these include the construction of shallow, upgrade perimeter ditches or low earthen berms and the use of temporary sumps to collect runoff and prevent water from damaging exposed subgrades. All collected water should be directed to a positive and permanent discharge system.

Permanent control of potential surface discharge of water should be incorporated in the final grading design. Under no circumstances should water be allowed to pond immediately adjacent to structures or paved areas. All drainage should be directed into conduits which carry runoff away from structures or paved areas and into storm drain systems or other

appropriate outlets. Finished grading adjacent to structures should direct surface water away from the structure.

4.11 Utility Trench Backfill

Utility trench backfill should conform to the recommendations provided in the following section or the pipeline manufacturer's recommendations, whichever is most stringent. If utility trench excavations encounter perched groundwater, dewatering with sump pumps is recommended.

4.11.1 Pipe Bedding

Following trench excavation, subgrade preparation and stabilization (if required), URS recommends placing a minimum of 4 inches of bedding sand at the bottom of the trench and compacting the bedding sand to 90 percent relative compaction. Bedding material should be placed in a single lift, compacted with appropriate equipment at a moisture content within 2 percent of the optimum moisture content. URS recommends that bedding material conforms to the gradation presented in Table 4-4.

Table 4-4. Bedding Sand Recommendations

Sieve Size	Percent Passing (% by weight)
3/8 inch	100
No. 4	95 - 100
No. 30	30 – 50
No. 200	0 - 5

4.11.2 Pipe Zone Backfill

Following placement of the pipe to the required grade, the pipe zone backfill soils should be placed and compacted to an elevation at least 1 foot above the crown of the pipe. Pipe zone backfill may consist of the same material as the bedding sand. Pipe zone backfill should be carefully compacted in lifts of 6 inches or less to 90 percent relative compaction without causing damage to the pipe, and should be compacted at a moisture content at or within 2 percent of the optimum moisture content.

4.11.3 Trench Backfill

Backfill in the trench zone above the pipe zone backfill may be a general fill soil type. The material may consist of native soils obtained from the trench excavations provided that the material meets the criteria for engineering fill as discussed in Section 4.5.2, and is processed to remove all particles larger than 3 inches in any dimension. No organic, spongy, hazardous or other improper materials should be used as trench backfill. If the contractor imports material from off-site, it should meet the preceding requirements for on-site engineered fill sources. Care should be taken so that heavy compaction equipment does not damage the pipe. A minimum soil cover over the pipe should be specified, which meets the pipe manufacturer's minimum requirement, where heavy compaction equipment may be used over the pipe.

4.12 Pavement Design

Improvements at the site will include construction of new parking and driveway areas. Vehicle traffic is expected to include large fire trucks and support vehicles. These vehicles may include on-site equipment and equipment using this facility for maintenance and support.

To provide uniform and adequate support, all pavement areas should be underlain by at least 12 inches of approved engineered fill compacted to 95 percent of the maximum dry density and moisture conditioned to within 2 percent of the optimum moisture content per ASTM D1557.

Pavements adjacent to buildings should be sloped away from the buildings in all directions and ponding of water should not be allowed. Pavements should be graded to direct surface water off the roadways or, alternatively, toward suitable catchments devices, which should be appropriately designed and maintained.

Parking and driveway areas subjected to automobile and pick-up truck traffic only, should consist of 4 inches of hot mix asphalt underlain by 6 inches of aggregate base course. Areas subjected to fire apparatus traffic should be paved with 8 inches of Portland cement concrete underlain by 6 inches of aggregate base course. Proper reinforcing and jointing should be provided to control cracking inherent in concrete construction.

URS does not recommend asphaltic concrete pavement for areas subjected to heavy trucks and fire equipment. However, if the increased risk for pavement, distress, damage, and higher maintenance costs can be accepted, a minimum section consisting of 8 inches of asphaltic concrete overlying 16 inches of aggregate base course can be used. Aprons, parking areas, and areas of concentrated turning movements should be paved with concrete to reduce the risk for pushing of the pavement.

4.13 Corrosivity

Pending lab results.

5.0 LIMITATIONS

This geotechnical investigation has been conducted in accordance with the standard of care commonly used as state-of-practice in the profession. URS provides no other warranties, either express or implied. The recommendations made in this report are based on the assumption that the subsurface soil and groundwater conditions do not deviate appreciably from those disclosed in the exploratory borings. If any variations or undesirable conditions are encountered during construction, URS should be notified so that additional recommendations can be made. The recommendations provided in this report have been developed exclusively for the proposed project as described in this report and are not valid for other locations and construction in the proposed project vicinity.

URS should be informed of any changes that are made in the assumptions mentioned in this report (such as the location and configuration of the proposed structures or site grading plans) so that additional recommendations may be given, if necessary. URS should be given the opportunity to review those portions of the proposed project plans and specifications that are affected by the recommendations made in this report to verify that the intent of these recommendations are properly incorporated into the construction documents. URS also recommends that it is retained to observe the earthwork and foundation construction for the proposed project, as stated in Section 5.0.

6.0 REFERENCES

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FIGURES

1, Vicinity Map

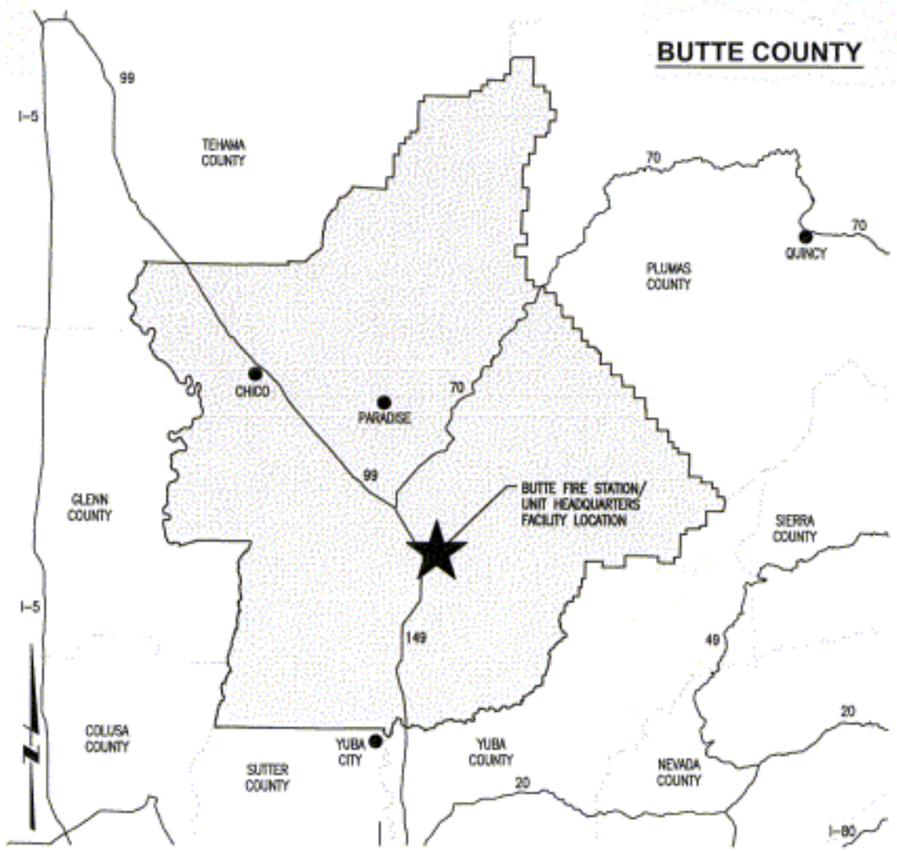
2, Boring Location Map

3, Section A-A' and Section B-B'

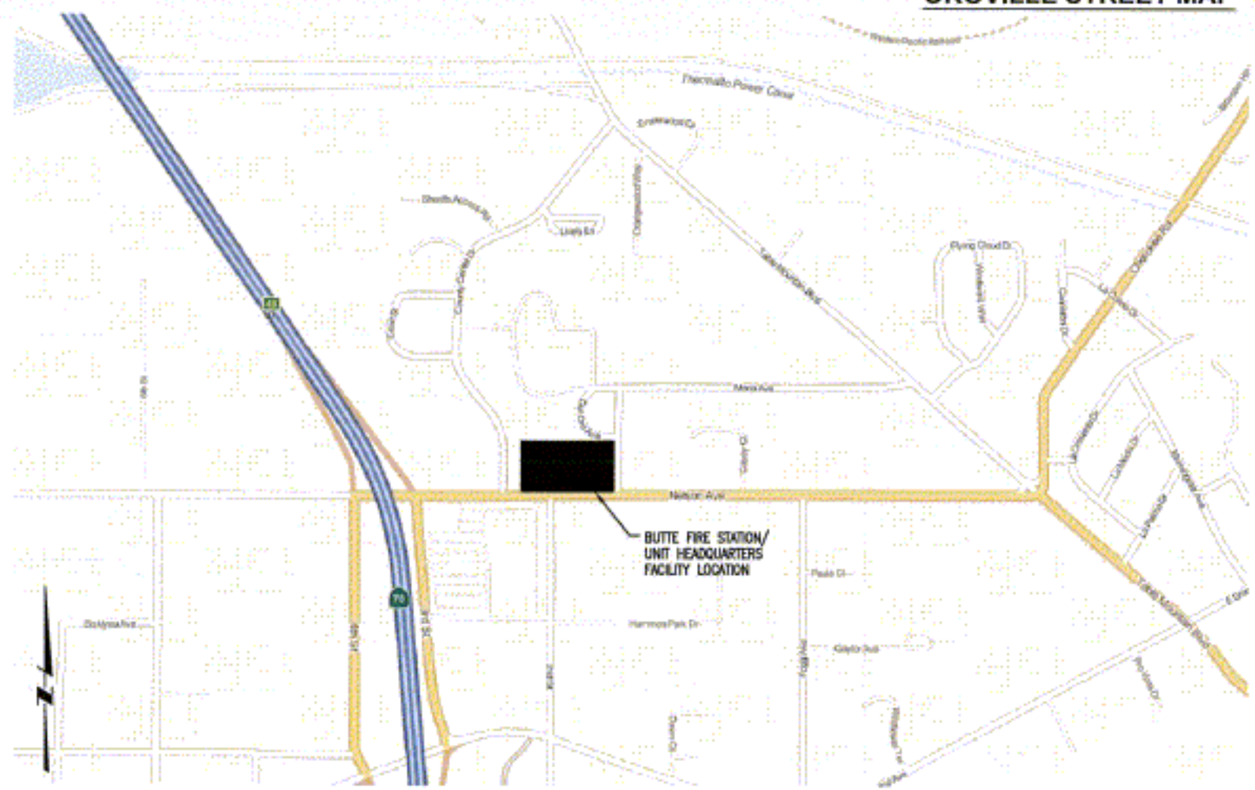
4, Section C-C' and D-D'

VICINITY MAP

BUTTE COUNTY



OROVILLE STREET MAP



BUTTE FIRE STATION / UNIT HEADQUARTERS REPLACE FACILITY
PRELIMINARY DESIGN - PROGRESS SET

VICINITY MAP

Figure
1

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DGS
State of California
Department of General Services

Mapping Unit (SKM) No.:

Date | Description | Rev. | Approved

Designed by: DESIGNED
Drawn by: DRAWN
Reviewed by: REVIEWED
Submitted by:
Drawing Date:
Design Stage:
Sub No.:
No. Name: BUTTE FIRE STATION
Sub Date: 7/17/2014
Sub Title: PRELIMINARY DESIGN

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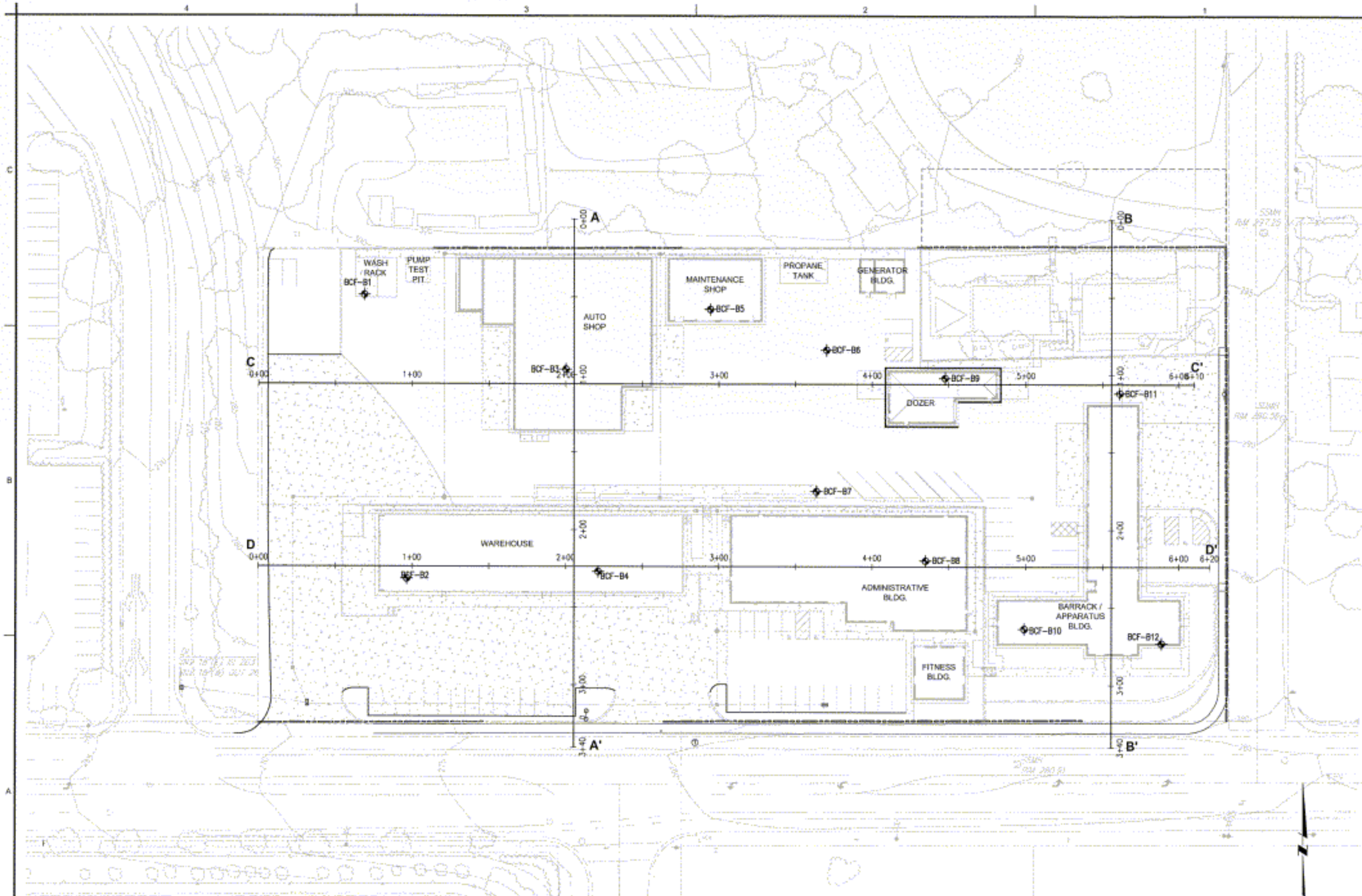

BORING LOCATION MAP

BUTTE FIRE STATION / UNIT HEADQUARTERS REPLACE FACILITY
PRELIMINARY DESIGN - PROGRESS SET

BORING LOCATION MAP

Figure 2

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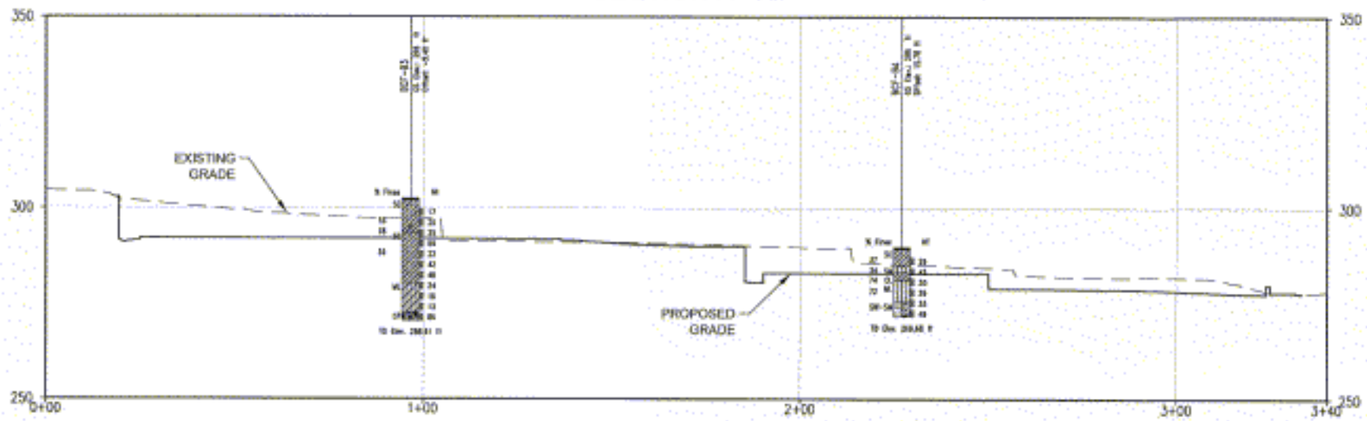
SECTION A - A'



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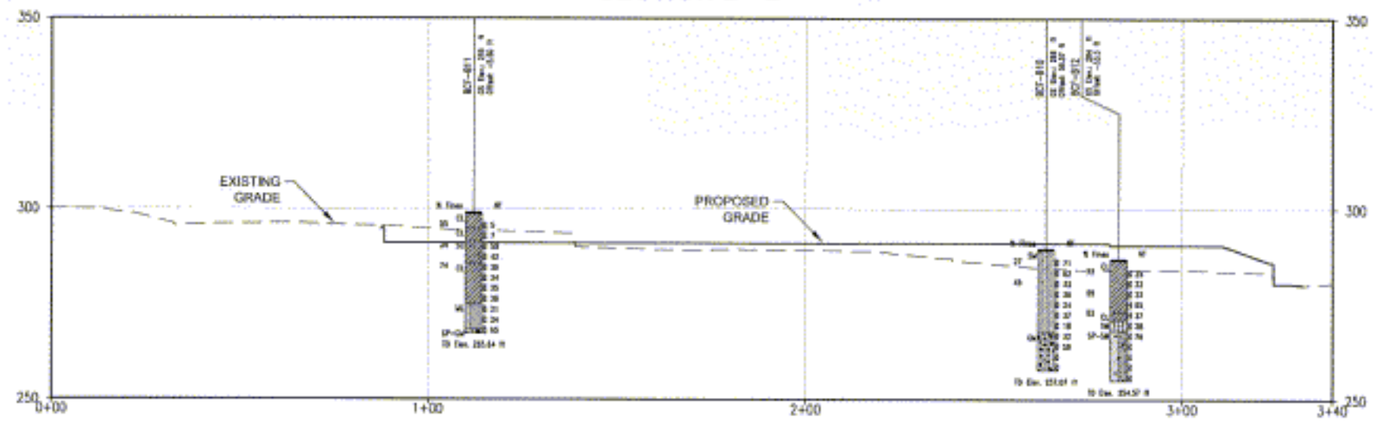

BUTTE FIRE STATION / UNIT HEADQUARTERS REPLACE FACILITY
PRELIMINARY DESIGN - PROGRESS SET

SECTION A-A' AND SECTION B-B'

Figure 3

URS

DGS

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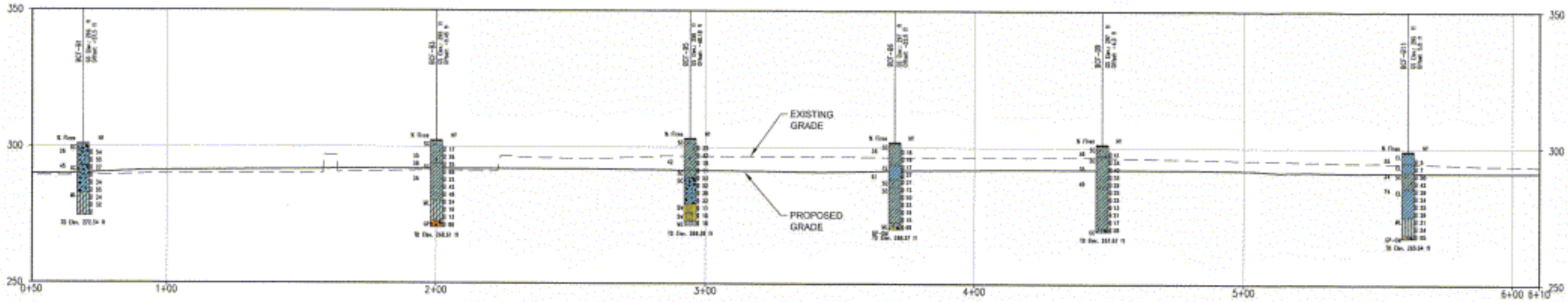
SECTION C - C'



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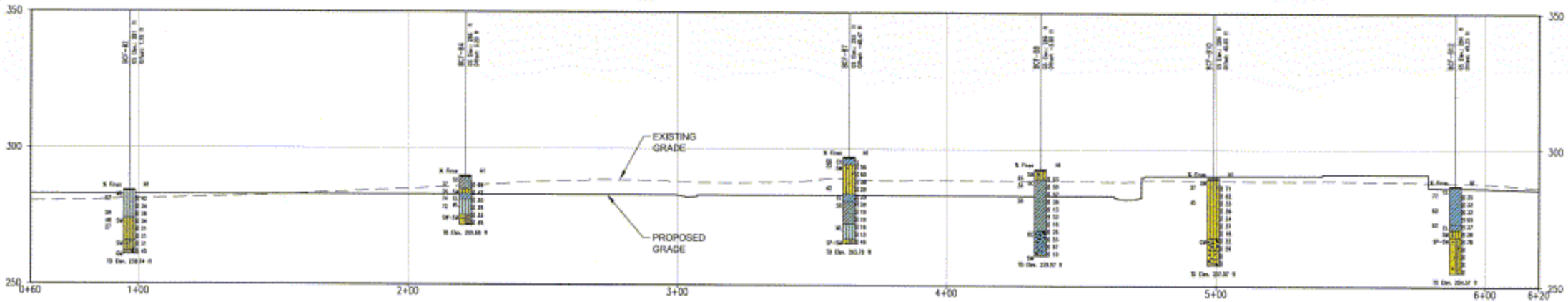

BUTTE FIRE STATION / UNIT HEADQUARTERS REPLACE FACILITY
PRELIMINARY DESIGN - PROGRESS SET

SECTION C-C' AND SECTION D-D'

Figure

4

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DGS CALIFORNIA Department of General Services

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Design: D. LARSON
Drawn by: D. LARSON
Reviewed by: J. SORENSEN
Submitted by:

Mapping Unit (DGS) No.:

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PLOT BY: DAVID_LARSON - Jul 10, 2014 - 12:04:26pm

APPENDIX A

Geotechnical Drilling and Sampling: Boring Logs

A.1 Field Exploration

Twelve exploratory borings, numbered BCF-B1 through BCF-B12, were drilled for this study. The borings were drilled using a CME 85 truck-mounted drilling rig. The borings were advanced using a nominal 8-inch outside diameter hollow-stem auger. After drilling, each boring was backfilled with neat cement grout. Borings BCF-B2 through BCF-B12 were advanced through existing asphalt pavement and were plugged with concrete cement.

A.2 Soil Sampling

Sampling Methods

Soil samples were collected from selected depth intervals in each boring by advancing a sampler into the soils at the bottom of the boring through the center of the hollow-stem auger. The following sampling equipment was utilized to collect samples from each boring:

- Standard Penetration Sampler (SPT) - 1 3/8-inch I.D., 2-inch O.D., stainless-steel split-spoon conforming to ASTM D1586.
- Modified California Sampler – 2-inch I.D., 2.5-inch O.D., stainless-steel split-barrel samplet fitted with three 6-inch long thin brass or stainless steel liners.

After the boring was advanced to the selected sample depth interval, the SPT or Modified California Sampler was attached to a steel rod, and lowered through the center of the hollow-stem auger. The SPT or Modified California Sampler was then seated and advanced into the underlying soil by a 140-pound automatic hammer falling 30 inches per blow. The URS field personnel observed and recorded the blows required to advance the sampler up to a total depth of 18 inches into the soil, in three successive 6-inch intervals. The blows required to advance the SPT or Modified California Sampler through the last 12 inches were recorded as the penetration resistance blow count in blows per foot.

Sample Handling

Soil samples from the SPT sampler were removed by unscrewing the shoe and check valve assembly, separating the two pieces of the split barrel, and placing the soils contained within into a plastic bag. URS field personnel recorded identifying features of the soil observed within the sampler. Soil samples recovered from the SPT and Modified California samplers are considered disturbed and, therefore, only used for soil classification purposes, index property tests, and determination of moisture contents.

Soil samples from the Modified California Sampler were removed by unscrewing the shoe and check valve assembly, separating the two pieces of the split barrel, and removing the individual thin brass or stainless steel liners. Soil samples recovered from the Modified California Sampler were retained in liners, and the ends of the sleeves were sealed with plastic caps.

All samples were marked with identification information directly on the sample container with indelible ink to identify URS job number, sample location, depth, date, and URS field personnel responsible for sample collection. Samples were transported to the geotechnical

laboratory of Geocon Consultants, Inc., in Rancho Cordova, California, for further examination and testing.

A.3 Boring Logs

The samples and cuttings were examined and classified in the field by URS field personnel as the exploratory borings were advanced. URS field personnel recorded their observations regarding the examination and soil classification, along with any notable observations regarding the advancement of the auger in the boring. Preliminary visual soil classifications were performed in accordance with the Unified Soil Classification System (USCS). Classifications were then verified by further examination and testing of soil samples performed in Geocon Consultants, Inc.'s geotechnical laboratory.

Logs of the borings were prepared from the field logs and laboratory test data. The boring logs show the soil classifications (according to the USCS) and observations of the subsurface strata encountered in the exploratory borings, locations and depth where samples were collected, type of sampler utilized, penetration resistance, and position of the groundwater level if it could be measured.

GROUP SYMBOLS AND NAMES

Graphic	Group Names	Graphic	Group Names	Graphic	Group Names
	Lean Clay (CL)		Lean Clay with Sand (CL)		Sandy Lean Clay (CL)
	Sandy Fat Clay (CH)		Clayey Silt (ML/CL)		Silt with Sand (ML)
	Sandy Silt (ML)		Poorly Graded Sand with Silt and Gravel (SP-SM)		Well-Graded Sand with Silt and Gravel (SW-SM)
	Clayey Sand (SC)		Clayey Sand with Gravel (SC)		Silty Sand (SM)
	Silty Sand with Gravel (SM)		Poorly Graded Gravel with Sand (GP)		Poorly Graded Gravel with Silt and Sand (GP-GM)
	Clayey Gravel (GC)		Clayey Gravel with Sand (GC)		Silty Gravel with Sand (GM)

Note: Soils were classified in the field in general accordance with ASTM D2488-06, Standard Practice for Description and Identification of Soils (Visual Manual Procedure). Where laboratory testing was performed, classifications were modified in general accordance with ASTM D2487-06, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

Borderline symbols, two group symbols separated by a slash, may be used in field visual classification when (1) percentage of fines is estimated to be between 45% and 55%, (2) percentages of sand and gravel are estimated to be about the same, (3) soil could be either well-graded or poorly graded, (4) soil could be either a silt or a clay, or (5) fine-grained soil has properties indicating that it is at the boundary between low and high plasticity. Refer to DWR Soil and Rock Logging, Classification, and Presentation Manual for guidelines in the use of borderline symbols.

FIELD AND LABORATORY TESTS

AL	Atterberg Limits - Liquid Limit, Plastic Limit, Plasticity Index (AASHTO T 89-02 & T 90-00)
CL	Collapse Potential (ASTM D 5333-03)
CN	Consolidation (ASTM D 2435-04)
CP	Relative Compaction (CTM 216 - 06)
CR	Corrosion, Sulfates, Chlorides (CTM 643 - 99; CTM 417 - 06; CTM 422 - 06)
CRSC	Constant Rate of Strain Consolidation
CU	Consolidated Undrained Triaxial (ASTM D 4767-02)
DS	Direct Shear (ASTM D 3080-04)
EI	Expansion Index (ASTM D 4829-03)
FWK	Hydraulic Conductivity Flexible Wall Permeameter (ASTM D 5084)
HD	Hydrometer (ASTM)
N_{60}	N_{60}(ASTM)=N_m*(Em/60)
OC	Organic Content (ASTM D 2974-07)
PA	Particle Size Analysis (ASTM D 422-63 [2002])
PE	Permeability (CTM 220 - 05)
PM	Pressure Meter
PP	Pocket Penetrometer
RV	R-Value (CTM 301 - 00)
SE	Sand Equivalent (CTM 217 - 99)
SG	Specific Gravity (AASHTO T 100-06)
SL	Shrinkage Limit (ASTM D 427-04)
SW	Swell Potential (ASTM D 4546-03)
TV	Pocket Torvane
UC	Unconfined Compression (ASTM D 2166-06)
UU	Unconsolidated Undrained Triaxial (ASTM D 2850-03)
UW	Unit Weight (ASTM D 4767-04)
VS	Vane Shear (AASHTO T 223 - 96 [2004])
WC	Water Content (ASTM D 2216-05)

SAMPLER GRAPHIC SYMBOLS

- Standard Penetration Test (1.4 in. ID)
- Standard California (2.5 in. ID)
- Modified California (2.0 in. ID)
- Tube (2.87 in. or 2.37 in. ID)
- Punch Core
- Sonic Core
- Dry Core
- Bag Sample
- Vane Shear
- Tricone Bit
- NSD — Non Sample Drilling

WELL GRAPHIC SYMBOLS

- Blank casing in cement grout
- Blank casing in filter sand
- Native backfill or slough
- Blank casing in bentonite seal
- Slotted casing in filter sand
- Vibrating wire piezometer

WATER LEVEL SYMBOLS

- First water encountered during drilling
- Water level measured after drilling
- Static water level reading (short-term)
- Static water level reading (long-term)

URS

Butte Cal Fire

BORING AND PIEZOMETER LOG LEGEND

Sheet 1 of 2

BORING LEGEND P1 DYN GROUP NAME GRAP BUTTECAL FIRE.GPJ 7/17/14

CONSISTENCY OF COHESIVE SOILS (AASHTO 1988)		
Descriptor	Pocket Penetrometer (tsf)	Torvane (tsf)
Very Soft	< 0.25	< 0.12
Soft	0.25 - 0.50	0.12 - 0.25
Medium Stiff	0.50 - 1.0	0.25 - 0.50
Stiff	1.0 - 2.0	0.50 - 1.0
Very Stiff	2.0 - 4.0	1.0 - 2.0
Hard	> 4.0	> 2.0

APPARENT DENSITY OF COHESIONLESS SOILS (ASTM 6066-96 (2004))	
Descriptor	SPT N(60) - Value (blows / foot)
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

MOISTURE (ASTM D 2488-06)	
Descriptor	Criteria
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

SOIL PARTICLE SIZE (ASTM D 2488-06)		
Descriptor		Size
Boulder		> 12 inches
Cobble		3 to 12 inches
Gravel	Coarse	3/4 inch to 3 inches
	Fine	No. 4 Sieve to 3/4 inch
Sand	Coarse	No. 10 Sieve to No. 4 Sieve
	Medium	No. 40 Sieve to No. 10 Sieve
	Fine	No. 200 Sieve to No. 40 Sieve
Silt and Clay		Passing No. 200 Sieve

PLASTICITY OF FINE-GRAINED SOILS (ASTM D 2488-06)	
Descriptor	Criteria
Nonplastic	A 1/8-inch thread cannot be rolled at any water content.
Low	The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll, and not much time is required to reach the plastic limit; it cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

DRY STRENGTH OF FINE-GRAINED SOILS (ASTM D 2488-06)	
Descriptor	Criteria
None	Dry specimen crumbles into powder with mere pressure of handling.
Low	Dry specimen crumbles into powder with some finger pressure.
Medium	Dry specimen breaks into pieces or crumbles with considerable finger pressure.
High	Dry specimen cannot be broken with finger pressure; will break into pieces between thumb and a hard surface.
Very High	Dry specimen cannot be broken between thumb and a hard surface.

DILATANCY OF FINE-GRAINED SOILS (ASTM D 2488-06)	
Descriptor	Criteria
None	No visible change in the specimen.
Slow	Water appears slowly on the surface of the specimen during shaking and does not disappear, or disappears slowly, upon squeezing.
Rapid	Water appears quickly on the surface of the specimen during shaking and disappears quickly upon squeezing.

TOUGHNESS OF FINE-GRAINED SOILS (ASTM D 2488-06)	
Descriptor	Criteria
Low	Only slight pressure is required to roll the thread near the plastic limit. The thread and the lump are weak and soft.
Medium	Medium pressure is required to roll the thread to near the plastic limit. The thread and the lump have medium stiffness.
High	Considerable pressure is required to roll the thread to near the plastic limit. The thread and the lump have very high stiffness.

CEMENTATION (ASTM D 2488-06)	
Descriptor	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure.

URS

Butte Cal Fire

BORING AND PIEZOMETE LOG LEGEND

BORING LEGEND P2 REV1 BUTTECALFIRE.GPJ CALFIREDATATEMPLATE07102014.GDT 7/17/14

DATE STARTED 6/13/14	DATE COMPLETED 6/13/14	GROUND ELEVATION 296 ft	ELEVATION DATUM NAVD 88	TOTAL DEPTH OF BORING 24.0 ft
DRILLING CONTRACTOR Cascade		DRILLER'S NAME Rick Alcartato	HELPER'S NAME Mat Talbert	TOTAL DEPTH OF FILL 0.5 ft
DRILLING METHOD Hollow Stem		DRILL RIG MAKE AND MODEL CME 85, 1831		CONSULTANT COMPANY URS Corporation
DRILL BIT SIZE AND TYPE (HOLE DIAMETER) 6" HS, 10"		DRILLING ROD TYPE AND DIAMETER NWT, 2"		FIELD LOGGER M. Maghsoudlou
[X] VERTICAL [ ] INCLINED		CASING TYPE, DIAMETER, INSTALLATION DEPTH NA		FIELD LOG REVIEWER G. Schaertl
SAMPLER TYPE(S) SPT(1.375")		HAMMER TYPE, MAKE/MODEL, WEIGHT/DROP Marl, automatic, 140 lbs / 30-inch drop		HAMMER EFFICIENCY
BOREHOLE BACKFILL OR COMPLETION Neat cement grout		GROUNDWATER READING: DURING DRILLING Not encountered during drilling		AFTER DRILLING (DATE-TIME)

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
FILL	0		Gravel.												
295	1		CLAYEY GRAVEL with Sand (GC); very dense; reddish brown; moist; 42% gravel; 32% fine to medium sand; 26% medium plasticity fines.												
	2														
	3			X	S1A		15 20 34			10	37	15	26		S1A_2.5-4.0S
	4						[54]								
	5			X	S2A	56	15 23 32								S2A_5.0-6.5S Rig chattering. Gravel in shoe. Weathered gravel particles may break down during processing.
290	6														
	7						[55]								
	8		CLAYEY GRAVEL (GC); dense to very dense; reddish brown; moist; 45% medium plasticity fines; 42% gravel; 13% fine to medium sand.	X	S3A	56	12 11 16						45		S3A_7.5-9.0S
	9						[27]								
	10			X		0	14 50/5"								No recovery Rig chattering. Engine stalling. Difficult drilling.
285	11														
	12						[50/5"]								
	13			X	S5A	78	13 10 24								S5A_12.5-14.0S
	14						[34]								
	15			X	S6A	56	13 25 30								S6A_15.0-16.5S
280	16														
	17		CLAYEY SILT (ML/CL); brown; moist; 70% low plasticity, low dry strength, slow dilatancy, low toughness fines; 30% fine sand.				[55]								
	18			X	S7A	89	9 15 19								S7A_17.5-19.0S
	19						[34]								
	20														

Draft 1 After Field Review 6/17/2014

BUTTECALFIRE.GPJ URS SAC GINT LIBRARY 06172014.GLB: 7/16/14

BUTTE CAL

URS

Borehole Location: Butte Cal Fire, Oroville **County:** Butte
Coordinates: Northing: 2,317,481.48 **Easting:** 6,682,908.99
Latitude: **Longitude:**
Station: 0+69 **Offset:** -57
Coordinate System: CA State Plane Zone II **Survey Method:**

LOG OF BORING
BCF-B1
Sheet 1 of 2

Butte Cal Fire

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	20														
	21				S8A	72	9 14 18 [32]								S8A_20.0-21.5S
275															
	22														
	23					0	31 45 50/4" [95/10"]								No recovery Gravel in shoe.
	24														
	25		Bottom of boring at 24' bgs. Backfilled with neat cement grout using 8 bags of 47 lb/bg cement and 45 gallons of water.												
270	26														
	27														
	28														
	29														
	30														
265	31														
	32														
	33														
	34														
	35														
260	36														
	37														
	38														
	39														
	40														
255	41														
	42														
	43														
	44														
	45														

Draft 1 After Field Review 6/17/2014

URS

Borehole Location: Butte Cal Fire, Oroville **County:** Butte
Coordinates: Northing: 2,317,481.48 **Easting:** 6,682,906.99
Latitude: **Longitude:**
Station: 0+69 **Offset:** -57
Coordinate System: CA State Plane Zone II **Survey Method:**

LOG OF BORING
BCF-B1
Sheet 2 of 2

Butte Cal Fire

BUTTE CALFIRE: BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/15/14

DATE STARTED	DATE COMPLETED	GROUND ELEVATION	ELEVATION DATUM	TOTAL DEPTH OF BORING
6/12/14	6/12/14	281 ft	NAVD 88	21.5 ft
DRILLING CONTRACTOR		**DRILLER'S NAME**	**HELPER'S NAME**	**TOTAL DEPTH OF FILL**
Cascade		Rick Alcartato	Mat Talbert	0.4 ft
DRILLING METHOD		**DRILL RIG MAKE AND MODEL**		**CONSULTANT COMPANY**
Hollow Stem		CME 85, 1831		URS Corporation
RILL BIT SIZE AND TYPE (HOLE DIAMETER)		**DRILLING ROD TYPE AND DIAMETER**		**FIELD LOGGER**
8" HS, 10"		NWT, 2"		M. Maghsoudlou
☒ VERTICAL ☐ INCLINED		**CASING TYPE, DIAMETER, INSTALLATION DEPTH**		**FIELD LOG REVIEWER**
		NA		G. Schaertl
SAMPLER TYPE(S)		**HAMMER TYPE, MAKE/MODEL, WEIGHT/DROP**		**HAMMER EFFICIENCY**
SPT(1.375")		Marl, automatic, 140 lbs / 30-inch drop		
BOREHOLE BACKFILL OR COMPLETION		**GROUNDWATER READING: DURING DRILLING**		**AFTER DRILLING (DATE-TIME)**
Neat cement grout		Not encountered during drilling		

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. (Blows per ft)	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
FILL	0		Asphalt.												
280	1		SANDY SILT (ML); brown; moist; 62% low plasticity, medium dry strength, low toughness fines; 38% fine sand.												
	2														
	3			X	S1A	78	29 13 29			20	33	5	62		S1A_2.5-4.0S
	4						[42]								
	5			X	S2A	78	9 12 22								S2A_5.0-6.5S
275	6						[34]								
	7														
	8		At 8 feet, 59% fines.	X	S3A	78	8 16 20						59		S3A_7.5-9.0S
	9						[36]								
	10		SILTY SAND (SM); dark brown; 52% fine sand; 48% no plasticity fines.	X	S4A	72	8 16 18						48		S4A_10.0-11.5S
270	11						[34]								
	12														
	13		At 13 feet, 27% fines.	X	S5A	78	8 11 10						27		S5A_13.0-14.0S
	14						[21]								
	15			X	S6A	100	6 8 13								S6A_15.0-16.5S
265	16						[21]								
	17		SILTY SAND with Gravel (SM); dense; dark brown; moist; 65% fine to medium sand; 20% no plasticity fines; 15% gravel.												
	18			X	S7A	94	12 13 18								S7A_17.5-19.0S
	19						[31]								
	20														

Draft 1 After Field Review 6/17/2014

BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/16/14

BUTTE CAL

Borehole Location: Butte Cal Fire, Oroville **County:** Butte

Coordinates: Northing: 2,317,298.48 **Easting:** 6,682,936.69

Latitude: **Longitude:**

Station: 0+97 **Offset:** 8

Coordinate System: CA State Plane Zone II **Survey Method:**

URS

LOG OF BORING

BCF-B2

Sheet 1 of 2

Butte Cal Fire

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	20														
260	21		SILTY GRAVEL with Sand (GM); moist; 50% gravel; 30% sand; 20% no plasticity fines.	X	S8A	78	19 24 21 [45]								S8A_20.5-21.5S
	22														
	23														
	24														
	25														
255	26														
	27														
	28														
	29														
	30														
250	31														
	32														
	33														
	34														
	35														
245	36														
	37														
	38														
	39														
	40														
240	41														
	42														
	43														
	44														
	45														

Bottom of boring at 21.5' bgs.
Backfilled with neat cement grout using 7 bags of 47 lb/bg cement and 45 gallons of water.

Draft 1 After Field Review 6/17/2014

URS

Borehole Location: Butte Cal Fire, Oroville **County:** Butte
Coordinates: Northing: 2,317,298.48 **Easting:** 6,682,936.69
Latitude: **Longitude:**
Station: 0+97 **Offset:** 8
Coordinate System: CA State Plane Zone II **Survey Method:**

LOG OF BORING
BCF-B2
Sheet 2 of 2

Butte Cal Fire

BUTTE CALFIRE: BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/16/14

DATE STARTED 6/13/14	DATE COMPLETED 6/13/14	GROUND ELEVATION 298 ft	ELEVATION DATUM NAVD 88	TOTAL DEPTH OF BORING 29.0 ft
DRILLING CONTRACTOR Cascade		DRILLER'S NAME Rick Alcartato	HELPER'S NAME Mat Talbert	TOTAL DEPTH OF FILL 8 ft
DRILLING METHOD Hollow Stem		DRILL RIG MAKE AND MODEL CME 85, 1831		CONSULTANT COMPANY URS Corporation
DRILL BIT SIZE AND TYPE (HOLE DIAMETER) 8" HS, 10"		DRILLING ROD TYPE AND DIAMETER NWT, 2"		FIELD LOGGER M. Maghsoudlou
X VERTICAL ☐ INCLINED		CASING TYPE, DIAMETER, INSTALLATION DEPTH NA		FIELD LOG REVIEWER G. Schaertl
SAMPLER TYPE(S) SPT(1.375")		HAMMER TYPE, MAKE/MODEL, WEIGHT/DROP Marl, automatic, 140 lbs / 30-inch drop		HAMMER EFFICIENCY
BOREHOLE BACKFILL OR COMPLETION Neat cement grout		GROUNDWATER READING: DURING DRILLING Not encountered during drilling	AFTER DRILLING (DATE-TIME)	

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	0		Asphalt.												
	1		CLAYEY SAND with Gravel (SC); medium dense; yellowish red; moist; 40% fine to coarse sand; 35% medium plasticity fines; 25% gravel.												
	2														
295	3			X	S1A	17	11 5 12 [17]								S1A_2.5-4.0S Crushed gravel in shoe. Pieces of AC.
	4														
	5			X	S2A	56	4 12 14 [26]			12	35	15	35		S2A_5.0-6.5S
	6														
FILL	7														
290	8		CLAYEY SAND (SC); medium dense to dense; yellowish red; moist; 54% fine to medium sand; 38% medium plasticity fines; 5% gravel.	X	S3A	56	11 14 11 [25]						38		S3A_8.0-9.0S
	9														
	10			X	S4A	61	11 29 37 [66]								S4A_10.0-11.5S
	11														
	12														
285	13		At 13 feet, 36% fines.	X	S5A	67	10 8 14 [22]						36		S5A_12.5-14.0S
	14														
	15			X	S6A	39	10 18 24 [42]								S6A_15.0-16.5S
	16														
	17														
280	18		At 18 feet, weathering decreased from strongly to moderately; gravel size particles increased to 15%.	X	S7A	100	11 21 27 [48]								S7A_17.5-19.0S
	19														
	20														

Draft 1 After Field Review 6/17/2014

BUTTECALFIRE.GPJ, URS SAC GINT LIBRARY 06172014.GLB, 7/16/14

BUTTE CAL

URS

Borehole Location: Butte Cal Fire, Oroville County: Butte
Coordinates: Northing: 2,317,433.47 Easting: 6,683,040.19
Latitude: Longitude:
Station: 0+97 Offset: 5
Coordinate System: CA State Plane Zone II Survey Method:

LOG OF BORING
BCF-B3
Sheet 1 of 2
Butte Cal Fire

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	20		CLAYEY SILT (ML/CL); brown; moist; 60% low plasticity, low dry strength, slow dilatancy, low toughness fines; 40% fine sand.												
	21				S8A	100	7 11 13								S8A_20.0-21.5S
	22						[24]								
275	23				S9A	100	3 7 9								S9A_22.5-24.0S
	24						[16]								
	25				S10A	100	3 5 8								S10A_25.0-26.5S
	26						[13]								
	27		Poorly Graded GRAVEL with Sand (GP); 50% gravel; 45% fine to medium sand; 5% no plasticity fines.												
270	28				S11A	67	27 44 42								S11A_27.5-29.0S
	29						[86]								
	30		Bottom of boring at 29' bgs. Backfilled with neat cement grout using 9 bags of 47 lb/bg cement and 60 gallons of water.												
	31														
	32														
265	33														
	34														
	35														
	36														
	37														
260	38														
	39														
	40														
	41														
	42														
255	43														
	44														
	45														

Draft 1 After Field Review 6/17/2014

URS

Borehole Location: Butte Cal Fire, Oroville **County:** Butte
Coordinates: Northing: 2,317,433.47 **Easting:** 6,683,040.19
Latitude: _____ **Longitude:** _____
Station: 0+97 **Offset:** 5
Coordinate System: CA State Plane Zone II **Survey Method:** _____

LOG OF BORING
BCF-B3
Sheet 2 of 2
Butte Cal Fire

BUTTE CALFIRE: BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/16/14

DATE STARTED 6/12/14	DATE COMPLETED 6/12/14	GROUND ELEVATION 286 ft	ELEVATION DATUM NAVD 88	TOTAL DEPTH OF BORING 16.5 ft
DRILLING CONTRACTOR Cascade		DRILLER'S NAME Rick Alcartalo	HELPER'S NAME Mat Talbert	TOTAL DEPTH OF FILL
DRILLING METHOD Hollow Stem		DRILL RIG MAKE AND MODEL CME 85, 1831		CONSULTANT COMPANY URS Corporation
RILL BIT SIZE AND TYPE (HOLE DIAMETER) 8" HS, 10"		DRILLING ROD TYPE AND DIAMETER NWT, 2"		FIELD LOGGER M. Maghsoudlou
X VERTICAL ☐ INCLINED		CASING TYPE, DIAMETER, INSTALLATION DEPTH NA		FIELD LOG REVIEWER G. Schaertl
SAMPLER TYPE(S) SPT(1.375")		HAMMER TYPE, MAKE/MODEL, WEIGHT/DROP Marl, automatic, 140 lbs / 30-inch drop		HAMMER EFFICIENCY
BOREHOLE BACKFILL OR COMPLETION Neat cement grout		GROUNDWATER READING: DURING DRILLING Not encountered during drilling		AFTER DRILLING (DATE-TIME)

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	0		Asphalt.												
285	1		CLAYEY SAND (SC); dense; strong brown; moist; 63% fine to medium sand; 37% medium plasticity fines.												
	2														
	3			X	S1A	78	15 11 18 [29]			14	38	15	37		S1A_2.5-4.0S
	4														
	5		SILTY SAND (SM); 76% sand; 34% no plasticity fines.												
	6			X	S2A S2B	89	8 20 22 [42]			14	41	15	34		S2A_5.0-6.0S S2B_6.0-6.5S
280	7		LEAN CLAY with Sand (CL); strong brown; moist; 74% medium plasticity, medium dry strength, no dilatancy, medium toughness fines; 26% fine sand.												
	8		SILT with Sand (ML); strong brown; moist; 72% no plasticity, low dry strength, rapid dilatancy, low toughness fines; 28% fine sand.	X	S3A S3B	89	6 13 17 [30]						74		S3A_7.5-8.0S S3B_8.0-9.0S
	9														
	10			X	S4A	100	6 12 17 [29]						72		S4A_10.0-11.5S
275	11														
	12														
	13		Well-Graded SAND with Silt and Gravel (SW-SM); strong brown; moist; 50% fine to coarse sand; 40% gravel; 10% no plasticity fines.	X	S5A	67	13 18 15 [33]								S5A_12.5-14.0S
	14														
	15			X	S6A	56	13 28 21 [49]								S6A_15.0-17.5S Gravel in shoe.
270	16														
	17		Bottom of boring at 16.5' bgs. Backfilled with neat cement grout using 6 bags of 47 lb/bg cement and 40 gallons of water.												
	18														
	19														
	20														

Draft 1 After Field Review 6/17/2014

BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/16/14

BUTTE CA

URS

Borehole Location: Butte Cal Fire, Oroville County: Butte

Coordinates: Northing: 2,317,303.06 Easting: 6,683,061.38

Latitude: Longitude:

Station: 2+21 Offset: 3

Coordinate System: CA State Plane Zone II Survey Method:

LOG OF BORING

BCF-B4

Sheet 1 of 1

Butte Cal Fire

DATE STARTED 6/12/14	DATE COMPLETED 6/12/14	GROUND ELEVATION 298 ft	ELEVATION DATUM NAVD 88	TOTAL DEPTH OF BORING 29.0 ft
DRILLING CONTRACTOR Cascade		DRILLER'S NAME Rick Alcartato	HELPER'S NAME Mat Talbert	TOTAL DEPTH OF FILL 0.4 ft
DRILLING METHOD Hollow Stem		DRILL RIG MAKE AND MODEL CME 85, 1831		CONSULTANT COMPANY URS Corporation
DRILL BIT SIZE AND TYPE (HOLE DIAMETER) 5" HS, 10"		DRILLING ROD TYPE AND DIAMETER NWT, 2"		FIELD LOGGER M. Maghsoudlou
☒ VERTICAL ☐ INCLINED		CASING TYPE, DIAMETER, INSTALLATION DEPTH NA		FIELD LOG REVIEWER G. Schaertl
SAMPLER TYPE(S) SPT(1.375")		HAMMER TYPE, MAKE/MODEL, WEIGHT/DROP Marl, automatic, 140 lbs / 30-inch drop		HAMMER EFFICIENCY
BOREHOLE BACKFILL OR COMPLETION Neat cement grout		GROUNDWATER READING: DURING DRILLING Not encountered during drilling		AFTER DRILLING (DATE-TIME)

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}/(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
FILL	0		Asphalt.												
	1		CLAYEY SAND with Gravel (SC); medium dense to dense; strong brown; moist; 55% fine to medium sand; 25% medium plasticity fines; 20% gravel.												
	2														
295	3			X	S1A	89	6 12 13 [25]								S1A_2.5-4.0S
	4														
	5			X	S2A	100	3 18 14 [32]								S2A_5.0-6.5S
	6														
	7														
290	8		At 8 feet, 42% fines.	X	S3A	56	7 11 7 [18]						42		S3A_7.5-9.0S
	9														
	10														
	11		CLAYEY SAND (SC); medium dense; yellowish red; moist; 80% fine to medium sand; 15% medium plasticity fines; 5% gravel.	X	S4A S4B	100	4 5 6 [11]								S4A_10.0-10.5S S4B_10.5-11.5S
	12														
285	13		CLAYEY GRAVEL with Sand (GC); 40% gravel; 30% sand; 30% medium plasticity fines.	X	S5A S5B	89	5 24 29 [53]								S5A_12.5-13.0S S5B_13.0-14.0S Moderately to highly weathered gravel. Further deterioration gravel clasts may put gravel below sand %.
	14														
	15														
	16			X	S6A	89	7 22 30 [52]								S6A_15.0-16.5S
	17														
280	18			X	S7A	94	5 10 18 [28]								S7A_17.5-19.0S
	19														
	20														

Draft 1 After Field Review 6/17/2014

Borehole Location: Butte Cal Fire, Oroville County: Butte
Coordinates: Northing: 2,317,472.20 Easting: 6,683,134.43
Latitude: Longitude:
Station: 2+94 Offset: -48
Coordinate System: CA State Plane Zone II Survey Method:

URS

LOG OF BORING
BCF-B5

Butte Cal Fire

BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/16/14

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	20			X	S8A	78	5 13 9 [22]								S8A_20.0-21.5S
	21														
	22		SILTY SAND (SM); medium dense; strong brown; moist; 80% fine sand; 20% no plasticity fines.												
275	23			X	S9A	89	3 5 6 [11]								S9A_22.5-24.0S
	24														
	25		SILTY SAND (SM); medium dense; strong brown; moist; 60% fine to medium sand; 40% fines.	X	S10A	100	4 5 5 [10]								S10A_25.0-26.5S
	26														
	27														
270	28		SANDY SILT (ML); dark yellowish brown; moist; 55% no plasticity, low dry strength, rapid dilatancy, low toughness fines; 45% fine sand.	X	S11A	94	4 7 9 [16]								S11A_27.5-29.0S
	29														
	30		Bottom of boring at 29' bgs. Backfilled with neat cement grout using 9 bags of 47 lb/bg cement and 55 gallons of water.												
	31														
	32														
265	33														
	34														
	35														
	36														
	37														
260	38														
	39														
	40														
	41														
	42														
255	43														
	44														
	45														

Draft 1 After Field Review 6/17/2014

BUTTE CALFIRE: BUTTECALFIRE.GPJ; URS SAC.GINT LIBRARY 06172014.GLB; 7/15/14

URS

Borehole Location: Butte Cal Fire, Oroville **County:** Butte
Coordinates: Northing: 2,317,472.20 **Easting:** 6,683,134.43
Latitude: **Longitude:**
Station: 2+94 **Offset:** -48
Coordinate System: CA State Plane Zone II **Survey Method:**

LOG OF BORING
BCF-B5
Sheet 2 of 2

Butte Cal Fire

DATE STARTED 6/13/14	DATE COMPLETED 6/13/14	GROUND ELEVATION 297 ft	ELEVATION DATUM NAVD 88	TOTAL DEPTH OF BORING 29.0 ft
DRILLING CONTRACTOR Cascade		DRILLER'S NAME Rick Alcartato	HELPER'S NAME Mat Talbert	TOTAL DEPTH OF FILL 0.5 ft
DRILLING METHOD Hollow Stem		DRILL RIG MAKE AND MODEL CME 85, 1831		CONSULTANT COMPANY URS Corporation
RILL BIT SIZE AND TYPE (HOLE DIAMETER) 8" HS, 10"		DRILLING ROD TYPE AND DIAMETER NWT, 2"		FIELD LOGGER M. Maghsoudlou
X VERTICAL ☐ INCLINED		CASING TYPE, DIAMETER, INSTALLATION DEPTH NA		FIELD LOG REVIEWER G. Schaertl
SAMPLER TYPE(S) Bag, SPT(1.375")		HAMMER TYPE, MAKE/MODEL, WEIGHT/DROP Marl, automatic, 140 lbs / 30-inch drop		HAMMER EFFICIENCY
BOREHOLE BACKFILL OR COMPLETION Neat cement grout		GROUNDWATER READING: DURING DRILLING Not encountered during drilling		AFTER DRILLING (DATE-TIME)

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
FILL	0		Asphalt.												
	1		CLAYEY SAND (SC); medium dense; reddish brown; moist; 59% fine to medium sand; 36% medium plasticity fines; 5% gravel.												
295	2														
	3				S1A	72	5 7 11 [18]			15	40	19	36		S1A_2.5-4.0S Broken gravel in sampler.
	4														
	5				S2A	33	9 7 12 [19]								S2A_5.0-6.5S
	6														
290	7														
	8		SANDY LEAN CLAY (CL); reddish brown; moist; 61% medium plasticity, high dry strength, no dilatancy, high toughness fines; 39% fine sand.			0	9 8 9 [17]								No recovery Gravel in shoe.
	9				S3A										S3A_9.0-10.0B
	10					0	8 10 17 [27]								No recovery
	11														
285	12				S4A					18	49	30	61		S4A_11.5-12.0B
	13		CLAYEY SAND with Gravel (SC); medium dense; reddish brown; moist; 60% sand; 25% medium plasticity fines; 15% gravel.		S5A	78	10 14 13 [27]								S5A_12.5-14.0S
	14														
	15		CLAYEY SAND (SC); medium dense to dense; reddish brown; moist; 70% fine to medium sand; 30% medium plasticity fines.		S6A	100	3 4 8 [12]								S6A_15.0-16.5S
	16														
280	17														
	18					0	21 25 25 [50]								No recovery
	19														
	20														

Draft 1 After Field Review 6/17/2014

Borehole Location: Butte Cal Fire, Oroville County: Butte
Coordinates: Northing: 2,317,445.99 Easting: 6,683,210.42
Latitude: Longitude:
Station: 3+70 Offset: -22
Coordinate System: CA State Plane Zone II Survey Method:

URS

LOG OF BORING
BCF-B6
Sheet 1 of 2
Butte Cal Fire

BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/18/14
BUTTE CAL

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	20														
	21				S7A	100	10 11 12 [23]								S7A_20.0-21.5S
275	22														
	23				S8A	100	4 8 11 [19]								S8A_22.5-24.0S
	24														
	25				S9A	100	5 6 9 [15]								S9A_25.0-26.5S
	26														
270	27		CLAYEY SILT (ML/CL); brown; moist; 70% low plasticity, medium dry strength, slow dilatancy, low toughness fines; 30% fine sand.												
	28		Poorly Graded GRAVEL with Silt and Sand (GP-GM); 65% gravel; 25% sand; 10% no plasticity fines.		S10A S10B	94	15 35 34 [69]								S10A_27.5-28.0S S10B_28.0-29.0S
	29														
	30		Bottom of boring at 29' bgs. Backfilled with neat cement grout using 9 bags of 47 lb/bg cement and 60 gallons of water.												
	31														
265	32														
	33														
	34														
	35														
	36														
260	37														
	38														
	39														
	40														
	41														
255	42														
	43														
	44														
	45														

Draft 1 After Field Review 6/17/2014

BUTTE CALFIRE: BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/16/14

URS

Borehole Location: Butte Cal Fire, Oroville **County:** Butte
Coordinates: Northing: 2,317,445.99 **Easting:** 6,683,210.42
Latitude: **Longitude:**
Station: 3+70 **Offset:** -22
Coordinate System: CA State Plane Zone II **Survey Method:**

LOG OF BORING
BCF-B6
Sheet 2 of 2
Butte Cal Fire

DATE STARTED 6/13/14	DATE COMPLETED 6/13/14	GROUND ELEVATION 293 ft	ELEVATION DATUM NAVD 88	TOTAL DEPTH OF BORING 29.0 ft
DRILLING CONTRACTOR Cascade		DRILLER'S NAME Rick Alcartato	HELPER'S NAME Mat Talbert	TOTAL DEPTH OF FILL 0.5 ft
DRILLING METHOD Hollow Stem		DRILL RIG MAKE AND MODEL CME 85, 1831		CONSULTANT COMPANY URS Corporation
RILL BIT SIZE AND TYPE (HOLE DIAMETER) 8" HS, 10"		DRILLING ROD TYPE AND DIAMETER NWT, 2"		FIELD LOGGER M. Maghsoudlou
X VERTICAL ☐ INCLINED		CASING TYPE, DIAMETER, INSTALLATION DEPTH NA		FIELD LOG REVIEWER G. Schaertl
SAMPLER TYPE(S) Bag, MCal(2"), SPT(1.375")		HAMMER TYPE, MAKE/MODEL, WEIGHT/DROP Marl, automatic, 140 lbs / 30-inch drop		HAMMER EFFICIENCY
BOREHOLE BACKFILL OR COMPLETION Neat cement grout		GROUNDWATER READING: DURING DRILLING Not encountered during drilling		AFTER DRILLING (DATE-TIME)

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
FILL	0		Asphalt.												
	1–2		SANDY FAT CLAY (CH); dusky red; moist; 66% high plasticity, very high dry strength, no dilatancy, high toughness fines; 34% fine sand.		S1A					20	56	37	66		S1A_1.0-2.5B
290	3–4		SILTY SAND with Gravel (SM); very dense; brown; moist; 63% fine to coarse sand; 22% fines; 15% gravel.		S2A	83	16 27 29 [56]			12	36	11	22		S2A_2.5-4.0S
	5–6				S3A	89	13 30 30 [60]								S3A_5.0-6.5S
285	7–8				S4A	11	20 21 17 [38]								S4A_7.5-9.0S
	9–10		At 10 feet, 42% fines.		S5A	100	7 12 17 [29]						42		S5A_10.0-11.5S
280	11–12					0	8 8 12 [20]								No recovery
	13–14		LEAN CLAY (CL); brown; moist; 90% medium plasticity, high dry strength, no dilatancy, high toughness fines; 10% fine sand.		S6A										S6A_14.0-15.0B
	15–16		CLAYEY SAND (SC); dense; reddish brown; moist; 70% fine to medium sand; 30% medium plasticity fines.		S7A S7B	78	4 16 23 [39]								S7A_15.5-16.0T S7B_16.0-16.5T
275	17–18				S8A	83	5 8 11 [19]								S8A_17.5-19.0S
	19–20														

Draft 1 After Field Review 6/17/2014

BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/16/14

BUTTE CA

URS

Borehole Location: Butte Cal Fire, Oroville County: Butte

Coordinates: Northing: 2,317,354.73 Easting: 6,683,203.80

Latitude: Longitude:

Station: 3+64 Offset: -48

Coordinate System: CA State Plane Zone II Survey Method:

LOG OF BORING

BCF-B7

Sheet 1 of 2

Butte Cal Fire

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	20														
	21			X	S9A	100	6 9 10								S9A_20.0-21.5S
	22						[19]								
270	23		Silt with Sand (ML); brown; moist; 80% no plasticity, no dry strength, rapid dilatancy, low toughness fines; 20% fine sand.	X	S10A	94	6 6 10								S10A_22.5-24.0S
	24						[16]								
	25			X	S11A	39	4 6 7								S11A_25.0-26.5S
	26						[13]								
	27														
265	28		Poorly Graded SAND with Silt and Gravel (SP-SM); 60% fine to medium sand; 30% gravel; 10% no plasticity fines.	X	S12A	83	15 25 21								S12A_27.5-29.0S
	29						[46]								
	30		Bottom of boring at 29' bgs. Backfilled with neat cement grout using 8 bags of 47 lb/bg cement and 45 gallons of water.												
	31														
	32														
260	33														
	34														
	35														
	36														
	37														
255	38														
	39														
	40														
	41														
	42														
250	43														
	44														
	45														

Draft 1 After Field Review 6/17/2014

Borehole Location: Butte Cal Fire, Oroville **County:** Butte
Coordinates: Northing: 2,317,354.73 **Easting:** 6,683,203.80
Latitude: **Longitude:**
Station: 3+64 **Offset:** -48
Coordinate System: CA State Plane Zone II **Survey Method:**

URS

LOG OF BORING
BCF-B7
Sheet 2 of 2

Butte Cal Fire

BUTTE CALFIRE: BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/15/14

DATE STARTED 6/12/14	DATE COMPLETED 6/12/14	GROUND ELEVATION 289 ft	ELEVATION DATUM NAVD 88	TOTAL DEPTH OF BORING 29.0 ft
DRILLING CONTRACTOR Cascade		DRILLER'S NAME Rick Alcantato	HELPER'S NAME Mat Talbert	TOTAL DEPTH OF FILL 3.5 ft
DRILLING METHOD Hollow Stem		DRILL RIG MAKE AND MODEL CME 85, 1831		CONSULTANT COMPANY URS Corporation
RILL BIT SIZE AND TYPE (HOLE DIAMETER) 5" HS, 10"		DRILLING ROD TYPE AND DIAMETER NWT, 2"		FIELD LOGGER M. Maghsoudlou
X VERTICAL ☐ INCLINED		CASING TYPE, DIAMETER, INSTALLATION DEPTH NA		FIELD LOG REVIEWER G. Schaertl
SAMPLER TYPE(S) MCal(2"), SPT(1.375")		HAMMER TYPE, MAKE/MODEL, WEIGHT/DROP Marl, automatic, 140 lbs / 30-inch drop		HAMMER EFFICIENCY
BOREHOLE BACKFILL OR COMPLETION Neat cement grout		GROUNDWATER READING: DURING DRILLING Not encountered during drilling		AFTER DRILLING (DATE-TIME)

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	0		Asphalt.												
	1		SILTY SAND with Gravel (SM); very dense; strong brown; moist; 59% fine to medium sand; 26% fines; 15% gravel.												
	2														
FILL	3				S1A S1B	78	21 38 25 [63]			13	37	8	26		S1A_3.0-3.5S S1B_3.5-4.0S
285	4		CLAYEY SAND (SC); very dense; yellowish brown; moist; 62% fine to coarse sand; 38% medium plasticity fines.												
	5				S2A	100	11 29 30 [59]						38		S2A_5.0-6.5S
	6														
	7														
	8				S3A	83	11 24 28 [52]								S3A_7.5-9.0S
280	9														Chattering
	10		At 10 feet, 28% fines.		S4A	67	5 12 26 [38]						28		S4A_10.0-11.5S
	11														
	12														
	13		At 13 feet, medium dense.		S5A	89	1 5 8 [13]								S5A_12.5-14.0S
275	14														
	15				S6A S6B	89	8 15 18 [33]								S6A_15.5-16.0T S6B_16.0-16.5T
	16														
	17														
	18				S7A	100	4 7 11 [18]								S7A_17.5-19.0S
270	19														
	20														

Draft 1 After Field Review 6/17/2014

Borehole Location: Butte Cal Fire, Oroville County: Butte
Coordinates: Northing: 2,317,310.19 Easting: 6,683,275.05
Latitude: Longitude:
Station: 4+35 Offset: -4
Coordinate System: CA State Plane Zone II Survey Method:

URS

LOG OF BORING
BCF-B8
Sheet 1 of 2
Butte Cal Fire

BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/16/14
BUTTE CA

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	20														
	21		CLAYEY GRAVEL with Sand (GC); moist; 60% gravel; 25% sand; 15% medium plasticity fines.		S8A S8B	94	3 13 13 [26]								S8A_20.0-20.5S S8B_20.5-21.5S
	22														Engine died. Chattering
	23				S9A	78	12 25 28 [53]								S9A_22.5-24.0S
265	24														Rig chattering
	25				S10A	100	25 33 34 [67]								S10A_25.0-26.5S
	26														
	27														
	28				S11A S11B	94	5 9 6 [15]								S11A_27.5-28.5S S11B_28.5-29.0S
260	29		SILTY SAND (SM); medium dense; reddish brown; moist; 75% fine to medium sand; 25% no plasticity fines.												
	30		Bottom of boring at 29' bgs. Backfilled with neat cement grout using 9 bags of 47 lb/bg cement and 50 gallons of water.												
	31														
	32														
	33														
255	34														
	35														
	36														
	37														
	38														
250	39														
	40														
	41														
	42														
	43														
245	44														
	45														

Draft 1 After Field Review 6/17/2014

URS

Borehole Location: Butte Cal Fire, Oroville County: Butte
Coordinates: Northing: 2,317,310.19 Easting: 6,683,275.05
Latitude: Longitude:
Station: 4+35 Offset: -4
Coordinate System: CA State Plane Zone II Survey Method:

LOG OF BORING
BCF-B8
Sheet 2 of 2

Butte Cal Fire

BUTTE CALFIRE: BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/16/14

DATE STARTED	DATE COMPLETED	GROUND ELEVATION	ELEVATION DATUM	TOTAL DEPTH OF BORING
6/12/14	6/12/14	297 ft	NAVD 88	29.0 ft
DRILLING CONTRACTOR		**DRILLER'S NAME**	**HELPER'S NAME**	**TOTAL DEPTH OF FILL**
Cascade		Rick Alcartato	Mat Talbert	9 ft
DRILLING METHOD		**DRILL RIG MAKE AND MODEL**		**CONSULTANT COMPANY**
Hollow Stem		CME 85, 1831		URS Corporation
DRILL BIT SIZE AND TYPE (HOLE DIAMETER)		**DRILLING ROD TYPE AND DIAMETER**		**FIELD LOGGER**
8" HS, 10"		NWT, 2"		M. Maghsoudlou
X VERTICAL ☐ INCLINED		**CASING TYPE, DIAMETER, INSTALLATION DEPTH**		**FIELD LOG REVIEWER**
		NA		G. Schaertl
SAMPLER TYPE(S)		**HAMMER TYPE, MAKE/MODEL, WEIGHT/DROP**		**HAMMER EFFICIENCY**
MCal(2"), SPT(1.375")		Marl, automatic, 140 lbs / 30-inch drop		
BOREHOLE BACKFILL OR COMPLETION		**GROUNDWATER READING: DURING DRILLING**		**AFTER DRILLING (DATE-TIME)**
Neat cement grout		Not encountered during drilling		

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	0		Asphalt.												
	1		CLAYEY SAND with Gravel (SC); dense; dark yellowish brown; moist; 46% medium plasticity fines; 35% fine to medium sand; 19% gravel.												
295	2														
	3			X	S1A	67	4 10 31			10	45	28	46		S1A_2.5-4.0S Pieces of asphalt
	4		CLAYEY SAND (SC); dense; dark yellowish brown; moist; 55% fine to medium sand; 35% low plasticity fines; 10% gravel.				[41]								
	5			X	S2A	100	16 18 16								S2A_5.0-6.5S
290	6														
	7						[34]								
	8			X	S3A	100	13 19 21						35		S3A_7.5-9.0S
Fill	9						[40]								
	10			X	S4A	72	14 18 15								S4A_10.0-11.5S
285	11						[33]								
	12														
	13		At 13 feet, 49% fines.	X	S5A	94	4 13 16						49		S5A_12.5-14.0S
	14						[29]								
	15		CLAYEY SAND/SANDY CLAY (SC/CL); medium dense; strong brown; moist; 50% fine to medium sand; 50% medium plasticity fines.												
	16			X	S6A	89	11 13 12								S6A_15.0-16.5S
280	17						[25]								
	18			X	S7A	100	3 9 14								S7A_17.5-19.0S
	19						[23]								
	20														

Draft 1 After Field Review 6/17/2014

Borehole Location: Butte Cal Fire, Oroville **County:** Butte
Coordinates: Northing: 2,317,427.98 **Easting:** 6,683,287.65
Latitude: **Longitude:**
Station: 4+48 **Offset:** -4
Coordinate System: CA State Plane Zone II **Survey Method:**

URS

LOG OF BORING
BCF-B9
Sheet 1 of 2

Butte Cal Fire

BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/16/14
BUTTE CAL

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	20														
	21			X	S8A	100	4 5 8								S8A_20.0-21.5S
275	22						[13]								
	23			X	S9A S9B	100	1 7 14								S9A_23.0-23.5T S9B_23.5-24.0T
	24						[21]								
	25			X	S10A	72	2 8 9								S10A_25.0-26.5S
	26														
270	27						[17]								
	28		CLAYEY GRAVEL with Sand (GC); 40% gravel; 30% sand; 30% fines.	X	S11A S11B	100	18 24 34								S11A_27.5-28.0S S11B_28.0-29.0S Rig chattering
	29						[58]								
	30		Bottom of boring at 29' bgs. Backfilled with neat cement grout using 9 bags of 47 lb/bg cement and 55 gallons of water.												
	31														
265	32														
	33														
	34														
	35														
	36														
260	37														
	38														
	39														
	40														
	41														
255	42														
	43														
	44														
	45														

Draft 1 After Field Review 6/17/2014

BUTTE CALFIRE: BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/16/14

URS

Borehole Location: Butte Cal Fire, Oroville **County:** Butte
Coordinates: Northing: 2,317,427.98 **Easting:** 6,683,287.65
Latitude: **Longitude:**
Station: 4+48 **Offset:** -4
Coordinate System: CA State Plane Zone II **Survey Method:**

LOG OF BORING
BCF-B9
Sheet 2 of 2

Butte Cal Fire

DATE STARTED 6/11/14	DATE COMPLETED 6/11/14	GROUND ELEVATION 286 ft	ELEVATION DATUM NAVD 88	TOTAL DEPTH OF BORING 29.0 ft
DRILLING CONTRACTOR Cascade		DRILLER'S NAME Rick Alcantato	HELPER'S NAME Mat Talbert	TOTAL DEPTH OF FILL 0.4 ft
DRILLING METHOD Hollow Stem		DRILL RIG MAKE AND MODEL CME 85, 1831		CONSULTANT COMPANY URS Corporation
DRILL BIT SIZE AND TYPE (HOLE DIAMETER) 8" HS, 10"		DRILLING ROD TYPE AND DIAMETER NWT, 2"		FIELD LOGGER M. Maghsoudlou
X VERTICAL ☐ INCLINED		CASING TYPE, DIAMETER, INSTALLATION DEPTH NA		FIELD LOG REVIEWER G. Schaertl
SAMPLER TYPE(S) SPT(1.375")		HAMMER TYPE, MAKE/MODEL, WEIGHT/DROP Marl, automatic, 140 lbs / 30-inch drop		HAMMER EFFICIENCY
BOREHOLE BACKFILL OR COMPLETION Neat cement grout		GROUNDWATER READING: DURING DRILLING Not encountered during drilling		AFTER DRILLING (DATE-TIME)

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
FILL	0		Asphalt.												
285	1		SILTY SAND (SM); very dense; strong brown; moist; 73% fine to medium sand; 27% low plasticity fines.												
	2														
	3			X	S1A	83	22 46 25 [71]			14	34	10	27		S1A_2.5-4.0S
	4														
	5			X	S2A	89	14 26 36 [62]								S2A_5.0-6.5S
280	6														
	7														
	8		At 8 feet, 45% fines.	X	S3A	94	10 14 19 [33]						45		S3A_7.5-9.0S
	9														
	10			X	S4A	83	7 18 18 [36]								S4A_10.0-11.5S
275	11														
	12														
	13			X	S5A	100	6 11 13 [24]								S5A_12.5-14.0S
	14														
	15			X	S6A	100	8 17 20 [37]								S6A_15.0-16.5S
270	16														
	17														
	18		At 18 feet, medium dense.	X	S7A	89	5 6 12 [18]								S7A_17.5-19.0S
	19														
	20														

Draft 1 After Field Review 6/17/2014

Borehole Location: Butte Cal Fire, Oroville County: Butte
Coordinates: Northing: 2,317,266.31 Easting: 6,683,339.03
Latitude: Longitude:
Station: 4+99 Offset: 40
Coordinate System: CA State Plane Zone II Survey Method:

URS

LOG OF BORING
BCF-B10
Sheet 1 of 2
Butte Cal Fire

BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/16/14
BUTTE CA

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	20		SILTY GRAVEL, with Sand (GM); moist; 55% fine to coarse gravel; 30% sand; 15% low plasticity fines.												
265	21				S8A	89	6 11 21 [32]								S8A_20.0-21.5S Chattering
	22														
	23				S9A	89	21 36 23 [59]								S9A_22.5-24.0S
	24														
	25				S10A	17	44 50/2" [50/2"]								S10A_25.0-26.5S Gravel in shoe, chattering and killing engine.
260	26														
	27														
	28				S11A	39	48 50/3" [50/3"]								S11A_27.5-29.0S
	29														
	30		Bottom of boring at 29' bgs. Backfilled with neat cement grout using 9 bags of 47 lb/bg cement and 55 gallons of water.												
255	31														
	32														
	33														
	34														
	35														
250	36														
	37														
	38														
	39														
	40														
245	41														
	42														
	43														
	44														
	45														

Draft 1 After Field Review 6/17/2014

BUTTE CALFIRE: BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/16/14

URS

Borehole Location: Butte Cal Fire, Oroville **County:** Butte
Coordinates: Northing: 2,317,266.31 **Easting:** 6,683,339.03
Latitude: **Longitude:**
Station: 4+99 **Offset:** 40
Coordinate System: CA State Plane Zone II **Survey Method:**

LOG OF BORING
BCF-B10
Sheet 2 of 2

Butte Cal Fire

DATE STARTED 6/13/14	DATE COMPLETED 6/13/14	GROUND ELEVATION 295 ft	ELEVATION DATUM NAVD 88	TOTAL DEPTH OF BORING 29.0 ft
DRILLING CONTRACTOR Cascade		DRILLER'S NAME Rick Alcartato	HELPER'S NAME Mat Talbert	TOTAL DEPTH OF FILL 4 ft
DRILLING METHOD Hollow Stem		DRILL RIG MAKE AND MODEL CME 85, 1831		CONSULTANT COMPANY URS Corporation
RILL BIT SIZE AND TYPE (HOLE DIAMETER) 3" HS, 10"		DRILLING ROD TYPE AND DIAMETER NWT, 2"		FIELD LOGGER M. Maghsoudlou
X VERTICAL ☐ INCLINED		CASING TYPE, DIAMETER, INSTALLATION DEPTH NA		FIELD LOG REVIEWER G. Schaertl
SAMPLER TYPE(S) SPT(1.375")		HAMMER TYPE, MAKE/MODEL, WEIGHT/DROP Marl, automatic, 140 lbs / 30-inch drop		HAMMER EFFICIENCY
BOREHOLE BACKFILL OR COMPLETION Neat cement grout		GROUNDWATER READING: DURING DRILLING Not encountered during drilling		AFTER DRILLING (DATE-TIME)

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	0		Asphalt.												
	1		SANDY LEAN CLAY (CL); dusky red; moist; 55% medium plasticity, very high dry strength, no dilatancy, high toughness fines; 45% fine sand.												
	2														
FILL	3			X	S1A	33	1 1 4 [5]			17	34	20	55		S1A_2.5-4.0S
	4														
290			LEAN CLAY with Sand (CL); reddish brown; moist; 75% medium plasticity fines; 25% fine sand.												
	5			X	S2A	33	3 3 4 [7]								S2A_5.0-6.5S
	6														
	7		CLAYEY SAND with Gravel (SC); very dense; grayish brown; moist; 81% fine to coarse sand; 24% medium plasticity fines; 15% gravel.												
	8			X	S3A	72	7 21 29 [50]						24		S3A_7.5-9.0S
	9														
285	10		At 10 feet, 35% gravel.	X	S4A	83	9 9 33 [42]								S4A_10.0-11.5S
	11														
	12														
	13		LEAN CLAY with Sand (CL); brown; moist; 74% medium toughness fines; 26% fine sand.	X	S5A	56	4 10 19 [29]						74		S5A_12.5-14.0S
	14														
280	15			X	S6A	50	5 10 14 [24]								S6A_15.0-16.5S
	16														
	17														
	18			X	S7A	72	4 10 15 [25]								S7A_17.5-19.0S
	19														
275	20														

Draft 1 After Field Review 6/17/2014

BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/16/14

BUTTE CAL

URS

Borehole Location: Butte Cal Fire, Oroville County: Butte
Coordinates: Northing: 2,317,418.19 Easting: 6,683,401.23
Latitude: Longitude:
Station: 1+12 Offset: -6
Coordinate System: CA State Plane Zone II Survey Method:

LOG OF BORING
BCF-B11

Butte Cal Fire

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60} (ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	20				S8A	100	3 13 16 [29]								S8A_20.0-21.5S
	21														
	22		SANDY SILT (ML); dark brown; moist; 70% no plasticity fines; 30% fine sand.												
	23				S9A	100	5 9 12 [21]								S9A_22.5-24.0S
	24														
270	25				S10A	100	8 10 14 [24]								S10A_25.0-26.5S
	26														
	27														
	28		Poorly Graded GRAVEL with Silt and Sand (GP-GM); 50% gravel; 40% fine to coarse sand; 10% no plasticity fines.		S11A	89	18 27 38 [65]								S11A_27.5-29.0S
	29														
265	30		Bottom of boring at 29' bgs. Backfilled with neat cement grout using 9 bags of 47 lb/bg cement and 60 gallons of water.												
	31														
	32														
	33														
	34														
260	35														
	36														
	37														
	38														
	39														
255	40														
	41														
	42														
	43														
	44														
250	45														

Draft 1 After Field Review 6/17/2014

URS

Borehole Location: Butte Cal Fire, Oroville **County:** Butte
Coordinates: Northing: 2,317,418.19 **Easting:** 6,683,401.23
Latitude: **Longitude:**
Station: 1+12 **Offset:** -6
Coordinate System: CA State Plane Zone II **Survey Method:**

LOG OF BORING
BCF-B11
Sheet 2 of 2
Butte Cal Fire

BUTTE CALFIRE: BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 09172014.GLB; 7/10/14

DATE STARTED	DATE COMPLETED	GROUND ELEVATION	ELEVATION DATUM	TOTAL DEPTH OF BORING
6/11/14	6/11/14	284 ft	NAVD 88	29.0 ft
DRILLING CONTRACTOR		**DRILLER'S NAME**	**HELPER'S NAME**	**TOTAL DEPTH OF FILL**
Cascade		Rick Alcartalo	Mat Talbert	0.4 ft
DRILLING METHOD		**DRILL RIG MAKE AND MODEL**		**CONSULTANT COMPANY**
Hollow Stem		CME 85, 1831		URS Corporation
DRILL BIT SIZE AND TYPE (HOLE DIAMETER)		**DRILLING ROD TYPE AND DIAMETER**		**FIELD LOGGER**
8" HS, 10"		NWT, 2"		M. Maghsoudlou
X VERTICAL ☐ INCLINED		**CASING TYPE, DIAMETER, INSTALLATION DEPTH**		**FIELD LOG REVIEWER**
		NA		G. Schaertl
SAMPLER TYPE(S)		**HAMMER TYPE, MAKE/MODEL, WEIGHT/DROP**		**HAMMER EFFICIENCY**
MCal(2"), SPT(1.375")		Marl, automatic, 140 lbs / 30-inch drop		
BOREHOLE BACKFILL OR COMPLETION		**GROUNDWATER READING: DURING DRILLING**		**AFTER DRILLING (DATE-TIME)**
Neat cement grout		Not encountered during drilling		

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
FILL	0		Asphalt												
	1		LEAN CLAY with Sand (CL); hard; brown; moist; 77% medium plasticity, medium dry strength, medium toughness fines; 23% fine sand.												
	2														
280	3				S1A	83	8 13 12 [25]			18	43	21	77		S1A_2.5-4.0S
	4														
	5				S2A	94	7 12 10 [22]								S2A_5.0-6.5S
	6														
	7														
275	8		At 8 feet, 69% fines.		S3A	83	11 11 11 [22]						69		S3A_7.5-9.0S
	9														
	10				S4A	44	14 23 42 [65]								S4A_10.5-11.0T
	11														
	12														
270	13		SANDY LEAN CLAY (CL); strong brown; moist; 62% low plasticity, medium dry strength, slow dilatancy, low toughness fines; 38% fine sand.		S5A S5B	89	11 16 21 [37]			14	30	8	62	UW	S5A_13.0-13.5T S5B_13.5-14.0T
	14														
	15		SILTY SAND (SM); medium dense; dark yellowish brown; moist; 80% fine sand; 20% no plasticity fines.		S6A	78	10 14 14 [28]								S6A_15.0-16.5S
	16														
	17		Poorly Graded SAND with Silt and Gravel (SP-SM); dark grayish brown; moist; 60% fine to medium sand; 30% gravel; 10% no plasticity fines.		S7A		20 28 50 [78]								S7A_17.0-18.5S
265	18														
	19														
	20														

Draft 1 After Field Review 6/17/2014

Borehole Location: Butte Cal Fire, Oroville **County:** Butte
Coordinates: Northing: 2,317,257.01 **Easting:** 6,683,429.07
Latitude: **Longitude:**
Station: 5+89 **Offset:** 49
Coordinate System: CA State Plane Zone II **Survey Method:**

URS

LOG OF BORING
BCF-B12
Sheet 1 of 2
Butte Cal Fire

BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB; 7/16/14
BUTTE CA

Elevation, feet	Depth, feet	Material Graphics	CLASSIFICATION OF MATERIALS (Description)	Sample Location	Sample Number	Recovery, %	Blows per 6 in. [Blows per ft]	N_{60}(ASTM)	PP or TV, tsf	LABORATORY DATA: Water Content, %	Liquid Limit	Plasticity Index	Fines, % < #200	Other Lab Tests	REMARKS
	20														
	21				S8A	67	4 14 50/4"								Rig started chattering at 20'. S8A_20.0-21.5S
	22						[64/10"]								
	23				S9A	44	9 30 50/4"								Gravel in shoe. Chattering and engine stalling at 22'. S9A_22.5-24.0S Gravel in shoe.
260	24						[80/10"]								
	25				S10A	44	43 50/4"								S10A_25.0-26.5S
	26														
	27						[50/4"]								
	28				S11A	33	50/7"								S11A_27.5-29.0S
255	29						REF								
	30		Bottom of boring at 29' bgs. Backfilled with neat cement grout using 10 bags of 47 lb/bg cement and 60 gallons of water.												
	31														
	32														
	33														
250	34														
	35														
	36														
	37														
	38														
245	39														
	40														
	41														
	42														
	43														
240	44														
	45														

Draft 1 After Field Review 6/17/2014

URS

Borehole Location: Butte Cal Fire, Oroville County: Butte
Coordinates: Northing: 2,317,257.01 Easting: 6,683,429.07
Latitude: Longitude:
Station: 5+89 Offset: 49
Coordinate System: CA State Plane Zone II Survey Method:

LOG OF BORING
BCF-B12
Sheet 2 of 2

Butte Cal Fire

BUTTE CALFIRE: BUTTECALFIRE.GPJ; URS SAC GINT LIBRARY 06172014.GLB: 7/16/14

APPENDIX B

Geotechnical Laboratory Testing

Sieve Analysis Test Results

Atterberg Limits Test Results

Corrosion Test Results

B.1 General

Laboratory tests were performed on selected representative samples as an aid in classifying the soils and to evaluate the physical properties of the soils affecting foundation and pavement design and construction procedures. Tests performed are indicated on the Logs of Borings. A description of the laboratory testing program is presented below.

B.2 Sieve Analyses

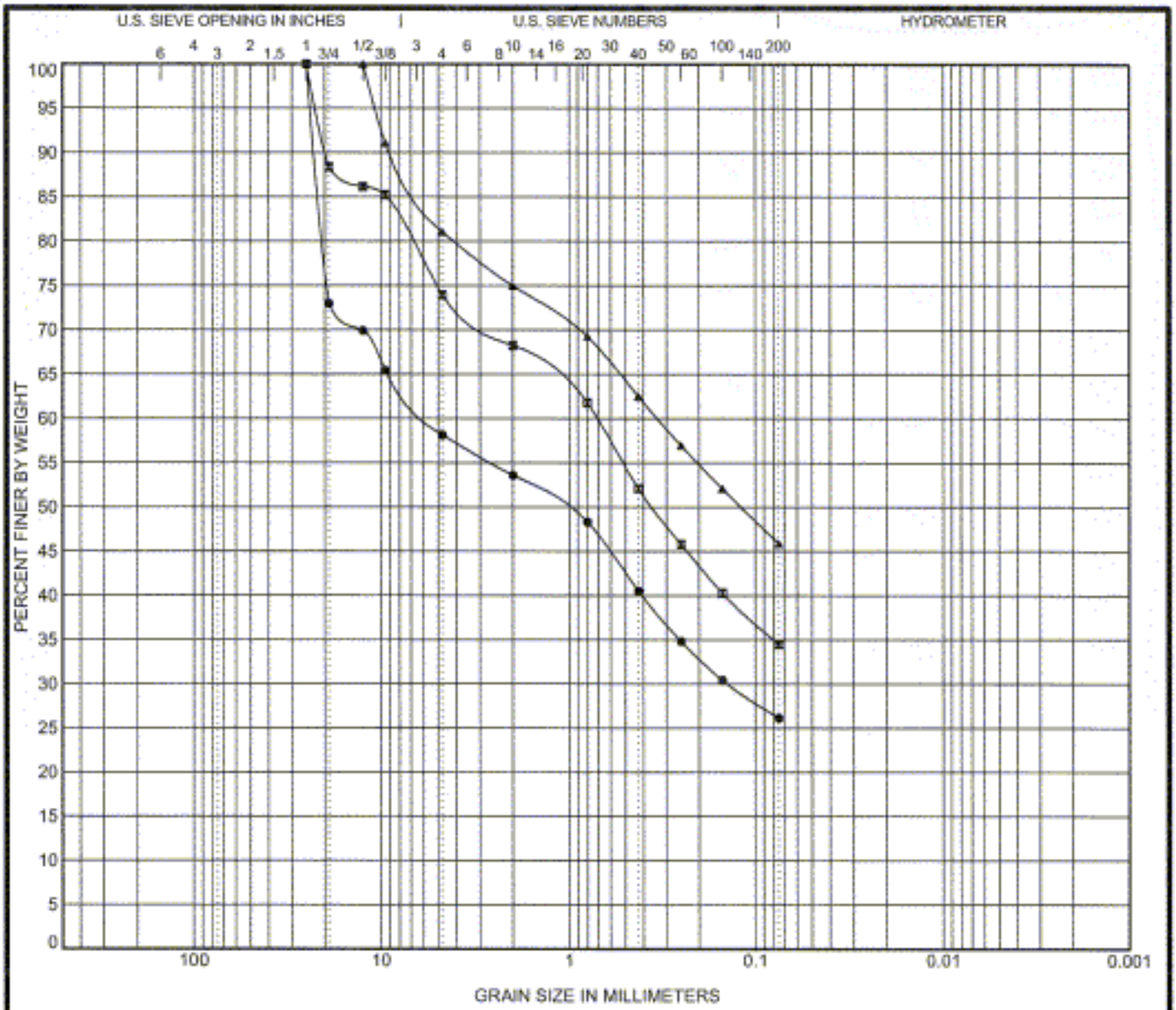
Particle size distribution tests were performed on selected samples of soils encountered at the site. These tests were performed to evaluate the gradation characteristics of the soils and to aid in their classification. The tests were performed in accordance with ASTM Test Methods D422 and D1140. The results are presented in this appendix.

B.3 Atterberg Limits

Atterberg Limits testing was performed to determine plasticity characteristics of selected samples and to aid in their classification. These tests were performed to determine the liquid limit, plastic limit, and plasticity index of the samples. These tests were performed in accordance with ASTM D4318. The results are presented in this appendix.

B.4 Corrosivity

Pending lab results.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample No. & Depth (ft.)	Classification	LL	PL	PI	Cc	Cu
●	BCF-B1_S1A-2.5-4.0S 2.5	**CLAYEY GRAVEL with SAND(GC)**	**37**	**22**	**15**		
⊠	BCF-B3_S2A-5.0-6.5S 5	**CLAYEY SAND with GRAVEL(SC)**	**35**	**20**	**15**		
▲	BCF-B9_S1A-2.5-4.0S 2.5	**CLAYEY SAND with GRAVEL(SC)**	**45**	**17**	**28**		

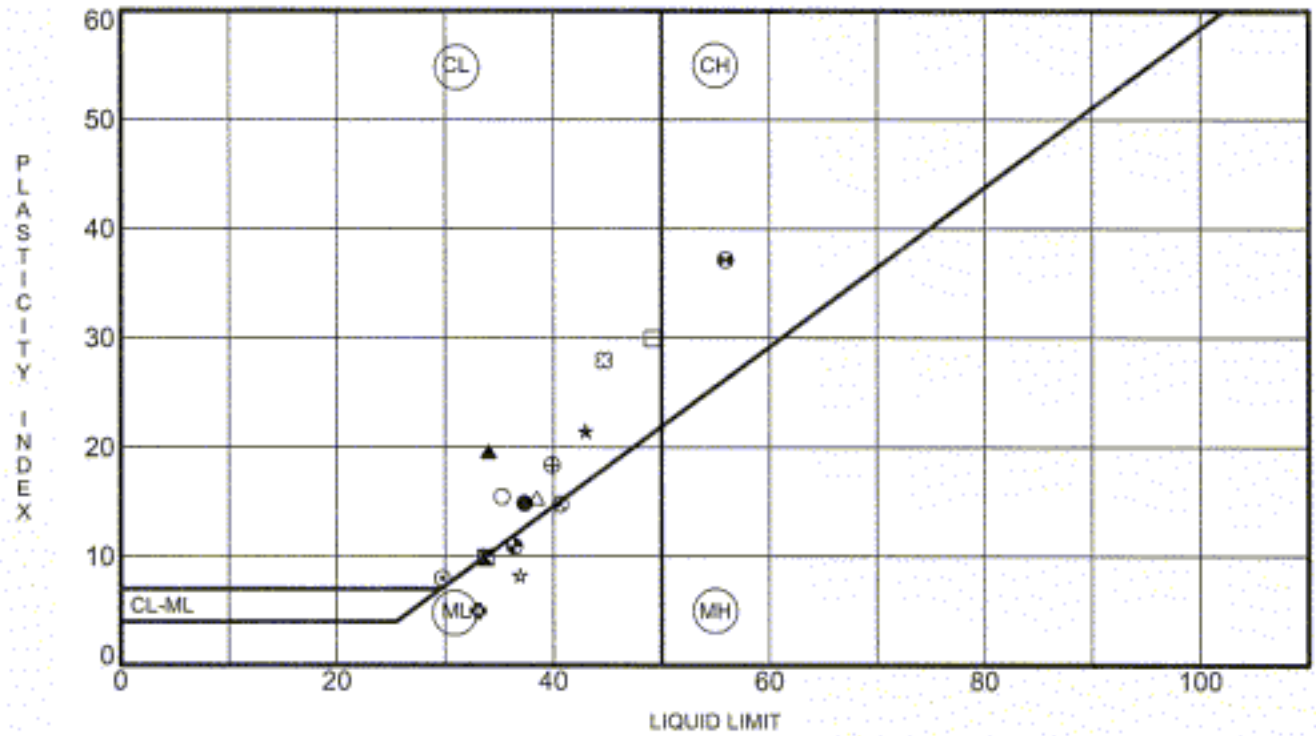
	Sample No. & Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	BCF-B1_S1A-2.5-4.0S 2.5	**25**	**5.666**	**0.14**		**41.8**	**32.0**	**26.1**	
⊠	BCF-B3_S2A-5.0-6.5S 5	**25**	**0.711**			**26.0**	**39.5**	**34.5**	
▲	BCF-B9_S1A-2.5-4.0S 2.5	**12.5**	**0.334**			**18.9**	**35.2**	**45.9**	

GEOCON
Geocon Consultants, Inc
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742
Telephone: 916-852-9118
Fax: 916-852-9132

GRAIN SIZE DISTRIBUTION

Project: URS Butte Cal Fire
Location:
Project Number: Geocon Project Number S9197-05-34

GRAIN SIZE URS-DWR S9197-05-34 URS BUTTE COUNTY FIRE.GPJ US_LAB.GDT 7/2/14



	Sample No. & Depth (ft.)	Liquid Limit	Plastic Limit	Plasticity Index	% Pass #200 Sieve	Unified Soil Classification Description	Preparation Method
●	BCF-B1_S1A-2.5-4.0S 2.5	37	22	15	26.1	CLAYEY GRAVEL with SAND(GC)	wet
⊠	BCF-B10_S1A-2.5-4.0S 2.5	34	24	10	27.4	SILTY SAND(SM)	wet
▲	BCF-B11_S1A-2.5-4.0S 2.5	34	14	20	55.5	SANDY LEAN CLAY(CL)	wet
★	BCF-B12_S1A-2.5-4.0S 2.5	43	22	21	77.4	LEAN CLAY with SAND(CL)	wet
⊙	BCF-B12_S5A-13.0-13.5T 13	30	22	8	62.0	SANDY LEAN CLAY(CL)	wet
✪	BCF-B2_S1A-2.5-4.0S 2.5	33	28	5	62.4	SANDY SILT(ML)	wet
○	BCF-B3_S2A-5.0-6.5S 5	35	20	15	34.5	CLAYEY SAND with GRAVEL(SC)	wet
△	BCF-B4_S1A-2.5-4.0S 2.5	38	23	15	36.8	CLAYEY SAND(SC)	wet
⊗	BCF-B4_S2A-5.0-6.0S 5	41	26	15	34.3	SILTY SAND(SM)	wet
⊕	BCF-B6_S1A-2.5-4.0S 2.5	40	21	19	35.5	CLAYEY SAND(SC)	wet
□	BCF-B6_S4A-11.5-12.0S 11.5	49	19	30	60.7	SANDY LEAN CLAY(CL)	wet
⊖	BCF-B7_S1A-1.0-2.5B 1	56	19	37	66.3	SANDY FAT CLAY(CH)	wet
◕	BCF-B7_S2A-2.5-4.0S 2.5	36	25	11	21.8	SILTY SAND(SM)	wet
☆	BCF-B8_S1A-2.5-3.5S 2.5	37	29	8	25.9	SILTY SAND(SM)	wet
⊠	BCF-B9_S1A-2.5-4.0S 2.5	45	17	28	45.9	CLAYEY SAND with GRAVEL(SC)	wet

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ATTERBERG LIMITS

Project: URS Butte Cal Fire
Location:
Project Number: Geocon Project Number S9197-05-34

P:\FOR DWR-URS_S9197-05-34 URS BUTTE COUNTY FIRE.GPJ US_LAB.GDT 7/2/14

APPENDIX G

Summary of Findings and Recommendations from Hazardous Materials Survey, URS, July 10, 2014.

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Technical Memorandum

FINAL

Prepared For	Sean Burnett, PE, Project Manager
Project	Butte Fire Station/Unit Headquarters – Replace Facility – Hazardous Materials Survey
Date	July 10, 2014
Subject	Summary of Findings and Recommendations from Hazardous Materials Survey
Prepared By	Mark King, CAC & Gordon Fong, EIT
Reviewed By	Richard Moore, CIH

1.0 BACKGROUND

Butte Forest Fire Station/Unit Headquarters (Station) is located on a 4.36 acre parcel adjacent to the City of Oroville and State Highways 70. The current facility is scheduled to be demolished and replaced with a new station. As part of the demolition plan, a hazardous material survey (Survey) consisting of sampling potential materials for asbestos, lead paint, and universal waste was conducted. The objective of the survey is to determine special measures necessary during the demolition process. The survey was conducted by Mark King, California Certified Asbestos Consultant (CAC) and Lead Based Paint Project Monitor. Mark was assisted by Gordon Fong. The survey was conducted on June 11th to 13th and was completed on June 19th.

2.0 SCOPE OF WORK

The Survey consisted of sampling of suspect homogeneous asbestos containing materials (ACMs), paint chip samples, and completing an inventory of potential universal (fluorescent light tubes, ballasts, thermostats, etc.) and household hazardous waste (oils, cleaners, solvents, paints, etc.). Sampling locations, testing results, and findings and recommendations are summarized in this memorandum.

2.1 Site Description

The site consists of ten (10) buildings, eight (8) of which will be demolished. The exact construction year of each building is unknown; however it is assumed the 10 buildings at the station were constructed in the early 1950s. The 8 buildings scheduled for demolition were surveyed. This included the following structures: Administrative building, kitchen (Mess Hall), Barracks, Warehouse, Auto Shop, storage building, Generator Building with Propane Tank, and the Garage.

The Administrative building is a single story building with a composite shingle roof. The observed exterior surfacing of the building is wood siding; and the interior finish consists of painted drywall, ceramic tile, vinyl composition tile (VCT), ceiling tile, and carpeting.

The kitchen (Mess Hall) building is a single story building with a metal roof. The observed exterior surfacing consists of a combination of wood siding and exterior shingle siding. The interior of the building comprises of painted drywall, ceramic tile, VCT and plaster. The barracks is similar to the kitchen building with the addition of carpeting in the interior.

The Warehouse and Auto Shop buildings consist of working areas and office areas. Office areas consist of painted drywall, ceramic tile and VCT. Both buildings are metal roofed two story buildings. The observed exterior of the warehouse consists of exterior shingle siding while the exterior of the auto shop is constructed of ordinary wood siding.

The storage building and Garage buildings have separate areas for storage/vehicle maintenance and office spaces. Interior surfacing of office areas consists of painted drywall, ceramic tile, VCT, and ceiling tile. Both buildings are single story metal roof structures. The north face of the Garage building is constructed of exterior shingle siding. The remainder of the Garage building and all of the observed exterior of the storage building is composed of wood siding.

Each of the 8 buildings consisted of a concrete foundation where pad elevations differed by several feet due to elevation changes throughout the site. The existing site is paved with asphalt pavement and concrete walkways.

3.0 TEST RESULTS

Suspect homogeneous ACMs and paint chip samples were collected and sent to Micro Analytical Laboratories in Emeryville, California for analysis. The inventory of potential universal and household waste consists of noting their general locations, no laboratory test were conducted for this waste. Exhibits 1 through 8 in Appendix C show where samples were taken and the general locations of potential universal and household hazardous waste.

3.1 Asbestos

During the Survey, a total of fifty (50) suspect homogeneous ACMs (109 individual samples) were identified inside the buildings. Each homogeneous area consisted of at least two (2) individual samples. Twenty (20) of the homogenous materials were found to contain >1% asbestos. Five (5) of the homogeneous materials were found to contain <1% asbestos. The remaining twenty five (25) homogeneous materials were found to contain no asbestos. Asbestos classification follows the following reference: Title 8 CCR 1529 (A) (B), 40 CFR 763.86. A summary of the sample results along with their locations is provided in Table 1. Negative asbestos materials are listed in Table 1A.

Table 1. Asbestos Containing Materials

Material Description	General Sample Location	NESHAP's Classification	Asbestos%	Approx. Quantities
Administrative Building				
Drywall & Taping mud	Throughout	NA	0.167%	5,049 sq. ft.
12"x12" white floor tile and mastic	SW office	Cat .I non-friable[1]	Floor tile ND, mastic 8% CH	2,880 sq. ft.
Kitchen (Mess Hall)				
9"x9" tan floor tile and mastic	Hallway	Cat. I non-friable[1]	Floor tile 3% CH, mastic 8% CH	620 sq. ft.
Plaster	Walk-In Room	Cat. I non-friable[1]	<1% CH	100 sq. ft.
Drywall & Taping mud	Throughout	NA	<0.083% CH	2,153 sq. ft.
9"x9" gray floor tile and mastic	Mess Hall	Cat. I non-friable[1]	Floor tile 3% CH, mastic 8% CH	600 sq. ft.
Exterior siding shingle	Building exterior	Cat II non-friable[2]	10% CH	1,658 sq. ft.
9"x9" blue floor tile and mastic	NW end	Cat. I non-friable[1]	Floor tile 6% CH, mastic 8% CH	299 sq. ft.
Barracks				
Drywall & Taping mud	Throughout	RACM[3]	1.667% CH	4,459 sq. ft.
9"x9" rust color floor tile and mastic	North hallway	Cat. I non-friable[1]	Floor tile 6% CH, mastic 8% CH	270 sq. ft.
9"x9" white floor tile and mastic	North/NE hallway	Cat. I non-friable[1]	Floor tile ND, mastic 8% CH	312 sq. ft.
Vapor barrier	Exterior under exterior siding shingles	Cat. I non-friable[1]	6% CH	3,218 sq. ft.
Exterior siding shingles	Exterior	Cat. II non-friable[2]	10% CH	3,218 sq. ft.
Warehouse				
Exterior siding shingle	Exterior	Cat. II non-friable[2]	10% CH	4,800 sq. ft.
Auto Shop				
9"x9" gray floor tile and mastic	Restroom	Cat. I non-friable[1]	Floor tile 2% CH, mastic ND	55 sq. ft.
Window glazing	West windows exterior	Cat. I non-friable[1]	<1% CH	10 lf.
Roof penetration mastic	Roof	Cat. I non-friable[1]	10% CH	15 sq. ft.
Storage Building				

Table 1. Asbestos Containing Materials

Material Description	General Sample Location	NESHAP's Classification	Asbestos%	Approx. Quantities
9"x9" tan floor tile and mastic	Office	Cat. I non-friable[1]	Floor tile 5% CH, mastic ND	330 sq. ft.
Drywall & Taping mud	Office	NA	0.083%	429 sq. ft.
Garage				
Exterior siding shingles	Exterior	Cat. II non-friable[2]	10% CH	376 sq. ft.
Interior siding shingles	Mechanical room	Cat. II non-friable[2]	10% CH	121 sq. ft.
9"x9" green floor tile and mastic	Exercise room	Cat. I non-friable[1]	Floor tile 3% CH, mastic ND	660 sq. ft.
12"x12" gray floor tile and mastic	Office	Cat. I non-friable[1]	Floor tile 2% CH, mastic ND	620 sq. ft.

CH = Chrysotile, CR = Crocidolite, Anthophylite = AN, AM= Amosite, NA = Not Applicable, ND = None Detected, NF = Non-friable, TM= Taping Mud, DW= Drywall, * - If mastic is removed using mechanical methods it shall be considered RACM, see note 3 below.

[1] Category I non-friable ACM is any asbestos-containing packing, gasket, resilient floor covering or asphalt roofing product which contains more than one percent (1%) asbestos as determined using polarized light microscopy (PLM)

[2] Category II non-friable ACM is any material, excluding Category I non-friable ACM, containing more than one percent (1%) asbestos as determined using PLM

[3] Regulated Asbestos -Containing Materials (RACM) is (a) friable asbestos material, (b) Category I non-friable ACM that has become friable, (c) Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting or abrading, or (d) Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations.

Table 1A. Non - Asbestos Containing Materials

Material Description	General Sample Location	Sample Results
Administrative Building		
4" brown base cove and mastic	NW office	ND
4" tan base cove and mastic	Break room	ND
Duct sealant	Mechanical room	ND
Duct insulation	Mechanical room	ND
6" blue base cove and mastic	Men's restroom	ND
Composite roof shingles	Roof field	ND
12"x12" white ceiling tile	Throughout	ND
Ceiling tile mastic (brown)	Throughout	ND

Table 1A. Non - Asbestos Containing Materials

Material Description	General Sample Location	Sample Results
Kitchen (Mess Hall)		
Vapor barrier	Building exterior, under exterior siding shingles	ND
4" brown base cove and mastic	Mess Hall	ND
Barracks		
Pipe insulation	Above ceiling throughout	ND
4" brown base cove and mastic	NE hallway	ND
4" blue base cove and mastic	West end barracks	ND
4" gray base cove and mastic	Laundry room	ND
Tan linoleum	Restroom	ND
Warehouse		
Tan Linoleum	Office	ND
Vapor barrier	Building exterior, under exterior siding shingles	ND
Auto Shop		
Tan linoleum	2nd level break room	ND
Storage Building		
12"x12" ceiling tile	Office	ND
Generator Building with Propane Tank		
Window glazing	West windows, interior	ND
Parking Lot		
Asphalt	Throughout	ND
Garage		
Drywall & Taping mud	Office	ND
Vapor barrier	Building exterior under exterior siding shingles	ND
4" gray base cove and mastic	Office	ND

ND=None Detected

All of the samples were transported under chain-of-custody procedures to Micro Analytical Laboratories in Emeryville, California. The asbestos samples were analyzed using polarized light

microscopy (PLM) techniques in accordance with methodology approved by the U.S. Environmental Protection Agency (EPA). As set forth in the Code of Federal Regulations (CFR), 40 CFR Part 763, Appendix A to Subpart F, Section 1.2 and 1.7.2.4, the lower limit of reliability detection for asbestos using the PLM method is approximately one percent (1%) by volume.

3.2 Lead in Paint

During the survey a total of twenty three (23) paint chip samples were collected from painted surfaces at each of the eight surveyed buildings. Lead regulatory criteria according to the following reference: Title 8 CCR 1532.1 Lead in Construction. A summary of the lead sample results is included in Table 2.

Table 2. Lead Containing Materials

Material Description	General Sample Location	Lead (Pb) Sample Results
Administrative Building		
White paint on wood	Exterior trim	3,600 ppm
Green paint on wood	Exterior trim	<74 ppm
Tan paint on wood	Heater room door	450 ppm
Kitchen (Mess Hall)		
Green paint on wood	Exterior trim	240 ppm
White paint on metal	Door	780 ppm
Barracks		
Tan paint on metal	Door	210 ppm
Green paint on wood	Exterior trim	<58 ppm
Warehouse		
White paint on wood	Exterior trim	910 ppm
Yellow paint on concrete	Interior floor	35,000 ppm
Green paint on wood	Exterior trim	190 ppm
Auto Shop		
Gray paint on concrete	Interior floor	<63 ppm
Blue paint on wood	Electrical parts storage room	2,100 ppm
White paint on wood	Building exterior	<69 ppm
Green paint on wood	Exterior trim	<80 ppm
Storage Building		

Table 2. Lead Containing Materials

Material Description	General Sample Location	Lead (Pb) Sample Results
Gray paint on concrete	Work area	100 ppm
White paint on wood	Exterior	<63 ppm
Green paint on wood	Exterior trim	<72 ppm
Generator Building with Propane Tank		
Tan paint on metal	Door	16000 ppm
Green paint on metal	Window frame	8,300 ppm
Garage		
Gray paint on concrete	Interior floor	<52 ppm
Red paint on wood	Door	16,000 ppm
Green paint on wood	Exterior trim	<75 ppm
White paint on concrete	Interior floor	<70 ppm

ppm= parts per million

3.3 Potential Universal Waste/Household Hazardous Waste

An inventory of potential universal waste and household hazardous waste was completed and summarized in Table 3.

Table 3. Potential Universal Waste/Household Hazardous Waste

Material Description	Approximate Quantities/General Location	Potential Hazards
Administrative Building		
Fluorescent light tubes	213/Throughout building	Mercury
Light fixture ballasts	91/Throughout building	PCBs
Compact fluorescent bulbs	1	Mercury
Thermostats	2	Mercury
Kitchen (Mess Hall)		
Fluorescent light tubes	31/Throughout building	Mercury
Light fixture ballasts	23/Throughout building	PCBs
Compact fluorescent bulbs	3	Mercury
Cleaning supplies	Kitchen	Household Hazardous Waste

Table 3. Potential Universal Waste/Household Hazardous Waste

Material Description	Approximate Quantities/General Location	Potential Hazards
Barracks		
Fluorescent light tubes	54/Throughout building	Mercury
Light fixture ballasts	27/Throughout building	PCBs
Compact fluorescent bulbs	3	Mercury
Thermostats	2	Mercury
Warehouse		
Fluorescent light tubes	63/Throughout building	Mercury
Light fixture ballasts	42/Throughout building	PCBs
Thermostats	1	Mercury
Printer ink, household cleaners, household batteries, absorbent, motor oil, hydraulic fluid	Throughout building	Household Hazardous Waste
Auto Shop		
Fluorescent light tubes	76/Throughout building	Mercury
Light fixture ballasts	48/Throughout building	PCBs
Compact fluorescent light bulbs	1	Mercury
Antifreeze, motor oil, truck batteries, household cleaners, compressed oxygen, acetylene tank, lubricants, paint, refrigerant	Throughout building	Household Hazardous Waste
Storage Building		
Fluorescent light tubes	66/Throughout building	Mercury
Light fixture ballasts	36/Throughout building	PCBs
Thermostats	1	Mercury
Refrigerant, spray glue, antifreeze, motor oil, solvent	Storage room	Household Hazardous Waste
Generator Building with Propane Tank		
Oils, solvents	Interior	Household Hazardous Waste
Garage		
Fluorescent light tubes	57/Throughout building	Mercury

Table 3. Potential Universal Waste/Household Hazardous Waste

Material Description	Approximate Quantities/General Location	Potential Hazards
Light fixture ballasts	41/Throughout building	PCBs
Compact fluorescent bulbs	3	Mercury
Thermostats	1	Mercury
Paints, solvents, oils, truck batteries, antifreeze, cleaners	Throughout building	Household Hazardous Waste

Note: Items listed as household hazardous waste can be disposed of locally at Recology of Butte, Colusa Counties. 2750 South 5th Ave., Oroville, CA. if the site owner chooses to dispose of these items.

4.0 FINDINGS AND RECOMMENDATIONS

4.1 Asbestos

Asbestos-containing building materials at the site contain asbestos in concentrations greater than one tenth of one percent (0.1%). Disturbing materials containing greater than 0.1% asbestos either through repair, maintenance, renovation, or demolition activities triggers numerous regulations enforced by such agencies as OSHA (worker protection) and EPA (environmental exposure, transportation and disposal).

Listed below are the regulations that apply if the materials are disturbed:

- Any individual who contracts to provide health and safety services relating to ACMs must be certified by Cal-OSHA as either a Certified Asbestos Consultant or a Site Surveillance Technician (SST) (under the supervision of a CAC). The activities they are certified to provide include: conducting asbestos surveys, writing work plans or specifications for abatement, monitoring the work of abatement contractors, collecting air samples, and determining if the work area is safe for re-occupancy by non-asbestos workers. Regulation: Cal-OSHA 8 CCR 1529 (q) (1).

- If more than 100 square feet of materials that contain greater than 0.1% asbestos will be abated, they must be abated by a Cal-OSHA registered asbestos abatement contractor. Regulation: Cal-OSHA 8 CCR 1529 (R).

- ACMs that are classified by OSHA as miscellaneous materials are present including drywall and taping mud, vinyl floor tile and mastic, roof mastic, cement siding shingles, vapor barrier, etc. Removal of these materials is considered a Class II activity according to CAL-OSHA regulations. Work practices and engineering controls for Class II work are specified in Cal-OSHA 8 CCR 1529 (g) (7-8).

- Friable ACMs greater than 1% asbestos must be manifested, transported, and disposed of as hazardous waste in accordance with the Department of Toxic and Substances Control (DTSC), a division of Cal-EPA. DTSC regulates disposal of asbestos waste. DTSC issues U.S. EPA hazardous waste generator identification numbers. Non-friable RACMS (regulated asbestos containing materials) those asbestos materials that when removed become friable, must be treated the same as friable ACMs.

- During activities such as demolition, removal, renovation, clean-up and routine maintenance, the OSHA specified method of compliance includes: respiratory protection, protective clothing and equipment, housekeeping, hygiene facilities, medical surveillance, training, etc.

4.2 Asbestos and Lead

4.2.1 Observations

- (Administrative Building) Asbestos containing materials were found in the floor mastic located under the white 12"x12" floor tile located at a south west office. Less than 1% asbestos was found in the drywall taping mud. Lead containing paint was found in white and green painted exterior trim.

- (Kitchen, Mess Hall) Asbestos containing materials ACMs were found in various colors of 9"x9" vinyl floor tile and mastic plaster, and cement siding shingles. Less than 1% asbestos was found in the drywall taping mud. Lead containing paint was found in white and green paint.

- (Barracks) Asbestos containing materials were found in rust color and white floor tile and mastic, drywall taping mud, vapor barrier, and cement siding shingles. Lead containing paint was found in tan colored paint.

- (Warehouse) Asbestos containing materials were found in cement siding shingles. Lead based paint was found on yellow paint on the concrete floor. Lead containing paint was found in white and green painted exterior trim.

- (Auto Shop) Asbestos containing materials were found in 9"x9" gray floor tile, window glazing, and roof penetration mastic. Lead containing paint was found in blue paint in an interior storage room.

- (Storage Building) Asbestos containing materials were found in tan 9"x9" floor tile. Less than 1% asbestos was found in the drywall taping mud. Lead containing paint was found in gray paint on the concrete floor.

- (Generator Building with Propane Tank) Lead based paint was found on tan colored paint. Lead containing paint was found in green paint.

- (Garage) Asbestos containing materials were found in cement siding shingles, 9"x9" green floor tile, and 12"x12" gray floor tile.

4.2.2 Recommendations

- Develop a work plan/job specification for the removal of ACMs. NESHAP regulations require the removal of all ACMs prior to demolition, or renovation. The work plan must take into account access to the materials to be abated and safety issues with the roof.

- Hire a California DOSH registered asbestos abatement contractor to remove the asbestos in accordance with all Federal, State, and local regulations, and utilizing state of the art work practices.

- Develop a work plan/job specifications for stabilization of lead based, and lead containing painted surfaces prior to the demolition of the buildings.
- Hire a California DOSH registered lead paint abatement contractor to stabilize lead painted surfaces in accordance with all applicable Federal, State, and local regulations and utilizing state of the art work practices.

5.0 CONCLUSION

Following conducting a hazardous materials survey it was determined that special measures need to be taken prior to demolition. Table 4 summarizes materials containing asbestos that shall be removed prior to demolition. Regulations and recommendations outlined in section 4.1 and 4.2.2 shall be followed during abatement. Table 5 summarizes paints that require paint stabilization prior to demolition. Recommendations outlines in section 4.2.2 shall be followed for lead abatement.

Table 4. Materials to be Removed Prior to Demolition

Material Description	General Location of Removal	Approx. Quantities
Administrative Building		
Drywall & Taping mud	Whole building	5,049 sq. ft.
12"x12" white floor tile and mastic	Whole building, tile under carpeting	2,880 sq. ft.
Kitchen (Mess Hall)		
9"x9" tan floor tile and mastic	Hallway	620 sq. ft.
Plaster	Walk-In room	100 sq. ft.
Drywall & Taping mud	Whole building	2,153 sq. ft.
9"x9" gray floor tile and mastic	Mess Hall area	600 sq. ft.
Exterior siding shingle	Building exterior	1,658 sq. ft.
9"x9" blue floor tile and mastic	HFEO barracks	299 sq. ft.
Barracks		
Drywall & Taping mud	Whole building	4,459 sq. ft.
9"x9" rust color floor tile and mastic	North hallway	270 sq. ft.
9"x9" white floor tile and mastic	North/NE hallway	312 sq. ft.
Vapor barrier	Exterior of building, under exterior shingle siding	3,218 sq. ft.
Exterior siding shingles	Exterior of building	3,218 sq. ft.
Warehouse		
Exterior siding shingle	Exterior of building	4,800 sq. ft.
Auto Shop		

Table 4. Materials to be Removed Prior to Demolition

Material Description	General Location of Removal	Approx. Quantities
9"x9" gray floor tile and mastic	Restroom	55 sq. ft.
Window glazing	West window exterior	10 lf.
Roof penetration mastic	Roof	15 sq. ft.
Storage Building		
9"x9" tan floor tile and mastic	Office area	330 sq. ft.
Drywall & Taping mud	Office area under wood facing	429 sq. ft.
Garage		
Exterior siding shingles	Exterior of building	376 sq. ft.
Interior siding shingles	Mechanical room	121 sq. ft.
9"x9" green floor tile and mastic	Exercise room	660 sq. ft.
12"x12" gray floor tile and mastic	Office area	620 sq. ft.

Table 5. Paint Requiring Paint Stabilization Prior to Demolition

Material Description	General Location of Removal
Administrative Building	
White paint on wood	All white paint exterior trim
Tan paint on wood	Heater room door
Kitchen (Mess Hall)	
Green paint on wood	All green paint exterior trim
White paint on metal	All metal doors with white paint
Barracks	
Tan paint on metal	All metal doors with tan paint
Warehouse	
White paint on wood	All white paint exterior trim
Yellow paint on concrete	On east loading area
Green paint on wood	All green paint exterior trim
Auto Shop	
Blue paint on wood	All blue paint in electrical parts storage room
Storage Building	

Table 5. Paint Requiring Paint Stabilization Prior to Demolition	
Material Description	**General Location of Removal**
Gray paint on concrete	Work area
Generator Building with Propane Tank	
Tan paint on metal	All metal doors with tan paint
Green paint on metal	All metal window frames
Garage	
Red paint on wood	All wooden doors with red paint

6.0 LIMITATIONS

The results of this report and the opinions expressed are based upon visual observations of the property and scope of services described herein.

Services consist of professional opinions; conclusions and recommendations that are made in accordance with generally accepted consulting standards, principles and practices.

Reasonable attempts have been made to ensure that the report is complete and accurate with respect to URS's authorized scope of investigation.

If insulated pipes, ducts, etc. are encountered during demolition in areas that I did not have access to (such as wall cavities), work must stop and further samples must be collected. Sub-surface excavation is anticipated during this demolition. A California registered geologist must be hired to confirm or refute this area as a GURU (geographical ultramafic rock unit) which is known to be susceptible to naturally occurring asbestos. Also if piping is encountered sub-surface the piping must be assumed to contain asbestos until further testing proves otherwise. This document is not intended to be an abatement specification. Abatement contractors must verify material amounts prior to removal.

Report prepared by:

Mark S. King CAC #92-0323/CDPH Lead Project Monitor/Supervisor 2493

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Technical Memorandum

FINAL

Appendix A
Field and Laboratory Sample Identification and Description

Table A-1. Asbestos Field and Laboratory Sampling Identification
Table A-2. Asbestos Field and Laboratory Sampling Identification – Asphalt Samples
Table A- 3. Lead In Paint Field and Laboratory Sampling Identification

Table A-1. Asbestos Field and Laboratory Sampling Identification

Administrative Building (28 Total Samples)

Field Sample Identification	Laboratory Identification	Description
DW1	HM#1-1-B	Dry Wall and Taping Mud, Women's Restroom
DW2	HM#1-1-A	Dry Wall and Taping Mud, Men's Restroom
DW3	HM#1-1-C	Dry Wall and Taping Mud, Break Room
DW4	HM#1-1-D	Dry Wall and Taping Mud, Office
DW5	HM#1-1-E	Dry Wall and Taping Mud, West End Hallway
BrBC1	HM#2-2-A	4" Brown Base Cove and Mastic, Northwest Office
BrBC2	HM#2-2-B	4" Brown Base Cove and Mastic, Northwest Office
TBC1	HM#3-3-A	4" Tan Base Cove and Mastic, Men's Restroom
TBC2	HM#3-3-B	4" Tan Base Cove and Mastic, Break Room
GF1	HM#4-4-A	Green Linoleum, Men's Restroom
GF2	HM#4-4-B	Green Linoleum, Break Room
DS1	HM#5-5-A	Duct Sealant, Mechanical Room
DS2	HM#5-5-B	Duct Sealant, Mechanical Room
DI1	HM#-6-6-A	Duct Insulation, Mechanical Room
DI2	HM#-6-6-B	Duct Insulation, Mechanical Room
DI3	HM#-6-6-C	Duct Insulation, Mechanical Room
BBC1	HM#7-7-A	6" Blue Base Cove and Mastic, Men's Restroom
BBC2	HM#7-7-B	6" Blue Base Cove and Mastic, Men's Restroom
RF1	HM#8-8-A	Roof Field, Northwest Side
RF2	HM#8-8-B	Roof Field, North Side, Middle of Building
CT1	HM#9-9-A	12"X12" Ceiling Tile-White, Men's Restroom
CT2	HM#9-9-B	12"X12" Ceiling Tile-White, Men's Restroom
CTM1	HM#10-10-A	Ceiling Tile Mastic-Brown, Men's Restroom
CTM2	HM#10-10-B	Ceiling Tile Mastic-Brown, Men's Restroom
FT1	HM#11-11-A	12"X12" Gray Floor Tile and Mastic, Men's Restroom Entryway
FT2	HM#11-11-B	12"X12" Gray Floor Tile and Mastic, Building Entryway
WFT1	HM#12-12-A	12"X12" White Floor Tile and Mastic, Office Entryway
WFT2	HM#12-12-B	12"X12" White Floor Tile and Mastic, Office Entryway

Kitchen (Mess Hall) (17 Total Samples)

Field Sample Identification	Laboratory Identification	Description
TT1	HM#13-13-A	9"X9" Tan Floor Tile and Mastic, Hallway
TT2	HM#13-13-B	9"X9" Tan Floor Tile and Mastic, Hallway
P1	HM#14-14-A	Plaster, Walk-in

P2	HM#14-14-B	Plaster, Walk-in
DW1	HM#15-15-A	Drywall and Taping Mud, Northeast End
DW2	HM#15-15-C	Drywall and Taping Mud, North End
DW3	HM#15-15-B	Drywall and Taping Mud, Southeast End
GT1	HM#16-16-A	9"X9" Gray Floor Tile and Mastic
GT2	HM#16-16-B	9"X9" Gray Floor Tile and Mastic
SS1	HM#17-17-A	Exterior Siding Shingle, Southeast End
SS2	HM#17-17-B	Exterior Siding Shingle, South End
VB1	HM#18-18-A	Vapor Barrier, Southeast End
VB2	HM#18-18-B	Vapor Barrier, South End
BBC1	HM#19-19-A	4" Brown Base Cove and Mastic
BBC2	HM#19-19-B	4" Brown Base Cove and Mastic
BT1	HM#20-20-A	9"X9" Blue Floor Tile and Mastic
BT2	HM#20-20-B	9"X9" Blue Floor Tile and Mastic

Barracks (23 Total Samples)

Field Sample Identification	Laboratory Identification	Description
DW1	HM#21-21-A	Drywall and Taping Mud, Day Room
DW2	HM#21-21-B	Drywall and Taping Mud, North Hallway
DW3	HM#21-21-C	Drywall and Taping Mud, Northwest Hallway
PE1	HM#22-22-A	Pipe Insulation Above Ceiling, Northwest End
PE2	HM#22-22-B	Pipe Insulation Above Ceiling, Northwest End
RT1	HM#23-23-A	9"x9" Rust Color Floor Tile and Mastic, North Hallway
RT2	HM#23-23-B	9"x9" Rust Color Floor Tile and Mastic, North Hallway Near West Exit
WT1	HM#24-24-A	9"X9" White Floor Tile and Mastic, Restroom
WT2	HM#24-24-B	9"X9" White Floor Tile and Mastic, North Hallway
VB1	HM#25-25-A	Vapor Barrier, Southwest End
VB2	HM#25-25-B	Vapor Barrier, Southwest End
ES1	HM#26-26-A	Exterior Siding Shingle, Southwest End
ES2	HM#26-26-B	Exterior Siding Shingle, Southwest End
BBC1	HM#27-27-A	4" Brown Base Cove and Mastic, Restroom
BBC2	HM#27-27-B	4" Brown Base Cove and Mastic, Restroom
BT1	HM#28-28-A	9"X9" Brown VCT and Mastic, Day Room
BT2	HM#28-28-B	9"X9" Brown VCT and Mastic, Sleeping Area
BLBC1	HM#29-29-A	4" Blue Base Cove and Mastic, Restroom
BLBC2	HM#29-29-B	4" Blue Base Cove and Mastic, Restroom
GBC1	HM#30-30-A	4" Gray Base Cove and Mastic, Laundry Room

GBC2	HM#30-30-B	4" Gray Base Cove and Mastic, Laundry Room
TL1	HM#31-31-A	Tan Linoleum, Restroom
TL2	HM#31-31-B	Tan Linoleum, Restroom

Warehouse (6 Total Samples)

Field Sample Identification	Laboratory Identification	Description
TL1	HM#32-32-A	Tan Linoleum, Office
TL2	HM#32-32-B	Tan Linoleum, Office
SS1	HM#33-33-A	Exterior Siding Shingle, East Loading Dock
SS2	HM#33-33-B	Exterior Siding Shingle, Southeast End
VB1	HM#34-34-A	Vapor Barrier, East Loading Dock
VB2	HM#34-34-B	Vapor Barrier, Southeast End

Auto Shop (8 Total Samples)

Field Sample Identification	Laboratory Identification	Description
GT1	35-A	9"X9" Gray Floor Tile and Mastic, Area outside of Restroom on 1st Floor
GT2	35-B	9"X9" Gray Floor Tile and Mastic, Area outside of Restroom on 1st Floor
TL1	36-A	Tan Linoleum, Break Room on 2nd Floor
TL2	36-B	Tan Linoleum, Break Room on 2nd Floor
WG1	37-A	Exterior Window Glazing, West End
WG2	37-B	Exterior Window Glazing, West End
PM1	38-A	Roof Penetration Mastic, Northeast Portion of Roof
PM2	38-B	Roof Penetration Mastic, Northeast Portion of Roof

Storage Building (7 Total Samples)

Field Sample Identification	Laboratory Identification	Description
FT1	39-A	9"X9" Tan VAT and Mastic, File Storage Room
FT2	39-B	9"X9" Tan VAT and Mastic, Office Area by Entryway
DW1	40-A	Drywall and Taping Mud, File Storage Room
DW2	40-B	Drywall and Taping Mud, Office Area Behind Entryway to File Storage Room
DW3	40-C	Drywall and Taping Mud, Office Area Behind Entryway to File Storage Room
CT1	41-A	12"X12" Ceiling Tile (White), File Storage Room
CT2	41-B	12"X12" Ceiling Tile (White), File Storage Room

Generator Building with Propane Tank (2 Total Samples)

Field Sample Identification	Laboratory Identification	Description
WG1	42-A	Interior Window Glazing, West Window
WG2	42-B	Interior Window Glazing, West Window

Garage (15 Total Samples)

Field Sample Identification	Laboratory Identification	Description
DW1	43-A	Drywall and Taping Mud, Office Area
DW2	43-B	Drywall and Taping Mud, Office Area
DW3	43-C	Drywall and Taping Mud, Office Area
VB1	44-A	Vapor Barrier, Southwest End
VB2	44-B	Vapor Barrier, Southwest End
SS1	45-A	Exterior Siding Shingles, Southwest End
SS2	45-B	Exterior Siding Shingles, Southwest End
GBC1	46-A	4" Gray Base Cove and Mastic, East End Office
GBC2	46-B	4" Gray Base Cove and Mastic, East End Office
IS1	47-A	Gray Interior Siding, South Storage Room
IS2	47-B	Gray Interior Siding, South Storage Room
GrFT1	48-A	9"X9" Green VAT and Mastic, Exercise Room
GrFT2	48-B	9"X9" Green VAT and Mastic, Exercise Room
GFT1	49-A	12"X12" Gray VAT and Mastic, East End Office
GFT2	49-B	12"X12" Gray VAT and Mastic, East End Office

Table A-2. Asbestos Field and Laboratory Sampling Identification

Asphalt Samples (3 Total Samples)

Field Sample Identification	Laboratory Identification	Description
AS1	50-A	Asphalt Sample, South of Admin. Building by Parking Area
AS2	50-B	Asphalt Sample, By Southwest Edge of Pavement by Admin, Building
AS3	50-C	Asphalt Sample, Northeast Corner by Barracks

Table A-3. Lead In Paint Field and Laboratory Sampling Identification

Field Sample Identification	Laboratory Identification	Description
Administrative Building		
WP	PB-01	White Paint on Wood Siding
GP	PB-02	Green Paint on Wood Siding
TP1	PB-03	Tan Paint on Wood Siding
Kitchen (Mess Hall)		
GP	PB-04	Green Paint on Wood Siding
WP	PB-05	White Paint on Metal Door
Barracks		
TP	PB-06	Tan Paint on Metal Door
GP	PB-07	Green Paint on Wood Siding
Warehouse		
WP	PB-08	White Paint on Wood Siding
YP	PB-09	Yellow Paint on Concrete
GP	PB-10	Green Paint on Wood and Metal Gutter
Auto Shop		
GrP	PB-11	Gray Paint on Concrete Floor
BP	PB-12	Blue Paint on Wood
WP	PB-13	White Paint on Wood Siding
GP	PB-14	Green Paint on Wood Siding
Storage Building		
GrP	PB-17	Gray Paint on Concrete Floor
WP	PB-18	White Paint on Wood Siding and Foundation
GP	PB-19	Green Paint on Wood Siding
Generator Building with Propane Tank		
TP	PB-15	Tan Paint on Metal Door
GP	PB-16	Green Paint on Metal Window Frame
Garage		
GrP	PB-20	Gray Paint on Concrete Floor
RP	PB-21	Red Paint on Wood Siding
GP	PB-22	Green Paint on Wood Siding
WP	PB-23	White Paint on Concrete

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Technical Memorandum
FINAL

Appendix B
Inspector Credentials

State of California Department of Public Health

Lead-Related Construction Certificate

Certificate Type	Expiration Date
Supervisor	10/28/2014
Project Monitor	10/28/2014

Mark S. King

ID # 2493

State of California
Division of Occupational Safety and Health
Certified Asbestos Consultant

Mark Steven King
Name

Certification No. 92-0323

Expires on 10/26/14

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.

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Technical Memorandum
FINAL

Appendix D
Laboratory Chain of Custody and Sample Results

1233 195212

URS Corporation
2870 Gateway Oaks Dr.
Sacramento, CA. 95833
Phone 916-679-2000

ACM BULK SAMPLE DATA SHEET

* PLM Analysis
* Stop Analysis at First Positive

Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 95965

Project #:17327033.50003 Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☐ Micro ☐ Other: _____ Turnaround Time: ___ Rush ___ 24Hrs ___ X 3-5 Days

Fax Report To: ☐ ☐ (Fax #) ☐ ☐

	HM# 1	**Material Description: Drywall and taping mud**
	Sample ID	**Sample Location & Material Location** — **Quantity: 5,049 sq. ft.**
1	1-A	Building B/ Admin. Building Men's restroom
2	1-B	Building B/Admin. Building Women's restroom
3	1-C	Building B/Admin. Building Break room
	HM# 1	**Material Description: Drywall and taping mud**
	Sample ID	**Sample Location & Material Location** — **Quantity: 5,049 sq. ft.**
4	*1-D*	*Building B/Admin. Building Office*
5	*1-E*	*Building B/Admin. Building West end hallway*
	HM# 2	**Material Description: 4" Brown base cove and mastic**
	Sample ID	**Sample Location & Material Location** — **Quantity: 300 lf.**
6	*2-A*	*Building B/Admin. Building North west office*
7	*2-B*	*Building B/Admin Building North west office*
	HM# 3	**Material Description: 4" Tan base cove and mastic**
	Sample ID	**Sample Location & Material Location** — **Quantity: 500 lf.**
8	*3-A*	*Building B/Admin. Building break room*
9	*3-B*	*Building B/Admin. Building break roo*
	HM# 4	**Material Description: Green linoleum**
	Sample ID	**Sample Location & Material Location** — **Quantity: 1,152 sq. ft.**
10	*4-A*	*Building B/Admin. Building men's restroom*
11	*4-B*	*Building B/Admin Building break room*
	HM# 5	**Material Description: Duct sealant**
	Sample ID	**Sample Location & Material Location** — **Quantity: 5 sq. ft.**
12	5-A	Building B/Admin. Building mechanical room
13	5-B	Building B/Admin. Building mechanical room

Relinquished By: MSK Signature: [signature] Date/Time: 6/19/14

Received By: JR Signature: Date/Time: 6/20/14 10:11a

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ACM BULK SAMPLE DATA SHEET
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Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 95965

Project #:17327033.50003 Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☐ Micro ☐ Other: _____ Turnaround Time: ___ Rush ___ 24Hrs ___ X 3-5 Day:

Fax Report To: ☐ ☐ (Fax #) _____ ☐ _____ ☐

	HM# 6	**Material Description: Duct Insulation**
	Sample ID	**Sample Location & Material Location** — **Quantity: 30 sq. ft.**
14	6-A	Building B/Admin. Building mechanical room
15	6-B	Building B/Admin. Building mechanical room
16	6-C	Building B/Admin. Building mechanical room
	HM# 7	**Material Description: 6" blue base cove and mastic**
	Sample ID	**Sample Location & Material Location** — **Quantity: 50 lf.**
17	7-A	Building B/Admin. Building men's restroom
18	7-B	Building B/Admin. Building men's restroom
	HM# 8	**Material Description: Roofing**
	Sample ID	**Sample Location & Material Location** — **Quantity: 3,884 sq. ft.**
19	8-A	Building B Admin. Building roof field ne side
20	8-B	Building B/Admin. Building roof field ne side
	HM# 9	**Material Description: 12"x12" ceiling tile (white)**
	Sample ID	**Sample Location & Material Location** — **Quantity: 3,884 sq. ft.**
21	9-A	Building B/Admin. Building men's restroom
22	9-B	Building B/Admin. Building men's restroom
	HM# 10	**Material Description: Ceiling tile mastic (brown)**
	Sample ID	**Sample Location & Material Location** — **Quantity: 1,000 sq. ft.**
23	10-A	Building B/Admin. Building men's restroom
24	10-B	Building B/Admin. Building men's restroom
	HM# 11	**Material Description: 12"x12" gray floor tile and mastic**
	Sample ID	**Sample Location & Material Location** — **Quantity: 754 sq. ft.**
25	11-A	Building B/Admin. Building entryway
26	11-B	Building B/Admin building entryway

Relinquished By: MSK Signature: [signature] Date/Time: 6/19/14

Received By: JR Signature: Date/Time: 6/20/14 10:11a

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Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 95965

Project #:17327033.50003 Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☐ Micro ☐ Other: _____ Turnaround Time: ___ Rush ___ 24Hrs ___ X 3-5 Days

Fax Report To: ☐ ☐ (Fax #) ☐ ☐

HM# 12	Material Description: 12"x12" white floor tile and mastic	
Sample ID	Sample Location & Material Location	Quantity: 2,880 sq. ft.
27 12-A	Building B/Admin. Building sw office	
28 12-B	Building B/Admin. Building sw office	
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:

Relinquished By: MSK Signature: [signature] Date/Time: 6/19/14

Received By: JR Signature: Date/Time: 6/20/14

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Phone 916-679-2000

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ACM BULK SAMPLE DATA SHEET

* PLM Analysis
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Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 95965

Project #:17327033.50003 Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☐ Micro ☐ Other: _____ Turnaround Time: ___ Rush ___ 24Hrs ___ X 3-5 Days

Fax Report To: ☐ ☐ (Fax #) _____ ☐ _____ ☐

	HM# 13	**Material Description: 9"x9" tan floor tile and mastic**
	Sample ID	**Sample Location & Material Location** — **Quantity: 620 sq. ft.**
29	13-A	Building C hallway
30	13-B	Building C hallway
	HM# 14	**Material Description: Plaster**
	Sample ID	**Sample Location & Material Location** — **Quantity: 100 sq. ft.**
31	14-A	Building C mechanical room
32	14-B	
	HM# 15	**Material Description: Drywall and taping mud**
	Sample ID	**Sample Location & Material Location** — **Quantity: 2,153 sq. ft.**
33	15-A	Building C ne end
34	15-B	Se end
35	15-C	North end
	HM# 16	**Material Description: 9"x9" gray floor tile and mastic**
	Sample ID	**Sample Location & Material Location** — **Quantity: 600 sq. ft.**
36	16-A	Building C mess hall
37	16-B	
	HM# 17	**Material Description: Exterior siding shingle**
	Sample ID	**Sample Location & Material Location** — **Quantity: 7,296 sq. ft.**
38	17-A	Building C se end
39	17-B	Building C south end
	HM# 18	**Material Description: Vapor barrier**
	Sample ID	**Sample Location & Material Location** — **Quantity: 7,296 sq. ft.**
40	18-A	Building C under exterior siding se end
41	18-B	Building C under exterior siding south end

Relinquished By: MBL Signature: [signature] Date/Time: 6/19/14

Received By: JR 6/20/14 10:11a Signature: Date/Time:

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ACM BULK SAMPLE DATA SHEET

* PLM Analysis
* Stop Analysis at First Positive

Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 95965

Project #:17327033.50003 Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☐ Micro ☐ Other: _____ Turnaround Time: Rush 24Hrs X 3-5 Days

Fax Report To: ☐ ☐ (Fax #) ☐ ☐

HM# 19	Material Description: Brown base cove and mastic 4"	
Sample ID	Sample Location & Material Location	Quantity:750 lf.
19-A	Building C mess hall	
19-B		

HM# 20	Material Description: 9"x9" blue floor tile and mastic	
Sample ID	Sample Location & Material Location	Quantity299 sq. ft.
20-A	Building C nw end	
20-B		

HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:

HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:

HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:

HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity

Relinquished By: MSR Signature: [signature] Date/Time: 6/19/14

JR 6/20/14 10:11a

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ACM BULK SAMPLE DATA SHEET

* PLM Analysis
* Stop Analysis at First Positive

Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 95965

Project #:17327033.50003 Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☐ Micro ☐ Other: _____ Turnaround Time: ___ Rush ___ 24Hrs ___ X 3-5 Days

Fax Report To: ☐ ☐ (Fax #) ☐ ☐

HM# 21	Material Description: Drywall and taping mud	
Sample ID	Sample Location & Material Location	Quantity:4,459 sq. ft.
46 21-A	Building D day room	
47 21-B	Building D north hallway	
48 21-C	Building D nw hallway	
HM# 22	Material Description: Pipe insulation	
Sample ID	Sample Location & Material Location	Quantity 1,000 lf.
49 22-A	Building D above ceiling nw end	
50 22-B	Building D above ceiling nw end	
HM#23	Material Description: 9"x9" rust color floor tile and mastic	
Sample ID	Sample Location & Material Location	Quantity: 270 sq. ft.
51 23-A	Building D north hallway	
52 23-B		
HM# 24	Material Description: 9"x9" white floor tile and mastic	
Sample ID	Sample Location & Material Location	Quantity:924 sq. ft.
53 24-A	Building D ne hallway	
54 24-B	Building D north hallway	
HM# 25	Material Description: Vapor barrier	
Sample ID	Sample Location & Material Location	Quantity:24,140 sq. ft.
55 25-A	Building D sw end	
56 25-B		
HM# 26	Material Description: Exterior siding shingles	
Sample ID	Sample Location & Material Location	Quantity24,140 sq. ft.
57 26-A	Building D sw end	
58 26-B		

Relinquished By: TTSR Signature: [signature] Date/Time: 6/19/14

JP 6/20/14 10:11am

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195212

ACM BULK SAMPLE DATA SHEET

* PLM Analysis
* Stop Analysis at First Positive

PAGE 7 OF 8

Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 95965

Project #:17327033.50003 Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☒ Micro ☐ Other: _____ Turnaround Time: ___Rush ___24Hrs ___X 3-5 Days

Fax Report To: ☐ ☐ (Fax #) ☐ ☐

HM#	Material Description:	Quantity:
27	9" Brown Base cove & Mastic	~~2,880 sq. ft.~~
Sample ID	Sample Location & Material Location	
59 27-A	Bldg. A NE Hallway	
60 27-B	" " " "	
HM#	Material Description:	Quantity:
28	4"x9" Brown VCT & Mastic	7,684
Sample ID	Sample Location & Material Location	
61 28-A	Bldg. A Hallway	
62 28-B	" " " " "	
HM#	Material Description:	Quantity:
29	4" Blue base cove & Mastic	750 LF
Sample ID	Sample Location & Material Location	
63 29-A	Bldg. A Barracks	
64 29-B	" " " "	
HM#	Material Description:	Quantity:
30	4" Gray base cove & Mastic	500 LF
Sample ID	Sample Location & Material Location	
65 30-A	Bldg. A Laundry room	
66 30-B	" " " " " " "	
HM#	Material Description:	Quantity:
31	Tan linoleum	209 sq ft.
Sample ID	Sample Location & Material Location	
67 31-A	Bldg. A Restroom	
68 31-B	" " " " " " " "	
HM#	Material Description:	Quantity:
Sample ID	Sample Location & Material Location	
Analyzed 1st Positive in each Homogenous group		

Relinquished By: ISR Signature: [signature] Date/Time: 6/19/14

Received By: Signature: Date/Time:

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2870 Gateway Oaks Dr.
Sacramento, CA. 95833
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195212

ACM BULK SAMPLE DATA SHEET

* PLM Analysis
* Stop Analysis at First Positive

PAGE 8 OF 8

Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 95965

Project #:17327033.50003 Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☐ Micro ☐ Other: _____ Turnaround Time: ___Rush ___24Hrs ___X 3-5 Days

Fax Report To: ☐ ☐ (Fax #) ☐ ☐

HM# 32	Material Description: Tan linoleum	
Sample ID	Sample Location & Material Location	Quantity: ~~2,880 sq. ft.~~ 300 ☒
69 32-A	Bldg. E Office	
70 32-B	" " " "	
HM# 33	Material Description: Exterior siding shingle	
Sample ID	Sample Location & Material Location	Quantity: 4,800 ☒
71 33-A	Bldg. E loading dock	
72 33-B	" " " "	
HM# 34	Material Description: Vapor barrier	
Sample ID	Sample Location & Material Location	Quantity: 4,800 ☒
73 34-A	Bldg E loading dock	
74 34-B	" " " "	
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:

Relinquished By: MSK Signature: [signature] Date/Time: 6/19/14

Received By: JR Signature: [signature] Date/Time: 6/20/14 10:11 am

MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - POLARIZED LIGHT MICROSCOPY (PLM)

1233
Mark King
URS Corporation
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833

PROJECT:
BUTTE FOREST FIRE STATION REPLACE FACILITY / HAZ. MAT. SURVEY
176 NELSON AVE.
OROVILLE, CA 95965
PROJECT NO. 17327033.50003

Micro Log In	**195212**
Total Samples	75
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/22/2014

ASBESTOS INFORMATION

SAMPLE IDENTIFICATION	QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#1-1-A Micro #: 195212-01 Analyst: WC DRYWALL AND TAPING MUD BUILDING B, ADMIN. BUILDING MEN'S RESTROOM	DRYWALL: NONE DETECTED TAPING MUD: NONE DETECTED PAINT: NONE DETECTED	10 % CELLULOSE Matrix: GYPSUM (CALCIUM SULFATE), Type: CARBONATE
Client #: HM#1-1-B Micro #: 195212-02 Analyst: WC DRYWALL AND TAPING MUD BUILDING B, ADMIN. BUILDING WOMEN'S RESTROOM	COMPOSITE DW & TM: <1% CHRYSOTILE ASBESTOS DRYWALL: NONE DETECTED TAPING MUD (OFF-WHITE): 3% CHRYSOTILE ASBESTOS PAINT: NONE DETECTED	10 % CELLULOSE 2 % FIBROUS GLASS Matrix: GYPSUM (CALCIUM SULFATE), Type: CARBONATE
Client #: HM#1-1-C Micro #: 195212-03 Analyst: WC DRYWALL AND TAPING MUD BUILDING B, ADMIN. BUILDING BREAK ROOM	DRYWALL: NONE DETECTED TAPING MUD (WHITE): NONE DETECTED PAINT: NONE DETECTED	10 % CELLULOSE 2 % FIBROUS GLASS Matrix: GYPSUM (CALCIUM SULFATE), Type: CARBONATE
Client #: HM#1-1-D Micro #: 195212-04 Analyst: WC GR DRYWALL AND TAPING MUD BUILDING B, ADMIN. BUILDING OFFICE	COMPOSITE DW & TM: <1% CHRYSOTILE ASBESTOS DRYWALL: NONE DETECTED OFF-WHITE TAPING MUD: 2% CHRYSOTILE ASBESTOS TAPE / PAINT: NONE DETECTED	15 % CELLULOSE 2 % FIBROUS GLASS Matrix: GYPSUM (CALCIUM SULFATE), Type: CARBONATE
Client #: HM#1-1-E Micro #: 195212-05 Analyst: WC DRYWALL AND TAPING MUD BUILDING B, ADMIN. BUILDING WEST END HALLWAY	DRYWALL: NONE DETECTED TAPING MUD: NONE DETECTED PAINT: NONE DETECTED	10 % CELLULOSE Matrix: GYPSUM (CALCIUM SULFATE), Type: CARBONATE

Technical Supervisor: Gamini Ranatunga, Ph.D. 6/23/2014 Date Reported

NVLAP Lab Code 101872-0. CA ELAP Certification #1037. Analyses use Polarized Light Microscopy (PLM). Micro Analytical SOP PLM-101 (Rev. Jan. 2014). Basic techniques follow the EPA Interim Method for Bulk Insulation Samples (1982), and EPA-600/R93-116 (1993). The 1993 method covers all types of bulk materials and is based on the 1982 Method, with improved analytical techniques for layered samples as required for NESHAP compliance. Asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (much less than 1%) may not be reliable or reproducible by PLM. Weight % cannot be determined by PLM. Asbestos with diameter below ~1 µm may not be detected by PLM. Absence of asbestos in dust, debris, and some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Tremolite-asbestos or actinolite- asbestos may be indistinguishable by PLM from some similar, non-regulated amphiboles (e.g. the "Libby Amphiboles" richterite and winchite), and should be confirmed by TEM. The lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos; however, reliable determination of asbestos percent at this level cannot be done by PLM estimation. PLM Point Counting or TEM weight percent analysis are recommended. Only dominant non-asbestos materials are indicated. Interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Layers are analyzed separately when feasible; if asbestos is detected, percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. The notation ND (or "NONE DETECTED") indicates a result of "NO ASBESTOS DETECTED" in a homogeneous sample, or in all layers of a heterogeneous sample. Composite asbestos percentages from multiple layers are applicable only to wallboard / joint compound systems; compositing is based on customers' descriptions of material as "joint compound". Customers are solely responsible for identification and description of bulk materials listed on field forms. Laboratory descriptions may differ from those given by customers. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated herein, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed.

MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - POLARIZED LIGHT MICROSCOPY (PLM)

1233
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PROJECT:
BUTTE FOREST FIRE STATION REPLACE FACILITY / HAZ. MAT. SURVEY
176 NELSON AVE.
OROVILLE, CA 95965
PROJECT NO. 17327033.50003

Micro Log In	**195212**
Total Samples	75
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/22/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#2-2-A Micro #: 195212-06 Analyst: KM 4" BROWN BASE COVE AND MASTIC BUILDING B, ADMIN. BUILDING NORTHWEST OFFICE	BASE COVE: NONE DETECTED MASTIC (BROWN): NONE DETECTED MASTIC (YELLOW): NONE DETECTED	1 % TALC Matrix: SYNTHETIC MATERIAL, Type: CARBONATE, ADHESIVE.
Client #: HM#2-2-B Micro #: 195212-07 Analyst: KM MO 4" BROWN BASE COVE AND MASTIC BUILDING B, ADMIN. BUILDING NORTHWEST OFFICE	BASE COVE: NONE DETECTED MASTIC (BROWN): NONE DETECTED MASTIC (YELLOW): NONE DETECTED	1 % TALC Matrix: SYNTHETIC MATERIAL, Type: CARBONATE, ADHESIVE.
Client #: HM#3-3-A Micro #: 195212-08 Analyst: KM 4" TAN BASE COVE AND MASTIC BUILDING B, ADMIN. BUILDING BREAK ROOM	BASE COVE: NONE DETECTED MASTIC (YELLOW): NONE DETECTED	Matrix: SYNTHETIC MATERIAL, Type: CARBONATE, ADHESIVE.
Client #: HM#3-3-B Micro #: 195212-09 Analyst: KM 4" TAN BASE COVE AND MASTIC BUILDING B, ADMIN. BUILDING BREAK ROOM	BASE COVE: NONE DETECTED MASTIC (YELLOW): NONE DETECTED	Matrix: SYNTHETIC MATERIAL, Type: CARBONATE, ADHESIVE.
Client #: HM#4-4-A Micro #: 195212-10A Analyst: KM GREEN LINOLEUM BUILDING B, ADMIN. BUILDING MEN'S RESTROOM *LAB NOTE: GREEN LINOLEUM*	LINOLEUM: NONE DETECTED BACKING: NONE DETECTED MASTIC (YELLOW): NONE DETECTED	10 % CELLULOSE 5 % FIBROUS GLASS Matrix: SYNTHETIC MATERIAL, Type: CARBONATE, ADHESIVE.

Technical Supervisor: Gamini Ranatunga, Ph.D. 6/23/2014 Date Reported

NVLAP Lab Code 101872-0. CA ELAP Certification #1037. Analyses are Polarized Light Microscopy (PLM). Micro Analytical SOP PLM-101 (Rev. Jan. 2014). Basic techniques follow the EPA Interim Method for Bulk Insulation Samples (1982), and EPA-600/R93-116 (1993). The 1993 method covers all types of bulk materials and is based on the 1982 Method, with improved analytical techniques for layered samples as required for NESHAP compliance. Asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (much less than 1%) may not be reliable or reproducible by PLM. Weight % cannot be determined by PLM. Asbestos with diameter below ~1 µm may not be detected by PLM. Absence of asbestos in dust, debris, and some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Tremolite-asbestos or actinolite- asbestos may be indistinguishable by PLM from some similar, non-regulated amphiboles (e.g. the "Libby Amphiboles" richterite and winchite), and should be confirmed by TEM. The lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos; however, reliable determination of asbestos percent at this level cannot be done by PLM estimation; PLM Point Counting or TEM weight percent analysis are recommended. Only dominant non-asbestos materials are indicated. Interferences may prevent detection of small asbestos fibers, and limited determination of some optical properties. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Layers are analyzed separately when feasible; if asbestos is detected, percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. The notation ND (or "NONE DETECTED") indicates a result of "NO ASBESTOS DETECTED" in a homogeneous sample, or in all layers of a heterogeneous sample. Composite asbestos percentages from multiple layers are applicable only to wallboard / joint compound systems; compositing is based on customers' descriptions of material as "joint compound". Customers are solely responsible for identification and description of bulk materials listed on field forms. Laboratory descriptions may differ from those given by customers. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated herein, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed.

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PROJECT:
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176 NELSON AVE.
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PROJECT NO. 17327033.50003

Micro Log In	**195212**
Total Samples	75
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/22/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#4-4-A Micro #: 195212-10B Analyst: KM GREEN LINOLEUM BUILDING B, ADMIN. BUILDING MEN'S RESTROOM *LAB NOTE: TAN FLOOR TILE*	VINYL FLOOR TILE: 3% CHRYSOTILE ASBESTOS MASTIC (BLACK): 8% CHRYSOTILE ASBESTOS	Matrix SYNTHETIC MATERIAL Type: CARBONATE, ADHESIVE
Client #: HM#4-4-B Micro #: 195212-11 Analyst: GREEN LINOLEUM BUILDING B, ADMIN. BUILDING BREAK ROOM	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: HM#5-5-A Micro #: 195212-12 Analyst: KM DUCT SEALANT BUILDING B, ADMIN. BUILDING MECHANICAL ROOM	NONE DETECTED	Matrix SYNTHETIC MATERIAL Type:
Client #: HM#5-5-B Micro #: 195212-13 Analyst: KM DUCT SEALANT BUILDING B, ADMIN. BUILDING MECHANICAL ROOM	NONE DETECTED	Matrix SYNTHETIC MATERIAL Type:
Client #: HM#6-6-A Micro #: 195212-14 Analyst: KM DUCT INSULATION BUILDING B, ADMIN. BUILDING MECHANICAL ROOM	NONE DETECTED	90 % FIBROUS GLASS Matrix SYNTHETIC MATERIAL Type:

Technical Supervisor: Gamini Ranatunga, Ph.D. 6/23/2014 Date Reported

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PROJECT NO. 17327033.50003

Micro Log In	**195212**
Total Samples	75
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/22/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#6-6-B Micro #: 195212-15 Analyst: KM DUCT INSULATION BUILDING B, ADMIN. BUILDING MECHANICAL ROOM	NONE DETECTED	90 % FIBROUS GLASS Matrix: SYNTHETIC MATERIAL Type:
Client #: HM#6-6-C Micro #: 195212-16 Analyst: KM DUCT INSULATION BUILDING B, ADMIN. BUILDING MECHANICAL ROOM	NONE DETECTED	90 % FIBROUS GLASS Matrix: SYNTHETIC MATERIAL Type:
Client #: HM#7-7-A Micro #: 195212-17 Analyst: KM MO 6" BLUE BASE COVE AND MASTIC BUILDING B, ADMIN. BUILDING MEN'S RESTROOM	BASE COVE: NONE DETECTED MASTIC (WHITE): NONE DETECTED	Matrix: Type:
Client #: HM#7-7-B Micro #: 195212-18 Analyst: KM 6" BLUE BASE COVE AND MASTIC BUILDING B, ADMIN. BUILDING MEN'S RESTROOM	BASE COVE: NONE DETECTED MASTIC (WHITE): NONE DETECTED	Matrix: Type:
Client #: HM#8-8-A Micro #: 195212-19 Analyst: KM ROOFING BUILDING B, ADMIN. BUILDING ROOF FIELD NE SIDE	TAR WITH GRAVEL: NONE DETECTED FIBERGLASS FELT LAYERS: NONE DETECTED GLOSSY TAR: NONE DETECTED	10 % FIBROUS GLASS Matrix: TAR/ASPHALT, BINDER Type:

Technical Supervisor: Gamini Ranatunga, Ph.D. 6/23/2014 Date Reported

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PROJECT:
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OROVILLE, CA 95965
PROJECT NO. 17327033.50003

Micro Log In	**195212**
Total Samples	75
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/22/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#8-8-B Micro #: 195212-20 Analyst: KM ROOFING BUILDING B, ADMIN. BUILDING ROOF FIELD NE SIDE	TAR WITH GRAVEL: NONE DETECTED FIBERGLASS FELT LAYERS: NONE DETECTED GLOSSY TAR: NONE DETECTED CELLULOSE FELT: NONE DETECTED	5 % CELLULOSE 10 % FIBROUS GLASS Matrix: TAR/ASPHALT, BINDER Type:
Client #: HM#9-9-A Micro #: 195212-21 Analyst: KM 12"X12" CEILING TILE-WHITE BUILDING B, ADMIN. BUILDING MEN'S RESTROOM	NONE DETECTED	90 % CELLULOSE Matrix: BINDER, OTHER, MISCELLANEOUS Type:
Client #: HM#9-9-B Micro #: 195212-22 Analyst: KM 12"X12" CEILING TILE-WHITE BUILDING B, ADMIN. BUILDING MEN'S RESTROOM	NONE DETECTED	90 % CELLULOSE Matrix: BINDER, OTHER, MISCELLANEOUS Type:
Client #: HM#10-10-A Micro #: 195212-23 Analyst: KM CEILING TILE MASTIC- BROWN BUILDING B, ADMIN. BUILDING MEN'S RESTROOM	CEILING TILE: NONE DETECTED MASTIC (BROWN): NONE DETECTED	50 % CELLULOSE Matrix: SYNTHETIC MATERIAL Type:
Client #: HM#10-10-B Micro #: 195212-24 Analyst: KM CEILING TILE MASTIC- BROWN BUILDING B, ADMIN. BUILDING MEN'S RESTROOM	CEILING TILE: NONE DETECTED MASTIC (BROWN): NONE DETECTED	50 % CELLULOSE Matrix: SYNTHETIC MATERIAL Type:

Technical Supervisor: Gamini Ranatunga, Ph.D. 6/23/2014 Date Reported

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PROJECT:
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PROJECT NO. 17327033.50003

Micro Log In	**195212**
Total Samples	75
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/22/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#11-11-A Micro #: 195212-25 Analyst: KM 12"X12" GRAY FLOOR TILE AND MASTIC BUILDING B, ADMIN. BUILDING ENTRYWAY	FLOOR TILE: NONE DETECTED MASTIC (BLACK): 8% CHRYSOTILE ASBESTOS	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: HM#11-11-B Micro #: 195212-26 Analyst: 12"X12" GRAY FLOOR TILE AND MASTIC BUILDING B, ADMIN. BUILDING ENTRYWAY	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: HM#12-12-A Micro #: 195212-27 Analyst: KM MO 12"X12" WHITE FLOOR TILE AND MASTIC BUILDING B, ADMIN. BUILDING SW OFFICE	FLOOR TILE: 5% CHRYSOTILE ASBESTOS MASTIC (BLACK): 8% CHRYSOTILE ASBESTOS	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: HM#12-12-B Micro #: 195212-28 Analyst: 12"X12" WHITE FLOOR TILE AND MASTIC BUILDING B, ADMIN. BUILDING SW OFFICE	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: HM#13-13-A Micro #: 195212-29 Analyst: KM 9"X9" TAN FLOOR TILE AND MASTIC BUILDING C HALLWAY	FLOOR TILE: 3% CHRYSOTILE ASBESTOS MASTIC (BLACK): 6% CHRYSOTILE ASBESTOS	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE

Technical Supervisor: Gamini Ranatunga, Ph.D. 6/23/2014 Date Reported

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Micro Log In	**195212**
Total Samples	75
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SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#13-13-B Micro #: 195212-30 Analyst: 9"X9" TAN FLOOR TILE AND MASTIC BUILDING C HALLWAY	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: HM#14-14-A Micro #: 195212-31 Analyst: KM PLASTER BUILDING C MECHANICAL ROOM	< 1% CHRYSOTILE ASBESTOS	Matrix Type: ROCK FRAGMENTS, CARBONATE, BINDER
Client #: HM#14-14-B Micro #: 195212-32 Analyst: KM PLASTER BUILDING C MECHANICAL ROOM	< 1% CHRYSOTILE ASBESTOS	Matrix Type: ROCK FRAGMENTS, CARBONATE, BINDER
Client #: HM#15-15-A Micro #: 195212-33 Analyst: KM DRYWALL AND TAPING MUD BUILDING C NE END	COMPOSITE DW & TM: <1% CHRYSOTILE ASBESTOS DRYWALL: NONE DETECTED TAPING MUD: 2% CHRYSOTILE ASBESTOS PAINT: NONE DETECTED	10 % CELLULOSE Matrix Type: GYPSUM (CALCIUM SULFATE), CARBONATE
Client #: HM#15-15-B Micro #: 195212-34 Analyst: KM DRYWALL AND TAPING MUD BUILDING C SE END	COMPOSITE DW & TM: <1% CHRYSOTILE ASBESTOS DRYWALL: NONE DETECTED TAPING MUD: 2% CHRYSOTILE ASBESTOS PAINT: NONE DETECTED TAPE: NONE DETECTED	10 % CELLULOSE Matrix Type: GYPSUM (CALCIUM SULFATE), CARBONATE

Technical Supervisor: Gamini Ranatunga, Ph.D. 6/23/2014 Date Reported

NVLAP Lab Code 101872-0. CA ELAP Certification #1037. Analyses use Polarized Light Microscopy (PLM), Micro Analytical SOP PLM-101 (Rev. Jan. 2014). Basic techniques follow the EPA Interim Method for Bulk Insulation Samples (1982), and EPA-600/R93-116 (1993). The 1993 method covers all types of bulk materials and is based on the 1982 Method, with improved analytical techniques for layered samples as required for NESHAP compliance. Asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (much less than 1%) may not be reliable or reproducible by PLM. Weight % cannot be determined by PLM. Asbestos with diameter below ~1 µm may not be detected by PLM. Absence of asbestos in dust, debris, and some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Tremolite-asbestos or actinolite- asbestos may be indistinguishable by PLM from some similar, non-regulated amphiboles (e.g. the "Libby Amphiboles" richterite and winchite), and should be confirmed by TEM. The lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos, however, reliable determination of asbestos percent at this level cannot be done by PLM estimation. PLM Point Counting or TEM weight percent analysis are recommended. Only dominant non-asbestos materials are indicated. Interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Layers are analyzed separately when feasible. If asbestos is detected, percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. The notation ND (or "NONE DETECTED") indicates a result of "NO ASBESTOS DETECTED" in a homogeneous sample, or in all layers of a heterogeneous sample. Composite asbestos percentages from multiple layers are applicable only to wallboard / joint compound systems; compositing is based on customers' descriptions of material as "joint compound". Customers are solely responsible for identification and description of bulk materials listed on field forms. Laboratory descriptions may differ from those given by customers. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated herein, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed.

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BULK ASBESTOS ANALYSIS - POLARIZED LIGHT MICROSCOPY (PLM)

1233
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PROJECT:
BUTTE FOREST FIRE STATION REPLACE FACILITY / HAZ. MAT. SURVEY
176 NELSON AVE.
OROVILLE, CA 95965
PROJECT NO. 17327033.50003

Micro Log In	**195212**
Total Samples	75
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/22/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#15-15-C Micro #: 195212-35 Analyst: KM DRYWALL AND TAPING MUD BUILDING C NORTH END	COMPOSITE DW & TM: <1% CHRYSOTILE ASBESTOS DRYWALL: NONE DETECTED TAPING MUD: 2% CHRYSOTILE ASBESTOS PAINT: NONE DETECTED	10 % CELLULOSE Matrix Type: GYPSUM (CALCIUM SULFATE), CARBONATE
Client #: HM#16-16-A Micro #: 195212-36 Analyst: KM 9"X9" GRAY FLOOR TILE AND MASTIC BUILDING C MESS HALL	FLOOR TILE: 3% CHRYSOTILE ASBESTOS MASTIC (BLACK): 8% CHRYSOTILE ASBESTOS	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: HM#16-16-B Micro #: 195212-37 Analyst: 9"X9" GRAY FLOOR TILE AND MASTIC BUILDING C MESS HALL	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: HM#17-17-A Micro #: 195212-38 Analyst: KM MD EXTERIOR SIDING SHINGLE BUILDING C SE END	10% CHRYSOTILE ASBESTOS	Matrix Type: SYNTHETIC MATERIAL
Client #: HM#17-17-B Micro #: 195212-39 Analyst: EXTERIOR SIDING SHINGLE BUILDING C SOUTH END	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:

Technical Supervisor: Gamini Ranatunga, Ph.D. 6/23/2014 Date Reported

NVLAP Lab Code 101672-0, CA ELAP Certification #1037. Analyses use Polarized Light Microscopy (PLM), Micro Analytical SOP PLM-101 (Rev. Jan. 2014). Basic techniques follow the EPA Interim Method for Bulk Insulation Samples (1982), and EPA-600/R93-116 (1993). The 1993 method covers all types of bulk materials and is based on the 1982 Method, with improved analytical techniques for layered samples as required for NESHAP compliance. Asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (much less than 1%) may not be reliable or reproducible by PLM. Weight % cannot be determined by PLM. Asbestos with diameter below ~1 µm may not be detected by PLM. Absence of asbestos in dust, debris, and some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Tremolite-asbestos or actinolite- asbestos may be indistinguishable by PLM from some similar, non-regulated amphiboles (e.g. the "Libby Amphiboles" richterite and winchite), and should be confirmed by TEM. The lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos; however, reliable determination of asbestos percent at this level cannot be done by PLM estimation. PLM Point Counting or TEM weight percent analysis are recommended. Only dominant non-asbestos materials are indicated. Interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Layers are analyzed separately when feasible; if asbestos is detected, percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. The notation ND (or "NONE DETECTED") indicates a result of "NO ASBESTOS DETECTED" in a homogeneous sample, or in all layers of a heterogeneous sample. Composite asbestos percentages from multiple layers are applicable only to wallboard / joint compound systems; compositing is based on customers' descriptions of material as "joint compound". Customers are solely responsible for identification and description of bulk materials listed on field forms. Laboratory descriptions may differ from those given by customers. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated herein, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed.

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BULK ASBESTOS ANALYSIS - POLARIZED LIGHT MICROSCOPY (PLM)

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Sacramento, CA 95833

PROJECT:
BUTTE FOREST FIRE STATION REPLACE FACILITY / HAZ. MAT. SURVEY
176 NELSON AVE.
OROVILLE, CA 95965
PROJECT NO. 17327033.50003

Micro Log In	**195212**
Total Samples	75
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/22/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#18-18-A Micro #: 195212-40 Analyst: KM VAPOR BARRIER BUILDING C UNDER EXTERIOR SIDING SE END	NONE DETECTED	60 % CELLULOSE Matrix: SYNTHETIC MATERIAL Type:
Client #: HM#18-18-B Micro #: 195212-41 Analyst: KM VAPOR BARRIER BUILDING C UNDER EXTERIOR SIDING SOUTH END	NONE DETECTED	60 % CELLULOSE Matrix: SYNTHETIC MATERIAL Type:
Client #: HM#19-19-A Micro #: 195212-42 Analyst: KM BROWN BASE COVE AND MASTIC 4" BUILDING C MESS HALL	BASE COVE: NONE DETECTED MASTIC (YELLOW): NONE DETECTED	Matrix: SYNTHETIC MATERIAL Type: CARBONATE, ADHESIVE
Client #: HM#19-19-B Micro #: 195212-43 Analyst: KM BROWN BASE COVE AND MASTIC 4" BUILDING C MESS HALL	BASE COVE: NONE DETECTED MASTIC (YELLOW): NONE DETECTED	Matrix: SYNTHETIC MATERIAL Type: CARBONATE, ADHESIVE
Client #: HM#20-20-A Micro #: 195212-44 Analyst: KM 9"X9" BLUE FLOOR TILE AND MASTIC BUILDING NW END	FLOOR TILE: 6% CHRYSOTILE ASBESTOS MASTIC: 8% CHRYSOTILE ASBESTOS	Matrix: SYNTHETIC MATERIAL Type: CARBONATE, ADHESIVE

Technical Supervisor: 6/23/2014
Gamini Ranatunga, Ph.D. Date Reported

NVLAP Lab Code 101872-0, CA ELAP Certification #1037. Analyses use Polarized Light Microscopy (PLM). Micro Analytical SOP PLM-101 (Rev. Jan. 2014). Basic techniques follow the EPA Interim Method for Bulk Insulation Samples (1982), and EPA-600/R93-116 (1993). The 1993 method covers all types of bulk materials and is based on the 1982 Method, with improved analytical techniques for layered samples as required for NESHAP compliance. Asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (much less than 1%) may not be reliable or reproducible by PLM. Weight % cannot be determined by PLM. Asbestos with diameter below ~1 µm may not be detected by PLM. Absence of asbestos in dust, debris, and some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Tremolite-asbestos or actinolite- asbestos may be indistinguishable by PLM from some similar, non-regulated amphiboles (e.g. the "Libby Amphiboles" richterite and winchite), and should be confirmed by TEM. The lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos; however, reliable determination of asbestos percent at this level cannot be done by PLM estimation. PLM Point Counting or TEM weight percent analysis are recommended. Only dominant non-asbestos materials are indicated. Interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Layers are analyzed separately when feasible; if asbestos is detected, percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. The notation ND (or "NONE DETECTED") indicates a result of "NO ASBESTOS DETECTED" in a homogeneous sample, or in all layers of a heterogeneous sample. Composite asbestos percentages from multiple layers are applicable only to wallboard / joint compound systems; compositing is based on customers' descriptions of material as "joint compound". Customers are solely responsible for identification and description of bulk materials listed on field forms. Laboratory descriptions may differ from those given by customers. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated herein, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed.

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BULK ASBESTOS ANALYSIS - POLARIZED LIGHT MICROSCOPY (PLM)

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PROJECT:
BUTTE FOREST FIRE STATION REPLACE FACILITY / HAZ. MAT. SURVEY
176 NELSON AVE.
OROVILLE, CA 95965
PROJECT NO. 17327033.50003

Micro Log In	**195212**
Total Samples	75
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/22/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#20-20-B Micro #: 195212-45 Analyst: 9"X9" BLUE FLOOR TILE AND MASTIC BUILDING NW END	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: HM#21-21-A Micro #: 195212-46 Analyst: KM DRYWALL AND TAPING MUD BUILDING D DAY ROOM	DRYWALL: NONE DETECTED PAINT: NONE DETECTED	10 % CELLULOSE Matrix Type: GYPSUM (CALCIUM SULFATE)
Client #: HM#21-21-B Micro #: 195212-47 Analyst: KM DRYWALL AND TAPING MUD BUILDING D NORTH HALLWAY	COMPOSITE DW & TM: <1% CHRYSOTILE ASBESTOS DRYWALL: NONE DETECTED TAPING MUD: 2% CHRYSOTILE ASBESTOS PAINT: NONE DETECTED	10 % CELLULOSE Matrix Type: GYPSUM (CALCIUM SULFATE), CARBONATE,
Client #: HM#21-21-C Micro #: 195212-48 Analyst: KM MO DRYWALL AND TAPING MUD BUILDING D NW HALLWAY	TAPING MUD: 2% CHRYSOTILE ASBESTOS PAINT: NONE DETECTED (NO DRYWALL IN THE SAMPLE.)	Matrix Type: CARBONATE,
Client #: HM#22-22-A Micro #: 195212-49 Analyst: KM PIPE INSULATION BUILDING D ABOVE CEILING NW END	FIBERGLASS FELT INSULATION: NONE DETECTED FOIL JACKET: NONE DETECTED MASTIC (BLACK): NONE DETECTED	10 % CELLULOSE 40 % FIBROUS GLASS Matrix Type: SYNTHETIC MATERIAL

Technical Supervisor: Gamini Ranatunga, Ph.D. 6/23/2014 Date Reported

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BULK ASBESTOS ANALYSIS - POLARIZED LIGHT MICROSCOPY (PLM)

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PROJECT:
BUTTE FOREST FIRE STATION REPLACE FACILITY / HAZ. MAT. SURVEY
176 NELSON AVE.
OROVILLE, CA 95965
PROJECT NO. 17327033.50003

Micro Log In	**195212**
Total Samples	75
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/22/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#22-22-B Micro #: 195212-50 Analyst: KM PIPE INSULATION BUILDING D ABOVE CEILING NW END	FIBERGLASS FELT INSULATION: NONE DETECTED FOIL JACKET: NONE DETECTED MASTIC (BLACK): NONE DETECTED	10 % CELLULOSE 40 % FIBROUS GLASS Matrix Type: SYNTHETIC MATERIAL
Client #: HM#23-23-A Micro #: 195212-51 Analyst: KM 9"X9" RUST COLOR FLOOR TILE AND MASTIC BUILDING D NORTH HALLWAY	FLOOR TILE: 6% CHRYSOTILE ASBESTOS MASTIC (BLACK): 8% CHRYSOTILE ASBESTOS	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: HM#23-23-B Micro #: 195212-52 Analyst: 9"X9" RUST COLOR FLOOR TILE AND MASTIC BUILDING D NORTH HALLWAY	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: HM#24-24-A Micro #: 195212-53 Analyst: KM 9"X9" WHITE FLOOR TILE AND MASTIC BUILDING D NE HALLWAY	FLOOR TILE: NONE DETECTED MASTIC (YELLOW): NONE DETECTED	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: HM#24-24-B Micro #: 195212-54 Analyst: KM 9"X9" WHITE FLOOR TILE AND MASTIC BUILDING D NORTH HALLWAY	FLOOR TILE: NONE DETECTED MASTIC (YELLOW): NONE DETECTED MASTIC (BLACK): 8% CHRYSOTILE ASBESTOS	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE

Technical Supervisor: Gamini Hanatunga, Ph.D. 6/23/2014 Date Reported

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176 NELSON AVE.
OROVILLE, CA 95965
PROJECT NO. 17327033.50003

Micro Log In	**195212**
Total Samples	75
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/22/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#25-25-A Micro #: 195212-55 Analyst: KM VAPOR BARRIER BUILDING D SW END	NONE DETECTED	10 % CELLULOSE Matrix Type: TARA/SHALT, BINDER
Client #: HM#25-25-B Micro #: 195212-56 Analyst: KM VAPOR BARRIER BUILDING D SW END	6% CHRYSOTILE ASBESTOS	Matrix Type: SYNTHETIC MATERIAL
Client #: HM#26-26-A Micro #: 195212-57 Analyst: KM EXTERIOR SIDING SHINGLES BUILDING D SW END	10% CHRYSOTILE ASBESTOS	Matrix Type: SYNTHETIC MATERIAL
Client #: HM#26-26-B Micro #: 195212-58 Analyst: EXTERIOR SIDING SHINGLES BUILDING D SW END	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: HM#27-27-A Micro #: 195212-59 Analyst: KM MO 4" BROWN AND BASE COVE AND MASTIC BLDG. D NE HALLWAY	BASE COVE: NONE DETECTED MASTIC (WHITE): NONE DETECTED	Matrix Type: SYNTHETIC MATERIAL, CARPET/MASTIC, ADHESIVE

Technical Supervisor: Gamini Ranatunga, Ph.D. 6/23/2014 Date Reported

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PROJECT NO. 17327033.50003

Micro Log In **195212**
Total Samples 75
Date Sampled 06/12/2014
Date Received 06/20/2014
Date Analyzed 06/22/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#27-27-B Micro #: 195212-60 Analyst: KM 4" BROWN AND BASE COVE AND MASTIC BLDG. D NE HALLWAY	BASE COVE: NONE DETECTED MASTIC (WHITE): NONE DETECTED	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: HM#28-28-A Micro #: 195212-61 Analyst: KM 4"X9" BROWN VCT AND MASTIC BLDG. D HALLWAY	VCT: 3% CHRYSOTILE ASBESTOS MASTIC (BLACK): 8% CHRYSOTILE ASBESTOS	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: HM#28-28-B Micro #: 195212-62 Analyst: 4"X9" BROWN VCT AND MASTIC BLDG. D HALLWAY	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: HM#29-29-A Micro #: 195212-63 Analyst: KM 4" BLUE BASE COVE AND MASTIC BLDG. D BARRACKS	BASE COVE: NONE DETECTED MASTIC (BROWN): NONE DETECTED	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: HM#29-29-B Micro #: 195212-64 Analyst: KM 4" BLUE BASE COVE AND MASTIC BLDG. D BARRACKS	BASE COVE: NONE DETECTED MASTIC (BROWN): NONE DETECTED	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE

Technical Supervisor 6/23/2014
Gamini Ranatunga, Ph.D. Date Reported

NVLAP Lab Code 101872-0, CA ELAP Certification #1037. Analyses use Polarized Light Microscopy (PLM). Micro Analytical SOP PLM-101 (Rev. Jan. 2014). Basic techniques follow the EPA Interim Method for Bulk Insulation Samples (1982), and EPA-600/R93-116 (1993). The 1993 method covers all types of bulk materials and is based on the 1982 Method, with improved analytical techniques for layered samples as required for NESHAP compliance. Asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (much less than 1%) may not be reliable or reproducible by PLM. Weight % cannot be determined by PLM. Asbestos with diameter below ~1 µm may not be detected by PLM. Absence of asbestos in dust, debris, and some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Tremolite-asbestos or actinolite- asbestos may be indistinguishable by PLM from some similar, non-regulated amphiboles (e.g. the "Libby Amphiboles" richterite and winchite), and should be confirmed by TEM. The lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos; however, reliable determination of asbestos percent at this level cannot be done by PLM estimation; PLM Point Counting or TEM weight percent analysis are recommended. Only dominant non-asbestos materials are indicated. Interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Layers are analyzed separately when feasible; if asbestos is detected, percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. The notation ND (or "NONE DETECTED") indicates a result of "NO ASBESTOS DETECTED" in a homogeneous sample, or in all layers of a heterogeneous sample. Composite asbestos percentages from multiple layers are applicable only to wallboard / joint compound systems; compositing is based on customers' descriptions of material as "joint compound". Customers are solely responsible for identification and description of bulk materials listed on field forms. Laboratory descriptions may differ from those given by customers. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated herein, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed.

MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - POLARIZED LIGHT MICROSCOPY (PLM)

1233
Mark King
URS Corporation
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833

PROJECT:
BUTTE FOREST FIRE STATION REPLACE FACILITY / HAZ. MAT. SURVEY
176 NELSON AVE.
OROVILLE, CA 95965
PROJECT NO. 17327033.50003

Micro Log In	**195212**
Total Samples	75
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/22/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#30-30-A Micro #: 195212-65 Analyst: KM 4" GRAY BASE COVE AND MASTIC BLDG. D LAUNDRY ROOM	BASE COVE: NONE DETECTED MASTIC (WHITE): NONE DETECTED MASTIC (BROWN): NONE DETECTED	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: HM#30-30-B Micro #: 195212-66 Analyst: KM 4" GRAY BASE COVE AND MASTIC BLDG. D LAUNDRY ROOM	BASE COVE: NONE DETECTED MASTIC (WHITE): NONE DETECTED MASTIC (BROWN): NONE DETECTED	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: HM#31-31-A Micro #: 195212-67 Analyst: KM TAN LINOLEUM BLDG. D REST ROOM	LINOLEUM: NONE DETECTED BACKING: NONE DETECTED MASTIC (YELLOW): NONE DETECTED	10 % CELLULOSE 5 % FIBROUS GLASS 3 % SYNTHETIC FIBERS Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: HM#31-31-B Micro #: 195212-68 Analyst: KM TAN LINOLEUM BLDG. D REST ROOM	LINOLEUM: NONE DETECTED BACKING: NONE DETECTED MASTIC (YELLOW): NONE DETECTED	10 % CELLULOSE 5 % FIBROUS GLASS 3 % SYNTHETIC FIBERS Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: HM#32-32-A Micro #: 195212-69 Analyst: KM MD TAN LINOLEUM BLDG. E OFFICE	LINOLEUM: NONE DETECTED MASTIC (TAN): NONE DETECTED	Matrix Type:

Technical Supervisor: 6/23/2014
Gamini Ranatunga, Ph.D. Date Reported

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BULK ASBESTOS ANALYSIS - POLARIZED LIGHT MICROSCOPY (PLM)

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Sacramento, CA 95833

PROJECT:
BUTTE FOREST FIRE STATION REPLACE FACILITY / HAZ. MAT. SURVEY
176 NELSON AVE.
OROVILLE, CA 95965
PROJECT NO. 17327033.50003

Micro Log In	**195212**
Total Samples	75
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/22/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#32-32-B Micro #: 195212-70 Analyst: KM TAN LINOLEUM BLDG. E OFFICE	LINOLEUM: NONE DETECTED MASTIC (TAN): NONE DETECTED	Matrix Type:
Client #: HM#33-33-A Micro #: 195212-71 Analyst: KM EXTERIOR SIDING SHINGLE BLDG. E BY LOADING DOCK	10% CHRYSOTILE ASBESTOS	Matrix Type: SYNTHETIC MATERIAL
Client #: HM#33-33-B Micro #: 195212-72 Analyst: EXTERIOR SIDING SHINGLE BLDG. E BY LOADING DOCK	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: HM#34-34-A Micro #: 195212-73 Analyst: KM VAPOR BARRIER BLDG. E BY LOADING DOCK	NONE DETECTED	60% CELLULOSE Matrix Type: SYNTHETIC MATERIAL
Client #: HM#34-34-B Micro #: 195212-74 Analyst: KM VAPOR BARRIER BLDG. E BY LOADING DOCK	NONE DETECTED	60% CELLULOSE Matrix Type: SYNTHETIC MATERIAL

Technical Supervisor: Gamini Ranatunga, Ph.D. 6/23/2014 Date Reported

NVLAP Lab Code 101872-0, CA ELAP Certification #1037. Analyses are Polarized Light Microscopy (PLM), Micro Analytical SOP PLM-101 (Rev. Jan. 2014). Basic techniques follow the EPA Interim Method for Bulk Insulation Samples (1982), and EPA-600/R93-116 (1993). The 1993 method covers all types of bulk materials and is based on the 1982 Method, with improved analytical techniques for layered samples as required for NESHAP compliance. Asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (much less than 1%) may not be reliable or reproducible by PLM. Weight % cannot be determined by PLM. Asbestos with diameter below ~1 µm may not be detected by PLM. Absence of asbestos in dust, debris, and some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Tremolite-asbestos or actinolite- asbestos may be indistinguishable by PLM from some similar, non-regulated amphiboles (e.g. the "Libby Amphiboles" richterite and winchite), and should be confirmed by TEM. The lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos; however, reliable determination of asbestos percent at this level cannot be done by PLM estimation; PLM Point Counting or TEM weight percent analysis are recommended. Only dominant non-asbestos materials are indicated. Interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Layers are analyzed separately when feasible; if asbestos is detected, percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. The notation ND (or "NONE DETECTED") indicates a result of "ND ASBESTOS DETECTED" in a homogeneous sample, or in all layers of a heterogeneous sample. Composite asbestos percentages from multiple layers are applicable only to wallboard / joint compound systems; compositing is based on customers' descriptions of material as "joint compound". Customers are solely responsible for identification and description of bulk materials listed on field forms. Laboratory descriptions may differ from those given by customers. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated herein, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed.

URS Corporation
2870 Gateway Oaks Dr.
Sacramento, CA. 95833
Phone 916-679-2000

195246

ACM BULK SAMPLE DATA SHEET

* PLM Analysis
* Stop Analysis at First Positive

PAGE 1 OF 5

Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 95965

Project #:17327033.50003 Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☐ Micro ☐ Other: _____ Turnaround Time: ___Rush ___24Hrs ___X 3-5 Day

Fax Report To: ☐ ☐ (Fax #) ☐ ☐

	HM# 35	Material Description: 9"x9" Gray Floor Tile + Mastic	
	Sample ID	Sample Location & Material Location	Quantity: ~~2,000 sq. ft.~~ 55 ☒
1	35-A	Bldg. F, 2nd Level, Restroom	
2	35-B	" " " " " "	

	HM# 36	Material Description: Tan Linoleum	
	Sample ID	Sample Location & Material Location	Quantity: 250 ☒
3	36-A	Bldg. F, 2nd level, Break Room	
4	36-B	" " " " " " " "	

	HM# 37	Material Description: Window glazing	
	Sample ID	Sample Location & Material Location	Quantity: 10 LF.
5	37-A	Bldg. F, West windows, Exterior	
6	37-B	" " " " " " " " " "	

	HM# 38	Material Description: Roof Penetration Mastic	
	Sample ID	Sample Location & Material Location	Quantity: 15 ☒
7	38-A	Bldg. F, Roof	
8	38-B	" " " "	

HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:

HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:

Analyzed 1st Positive in each Homogeneous group

Relinquished By: MSK Signature: [signature] Date/Time: 6/20/14

Received By: Ken Sackel Signature: [signature] Date/Time: 6/20/2014

URS Corporation
2870 Gateway Oaks Dr.
Sacramento, CA. 95833
Phone 916-679-2000

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ACM BULK SAMPLE DATA SHEET

* PLM Analysis
* Stop Analysis at First Positive

Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 95965

Project #:17327033.50003 Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☒ Micro ☐ Other: _____ Turnaround Time: Rush 24Hrs X 3-5 Days

Fax Report To: ☐ ☐ (Fax #) ☐ ☐

	HM# 39	Material Description: 9"x9" Tan Vct + Mastic	
	Sample ID	Sample Location & Material Location	Quantity: ~~2,880 sq. ft.~~ 230 ☒
9	39-A	Bldg. G Office	
10	39-B	" " " " "	
	HM# 40	Material Description: Drywall + Taping mud	
	Sample ID	Sample Location & Material Location	Quantity: 429 ☒
11	40-A	Bldg. G office	
12	40-B	" " " "	
13	40-C	" " " "	
	HM# 41	Material Description: 12"x12" ceiling tile (White)	
	Sample ID	Sample Location & Material Location	Quantity: 230 ☒
14	41-A	Bldg. G office	
15	41-B	" " " " "	
	HM#	Material Description:	
	Sample ID	Sample Location & Material Location	Quantity:
	HM#	Material Description:	
	Sample ID	Sample Location & Material Location	Quantity:
	HM#	Material Description:	
	Sample ID	Sample Location & Material Location	Quantity:
	Analyze to 1st Positive in each Homogeneous group		

Relinquished By: MSK Signature: [signature] Date/Time: 6/20/14

Received By: Kao Seekee Signature: [signature] Date/Time: 6/20/2014

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ACM BULK SAMPLE DATA SHEET

- PLM Analysis
- Stop Analysis at First Positive

PAGE 3 OF 5

Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 95965

Project #:17327033.50003 Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☒ Micro ☐ Other: _____ Turnaround Time: ___Rush ___24Hrs ___X 3-5 Days

Fax Report To: ☐ ☐ (Fax #) ☐ ☐

HM#	Material Description: Window glazing	
Sample ID	Sample Location & Material Location	Quantity: ~~10,000 sq. ft.~~ 30 LF
16 H2-A	Bldg. K, West windows, interior	
17 H2-B	" " " " " " " "	
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
Analyze to 1st positive in each homogeneous group		

Relinquished By: MSK Signature: [signature] Date/Time: 6/20/14

Received By: Kao Sauter Signature: [signature] Date/Time: 6/20/2014

URS Corporation
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Sacramento, CA. 95833
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ACM BULK SAMPLE DATA SHEET

* PLM Analysis
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PAGE 4 OF 5

Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 95965

Project #:17327033.50003 Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☑ Micro ☐ Other: _____ Turnaround Time: ___Rush ___24Hrs ___X 3-5 Days

Fax Report To: ☐ ☐ (Fax #) ☐ ☐

	HM#	Material Description: Drywall + Taping Mud	Quantity: ~~9,000 sq. ft.~~ 620 ☒
	Sample ID	Sample Location & Material Location	
18	43-A	Bldg. L office	
19	43-B	" " " "	
20	43-C	" " " "	
	HM# 44	Material Description: Vapor Barrier	Quantity: 376 ☒
	Sample ID	Sample Location & Material Location	
21	44-A	under Exterior siding shingles, SV end, Bldg. L	
22	44-B	" " " " " " " " " " "	
	HM# 45	Material Description: Exterior siding shingles	Quantity: 376 ☒
	Sample ID	Sample Location & Material Location	
23	45-A	Bldg. L exterior SV end	
24	45-B	" " " " " "	
	HM# 46	Material Description: Gray Base cove & Mastic, 4"	Quantity: 500 LF
	Sample ID	Sample Location & Material Location	
25	46-A	Bldg. L office	
26	46-B	" " " "	
	HM# 47	Material Description: Interior Siding, Gray	Quantity: 121 ☒
	Sample ID	Sample Location & Material Location	
27	47-A	Bldg. L mechanical room	
28	47-B	" " " " " " "	
	HM# 48	Material Description: 9"x9" Green VCT & Mastic	Quantity: 1,400 ☒
	Sample ID	Sample Location & Material Location	
29	48-A	Bldg. L exercise room	
30	48-B	" " " " " " " "	

Analyze to 1st Positive in each Homogeneous Group

Relinquished By: MSK Signature: [signature] Date/Time: 6/20/14

Received By: Rao Sankee Signature: [signature] Date/Time: 6/20/2014

URS Corporation
2870 Gateway Oaks Dr.
Sacramento, CA. 95833
Phone 916-679-2000

195246

ACM BULK SAMPLE DATA SHEET

* PLM Analysis
* Stop Analysis at First Positive

PAGE 5 OF 5

Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 95965

Project #:17327033.50003 Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☒ Micro ☐ Other: _____ Turnaround Time: ___Rush ___24Hrs ___X 3-5 Days

Fax Report To: ☐ ☐ (Fax #) _____ ☐ _____ ☐ _____

HM# 49	Material Description: 12"x12" Gray Vat & Mastic	
Sample ID	Sample Location & Material Location	Quantity: ~~2,880 sq. ft.~~ 620 ft
31 49-A	Bldg. L, Office	
32 49-B	" " " "	

HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:

HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:

HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:

HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:

HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
Analyzed 1st positive		

Relinquished By: RSK Signature: [signature] Date/Time: 6/20/14

Received By: Kim Sackett Signature: [signature] Date/Time: 6/20/2014

MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - POLARIZED LIGHT MICROSCOPY (PLM)

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PROJECT:
BUTTE FOREST FIRE STATION
REPLACE FACILITY
HAZ. MAT. SURVEY
176 NELSON AVENUE
OROVILLE, CA
JOB NO. 17327033.50003

Micro Log In **195246**
Total Samples 34
Date Sampled 06/12/2014
Date Received 06/20/2014
Date Analyzed 06/21/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: 35-A Micro #: 195246-01 Analyst: MO HM# 35 9" X 9" GRAY FLOOR TILE AND MASTIC BUILDING F, 2ND LEVEL, RESTROOM	FLOOR TILE: 2% CHRYSOTILE ASBESTOS MASTIC (YELLOW): NONE DETECTED CONCRETE: NONE DETECTED	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: 35-B Micro #: 195246-02 Analyst: HM# 35 9" X 9" GRAY FLOOR TILE AND MASTIC BUILDING F, 2ND LEVEL, RESTROOM	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: 36-A Micro #: 195246-03 Analyst: MO MO HM# 36 TAN LINOLEUM BUILDING F, 2ND LEVEL, BREAK ROOM	SHEET FLOORING: NONE DETECTED BACKING: NONE DETECTED	8 % CELLULOSE 2 % FIBROUS GLASS Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: 36-B Micro #: 195246-04 Analyst: MO HM# 36 TAN LINOLEUM BUILDING F, 2ND LEVEL, BREAK ROOM	SHEET FLOORING: NONE DETECTED BACKING: NONE DETECTED	8 % CELLULOSE 2 % FIBROUS GLASS Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: 37-A Micro #: 195246-05 Analyst: MO HM# 37 WINDOW GLAZING BUILDING F, WEST WINDOWS, EXTERIOR	WINDOW GLAZING: < 1% CHRYSOTILE ASBESTOS	Matrix Type: CARBONATE

Technical Supervisor: Mark Olivier 6/21/2014
Fr. Gamini Ranatunga, Ph.D. Date Reported

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176 NELSON AVENUE
OROVILLE, CA
JOB NO. 17327033.50003

Micro Log In	**195246**
Total Samples	34
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/21/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: 37-B Micro #: 195246-06 Analyst: MO HM# 37 WINDOW GLAZING BUILDING F, WEST WINDOWS, EXTERIOR	WINDOW GLAZING: NONE DETECTED	Matrix: CARBONATE Type:
Client #: 38-A Micro #: 195246-07 Analyst: MO HM# 38 ROOF PENETRATION MASTIC BUILDING F, ROOF	PENETRATION MASTIC: 10% CHRYSOTILE ASBESTOS	Matrix: TAR/ASPHALT, BINDER Type:
Client #: 38-B Micro #: 195246-08 Analyst: HM# 38 ROOF PENETRATION MASTIC BUILDING F, ROOF	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: 39-A Micro #: 195246-09 Analyst: MO HM# 39 9" X 9" TAN VAT AND MASTIC BUILDING G OFFICE	FLOOR TILE: 5% CHRYSOTILE ASBESTOS MASTIC (BLACK): NONE DETECTED	Matrix: SYNTHETIC MATERIAL, Type: CARBONATE, ADHESIVE
Client #: 39-B Micro #: 195246-10 Analyst: HM# 39 9" X 9" TAN VAT AND MASTIC BUILDING G OFFICE	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:

Technical Supervisor: Mark Olivares 6/21/2014
For Gamini Ranatunga, Ph.D. Date Reported

NVLAP Lab Code 101872-0. CA ELAP Certification #1037. Analyses use Polarized Light Microscopy (PLM). Micro Analytical SOP PLM-101 (Rev. Jan. 2014). Basic techniques follow the EPA Interim Method for Bulk Insulation Samples (1982), and EPA-600/R93-116 (1993). The 1993 method covers all types of bulk materials and is based on the 1982 Method, with improved analytical techniques for layered samples as required for NESHAP compliance. Asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (much less than 1%) may not be reliable or reproducible by PLM. Weight % cannot be determined by PLM. Asbestos with diameter below ~1 µm may not be detected by PLM. Absence of asbestos in dust, debris, and some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Tremolite-asbestos or actinolite- asbestos may be indistinguishable by PLM from some similar, non-regulated amphiboles (e.g. the "Libby Amphiboles" richterite and winchite), and should be confirmed by TEM. The lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos; however, reliable determination of asbestos percent at this level cannot be done by PLM estimation. PLM Point Counting or TEM weight percent analysis are recommended. Only dominant non-asbestos materials are indicated. Interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Layers are analyzed separately when feasible; if asbestos is detected, percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. The notation ND (or "NONE DETECTED") indicates a result of "NO ASBESTOS DETECTED" in a homogeneous sample, or in all layers of a heterogeneous sample. Composite asbestos percentages from multiple layers are applicable only to wallboard / joint compound systems; compositing is based on customers' descriptions of material as "joint compound". Customers are solely responsible for identification and description of bulk materials listed on field forms. Laboratory descriptions may differ from those given by customers. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated herein, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed.

MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - POLARIZED LIGHT MICROSCOPY (PLM)

1233
Mark King
URS Corporation
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833

PROJECT:
BUTTE FOREST FIRE STATION
REPLACE FACILITY
HAZ. MAT. SURVEY
176 NELSON AVENUE
OROVILLE, CA
JOB NO. 17327033.50003

Micro Log In	**195246**
Total Samples	34
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/21/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: 40-A Micro #: 195246-11 Analyst: MO HM# 40 DRYWALL AND TAPING MUD BUILDING G OFFICE	COMPOSITE DW & TM: 2% CHRYSOTILE ASBESTOS DRYWALL: NONE DETECTED TAPING MUD: 2% CHRYSOTILE ASBESTOS PAINT: NONE DETECTED	5 % CELLULOSE Matrix Type: GYPSUM (CALCIUM SULFATE), CARBONATE
Client #: 40-B Micro #: 195246-12 Analyst: HM# 40 DRYWALL AND TAPING MUD BUILDING G OFFICE	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: 40-C Micro #: 195246-13 Analyst: HM# 40 DRYWALL AND TAPING MUD BUILDING G OFFICE	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: 41-A Micro #: 195246-14 Analyst: MO MO HM# 41 12" X 12" CEILING TILE (WHITE) BUILDING G OFFICE	CEILING TILE: NONE DETECTED COATING (WHITE): NONE DETECTED	99 % CELLULOSE Matrix Type: BINDER, OTHER, MISCELLANEOUS
Client #: 41-B Micro #: 195246-15 Analyst: MO HM# 41 12" X 12" CEILING TILE (WHITE) BUILDING G OFFICE	CEILING TILE: NONE DETECTED COATING (WHITE): NONE DETECTED	99 % CELLULOSE Matrix Type: BINDER, OTHER, MISCELLANEOUS

Technical Supervisor: Dr. Gamini Ranatunga, Ph.D. 6/21/2014 Date Reported

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MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - POLARIZED LIGHT MICROSCOPY (PLM)

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Mark King
URS Corporation
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833

PROJECT:
BUTTE FOREST FIRE STATION
REPLACE FACILITY
HAZ. MAT. SURVEY
176 NELSON AVENUE
OROVILLE, CA
JOB NO. 17327033.50003

Micro Log In	**195246**
Total Samples	34
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/21/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: 42-A Micro #: 195246-16 Analyst: MO HM# 42 WINDOW GLAZING BUILDING K, WEST WINDOWS INTERIOR	WINDOW GLAZING: NONE DETECTED	Matrix: CARBONATE Type:
Client #: 42B Micro #: 195246-17 Analyst: MO HM# 42 WINDOW GLAZING BUILDING K, WEST WINDOWS INTERIOR	WINDOW GLAZING: NONE DETECTED	Matrix: CARBONATE Type:
Client #: 43-A Micro #: 195246-18 Analyst: MO HM# 43 DRYWALL AND TAPING MUD BUILDING L OFFICE	DRYWALL: NONE DETECTED TAPING MUD: NONE DETECTED PAINT: NONE DETECTED	5 % CELLULOSE Matrix: GYPSUM (CALCIUM SULFATE) Type:
Client #: 43-B Micro #: 195246-19 Analyst: MO HM# 43 DRYWALL AND TAPING MUD BUILDING L OFFICE	DRYWALL: NONE DETECTED TAPING MUD: NONE DETECTED PAINT: NONE DETECTED	5 % CELLULOSE Matrix: GYPSUM (CALCIUM SULFATE) Type:
Client #: 43-C Micro #: 195246-20 Analyst: MO HM# 43 DRYWALL AND TAPING MUD BUILDING L OFFICE	DRYWALL: NONE DETECTED TAPING MUD: NONE DETECTED PAINT: NONE DETECTED	5 % CELLULOSE Matrix: GYPSUM (CALCIUM SULFATE) Type:

Technical Supervisor: Mark O'Hanlon 6/21/2014
for Gamini Ranatunga, Ph.D. Date Reported

NVLAP Lab Code 101872-0. CA ELAP Certification #1037. Analyses use Polarized Light Microscopy (PLM). Micro Analytical SOP PLM-101 (Rev. Jan. 2014). Basic techniques follow the EPA Interim Method for Bulk Insulation Samples (1982), and EPA-600/R93-116 (1993). The 1993 method covers all types of bulk materials and is based on the 1982 Method, with improved analytical techniques for layered samples as required for NESHAP compliance. Asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (much less than 1%) may not be reliable or reproducible by PLM. Weight % cannot be determined by PLM. Asbestos with diameter below ~1 um may not be detected by PLM. Absence of asbestos in dust, debris, and some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Tremolite-asbestos or actinolite- asbestos may be indistinguishable by PLM from some similar, non-regulated amphiboles (e.g. the "Libby Amphiboles" richterite and winchite), and should be confirmed by TEM. The lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos; however, reliable determination of asbestos percent at this level cannot be done by PLM estimation. PLM Point Counting or TEM weight percent analysis are recommended. Only dominant non-asbestos materials are indicated. Interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Layers are analyzed separately when feasible, if asbestos is detected, percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. The notation ND (or "NONE DETECTED") indicates a result of "NO ASBESTOS DETECTED" in a homogeneous sample, or in all layers of a heterogeneous sample. Composite asbestos percentages from multiple layers are applicable only to wallboard / joint compound systems; compositing is based on customers' descriptions of material as "joint compound". Customers are solely responsible for identification and description of bulk materials listed on field forms. Laboratory descriptions may differ from those given by customers. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated herein, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed.

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BULK ASBESTOS ANALYSIS - POLARIZED LIGHT MICROSCOPY (PLM)

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PROJECT:
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REPLACE FACILITY
HAZ. MAT. SURVEY
176 NELSON AVENUE
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JOB NO. 17327033.50003

Micro Log In	**195246**
Total Samples	34
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/21/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: 44-A Micro #: 195246-21 Analyst: MO HM# 44 VAPOR BARRIER UNDER EXTERIOR SIDING SHINGLES, SOUTH WEST END, BUILDING L	VAPOR BARRIER: NONE DETECTED	75 % CELLULOSE Matrix Type: TARASPHALT, BINDER
Client #: 44-B Micro #: 195246-22 Analyst: MO HM# 44 VAPOR BARRIER UNDER EXTERIOR SIDING SHINGLES, SOUTH WEST END, BUILDING	VAPOR BARRIER: NONE DETECTED	75 % CELLULOSE Matrix Type: TARASPHALT, BINDER
Client #: 45-A Micro #: 195246-23 Analyst: MO HM# 45 EXTERIOR SIDING SHINGLES BUILDING L EXTERIOR SOUTH WEST END	SIDING: 10% CHRYSOTILE ASBESTOS	Matrix Type: ROCK FRAGMENTS, CARBONATE, BINDER
Client #: 45-B Micro #: 195246-24 Analyst: HM# 45 EXTERIOR SIDING SHINGLES BUILDING L EXTERIOR SOUTH WEST END	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: 46-A Micro #: 195246-25 Analyst: MO MO HM# 46 GRAY BASE COVE AND MASTIC, 4" BUILDING L OFFICE	BASE COVE: NONE DETECTED MASTIC (WHITE): NONE DETECTED	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE

Technical Supervisor: Mark Oliver 6/21/2014
for Gamini Ranatunga, Ph.D. Date Reported

NVLAP Lab Code 101672-0, CA ELAP Certification #1037. Analyses use Polarized Light Microscopy (PLM). Micro Analytical SOP PLM-101 (Rev. Jan. 2014). Basic techniques follow the EPA Interim Method for Bulk Insulation Samples (1982), and EPA-600/R93-116 (1993). The 1993 method covers all types of bulk materials and is based on the 1982 Method, with improved analytical techniques for layered samples as required for NESHAP compliance. Asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (much less than 1%) may not be reliable or reproducible by PLM. Weight % cannot be determined by PLM. Asbestos with diameter below ~1 µm may not be detected by PLM. Absence of asbestos in dust, debris, and some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Tremolite-asbestos or actinolite- asbestos may be indistinguishable by PLM from some similar, non-regulated amphiboles (e.g. the "Libby Amphiboles" richterite and winchite), and should be confirmed by TEM. The lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos; however, reliable determination of asbestos percent at this level cannot be done by PLM estimation; PLM Point Counting or TEM weight percent analysis are recommended. Only dominant non-asbestos materials are indicated. Interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Layers are analyzed separately when feasible; if asbestos is detected, percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. The notation ND (or "NONE DETECTED") indicates a result of "NO ASBESTOS DETECTED" in a homogeneous sample, or in all layers of a heterogeneous sample. Composite asbestos percentages from multiple layers are applicable only to wallboard / joint compound systems; compositing is based on customers' descriptions of material as "joint compound". Customers are solely responsible for identification and description of bulk materials listed on field forms. Laboratory descriptions may differ from those given by customers. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated herein, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed.

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176 NELSON AVENUE
OROVILLE, CA
JOB NO. 17327033.50003

Micro Log In	**195246**
Total Samples	34
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/21/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: 46-B Micro #: 195246-26 Analyst: MO HM# 46 GRAY BASE COVE AND MASTIC, 4" BUILDING L OFFICE	BASE COVE: NONE DETECTED MASTIC (WHITE): NONE DETECTED TEXTURE / PAINT: NONE DETECTED	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE,
Client #: 47-A Micro #: 195246-27 Analyst: MO HM# 47 INTERIOR SIDING GRAY BUILDING L MECHANICAL ROOM	SIDING: 10% CHRYSOTILE ASBESTOS	Matrix Type: ROCK FRAGMENTS, CARBONATE, BINDER
Client #: 47-B Micro #: 195246-28 Analyst: HM# 47 INTERIOR SIDING GRAY BUILDING L MECHANICAL ROOM	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:
Client #: 48-A Micro #: 195246-29 Analyst: MO HM# 48 9" X 9" GREEN VAT AND MASTIC BUILDING L, EXERCISE ROOM	FLOOR TILE: 3% CHRYSOTILE ASBESTOS MASTIC (BLACK): NONE DETECTED	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE,
Client #: 48-B Micro #: 195246-30 Analyst: HM# 48 9" X 9" GREEN VAT AND MASTIC BUILDING L, EXERCISE ROOM	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:

Technical Supervisor: Mark O'Brien 6/21/2014
For Gamini Ranatunga, Ph.D. Date Reported

NVLAP Lab Code 101872-0. CA ELAP Certification #1037. Analyses use Polarized Light Microscopy (PLM). Micro Analytical SOP PLM-101 (Rev. Jan. 2014). Basic techniques follow the EPA Interim Method for Bulk Insulation Samples (1982), and EPA-600/R93-116 (1993). The 1993 method covers all types of bulk materials and is based on the 1982 Method, with improved analytical techniques for layered samples as required for NESHAP compliance. Asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (much less than 1%) may not be reliable or reproducible by PLM. Weight % cannot be determined by PLM. Asbestos with diameter below ~1 µm may not be detected by PLM. Absence of asbestos in dust, debris, and some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Tremolite-asbestos or actinolite- asbestos may be indistinguishable by PLM from some similar, non-regulated amphiboles (e.g. the "Libby Amphiboles" richterite and winchite), and should be confirmed by TEM. The lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos; however, reliable determination of asbestos percent at this level cannot be done by PLM estimation; PLM Point Counting or TEM weight percent analysis are recommended. Only dominant non-asbestos materials are indicated. Interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Layers are analyzed separately when feasible; if asbestos is detected, percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. The notation ND (or "NONE DETECTED") indicates a result of "NO ASBESTOS DETECTED" in a homogeneous sample, or in all layers of a heterogeneous sample. Composite asbestos percentages from multiple layers are applicable only to wallboard / joint compound systems; compositing is based on customers' descriptions of material as "joint compound". Customers are solely responsible for identification and description of bulk materials listed on field forms. Laboratory descriptions may differ from those given by customers. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated herein, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed.

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PROJECT:
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HAZ. MAT. SURVEY
176 NELSON AVENUE
OROVILLE, CA
JOB NO. 17327033.50003

Micro Log In	**195246**
Total Samples	34
Date Sampled	06/12/2014
Date Received	06/20/2014
Date Analyzed	06/21/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: 49-A Micro #: 195246-31A Analyst: MO HM#49 12" X 12" GRAY VAT AND MASTIC BUILDING L OFFICE *LAB NOTE: UPPER GRAY VAT SYSTEM*	FLOOR TILE: NONE DETECTED MASTIC (YELLOW): NONE DETECTED	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: 49-A Micro #: 195246-31B Analyst: MO HM#49 12" X 12" GRAY VAT AND MASTIC BUILDING L OFFICE *LAB NOTE: LOWER THIN BROWN VAT SYSTEM*	FLOOR TILE: 2% CHRYSOTILE ASBESTOS MASTIC (YELLOW): NONE DETECTED	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: 49-B Micro #: 195246-32A Analyst: MO HM#49 12" X 12" GRAY VAT AND MASTIC BUILDING L OFFICE *LAB NOTE: UPPER GRAY VAT SYSTEM*	FLOOR TILE: NONE DETECTED MASTIC (YELLOW): NONE DETECTED	Matrix Type: SYNTHETIC MATERIAL, CARBONATE, ADHESIVE
Client #: 49-B Micro #: 195246-32B Analyst: HM#49 12" X 12" GRAY VAT AND MASTIC BUILDING L OFFICE *LAB NOTE: LOWER THIN BROWN VAT SYSTEM*	NOT ANALYZED (PRIOR POSITIVE)	Matrix Type:

Technical Supervisor: Mark Olivier 6/21/2014
Gamini Ranatunga, Ph.D. Date Reported

NVLAP Lab Code 101872-0. CA ELAP Certification #1037. Analyses use Polarized Light Microscopy (PLM), Micro Analytical SOP PLM-101 (Rev. Jan. 2014). Basic techniques follow the EPA Interim Method for Bulk Insulation Samples (1982), and EPA-600/R93-116 (1993). The 1993 method covers all types of bulk materials and is based on the 1982 Method, with improved analytical techniques for layered samples as required for NESHAP compliance. Asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (much less than 1%) may not be reliable or reproducible by PLM. Weight % cannot be determined by PLM. Asbestos with diameter below ~1 µm may not be detected by PLM. Absence of asbestos in dust, debris, and some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Tremolite-asbestos or actinolite- asbestos may be indistinguishable by PLM from some similar, non-regulated amphiboles (e.g. the "Libby Amphiboles" richterite and winchite), and should be confirmed by TEM. The lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos; however, reliable determination of asbestos percent at this level cannot be done by PLM estimation. PLM Point Counting or TEM weight percent analysis are recommended. Only dominant non-asbestos materials are indicated. Interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Layers are analyzed separately when feasible; if asbestos is detected, percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. The notation ND (or "NONE DETECTED") indicates a result of "NO ASBESTOS DETECTED" in a homogeneous sample, or in all layers of a heterogeneous sample. Composite asbestos percentages from multiple layers are applicable only to wallboard / joint compound systems; compositing is based on customers' descriptions of material as "joint compound". Customers are solely responsible for identification and description of bulk materials listed on field forms. Laboratory descriptions may differ from those given by customers. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated herein, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed.

URS Corporation
2870 Gateway Oaks Dr.
Sacramento, CA. 95833
Phone 916-679-2000

195444
1200 pts count
3-strips

ACM BULK SAMPLE DATA SHE

- PLM Analysis
- Stop Analysis at First Positive

PAGE 2

Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 9596

Project #:17327033.50003

Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☒ Micro ☐ Other: _____ Turnaround Time: ___Rush ___24Hrs ___X 3-

Fax Report To: ☐ ☐ (Fax #) ☐ ☐

HM#	Material Description:	Quantity:
39	9"x9" Tan Vct + Mastic	230
Sample ID	Sample Location & Material Location	
9 39-A	Bldg. G Office	
10 39-B	" " " " "	
HM# 40	Material Description: Drywall + taping mud	Quantity: 1429 ft
Sample ID	Sample Location & Material Location	
(1) 11 40-A	Bldg. G office	
(2) 12 40-B		
(3) 13 40-C		
HM# 41	Material Description: 12"x12" ceiling tile (White)	Quantity: 230 ft
Sample ID	Sample Location & Material Location	
14 41-A	Bldg. G office	
15 41-B	" " " " "	
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:

Analyze to 1st Positive in each Homogeneous group

Relinquished By: TSR Signature: [signature] Date/Time: 6/20/14

Received By: Kao Scatee Signature: [signature] Date/Time: 6/20/2014

MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - PLM POINT COUNT

1233
Mark King
URS Corporation
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833

PROJECT:
BUTTE FOREST FIRE STATION
REPLACE FACILITY
HAZ. MAT. SURVEY
176 NELSON AVENUE
OROVILLE, CA
JOB NO. 17327033.50003

Micro Log In **195444**
Total Samples 3
Date Sampled 06/12/2014
Date Received 06/25/2014
Date Analyzed 06/25/2014

SAMPLE INFORMATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: 40-A Micro #: 195444-01 Analyst: GR HMF 40 DRYWALL AND TAPING MUD BUILDING G OFFICE (REANALYSIS OF PLM 195246-11) Asb. / Total Pts. 1 / 1200 Matrix Removed 0% Sensitivity 0.083%	0.083% CHRYSOTILE ASBESTOS (ANALYSIS OF DRYWALL AND TAPING MUD COMPOSITE.)	5 % CELLULOSE Matrix Type: GYPSUM, OPAQUES
Client #: 40-B Micro #: 195444-02 Analyst: HMF 40 DRYWALL AND TAPING MUD BUILDING G OFFICE (REANALYSIS OF PLM 195246-12) Asb. / Total Pts. / Sensitivity	NOT ANALYZED (NO JOINT COMPOUND IN THE SAMPLE.)	Matrix Type:
Client #: 40-C Micro #: 195444-03 Analyst: WC HMF 40 DRYWALL AND TAPING MUD BUILDING G OFFICE (REANALYSIS OF PLM 195246-13) Asb. / Total Pts. 0 / 1200 Matrix Removed 0% Sensitivity 0.083%	<0.083% CHRYSOTILE ASBESTOS (ANALYSIS OF DRYWALL AND TAPING MUD COMPOSITE.) CHRYSOTILE ASBESTOS WAS OBSERVED DURING SCANNING BUT NO POINTS WERE COUNTABLE (ASBESTOS IS BELOW THE DETECTION LIMIT OF THE METHOD).	10 % CELLULOSE Matrix Type: 'GYPSUM' (CALCIUM SULFATE), CARBONATE.

Technical Supervisor: Gamini Ranatunga, Ph.D. 6/26/2014 Date Reported

Analyses use Polarized Light Microscopy (PLM), Micro Analytical SOP PLM-101,Rev.14/2013 for building materials (based on EPA-600/R93-116 (1993)), and California ARB 435 (1991) for applicable soil, rock, or aggregate samples. NOTES: Weight %cannot be determined by PLM estimation or point counts. Asbestos fibers with diameter below ~1 µm may not be detected by PLM. The absence of asbestos in dust or debris (including wipe or microvacuum), and in some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Only dominant non-asbestos materials are indicated. This report must not be interpreted as a conclusive identification of non-asbestos (fibrous or not). Quantities of non-asbestos fibers are estimated, not point counted. Preparation (all samples): grinding, milling, teasing bundles apart; drying, if needed, by hotplate. Acid dissolution, ashing, or other matrix reduction techniques may be applied to some samples; residue asbestos % is corrected for amount of matrix removed. Various sample interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Notes are made if point counting is used; otherwise, asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (<<1%) may not be reliable or reproducible by PLM. Lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos by weight; however, reliable determination of asbestos weight percent at this level cannot be done by PLM, and TEM is recommended. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Composite asbestos percentages on multilayered samples are applicable only to layered wall systems (wallboard, joint compound, and related materials); compositing is based on clients' descriptions of a material as "joint compound". Clients are solely responsible for identification and description of bulk materials listed on field forms. Laboratory sample descriptions may differ from descriptions given by the client. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated in this report, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed. ND = NO ASBESTOS DETECTED.

PLM.

195352

URS Corporation
2870 Gateway Oaks Dr.
Sacramento, CA. 95833
Phone 916-679-2000

ACM BULK SAMPLE DATA SHEET

* PLM Analysis
* Stop Analysis at First Positive

PAGE 1 OF 1

Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 95965

Project #:17327033.50003 Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☒ Micro ☐ Other: _____ Turnaround Time: ___Rush ___24Hrs ___X 3-5 Day

Fax Report To: ☐ ☐ (Fax #) ☐ ☐

HM# 50	Material Description: Asphalt	
Sample ID	Sample Location & Material Location	Quantity: ~~[illegible] sq. ft.~~
50-A	NE section of parking by Bldg. B	
50-B	" " " " " " " "	
50-C	West section of parking by Bldg. D	
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
HM#	Material Description:	
Sample ID	Sample Location & Material Location	Quantity:
ANALYZED 1st POSITIVE		

Relinquished By: MSK Signature: [signature] Date/Time: 6/20/14

Received By: [signature] Signature: [signature] Date/Time: 6/23/14 9:45Am

MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - POLARIZED LIGHT MICROSCOPY (PLM)

1233
Mark King
URS Corporation
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833

PROJECT:
BUTTE FOREST
FIRE STATION REPLACE
FACILITY HAZ. MAT. SURVEY
176 NELSON AVE
OROVILLE, CA 95965

Micro Log In	**195352**
Total Samples	3
Date Sampled	06/12/2014
Date Received	06/23/2014
Date Analyzed	06/23/2014

SAMPLE IDENTIFICATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: 50-A Micro #: 195352-01 Analyst: GR ASPHALT NORTHEAST SECTION OF PARKING BY BUILDING B	NONE DETECTED	3 % CELLULOSE 3 % MISC. FIBERS Matrix Type: ROCK FRAGMENTS, ASPHALT
Client #: 50-B Micro #: 195352-02 Analyst: GR ASPHALT NORTHEAST SECTION OF PARKING BY BUILDING B	NONE DETECTED	3 % CELLULOSE 3 % MISC. FIBERS Matrix Type: ROCK FRAGMENTS, ASPHALT
Client #: 50-C Micro #: 195352-03 Analyst: GR ASPHALT WEST SECTION OF PARKING BY BUILDING D	NONE DETECTED	3 % CELLULOSE 3 % MISC. FIBERS Matrix Type: ROCK FRAGMENTS, ASPHALT

Technical Supervisor: Gamini Ranatunga, Ph.D. 6/23/2014 Date Reported

NVLAP Lab Code 101872-0. CA ELAP Certification #1037. Analyses use Polarized Light Microscopy (PLM). Micro Analytical SOP PLM-101 (Rev. Jan. 2014). Basic techniques follow the EPA Interim Method for Bulk Insulation Samples (1982), and EPA-600/R93/116 (1993). The 1993 method covers all types of bulk materials and is based on the 1982 Method, with improved analytical techniques for layered samples as required for NESHAP compliance. Asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (much less than 1%) may not be reliable or reproducible by PLM. Weight % cannot be determined by PLM. Asbestos with diameter below ~1 µm may not be detected by PLM. Absence of asbestos in dust, debris, and some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Tremolite-asbestos or actinolite- asbestos may be indistinguishable by PLM from some similar, non-regulated amphiboles (e.g. the "Libby Amphiboles" richterite and winchite), and should be confirmed by TEM. The lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos; however, reliable determination of asbestos percent at this level cannot be done by PLM estimation; PLM Point Counting or TEM weight percent analysis are recommended. Only dominant non-asbestos materials are indicated. Interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Layers are analyzed separately when feasible; if asbestos is detected, percentages are reported for individual layers. Interlayer contamination is possible among any layers in a sample. The notation ND (or "NONE DETECTED") indicates a result of "NO ASBESTOS DETECTED" in a homogeneous sample, or in all layers of a heterogeneous sample. Composite asbestos percentages from multiple layers are applicable only to wallboard / joint compound systems; compositing is based on customers' descriptions of material as "joint compound". Customers are solely responsible for identification and description of bulk materials listed on field forms. Laboratory descriptions may differ from those given by customers. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated herein, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed.

1203 195212 B

URS Corporation
2870 Gateway Oaks Dr.
Sacramento, CA. 95833
Phone 916-679-2000

195433
1200 pts count
3-salvage

ACM BULK SAMPLE DATA SHE

- PLM Analysis
- Stop Analysis at First Positive

PAGE 1 of 5

Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 9596

Project #:17327033.50003 Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☐ Micro ☐ Other: _____ Turnaround Time: ___Rush ___24Hrs ___X 3-5

Fax Report To: ☐ ☐ (Fax #) ☐ ☐

HM# 1	Material Description: Drywall and taping mud	
Sample ID	Sample Location & Material Location	Quantity: 5,049 sq. ft.
1-A	Building B/ Admin. Building Men's restroom	
1-B	Building B/Admin. Building Women's restroom	
1-C	Building B/Admin. Building Break room	
HM# 1	Material Description: Drywall and taping mud	
Sample ID	Sample Location & Material Location	Quantity: 5,049 sq. ft.
1-D	Building B/Admin. Building Office	
1-E	Building B/Admin. Building West end hallway	
HM# 2	Material Description: 4" Brown base cove and mastic	
Sample ID	Sample Location & Material Location	Quantity: 300 ft.
2-A	Building B/Admin. Building North west office	
2-B	Building B/Admin Building North west office	
HM# 3	Material Description: 4" Tan base cove and mastic	
Sample ID	Sample Location & Material Location	Quantity: 500 ft.
3-A	Building B/Admin. Building break room	
3-B	Building B/Admin. Building break roo	
HM# 4	Material Description: Green linoleum	
Sample ID	Sample Location & Material Location	Quantity: 1,152 sq. ft.
4-A	Building B/Admin. Building men's restroom	
4-B	Building B/Admin Building break room	
HM# 5	Material Description: Duct sealant	
Sample ID	Sample Location & Material Location	Quantity: 5 sq. ft.
5-A	Building B/Admin. Building mechanical room	
5-B	Building B/Admin. Building mechanical room	

Relinquished By: MSR Signature: [signature] Date/Time: 6/19/14

Received By: JR Signature: Date/Time: 6/20/14 10:11a

URS Corporation
2870 Gateway Oaks Dr.
Sacramento, CA. 95833
Phone 916-679-2000

195433
1200 pts Count
3-sc bags

ACM BULK SAMPLE DATA SHE

195278

* PLM Analysis
* Stop Analysis at First Positive

Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 9596

Project #:17327033.50003

Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☐ Micro ☐ Other: _____ Turnaround Time: __Rush __24Hrs _X 3-

Fax Report To: ☐ ☐ (Fax #) _____ ☐ _____ ☐ _____

	HMS 13	Material Description: 9"x9" tan floor tile and mastic
	Sample ID	Sample Location & Material Location — Quantity: 620 sq. ft.
29	13-A	Building C hallway
30	13-B	Building C hallway
	HMS 14	Material Description: Plaster
	Sample ID	Sample Location & Material Location — Quantity: 100 sq. ft.
31	14-A	Building C mechanical room
32	14-B	
	HMS 15	Material Description: Drywall and taping mud
	Sample ID	Sample Location & Material Location — Quantity: 2,153 sq. ft.
(3) 33	15-A	Building C ne end
(4) 34	15-B	Se end
(5) 35	15-C	North end
	HMS 16	Material Description: 9"x9" gray floor tile and mastic
	Sample ID	Sample Location & Material Location — Quantity: 600 sq. ft.
36	16-A	Building C mess hall
37	16-B	
	HMS 17	Material Description: Exterior siding shingle
	Sample ID	Sample Location & Material Location — Quantity: 7,296 sq. ft.
38	17-A	Building C se end
39	17-B	Building C south end
	HMS 18	Material Description: Vapor barrier
	Sample ID	Sample Location & Material Location — Quantity: 7,296 sq. ft.
40	18-A	Building C under exterior siding se end
41	18-B	Building C under exterior siding south end

Relinquished By: MBC Signature: [signature] Date/Time: 6/19/14

Received By: JR 6/20/14 10:11a Signature: Date/Time:

URS Corporation
2870 Gateway Oaks Dr.
Sacramento, CA. 95833
Phone 916-679-2000

195443
1200 pts Count
3-Schools

ACM BULK SAMPLE DATA SHEET

195218

- PLM Analysis
- Stop Analysis at First Positive

PAGE 6 Of 2

Project Name/Address: Butte Forest Fire Station Replace Facility/Haz. Mat. Survey, 176 Nelson Ave., Oroville, CA. 9596

Project #:17327033.50003

Sampled By: Mark King Sampling Date: 6/12/14

Sample(s) Sent To: ☐ R.J. Lee ☐ Micro ☐ Other: _____ Turnaround Time: ___Rush ___24Hrs _X 3-5

Fax Report To: ☐ ☐ (Fax #) ☐ ☐

HM# 21	Material Description: Drywall and taping mud
Sample ID	Sample Location & Material Location — Quantity: 4,459 sq. ft.
21-A	Building D day room
21-B	Building D north hallway
21-C	Building D nw hallway

HM# 22	Material Description: Pipe insulation
Sample ID	Sample Location & Material Location — Quantity: 1,000 ft.
22-A	Building D above ceiling nw end
22-B	Building D above ceiling nw end

HM#23	Material Description: 9"x9" rust color floor tile and mastic
Sample ID	Sample Location & Material Location — Quantity: 270 sq. ft.
23-A	Building D north hallway
23-B	

HM# 24	Material Description: 9"x9" white floor tile and mastic
Sample ID	Sample Location & Material Location — Quantity: 924 sq. ft.
24-A	Building D ne hallway
24-B	Building D north hallway

HM# 25	Material Description: Vapor barrier
Sample ID	Sample Location & Material Location — Quantity: 24,140 sq. ft.
25-A	Building D sw end
25-B	

HM# 26	Material Description: Exterior siding shingles
Sample ID	Sample Location & Material Location — Quantity: 24,140 sq. ft.
26-A	Building D sw end
26-B	

Relinquished By: 1151 Signature: [signature] Date/Time: 6/19/14

JR 6/20/14 10:11a

MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - PLM POINT COUNT

1233
Mark King
URS Corporation
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833

PROJECT:
BUTTE FOREST FIRE STATION REPLACE FACILITY / HAZ. MAT. SURVEY
176 NELSON AVE.
OROVILLE, CA 95965
PROJECT NO. 17327033.50003

Micro Log In **195443**
Total Samples 7
Date Sampled 06/12/2014
Date Received 06/25/2014
Date Analyzed 06/25/2014

SAMPLE INFORMATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#1-1-B Micro #: 195443-01 Analyst: BK DRYWALL AND TAPING MUD BUILDING B, ADMIN. BUILDING WOMEN'S RESTROOM (REANALYSIS OF PLM 195212-02) Asb. / Total Pts. 2 / 1200 Matrix Removed 0% Sensitivity 0.083%	0.167% CHRYSOTILE ASBESTOS (ANALYSIS OF DRYWALL AND TAPING MUD COMPOSITE.)	10 % CELLULOSE Matrix Type: 'GYPSUM' (CALCIUM SULFATE), CARBONATE.
Client #: HM#1-1-D Micro #: 195443-02 Analyst: BK DRYWALL AND TAPING MUD BUILDING B, ADMIN. BUILDING OFFICE (REANALYSIS OF PLM 195212-04) Asb. / Total Pts. / Sensitivity	NOT ANALYZED (INSUFFICIENT TAPING MUD FOR ANALYSIS)	Matrix Type:
Client #: HM#15-15-A Micro #: 195443-03 Analyst: BK DRYWALL AND TAPING MUD BUILDING C NE END (REANALYSIS OF PLM 195212-33) Asb. / Total Pts. 0 / 1200 Matrix Removed 0% Sensitivity 0.083%	<0.083% CHRYSOTILE ASBESTOS (ANALYSIS OF DRYWALL AND TAPING MUD COMPOSITE.) CHRYSOTILE ASBESTOS WAS OBSERVED DURING SCANNING BUT NO POINTS WERE COUNTABLE (ASBESTOS IS BELOW THE DETECTION LIMIT OF THE METHOD).	10 % CELLULOSE Matrix Type: 'GYPSUM' (CALCIUM SULFATE), CARBONATE.
Client #: HM#15-15-B Micro #: 195443-04 Analyst: BK DRYWALL AND TAPING MUD BUILDING C SE END (REANALYSIS OF PLM 195212-34) Asb. / Total Pts. 0 / 1200 Matrix Removed 0% Sensitivity 0.083%	<0.083% CHRYSOTILE ASBESTOS (ANALYSIS OF DRYWALL AND TAPING MUD COMPOSITE.) CHRYSOTILE ASBESTOS WAS OBSERVED DURING SCANNING BUT NO POINTS WERE COUNTABLE (ASBESTOS IS BELOW THE DETECTION LIMIT OF THE METHOD).	10 % CELLULOSE Matrix Type: 'GYPSUM' (CALCIUM SULFATE), CARBONATE.
Client #: HM#15-15-C Micro #: 195443-05 Analyst: BK DRYWALL AND TAPING MUD BUILDING C NORTH END (REANALYSIS OF PLM 195212-35) Asb. / Total Pts. 0 / 1200 Matrix Removed 0% Sensitivity 0.083%	<0.083% CHRYSOTILE ASBESTOS (ANALYSIS OF DRYWALL AND TAPING MUD COMPOSITE.) CHRYSOTILE ASBESTOS WAS OBSERVED DURING SCANNING BUT NO POINTS WERE COUNTABLE (ASBESTOS IS BELOW THE DETECTION LIMIT OF THE METHOD).	10 % CELLULOSE Matrix Type: 'GYPSUM' (CALCIUM SULFATE), CARBONATE.

Technical Supervisor: _____ 6/26/2014
Gamini Ranatunga, Ph.D. Date Reported

Analyses use Polarized Light Microscopy (PLM), Micro Analytical SOP PLM-101,Rev 1/4/2013 for building materials (based on EPA-600/R93-116 (1993)), and California ARB 435 (1991) for applicable soil, rock, or aggregate samples. NOTES: Weight % cannot be determined by PLM estimation or point counts. Asbestos fibers with diameter below ~1 µm may not be detected by PLM. The absence of asbestos in dust or debris (including wipe or microvacuum), and in some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Only dominant non-asbestos materials are indicated. This report must not be interpreted as a conclusive identification of non-asbestos (fibrous or not). Quantities of non-asbestos fibers are estimated, not point counted. Preparation (all samples): grinding, milling; teasing bundles apart; drying, if needed, by hotplate. Acid dissolution, ashing, or other matrix reduction techniques may be applied to some samples; residue asbestos % is corrected for amount of matrix removed. Various sample interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Notes are made if point counting is used; otherwise, asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (<<1%) may not be reliable or reproducible by PLM. Lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos by weight; however, reliable determination of asbestos weight percent at this level cannot be done by PLM, and TEM is recommended. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Composite asbestos percentages on multilayered samples are applicable only to layered wall systems (wallboard, joint compound, and related materials); compositing is based on clients' descriptions of a material as "joint compound". Clients are solely responsible for identification and description of bulk materials listed on field forms. Laboratory sample descriptions may differ from descriptions given by the client. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated in this report, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed. ND = NO ASBESTOS DETECTED.

MICRO ANALYTICAL LABORATORIES, INC.

BULK ASBESTOS ANALYSIS - PLM POINT COUNT

1233
Mark King
URS Corporation
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833

PROJECT:
BUTTE FOREST FIRE STATION REPLACE FACILITY / HAZ. MAT. SURVEY
176 NELSON AVE.
OROVILLE, CA 95965
PROJECT NO. 17327033.50003

Micro Log In **195443**
Total Samples 7
Date Sampled 06/12/2014
Date Received 06/25/2014
Date Analyzed 06/25/2014

SAMPLE INFORMATION	ASBESTOS INFORMATION QUANTITY (AREA %) / TYPES / LAYERS / DISTINCT SAMPLES	DOMINANT OTHER MATERIALS
Client #: HM#21-21-B Micro #: 195443-06 Analyst: BK DRYWALL AND TAPING MUD BUILDING D NORTH HALLWAY (REANALYSIS OF PLM 195213-47) Asb. / Total Pts. 1 / 1200 Matrix Removed 0% Sensitivity 0.083%	0.083% CHRYSOTILE ASBESTOS (ANALYSIS OF DRYWALL AND TAPING MUD COMPOSITE.)	10 % CELLULOSE Matrix Type: 'GYPSUM' (CALCIUM SULFATE), CARBONATE.
Client #: HM#21-21-C Micro #: 195443-07 Analyst: BK DRYWALL AND TAPING MUD BUILDING D NW HALLWAY (REANALYSIS OF PLM 195213-48) Asb. / Total Pts. 20 / 1200 Matrix Removed 0% Sensitivity 0.083%	1.667% CHRYSOTILE ASBESTOS ANALYSIS OF TAPING MUD (NO DRYWALL IN THE SAMPLE)	Matrix Type: SYNTHETIC MATERIAL, CARBONATE.

Technical Supervisor: Gamini Ranatunga, Ph.D. 6/26/2014 Date Reported

Analyses use Polarized Light Microscopy (PLM), Micro Analytical SOP PLM-101,Rev.1/4/2013 for building materials (based on EPA-600/R93-116 (1993)), and California ARB 435 (1991) for applicable soil, rock, or aggregate samples. NOTES: Weight % cannot be determined by PLM estimation or point counts. Asbestos fibers with diameter below ~1 µm may not be detected by PLM. The absence of asbestos in dust or debris (including wipe or microvacuum), and in some compact materials, including floor tiles, cannot be conclusively established by PLM, and should be confirmed by Transmission Electron Microscopy (TEM). Only dominant non-asbestos materials are indicated. This report must not be interpreted as a conclusive identification of non-asbestos (fibrous or not). Quantities of non-asbestos fibers are estimated, not point counted. Preparation (all samples): grinding, milling; teasing bundles apart; drying, if needed, by hotplate. Acid dissolution, ashing, or other matrix reduction techniques may be applied to some samples; residue asbestos % is corrected for amount of matrix removed. Various sample interferences may prevent detection of small asbestos fibers, and hinder determination of some optical properties. Notes are made if point counting is used; otherwise, asbestos is quantified by calibrated visual estimation. Detection limit is material dependent. Detection of asbestos traces (<<1%) may not be reliable or reproducible by PLM. Lower quantitation limit (reporting limit) of PLM estimation is 1%. The Cal-OSHA definition of asbestos-containing construction material is 0.1% asbestos by weight; however, reliable determination of asbestos weight percent at this level cannot be done by PLM, and TEM is recommended. Sample heterogeneity is indicated by listing more than one distinct layer or material on the report. Composite asbestos percentages on multilayered samples are applicable only to layered wall systems (wallboard, joint compound, and related materials); compositing is based on clients' descriptions of a material as "joint compound". Clients are solely responsible for identification and description of bulk materials listed on field forms. Laboratory sample descriptions may differ from descriptions given by the client. Quality Control (QC): all results have been determined to be within acceptance limits prior to reporting. Samples that were reanalyzed are denoted by two sets of analyst initials. Unless otherwise stated in this report, all samples were received in acceptable condition for analysis. This report must not be used to claim product endorsement by NIST or any U.S. Government agency. This report shall not be reproduced except in full without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed. ND = NO ASBESTOS DETECTED.

CLEAR FORM | SAVE FORM | E-MAIL

Client ID # 1233

MICRO ANALYTICAL LABORATORIES, INC.

5900 Hollis St., Suite M, Emeryville, CA 94608
(510) 653-0624 - (510) 653-1361 - FAX

Log In # 195245

Name / Client / Address:
URS Corporation
2780 Gateway Oaks
Sacramento, CA. 95833

Tel. (916) 679-2000

Fax

E-mail mkec01ca@yahoo.com
sean.burnett@urs.com

Project
Butte Forest Fire Station
Replace Facility
Haz. Mat. Survey
176 Nelson Ave.
Oroville, CA. 95965

Job No. 17327033.50003

Asbestos (TEM) 1 of 3
Asbestos
Lead Only LEAD-PAINT
Metals (Specify)
Mold, Non-Viable
Other (Specify)

Number of Samples 22
Turn-Around Time 3-5 DAYS

Micro ID # (For Lab Use Only)	Client Sample ID#	Description	Date Sampled	Time Sampled Start / Stop / Total Minutes	Average LPM	Total Liters	Filter Pore Size
195245-1	Pb-1	Bldg. B White Paint on Wood	06/18/2014	: :			
2	Pb-2	Green Paint on Wood Bldg. B		: :			
3	Pb-3	Tan Paint on Wood Bldg. B		: :			
4	Pb-4	Green Paint on Wood Bldg. C		: :			
5	Pb-5	White Paint on Metal Bldg. C		: :			
6	Pb-6	Tan Paint on Metal Bldg. A		: :			
7	Pb-7	Green Paint on Wood Bldg. A		: :			
		~~Analyze to 4ci positive in each homogeneous group~~		: :			
				: :			
				: :			

Instructions / Comments: ☐ Fax ☑ E-mail To:

Sample Return: YES ☐ NO ☑ If "YES" is checked, samples will be returned to the client or archived at Micro Analytical if required.
If "NO" is checked, solid samples may be disposed of within three months (one week for liquid samples, lab suspensions, and digestates).

Sampler's Signature / Name MSE

Note to Lab: If any samples are not acceptable, record reasons for rejection.

Relinquished By MSE **Date / Time** 6/20/14 **Drop Box / Courier** **Received By** Kao Saelee **Date / Time** 6/20/2014 2pm

Relinquished By **Date/Time** **Received By** **Date / Time**

Page 1 of 1

CLEAR FORM | SAVE FORM | E-MAIL

Client ID # 1233

MICRO ANALYTICAL LABORATORIES, INC.

5900 Hollis St., Suite M, Emeryville, CA 94608
(510) 653-0824 - (510) 653-1361 - FAX

Log in # 195245

Name / Client / Address:
URS Corporation
2780 Gateway Oaks
Sacramento, CA. 95833

Tel. (916) 679-2000
Fax
E-mail mkec01ca@yahoo.com
sean.burnett@urs.com

Project
Butte Forest Fire Station
Replace Facility
Haz. Mat. Survey
176 Nelson Ave.
Oroville, CA. 95965

Job No. 17327033.50003

Asbestos (TEM)
Asbestos
Lead Only LEAD-PAINT
Metals (Specify)
Mold, Non-Viable
Other (Specify)

Number of Samples 23
Turn-Around Time 3-5 DAYS

Micro ID # (For Lab Use Only)	Client Sample ID#	Description	Date Sampled	Time Sampled Start / Stop / Total Minutes	Average LPM	Total Liters	Filter Pore Size
195245.8	Pb-8	White paint on wood Bldg. E	06/18/2014	: :			
9	Pb-9	Yellow paint on concrete Bldg. E		: :			
10	Pb-10	Green paint on wood Bldg. E		: :			
11	Pb-11	Gray paint on concrete Bldg. F		: :			
12	Pb-12	Blue paint on wood Bldg. F		: :			
13	Pb-13	White paint on wood Bldg. F		: :			
14	Pb-14	Green paint on wood Bldg. F		: :			
		~~Analyze to 1st positive in each homogeneous group~~		: :			
15	Pb-15	Tan paint on metal Bldg. K		: :			
16	Pb-16	Green paint on metal, Bldg. K		: :			

Instructions / Comments: ☐ Fax ☑ E-mail To:

Sample Return: YES ☐ NO ☑ If "YES" is checked, samples will be returned to the client or archived at Micro Analytical if required.
If "NO" is checked, solid samples may be disposed of within three months (one week for liquid samples, lab suspensions, and digestates).

Sampler's Signature / Name: MSK

Note to Lab: If any samples are not acceptable, record reasons for rejection.

Relinquished By	Date / Time	Drop Box / Courier	Received By	Date / Time
MSK	6/20/14		Kuo Sukee	6/20/2014 2pm

Relinquished By	Date/Time	Received By	Date / Time

CLEAR FORM | SAVE FORM | E-MAIL

Client ID # 1233

MICRO ANALYTICAL LABORATORIES, INC.

5900 Hollis St., Suite M, Emeryville, CA 94608
(510) 653-0824 - (510) 653-1301 - FAX

Log in # 195245

Name / Client / Address:
URS Corporation
2780 Gateway Oaks
Sacramento, CA. 95833

Tel. (916) 679-2000
Fax
E-mail mkec01ca@yahoo.com
sean.burnett@urs.com

Project
Butte Forest Fire Station
Replace Facility
Haz. Mat. Survey
176 Nelson Ave
Oroville, CA. 95965

Job No. 17327033.50003

Asbestos (TEM)
Asbestos
Lead Only LEAD-PAINT
Metals (Specify)
Mold, Non-Viable
Other (Specify)

Number of Samples 23
Turn-Around Time 3-5 DAYS

Micro ID # (For Lab Use Only)	Client Sample ID#	Description	Date Sampled	Time Sampled Start / Stop / Total Minutes	Average LPM	Total Liters	Filter Pore Size
195245-17	Pb-17	GRAY PAINT ON CONCRETE Bldg. G	06/18/2014	: :			
18	Pb-18	WHITE PAINT ON WOOD Bldg. G		: :			
19	Pb-19	GREEN PAINT ON WOOD Bldg. G		: :			
20	Pb-20	GRAY PAINT ON CONCRETE Bldg. L		: :			
21	Pb-21	RED PAINT ON WOOD Bldg. L		: :			
22	Pb-22	GREEN PAINT ON WOOD Bldg. L		: :			
23	Pb-23	WHITE PAINT ON CONCRETE Bldg. L		: :			
		~~Analyze to 1st positive in each homogeneous group~~		: :			
				: :			
				: :			

Instructions / Comments: ☐ Fax ☑ E-mail To:

Sample Return: YES ☐ NO ☑ If "YES" is checked, samples will be returned to the client or archived at Micro Analytical if required.
If "NO" is checked, solid samples may be disposed of within three months (one week for liquid samples, lab suspensions, and digestates).

Sampler's Signature / Name MGE / [illegible]

Note to Lab: If any samples are not acceptable, record reasons for rejection.

Relinquished By Date / Time 6/20/14 — Drop Box / Courier ☐ — **Received By** Yao Sucker — Date / Time 6/20/2014 2p

Relinquished By Date/Time — Drop Box / Courier ☐ — **Received By** — Date / Time

Page 1 of 1

MICRO ANALYTICAL LABORATORIES, INC.

LEAD IN PAINT - FLAME AAS (SW846)

1233
Mark King
URS Corporation
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833

PROJECT:
BUTTE FOREST FIRE STATION
REPLACE FACILITY
HAZ. MAT. SURVEY
176 NELSON AVENUE
OROVILLE, CA
JOB NO. 17327033.50003

Micro Log In 195245
Total Samples 23
Date Sampled 06/18/2014
Date Received 06/20/2014
Date Analyzed 06/24/2014

Sample ID	Lead Concentration Weight Percent	mg/kg (ppm)	RDL
Client: PB-01 Lab: 195245-01 BUILDIGN B WHITE PAINT ON WOOD	0.36 %	3600	0.0493 % 493 mg/kg
Client: PB-02 Lab: 195245-02 BUILDING B GREEN PAINT ON WOOD	< 0.0074 %	< 74	0.00741 % 74 mg/kg
Client: PB-03 Lab: 195245-03 BUILDING B TAN PAINT ON WOOD	0.045 %	450	0.00667 % 67 mg/kg
Client: PB-04 Lab: 195245-04 BUILDING C GREEN PAINT ON WOOD	0.024 %	240	0.00787 % 79 mg/kg
Client: PB-05 Lab: 195245-05 BUILDING C WHITE PAINT ON METAL	0.078 %	780	0.00559 % 56 mg/kg

Technical Supervisor: Tess Tagorda 6/24/2014 Analyst: TT
Tess Tagorda, Chemistry Supervisor Date Reported

AIHA ELLAP Accredited Laboratory, ID #101768. SOP M4. Samples are analyzed by Flame Atomic Absorption Spectrometry (AAS). U.S. EPA SW-846 Method 7000B is used for the instrumental analysis. Nitric acid and hydrogen peroxide digestion procedures are based on ASTM E-1645. Unless otherwise indicated on this report, all required Quality Control samples have been determined to be in control prior to releasing these analytical results. Unless otherwise stated in this report, all samples were received in acceptable condition for analysis. Note: due to software limitations, the number of reported significant figures does not necessarily reflect the uncertainty of the analysis. This report must not be reproduced without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed. Unit explanations: mg = milligrams; kg = kilograms; ppm = parts per million. N/A = Not Applicable. RDL = Report Detection Limit.

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OROVILLE, CA
JOB NO. 17327033.50003

Micro Log In 195245
Total Samples 23
Date Sampled 06/18/2014
Date Received 06/20/2014
Date Analyzed 06/24/2014

Sample ID	Lead Concentration Weight Percent	mg/kg (ppm)	RDL
Client: PB-06 Lab: 195245-06 BUILDING D TAN PAINT ON METAL	0.021 %	210	0.0073 % 73 mg/kg
Client: PB-07 Lab: 195245-07 BUILDING D GREEN PAINT ON WOOD	< 0.0058 %	< 58	0.00581 % 58 mg/kg
Client: PB-08 Lab: 195245-08 BUILDING E WHITE PAINT ON WOOD	0.091 %	910	0.00435 % 43 mg/kg
Client: PB-09 Lab: 195245-09 BUILDING E YELLOW PAINT ON CONCRETE	3.5 %	35000	0.176 % 1,761 mg/kg
Client: PB-10 Lab: 195245-10 BUILDING E GREEN PAINT ON WOOD	0.019 %	190	0.00741 % 74 mg/kg

Technical Supervisor: Tess Tagorda 6/24/2014 Analyst: TT
Tess Tagorda, Chemistry Supervisor Date Reported

AIHA ELLAP Accredited Laboratory, ID #101768. SOP M4. Samples are analyzed by Flame Atomic Absorption Spectrometry (AAS). U.S. EPA SW-846 Method 7000B is used for the instrumental analysis. Nitric acid and hydrogen peroxide digestion procedures are based on ASTM E-1645. Unless otherwise indicated on this report, all required Quality Control samples have been determined to be in control prior to releasing these analytical results. Unless otherwise stated in this report, all samples were received in acceptable condition for analysis. Note: due to software limitations, the number of reported significant figures does not necessarily reflect the uncertainty of the analysis. This report must not be reproduced without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed. Unit explanations: mg = milligrams; kg = kilograms; ppm = parts per million. N/A = Not Applicable. RDL = Report Detection Limit.

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OROVILLE, CA
JOB NO. 17327033.50003

Micro Log In 195245
Total Samples 23
Date Sampled 06/18/2014
Date Received 06/20/2014
Date Analyzed 06/24/2014

Sample ID	Lead Concentration Weight Percent	mg/kg (ppm)	RDL
Client: PB-11 Lab: 195245-11 BUILDING F GRAY PAINT ON CONCRETE	< 0.0063 %	< 63	0.00625 % 63 mg/kg
Client: PB-12 Lab: 195245-12 BUILDING F BLUE PAINT ON WOOD	0.21 %	2100	0.0279 % 279 mg/kg
Client: PB-13 Lab: 195245-13 BUILDING F WHITE PAINT ON WOOD	< 0.0069 %	< 69	0.00694 % 69 mg/kg
Client: PB-14 Lab: 195245-14 BUILDING F GREEN PAINT ON WOOD	< 0.0080 %	< 80	0.0080 % 80 mg/kg
Client: PB-15 Lab: 195245-15 BUILDING K TAN PAINT ON METAL	1.6 %	16000	0.203 % 2,033 mg/kg

Technical Supervisor: Tess Tagorda 6/24/2014 Analyst: TT
Tess Tagorda, Chemistry Supervisor Date Reported

AIHA ELLAP Accredited Laboratory, ID #101768. SOP M4. Samples are analyzed by Flame Atomic Absorption Spectrometry (AAS). U.S. EPA SW-846 Method 7000B is used for the instrumental analysis. Nitric acid and hydrogen peroxide digestion procedures are based on ASTM E-1645. Unless otherwise indicated on this report, all required Quality Control samples have been determined to be in control prior to releasing these analytical results. Unless otherwise stated in this report, all samples were received in acceptable condition for analysis. Note: due to software limitations, the number of reported significant figures does not necessarily reflect the uncertainty of the analysis. This report must not be reproduced without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed. Unit explanations: mg = milligrams; kg = kilograms; ppm = parts per million. N/A = Not Applicable. RDL = Report Detection Limit.

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PROJECT:
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HAZ. MAT. SURVEY
176 NELSON AVENUE
OROVILLE, CA
JOB NO. 17327033.50003

Micro Log In 195245
Total Samples 23
Date Sampled 06/18/2014
Date Received 06/20/2014
Date Analyzed 06/24/2014

Sample ID	Lead Concentration Weight Percent	mg/kg (ppm)	RDL
Client: PB-16 Lab: 195245-16 BUILDING K GREEN PAINT ON METAL	0.83 %	8300	0.0629 % 629 mg/kg
Client: PB-17 Lab: 195245-17 BUILDING G GRAY PAINT ON CONCRETE	0.010 %	100	0.00556 % 56 mg/kg
Client: PB-18 Lab: 195245-18 BUILDING G WHITE PAINT ON WOOD	< 0.0063 %	< 63	0.00629 % 63 mg/kg
Client: PB-19 Lab: 195245-19 BUILDING G GREEN PAINT ON WOOD	< 0.0073 %	< 72	0.00725 % 72 mg/kg
Client: PB-20 Lab: 195245-20 BUILDING L GRAY PAINT ON CONCRETE	< 0.0052 %	< 52	0.00518 % 52 mg/kg

Technical Supervisor: Tess Tagorda, Chemistry Supervisor — 6/24/2014 Date Reported — Analyst: TT

AIHA ELLAP Accredited Laboratory, ID #101706. SOP M4. Samples are analyzed by Flame Atomic Absorption Spectrometry (AAS). U.S. EPA SW-846 Method 7000B is used for the instrumental analysis. Nitric acid and hydrogen peroxide digestion procedures are based on ASTM E-1645. Unless otherwise indicated on this report, all required Quality Control samples have been determined to be in control prior to releasing these analytical results. Unless otherwise stated in this report, all samples were received in acceptable condition for analysis. Note: due to software limitations, the number of reported significant figures does not necessarily reflect the uncertainty of the analysis. This report must not be reproduced without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed. Unit explanations: mg = milligrams; kg = kilograms; ppm = parts per million. N/A = Not Applicable. RDL = Report Detection Limit.

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LEAD IN PAINT - FLAME AAS (SW846)

1233
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PROJECT:
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HAZ. MAT. SURVEY
176 NELSON AVENUE
OROVILLE, CA
JOB NO. 17327033.50003

Micro Log In 195245
Total Samples 23
Date Sampled 06/18/2014
Date Received 06/20/2014
Date Analyzed 06/23/2014

Sample ID	Lead Concentration Weight Percent	mg/kg (ppm)	RDL
Client: PB-21 Lab: 195245-21 BUILDING L RED PAINT ON WOOD	1.6 %	16000	0.151 % 1,506 mg/kg
Client: PB-22 Lab: 195245-22 BUILDING L GREEN PAINT ON WOOD	< 0.0075 %	< 75	0.00752 % 75 mg/kg
Client: PB-23 Lab: 195245-23 BUILDING L WHITE PAINT ON CONCRETE	< 0.0070 %	< 70	0.00699 % 70 mg/kg

Technical Supervisor: Tess Tagorda 6/24/2014 Analyst: TT
Tess Tagorda, Chemistry Supervisor Date Reported

AIHA ELLAP Accredited Laboratory, ID #101768. SOP M4. Samples are analyzed by Flame Atomic Absorption Spectrometry (AAS). U.S. EPA SW-846 Method 7000B is used for the instrumental analysis. Nitric acid and hydrogen peroxide digestion procedures are based on ASTM E-1645. Unless otherwise indicated on this report, all required Quality Control samples have been determined to be in control prior to releasing these analytical results. Unless otherwise stated in this report, all samples were received in acceptable condition for analysis. Note: due to software limitations, the number of reported significant figures does not necessarily reflect the uncertainty of the analysis. This report must not be reproduced without the approval of Micro Analytical Laboratories, Inc., and pertains only to the samples analyzed. Unit explanations: mg = milligrams; kg = kilograms; ppm = parts per million. N/A = Not Applicable. RDL = Report Detection Limit.

Appendix E
Sample Photographs (In Attached CD)

Note: Use Appendix A to associate photos with laboratory results

APPENDIX H

Butte Fire Station and Unit Headquarters Project Noise Assessment, j.c. brennan & associates, September 4, 2014.

Butte Fire Station and Unit Headquarters Project
Noise Assessment

City of Oroville, California

September 4, 2014

Job # 2014-113

Lead Agency:

Prepared for:

Attn: Chris Stabenfeldt

Prepared by:

j.c. brennan & associates, Inc.

Luke Saxelby, INCE Bd. Cert.
Board Certified, Institute of Noise Control Engineering

1287 High Street, Auburn, California 95603 * 530-823-0960 (p) * (530)823-0961 (f)

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APPENDICES

Appendix A – Acoustical Terminology
Appendix B – Roadway Construction Model Inputs/Results

INTRODUCTION

The Proposed Project is located in the City of Oroville, Butte County, California. The City of Oroville is located in the southern portion of Butte County, approximately 65 miles north of the City of Sacramento and approximately 22 miles southwest of the City of Chico. The Project site consists of the existing California Department of Forestry and Fire Protection (CAL FIRE) Butte Fire Station and Unit Headquarters (Butte FS and UHQ), located at 176 Nelson Avenue, Oroville, California 95965. Access to the Project site is provided via Nelson Avenue and Del Oro Avenue.

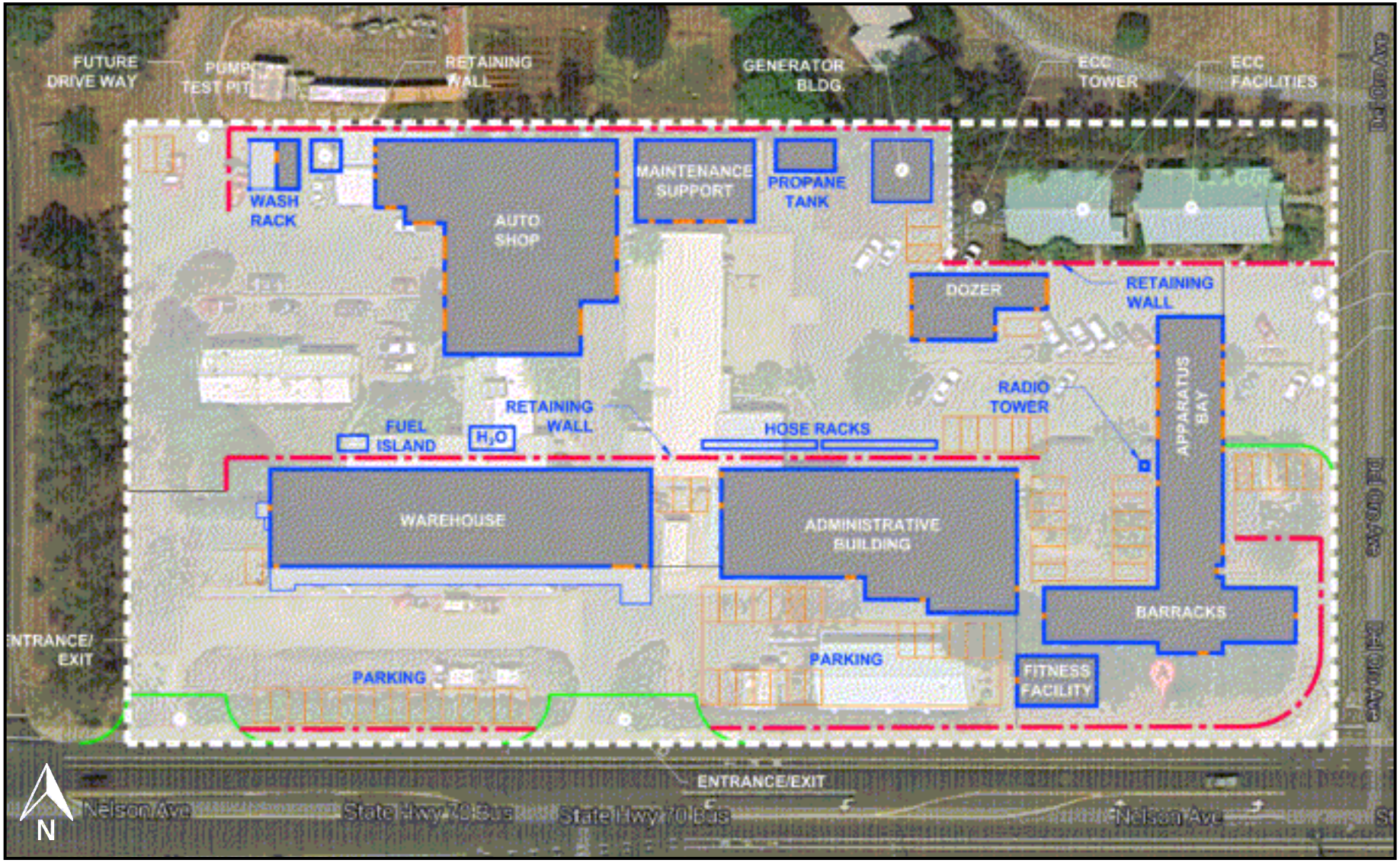
The Project site corresponds to a 4.36-acre parcel, Assessor's Parcel Number (APN) 031-040-015-000, west of Highway 70 off Nelson Avenue between County Center Drive and Del Oro Avenue. The Project site is bound by Butte County owned land consisting of residential homes (previously physician homes for the County Hospital) and a storage yard for the Butte County Fire Department on the north, the County of Butte government complex on the west across County Center Drive, the Home Depot and land under development for the Butte County Clerk-Recorder Complex (aka Hall of Records) on the south across Nelson Avenue, and residential homes and an apartment complex on the east across Del Oro Avenue.

The Project site is currently developed and contains the existing Butte FS and UHQ. The Butte FS and UHQ consists of an administrative building, equipment garage (with vehicle bays) and headquarters office, main equipment auto shop (with vehicle bays), equipment/maintenance building (with vehicle bays), two emergency command center (ECC) buildings and ECC tower, barracks, galley (mess hall/kitchen), warehouse/service center, fire suppression building, gas and oil house, fuel tanks, and parking areas

The Proposed Project would construct a new fire station and unit administrative headquarters complex. Construction of new facilities would include: administrative building, three-bay fire apparatus building, 20-bed barracks/mess hall, warehouse/service center, two-bay dozer shed, auto shop, covered vehicle wash rack with filtration system, maintenance support building, physical fitness building, a generator/storage building, a fire pump test pit and several other site improvements

The purpose of this study is to examine the potential noise impacts associated with the Project at any existing noise-sensitive uses in the project vicinity. Figure 1 shows the project site plan.

Figure 1
Butte FS and UHQ – City of Oroville, California
Project Site Plan



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Environmental Setting

Noise Background

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective. Often, someone's music is described as noise by another.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dBA. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dBA, and changes in levels (dBA) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels.

There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but may be expressed as dBA, unless otherwise noted.

The decibel scale is logarithmic, not linear. In other words, two sound levels 10 dBA apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70 dBA sound is half as loud as an 80 dBA sound, and twice as loud as a 60 dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn}

represents a 24-hour average, it tends to disguise short-term variations in the noise environment. Table 1 lists several examples of maximum noise levels associated with common noise sources.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

Table 1: Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft)	--100--	
Gas Lawn Mower at 1 m (3 ft)	--90--	
Diesel Truck at 15 m (50 ft), at 80 km/hr (50 mph)	--80--	Food Blender at 1 m (3 ft) Garbage Disposal at 1 m (3 ft)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft)	--70--	Vacuum Cleaner at 3 m (10 ft)
Commercial Area Heavy Traffic at 90 m (300 ft)	--60--	Normal Speech at 1 m (3 ft)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

Source: Caltrans, Technical Noise Supplement, Traffic Noise Analysis Protocol. November 2009.

With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference;
- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- A 10 dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6 dBA per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

A complete listing of acoustical terminology is provided in Appendix A.

Existing Noise Environment in Project Vicinity

The existing noise environment in the vicinity of the project is typical of a suburban neighborhood with traffic noise as the primary source of ambient noise, especially during daytime hours. Nighttime ambient noise levels are fairly low due to low nighttime traffic volumes. The primary noise source in the vicinity of the proposed project is roadway traffic on Nelson Avenue, and activities associated with the existing Butte FS and UHQ. The primary noise source from the Fire Station included dispatch chatter on exterior public address speakers and vehicle movements on the project site.

Existing Ambient Noise Levels

To quantify the existing ambient noise environment in the project vicinity continuous noise level measurements were conducted in the project vicinity on April 2-3, 2014. The noise measurement locations are shown on Figure 2. The noise level measurement survey results are provided in Table 2.

The sound level meters were programmed to collect hourly noise level intervals during the survey. The maximum value (L_{max}) represents the highest noise level measured during an interval. The average value (L_{eq}) represents the energy average of all of the noise measured during an interval. The median value (L_{50}) represents the sound level exceeded 50 percent of the time during an interval.

Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

Figure 2
Butte FS and UHQ – City of Oroville, California
Project Site and Noise Measurement Locations

△ : Noise Measurement Site

j.c. brennan & associates
consultants in acoustics

Table 2: Summary of Existing Background Noise Measurement Data								
			Average Measured Hourly Noise Levels, dB					
			Daytime (7am-10pm)			Nighttime (10pm-7am)		
Site	Location	Ldn	L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
Continuous (24-hour) Noise Level Measurements								
LT-1	Traffic on Nelson Avenue	61	61	56	79	52	43	69
LT-2	Chatter from CalFire Speaker/Dispatch, background traffic noise, activities at Butte FS and UHQ	57	58	47	70	45	42	57
Source: j.c. brennan & associates, Inc., 2014.								

REGULATORY FRAMEWORK

Federal

There are no federal regulations related to noise that apply to the Proposed Project.

State

The California Environmental Quality Act (CEQA) Guidelines, Appendix G, indicate that a significant noise impact may occur if a project exposes persons to noise levels in excess of local general plans or noise ordinance standards, or cause a substantial permanent or temporary increase in ambient noise levels.

City of Oroville General Plan Noise Element

The General Plan Noise Element establishes objectives and implementing policies intended to limit community exposure to excessive noise levels. Noise/land use compatibility standards are detailed in Tables NOI-6 [Table 3] and NOI-7 [Table 4]. Table NOI-6 [Table 3] summarizes the standards for transportation (i.e. mobile) sources and Table NOI-7 [Table 4] summarizes standards for non-transportation (i.e. stationary) sources. Table NOI-8 [Table 5] identifies significance thresholds for increases in noise based on changes in cumulative noise exposure. The General Plan Noise Element establishes the following goals, objectives, and policies associated with noise that are applicable to the proposed project:

Land Use Compatibility

- **Goal NOI-1:** Minimize community exposure to excessive noise by ensuring compatible land uses relative to noise sources.

Policies

P1.1: Include noise considerations in land use planning, transportation planning and project design decisions.

P1.2: Require new development to mitigate exterior noise to the noise exposure levels shown in Tables NOI-6 [Table 3] and NOI-7 [Table 4] in the backyards of single-family homes and in outdoor common use areas in multi-family residential facilities.

P1.3: Require preparation of a noise analysis/acoustical study, which is to include recommendations for mitigation, for all proposed projects which may result in potentially significant noise impacts to nearby noise sensitive land uses, such as residences or that is predicted to be exposed to noise levels greater than the exterior or interior noise levels shown in Tables NOI-6 [Table 3] and NOI-7 [Table 4].

The following provisions would apply to project-specific acoustical analyses:

- Be the financial responsibility of the applicant.
- Be prepared by a qualified person experienced in the fields of environmental noise assessment and architectural acoustics.
- Include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions and the predominant noise sources.
- Where the noise source in question consists of intermittent single events, the report must address the effects of maximum noise levels in sleeping rooms in terms of possible sleep disturbance.
- Recommend appropriate mitigation to achieve compliance with the adopted policies and standards of the Noise Element, giving preference to proper site planning and design over mitigation measures that require the construction of noise barriers or structural modifications to buildings that may be considered to contain noise-sensitive land uses.
- Estimate noise exposure after the prescribed mitigation measures have been implemented.
- Describe a post-project assessment program that could be used to evaluate the effectiveness of the proposed mitigation measures.

Table 3: Maximum Allowable Noise Exposure to Transportation Noise Sources			
Land Use	**Exterior Noise Level Standard for Outdoor Activity Areas[a]**	**Interior Noise Level Standard**	
	L_{dn}/CNEL, dB	**L_{dn}/CNEL, dB**	**L_{eq}, dB[b]**
Residential	60[c]	45	—
Transient Lodging	60[c]	45	—
Hospitals, Nursing Homes	60[c]	45	—
Theaters, Auditoriums, Music Halls	—	—	35
Churches, Meeting Halls	60[c]	—	40
Office Buildings	—	—	45
Schools, Libraries, Museums	—	—	45
Playgrounds, Neighborhood Parks	70	—	—

Notes:

[a] Where the location of outdoor activity areas is unknown, the exterior noise-level standard shall be applied to the property line of the receiving land use.

[b] As determined for a typical worst-case hour during periods of use.

[c] Where it is not possible to reduce noise in outdoor activity areas to 60 dB L_{dn}/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB L_{dn}/CNEL may be allowed, provided that available exterior noise-level reduction measures have been implemented and interior noise levels are in compliance with this table.

Source: City of Oroville, 2009.

Table 4: Maximum Allowable Noise Exposure to Non-Transportation Sources					
Land Use	**Noise Level Descriptor**	**Exterior Noise Level Standard (Applicable at Property Line)**		**Interior Noise Level Standard**	
		Daytime (7 a.m. to 10 p.m.)	**Nighttime (10 p.m. to 7 a.m.)**	**Daytime (7 a.m. to 10 p.m.)**	**Nighttime (10 p.m. to 7 a.m.)**
Residential	L_{eq}	50	45	40	35
	L_{max}	70	65	60	55
Transient Lodging, Hospitals, Nursing Homes	L_{eq}	—	—	40	35
	L_{max}	—	—	60	35
Theaters, Auditoriums, Music Halls	L_{eq}	—	—	35	35
Churches, Meeting Halls	L_{eq}	—	—	40	40
Office Buildings	L_{eq}	—	—	45	—
Schools, Libraries	L_{eq}	—	—	45	—
Playgrounds, Parks	L_{eq}	65	—	—	—

Notes:
Each of the noise levels specified above shall be lowered by 5 dB for simple tone noises, which are noises consisting primarily of speech, music or recurring impulsive noises. These noise-level standards do not apply to residential units
established in conjunction with industrial or commercial use (e.g., caretaker dwelling).
Source: City of Oroville, 2009.

P1.4: Require an acoustical analysis and include appropriate mitigation measures in the project design where the land uses listed in Table NOI-6 [Table 3] are proposed in areas exposed to existing or projected exterior transportation noise levels exceeding the levels specified in able NOI-6 [Table 3].

P1.5: Mitigate noise created by proposed non-transportation noise sources so as not to exceed the noise level standards of Table NOI-7 [Table 4] as measured immediately within the property line of the affected land use.

P1.6: Require mitigation of all significant noise impacts as a condition of project approval. Use the following thresholds in making a determination of significant impact pursuant to the California Environmental Quality Act (CEQA):

- The significance of noise impacts may be determined by comparison of overall noise levels (including contributions from the project) to applicable federal, State or local noise level standards, and by the expected change in ambient noise levels which will occur as a result of the project.

- The overall noise level may be considered significant if the project results in the exposure of noise sensitive land uses to noise levels which exceed the noise standards in Table NOI-7 [Table 4].
- An increase of 3 dB represents will be considered a significant increase in the ambient noise level.
- For transportation noise sources in the City of Oroville the increases in noise specified in Table NOI-8 [Table 5] represent a significant increase in ambient noise.

Table 5: Significant Increase in Transportation Noise

Ambient Noise Level Without Project (L_{dn} or CNEL)	Significant Increase
< 60	+ 5.0 dB or more
60 to 65	+ 3.0 dB or more
>65 dB	+1.5 dB or more

Source: City of Oroville, 2009.

P1.7: Only allow land uses to exceed the noise exposure standards in Tables NOI-6 [Table 3] and NOI-7 [Table 4] if the proposed use can be shown to serve the greater public interests of the citizens of Oroville.

P1.8: Discourage the construction of sound walls. Instead, use building set-backs, earthen berms, alternative architectural layouts and other means to meet the land use compatibility requirements specified in Table NOI-6 [Table 3] and Table NOI-7 [Table 4].

P1.11: Reduce potential impacts from groundborne vibration associated with rail operations by requiring that vibration sensitive buildings (e.g., residences) are sited at least 100 feet from the centerline of the railroad tracks whenever feasible and that development of vibration- sensitive buildings within 100 feet from the centerline of the railroad tracks require a study demonstrating that

groundborne vibration issues associated with rail operations have been adequately addressed (i.e., through building siting or construction techniques).

Noise Source Reduction

Goal NOI-2: Reduce noise levels from sources such as domestic uses, construction, and mobile sources including motor vehicles and aircraft.

Policies

P2.1: Mitigate noise created by new transportation noise sources, including roadway improvement projects, so as not to exceed the levels specified in Table NOI-6 [Table 3] at outdoor activity areas or interior spaces of the existing uses specified in Table NOI-4.

P2.2: Enforce provisions of the Community Noise Ordinance, which limits maximum permitted noise levels that cross property lines and impact adjacent land uses.

P2.3: Limit noise generating construction activities located within 1,000 feet of residential uses to daytime hours between 7:00 a.m. and 6:00 p.m. on weekdays and non-holidays.

P2.4: Require the following standard construction noise control measures to be included as requirements at construction sites in order to minimize construction noise impacts:

- Equip all internal combustion engine driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

- Locate stationary noise generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area.

- Utilize “quiet” air compressors and other stationary noise-generating equipment where appropriate technology exists and is feasible.

- The project sponsor shall designate a “noise coordinator” who would be responsible for responding to any local complaints about construction noise. The noise coordinator will determine the cause of the noise complaint (e.g., starting too early, bad muffler) and will require that reasonable measures warranted to correct the problem be implemented. The project sponsor shall also post a telephone number for excessive noise complaints in conspicuous locations in the vicinity of the project site. Additionally, the project sponsor shall send a notice to neighbors in the project vicinity with information on the construction schedule and the telephone number for noise complaints.

P2.6: Support efforts to reduce vehicle and equipment noise, e.g. through fleet and equipment modernization or retrofits, use of alternative fuel vehicles and installation of mufflers or other noise reducing equipment.

City of Oroville Noise Ordinance

The City of Oroville Municipal Code, Chapter 13A, Noise, also known as the Noise Ordinance of the City of Oroville is a follows:

13A-1 Declaration of policy.

It is declared to be the policy of the city, in the exercise of its police power, to prohibit unnecessary, excessive, and annoying noise levels from all sources. At certain levels, noises are detrimental to the health and welfare of the citizenry and, in the public interest, shall be systematically proscribed. It is the purpose of this chapter to prescribe standards for and to prohibit such unacceptable noises and to provide an effective and readily available remedy for violations of this chapter. The provisions of this chapter and the remedies contained herein shall be cumulative and are not intended to replace any otherwise available remedies for public, private or mixed nuisances, nor any other civil or criminal remedies otherwise available (Ord. No. 1380, Sec. 1).

13A-3 Residential property noise limits.

(a) No person shall produce, suffer or allow to be produced by any machine, animal or device, or any combination of same, on residential property, a noise level more than five dB above the local ambient at any point outside of the property plane.

(b) No person shall produce, suffer or allow to be produced by any machine, animal, or device, or any combination of same, on multifamily residential property, a noise level more than five dB above the local ambient three feet from any wall, floor, or ceiling inside any dwelling unit on the same property, when the windows and doors of the dwelling unit are closed, except within the dwelling unit in which the noise source or sources may be located (Ord. No. 1380, Sec. 3).

13A-4 Commercial and industrial property noise limits.

No person shall produce, suffer or allow to be produced by any machine or device, or any combination of same, on commercial or industrial property, a noise level more than eight dB above the local ambient at any point outside of the property plane (Ord. No. 1380, Sec. 4).

13A-5 Public property noise limits.

(a) No person shall produce, suffer or allow to be produced by any machine or device, or any combination of same, on public property, a noise level more than fifteen dB above the local ambient at a distance of twenty-five feet or more from the source unless otherwise provided in this chapter.

(b) Sound performances and special events not exceeding eighty dBA measured at a distance of fifty feet from the source are exempt from this chapter when approval therefore has been obtained from the city.

(c) Vehicle horns, or other devices primarily intended to create a loud noise for warning purposes, shall not be used when the vehicle is at rest, or when a

situation endangering life, health, or property is not imminent (Ord. No. 1380, Sec. 5).

13A-6 Exceptions--Designated.

(a) Daytime Exceptions. Any noise source which does not produce a noise level exceeding seventy dBA at a distance of twenty-five feet from the source under its most noisy condition of use shall be exempt from the provisions of sections 13A-3, 13A-4 and 13A-5 between the hours of seven a.m. and nine p.m. daily except Saturdays, Sundays and holidays, when the exemption herein shall apply between ten a.m. and six p.m.

(b) Safety Devices. Aural warning devices which are required by law to protect the health, safety, and welfare of the community shall not produce a noise level more than three dB above the standard or minimum level as provided by state law.

(c) Construction and Alteration of Structures. Notwithstanding any other provision of this chapter, between the hours of seven a.m. and nine p.m. daily except Saturdays, Sundays and holidays, when the exemption herein shall apply between ten a.m. and six p.m., construction, alteration or repair of structures shall be allowed if it meets at least one of the following noise limitations:

(1) No individual piece of equipment shall produce a noise level exceeding eighty-three dBA at a distance of twenty-five feet from the source. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to twenty-five feet from the equipment as possible;

(2) The noise level at any point outside of the property plane of the project shall not exceed eighty-six dBA;

(3) The provisions of subdivisions (1) and (2) of this subsection shall not be applicable to impact tools and equipment, provided that on and after a date six months after the effective date of this chapter, such impact tools and equipment shall have intake and exhaust mufflers recommended by the manufacturers thereof and approved by the city's director of public works as best accomplishing maximum noise attenuation, and that pavement breakers and jackhammers shall also be equipped with acoustically attenuating shields or shrouds recommended by the manufacturers thereof and approved by the city's director of public works as best accomplishing maximum noise attenuation. In the absence of manufacturer's recommendations, the director of public works may prescribe such means of accomplishing maximum noise attenuation as he may determine to be in the public interest.

(d) Emergencies and Emergency Vehicles. Emergencies and emergency vehicles are exempt from the provisions of this chapter.

(f) Power Tools. The operation of power tools for noncommercial purposes shall be exempt from the provisions of sections 13A-3, 13A-4 and 13A-5 between the

hours of nine a.m. and eight p.m.; provided, that such operations shall be subject to the provisions of section 13A-8. For the purpose of this subsection, a noncommercial use shall be any use for which a business license is not required pursuant to Chapter 12 of this Code (Ord. No. 1380, Sec. 6).

13A-8 Loud and unusual noises prohibited.

Consistent with other provisions of this chapter, and in addition thereto, it shall be unlawful for any person to willfully make, produce, suffer or allow to be produced by any machine, animal or device, or any combination of same, any loud, unnecessary, or unusual noise which causes discomfort or annoyance to any reasonable person of normal sensitivity residing in the area (Ord. No. 1380, Sec. 10).

Vibration Standards

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities.

The City of Oroville does not have specific policies pertaining to vibration levels. However, vibration levels associated with construction activities and railroad operations are addressed as potential noise impacts associated with project implementation.

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 6 indicates that the threshold for damage to structures ranges from 2 to 6 peak particle velocity in inches per second (in/sec p.p.v). One-half this minimum threshold or 1 in/sec p.p.v. is considered a safe criterion that would protect against architectural or structural damage. The general threshold at which human annoyance could occur is noted as 0.1 in/sec p.p.v.

Table 6: Effects of Vibration on People and Buildings			
Peak Particle Velocity		**Human Reaction**	**Effect on Buildings**
mm/sec.	**in/sec.**		
0.15-0.30	0.006-0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of "architectural" damage to normal dwelling - houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage
10-15	0.4-0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage.
Source: Caltrans. Transportation Related Earthborne Vibrations. TAV-02-01-R9601 February 20, 2002.			

Standards of Significance

CEQA Guidelines define a significant adverse impact on the environment as an impact that would:

a. Exposure of persons to or generation of noise levels in excess of standards established in the City of Oroville General Plan. Specifically, exterior noise levels exceeding 60 dB CNEL.

` b. Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels. Specifically, a threshold of 0.1 in/sec p.p.v. is considered a safe criterion that would protect against architectural or structural damage and human annoyance.

b. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project, as defined by Table 5.

c. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project, as defined by the Table 5.

d. For a project located within an airport land use plan or, where such a plan has not be adopted, within two miles of a public airport or public use airport, where the project would expose people residing or working in the area to excessive noise levels.

e. For a project within the vicinity of a private airstrip, where the project would expose people residing or working in the project area to excessive noise levels.

The proposed project is not located within two miles of an airport. Therefore, aircraft noise is not examined further in this report.

PROJECT IMPACT NOISE ASSESSMENT

Construction Noise

During the construction phases of the project, noise from construction activities would add to the noise environment in the immediate project vicinity. Activities involved in construction would generate maximum noise levels, as indicated in Table 7, ranging from 78 to 85 dBA at a distance of 50 feet. Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours.

Noise would also be generated during the construction phase by increased truck traffic on area roadways. A significant project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from construction sites. This noise increase would be of short duration, and would likely occur primarily during daytime hours.

Table 7: Construction Equipment Noise

Type of Equipment	Maximum Level, dBA at 50 feet
Backhoe	78
Compactor	83
Compactor	80
Dozer	82
Dump Truck	76
Excavator	81
Paver	85
Grader	85
Roller	80
Trencher	81

Source: *Roadway Construction Noise Model User's Guide*. Federal Highway Administration. FHWA-HEP-05-054. January 2006.

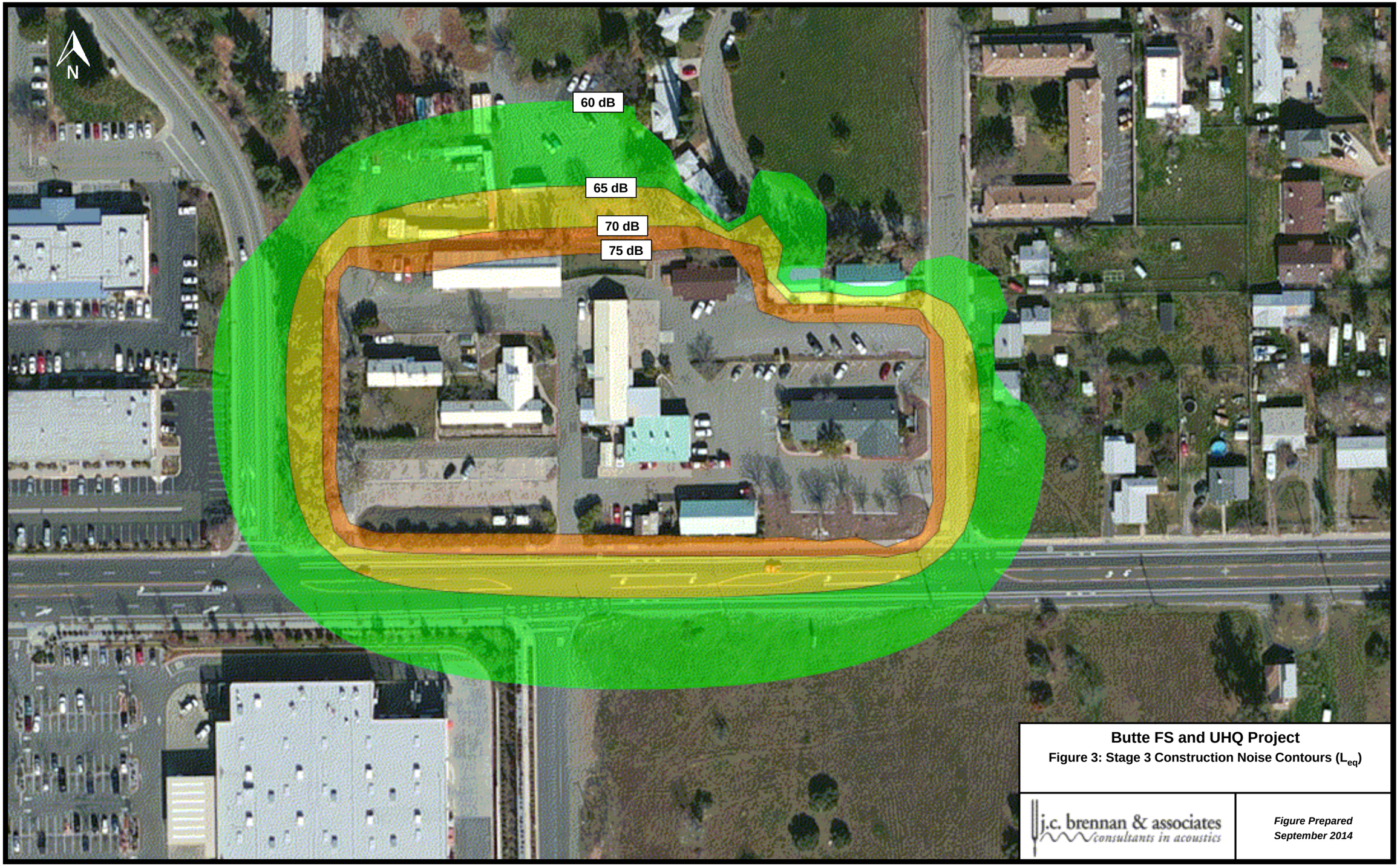
As a means of determining the construction noise impacts, j.c. brennan & associates, Inc. used the Federal Highway Administration Construction Noise Model (RCNM). The model has typical maximum noise levels associated with individual pieces of construction equipment. It also has typical use factors to determine the hourly average (L_{eq}) noise levels associated with each individual piece of equipment.

Based upon the results of the RCNM analysis, the predicted overall noise levels are shown in Table 8. The construction noise levels are typical of the noisiest construction periods. Appendix B provides the inputs and results for the RCNM model.

Table 8: Predicted Construction Noise Levels(Worst Case Period)

Stage	Typical Equipment List	Estimated Hourly Sound Levels @ 50 feet L_{eq} / L_{max} (dBA)
3 - Grading	Excavators (1) Back hoes (2) Riding compactors (2) Hand held portable compactors (2) Grader (1) Dump truck (1) Water truck (1)	**Total: 86.2 dBA L_{eq} - 85.0 dBA L_{max}**
4 – Final Construction	15-foot lifts (2) 20-ton crane (1) Fork lift (1) Water truck (1)	**Total: 80. 6dBA L_{eq} – 77.1 dBA L_{max}**
Source: Federal Highway Roadway Construction Model (RCNM), j.c. brennan & associates, Inc. - 2014		

Figures 3 and 4 show the construction noise contours for Stage 3 and Stage 4, respectively. The construction noise contours were developed using the CadnaA noise prediction model with direct inputs from the FHWA Construction Noise Model. The CadnaA model can develop noise contours while accounting topography, intervening buildings, multiple noise sources and ground type.

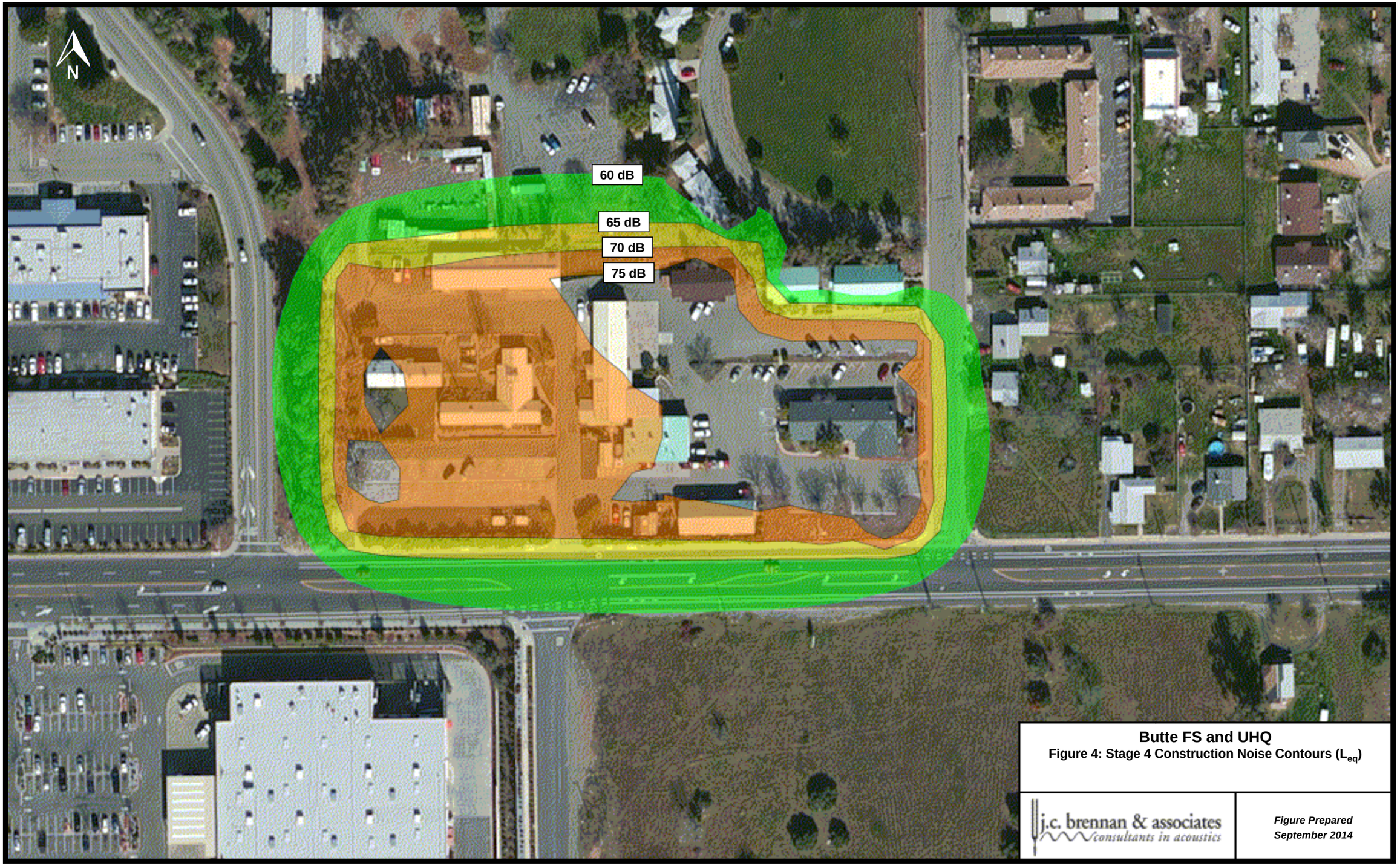


Butte FS and UHQ Project

Figure 3: Stage 3 Construction Noise Contours (L_{eq})

j.c. brennan & associates
consultants in acoustics

Figure Prepared
September 2014



Butte FS and UHQ

Figure 4: Stage 4 Construction Noise Contours (L_{eq})

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consultants in acoustics

Figure Prepared
September 2014

The City of Oroville General Plan limits construction noise as outlined below:

General Plan Policies

P2.3: Limit noise generating construction activities located within 1,000 feet of residential uses to daytime hours between 7:00 a.m. and 6:00 p.m. on weekdays and non-holidays.

P2.4: Require the following standard construction noise control measures to be included as requirements at construction sites in order to minimize construction noise impacts:

- Equip all internal combustion engine driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

- Locate stationary noise generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area.

- Utilize "quiet" air compressors and other stationary noise-generating equipment where appropriate technology exists and is feasible.

- The project sponsor shall designate a "noise coordinator" who would be responsible for responding to any local complaints about construction noise. The noise coordinator will determine the cause of the noise complaint (e.g., starting too early, bad muffler) and will require that reasonable measures warranted to correct the problem be implemented. The project sponsor shall also post a telephone number for excessive noise complaints in conspicuous locations in the vicinity of the project site. Additionally, the project sponsor shall send a notice to neighbors in the project vicinity with information on the construction schedule and the telephone number for noise complaints.

Noise Ordinance Exemption

13A-6 Exceptions--Designated.

(c) Construction and Alteration of Structures. Notwithstanding any other provision of this chapter, between the hours of seven a.m. and nine p.m. daily except Saturdays, Sundays and holidays, when the exemption herein shall apply between ten a.m. and six p.m., construction, alteration or repair of structures shall be allowed if it meets at least one of the following noise limitations:

(1) No individual piece of equipment shall produce a noise level exceeding eighty-three dBA at a distance of twenty-five feet from the source. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to twenty-five feet from the equipment as possible;

(2) The noise level at any point outside of the property plane of the project shall not exceed eighty-six dBA;

(3) The provisions of subdivisions (1) and (2) of this subsection shall not be applicable to impact tools and equipment, provided that on and after a date six months after the effective date of this chapter, such impact tools and equipment shall have intake and exhaust mufflers recommended by the manufacturers thereof and approved by the city's director of public works as best accomplishing maximum noise attenuation, and that pavement breakers and jackhammers shall also be equipped with acoustically attenuating shields or shrouds recommended by the manufacturers thereof and approved by the city's director of public works as best accomplishing maximum noise attenuation. In the absence of manufacturer's recommendations, the director of public works may prescribe such means of accomplishing maximum noise attenuation as he may determine to be in the public interest.

Based upon the above-listed City of Oroville General Plan and Noise Ordinance polices, daytime construction activity is typically exempt from regulation, assuming that construction activities follow the City's polices, as outlined below:

1. Limit construction to between the hours of 7:00 a.m. and 6:00 p.m. on weekdays;

2. Equip all internal combustion engine driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

3. Locate stationary noise generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area.

4. Utilize "quiet" air compressors and other stationary noise-generating equipment where appropriate technology exists and is feasible.

5. The project sponsor shall designate a "noise coordinator" who would be responsible for responding to any local complaints about construction noise. The noise coordinator will determine the cause of the noise complaint (e.g., starting too early, bad muffler) and will require that reasonable measures warranted to correct the problem be implemented. The project sponsor shall also post a telephone number for excessive noise complaints in conspicuous locations in the vicinity of the project site. Additionally, the project sponsor shall send a notice to neighbors in the project vicinity with information on the construction schedule and the telephone number for noise complaints.

6. One of the following limitations is met:

(1) No individual piece of equipment shall produce a noise level exceeding eighty-three dBA at a distance of twenty-five feet from the source. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to twenty-five feet from the equipment as possible;

(2) The noise level at any point outside of the property plane of the project shall not exceed eighty-six dBA;

(3) The provisions of subdivisions (1) and (2) of this subsection shall not be applicable to impact tools and equipment, provided that on and after a date six months after the effective date of this chapter, such impact tools and equipment shall have intake and exhaust mufflers recommended by the manufacturers thereof and approved by the city's director of public works as best accomplishing maximum noise attenuation, and that pavement breakers and jackhammers shall also be equipped with acoustically attenuating shields or shrouds recommended by the manufacturers thereof and approved by the city's director of public works as best accomplishing maximum noise attenuation. In the absence of manufacturer's recommendations, the director of public works may prescribe such means of accomplishing maximum noise attenuation as he may determine to be in the public interest.

Therefore, assuming that the project construction adheres to the requirements of the City of Oroville General Plan and City of Oroville Noise Ordinance, no additional noise control measures would be required. Implementation of the proposed project would have a less than significant impact.

Construction Vibration Levels

Table 9 shows the typical vibration levels produced by various pieces of construction equipment.

Table 9: Typical Construction Equipment Vibration Levels			
Type of Equipment	**Peak Particle Velocity @ 25 feet (inches/second)**	**Peak Particle Velocity @ 50 feet (inches/second)**	**Peak Particle Velocity @ 100 feet (inches/second)**
Large Bulldozer	0.089	0.031	0.011
Loaded Trucks	0.076	0.027	0.010
Small Bulldozer	0.003	0.001	0.000
Auger/drill Rigs	0.089	0.031	0.011
Jackhammer	0.035	0.012	0.004
Vibratory Hammer	0.070	0.025	0.009
Vibratory Compactor/roller	0.210 (<0.200 @ 26')	0.074	0.026
Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Guidelines, May 2006			

The Table 9 data indicate that construction vibration levels anticipated for the project are less than the 0.1 in/sec criteria at distances of 26 feet. Substantial project construction activity (grading, vibratory compactor) is not predicted to occur with 26 feet of any existing sensitive structures. Therefore, construction vibrations are not predicted to cause damage to existing buildings or cause annoyance to sensitive receptors. Implementation of the proposed project would have a less than significant impact.

Operational Noise Levels

The primary noise-generating components of the project are expected to include auto shop operations, vehicle wash rack, and backup generator.

Auto Shop Noise Levels

Typical noise sources associated with the new auto shop will include pneumatic air wrenches, compressors, impact tools, grinders, and panel cutters. As a means of evaluating noise levels associated with the new auto shop, j.c. brennan & associates, Inc. utilized noise measurement data collected at an existing auto shop in Grass Valley, California. The noise measurements were conducted at a distance of 20 feet from the bays. The center of the proposed auto shop bays would be located approximately 135 feet from the nearest residential property line to the northeast. The predicted auto shop noise levels are shown in Table 10, accounting for the increased distances to the adjacent residential property line.

Wash Rack Noise Levels

Noise levels for the wash rack were collected at an auto shop in Sacramento, California and included the use of a high pressure spray rig. The noise level measurements were conducted at a distance of 75 feet. The center of the proposed wash rack would be located approximately

240 feet from the nearest residential property line to the northeast. The predicted wash rack noise levels are shown in Table 10, accounting for the increased distances to the adjacent residential property line.

Table 10: Predicted Auto Shop and Wash Rack Noise Levels

Equipment	Measured Noise Level	Predicted Maximum Noise Level at Property Line	Typical Hourly Use	Predicted L_{eq} at the Property Line [1]
Compressor	53 dBA at 20'	31 dBA L_{max}	5 minutes	18 dBA L_{eq}
Impact Tools	54 dBA at 20'	32 dBA L_{max}	10 minutes	22 dBA L_{eq}
Panel Cutter	62 dBA at 20'	40 dBA L_{max}	5 - 10 minutes	30 dBA L_{eq}
Grinder	55 dBA at 20'	33 dBA L_{max}	5 - 10 minutes	23 dBA L_{eq}
Wash Rack	70 dBA L_{max} at 75' 62 dB L_{eq} at 75'	55 dBA L_{max}	30-60 minutes	47 dBA L_{eq}
			Cumulative Hourly L_{eq}	**47 dBA L_{eq}**

[1] Predicted noise levels include a -5 dB offset to account for shielding from intervening buildings.
Source: j.c. brennan & associates, Inc. 2014

Based upon the Table 10 data, project-related noise levels are predicted to be 47 dBA L_{eq} at the nearest residential property line. The City of Oroville establishes a daytime (7:00 am. to 10:00 pm) noise level standard of 50 dBA L_{eq}. Therefore, no additional noise control measures would be required. Implementation of the proposed project would have a less than significant impact.

Backup Generator Noise Levels

The generator/storage building would be approximately 534 square feet and would be located east of the maintenance/support building. The building would store two parallel 150 kilowatt (KW) propane emergency power generators (120/208 Volts (V), 3-phase) set up as a 300KW emergency back-up source.

Specific sound level data for these generators is not currently available. However, based upon manufacturer's data for a similar 150 kW generator [1], noise levels for a single unit are estimated to be 90 dBA at a distance of 7 meters (23 feet) at full rated load. The total noise level for both units would be 93 dBA at 7 meters (23 feet). The center of the proposed generator building would be located approximately 25 feet from the nearest property to the north, which is zoned for residential uses. The predicted noise levels of 93 dBA would exceed the City of Oroville daytime noise level standard of 50 dBA L_{eq} and nighttime standard of 45 dBA L_{eq}. However, the City of Oroville General Plan allows for an exemption from their normal noise level standards where the proposed use can be shown to serve the greater public interest of the citizens of Oroville (General Plan Noise Element Policy 1.7). In this case operation of the emergency generators would allow the fire station to remain operational under a period of extended power

[1] Cummins Power Generation. *Sound-attenuated and weather-protective enclosures for generator sets from 10 to 1000 kW.* 2008.

outage. This is clearly in the interest of the citizen's of Oroville and the City's General Plan noise level standards would likely not apply.

Additionally, the City's Noise Ordinance Section 13A-6(d) exempts noise from emergencies and emergency vehicles. Extended operation of the proposed backup generators would only occur under emergency conditions. Therefore, noise associated with emergency generator operation would likely be exempt from regulation.

Backup generators typically require monthly or even weekly exercising to ensure that they remain operational in case of an emergency power outage. This exercising would typically occur during daytime hours. Under these conditions, the generators would not be operating under emergency conditions and may likely fall under the regulation of the City's Noise Ordinance. Noise Ordinance, Section 13A06(a), provides an exemption for daytime noise regulation, assuming that the noise level is less than 70 dBA at a distance of 25 feet from the noise source. Therefore, j.c. brennan & associates, Inc. recommends that the proposed backup generator building include sound control measures to ensure compliance with a noise level standard of 70 dBA at a distance of 25 feet from the generator building.

The above-listed noise levels assume a standard weather-protective cover and do not account for the generators being located within a structure. The proposed generator building would consist of concrete masonry unit (CMU) type construction. However, ventilation openings required for operation of the generators (cooling air, combustion air, engine exhaust, etc.) would be a primary path for noise to escape the building. Therefore, these paths would require acoustic treatment to reduce exterior noise levels from the backup generators. Such treatments would likely include the use of silencers or acoustical louvers, in addition to upgraded engine mufflers. At this time there is not enough information available on the proposed backup generators to design these noise control measures. Therefore, specific noise control measures will need to be specified at a later time. The specified noise control measures would be designed to achieve a noise level of 70 dBA, or less, at a distance of 25 feet from the proposed generator building.

Traffic Noise Levels

The proposed project will not contribute to a substantial increase in traffic noise levels on the adjacent project roadways. Nelson Avenue at the project site carries approximately 9,061 vehicles per day (BCAG Traffic Counts, 2006). The project would have to contribute more than 3,000 vehicles per day to cause an increase of 1.5 dB in traffic noise from Nelson Avenue. The project's contribution to traffic on Nelson Avenue would be substantially less than 3,000 vehicles per day. Therefore, the proposed project is not predicted to substantially increase traffic noise levels. Implementation of the proposed project would have a less than significant impact.

NOISE REDUCTION MEASURES

Noise reduction measures should be included in the project. The following noise reduction measures are recommended for the proposed project:

Construction Noise Limits

1. Limit construction to between the hours of 7:00 a.m. and 6:00 p.m. on weekdays;

2. Equip all internal combustion engine driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

3. Locate stationary noise generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area.

4. Utilize "quiet" air compressors and other stationary noise-generating equipment where appropriate technology exists and is feasible.

5. The project sponsor shall designate a "noise coordinator" who would be responsible for responding to any local complaints about construction noise. The noise coordinator will determine the cause of the noise complaint (e.g., starting too early, bad muffler) and will require that reasonable measures warranted to correct the problem be implemented. The project sponsor shall also post a telephone number for excessive noise complaints in conspicuous locations in the vicinity of the project site. Additionally, the project sponsor shall send a notice to neighbors in the project vicinity with information on the construction schedule and the telephone number for noise complaints.

6. One of the following construction noise limitations shall be met:

    (1) No individual piece of equipment shall produce a noise level exceeding eighty-three dBA at a distance of twenty-five feet from the source. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to twenty-five feet from the equipment as possible;

    (2) The noise level at any point outside of the property plane of the project shall not exceed eighty-six dBA;

    (3) The provisions of subdivisions (1) and (2) of this subsection shall not be applicable to impact tools and equipment, provided that on and after a date six months after the effective date of this chapter, such impact tools and equipment shall have intake and exhaust mufflers recommended by the manufacturers thereof and approved by the city's director of public works as best accomplishing maximum noise attenuation, and that pavement breakers and jackhammers shall also be equipped with acoustically attenuating shields or shrouds recommended by the manufacturers thereof and approved by the city's director of public works as best accomplishing maximum noise attenuation. In the absence of manufacturer's recommendations, the director of public works may

prescribe such means of accomplishing maximum noise attenuation as he may determine to be in the public interest.

Operational Noise Limits

1. The proposed backup generator building shall be designed to achieve a noise level of 70 dBA, or less, at a distance of 25 feet from the proposed generator building. The design shall be reviewed by a qualified acoustic engineer to verify that sufficient noise control measures have been implemented into the project design to verify this requirement. It is anticipated that meeting this requirement would likely require the use of silencers or acoustical louvers, in addition to upgraded engine mufflers.

Appendix A
Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).
L_{dn}	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
L_{max}	The highest root-mean-square (RMS) sound level measured over a given period of time.
$L_{(n)}$	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L_{50} is the sound level exceeded 50% of the time during the one hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
Noise	Unwanted sound.
NRC	Noise Reduction Coefficient. NRC is a single-number rating of the sound-absorption of a material equal to the arithmetic mean of the sound-absorption coefficients in the 250, 500, 1000, and 2,000 Hz octave frequency bands rounded to the nearest multiple of 0.05. It is a representation of the amount of sound energy absorbed upon striking a particular surface. An NRC of 0 indicates perfect reflection; an NRC of 1 indicates perfect absorption.
Peak Noise	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the “Maximum” level, which is the highest RMS level.
RT_{60}	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 Sabin.
SEL	Sound Exposure Level. SEL is s rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy into a one-second event.
STC	Sound Transmission Class. STC is an integer rating of how well a building partition attenuates airborne sound. It is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
Simple Tone	Any sound which can be judged as audible as a single pitch or set of single pitches.

Appendix B

Roadway Construction Noise Model Inputs and Results

j.c. brennan & associates
consultants in acoustics

Roadway Construction Noise Model (RCNM),Version 1.1

Report date 1/22/2014
Case Desc Phase 1

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
General	Residential	45	45	45

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	50	0
Backhoe	No	40		77.6	50	0
Backhoe	No	40		77.6	50	0
Compactor (ground)	No	20		83.2	50	0
Compactor (ground)	No	20		83.2	50	0
Compactor (ground)	No	20		83.2	50	0
Compactor (ground)	No	20		83.2	50	0
Grader	No	40	85		50	0
Dump Truck	No	40		76.5	50	0
Flat Bed Truck	No	40		74.3	50	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	83.2	76.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	83.2	76.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	83.2	76.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	83.2	76.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	85	81	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	76.5	72.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	74.3	70.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	**85.0**	**86.2**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date 1/22/2014
Case Desc Phase 2 - Construction

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
General	Residential	45	45	45

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20		74.7	50	0
Man Lift	No	20		74.7	50	0
Crane	No	16		80.6	50	0
Flat Bed Truck	No	40		74.3	50	0
Flat Bed Truck	No	40		74.3	50	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Man Lift	74.7	67.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	74.7	67.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane	80.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	74.3	70.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	74.3	70.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.6	77.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

APPENDIX I

Traffic Assessment, KD Anderson & Associates, September 8, 2014.

KD Anderson & Associates, Inc.
Transportation Engineers

September 8, 2014

Mr. Chris Stabenfeldt, Senior Environmental Planner / Project Manager
ECORP CONSULTING, INC.
2525 Warren Drive
Rocklin, CA 95677

RE: TRAFFIC ASSESSMENT FOR BUTTE FIRE STATION AND UNIT HEADQUARTERS REPLACEMENT PROJECT, OROVILLE, CA

Dear Mr. Stabenfeldt:

Thank you for contacting our firm regarding the **Butte Fire Station and Unit Headquarters Replacement Project (Butte Fire Station Project).** This letter summarizes our focused traffic impact assessment for the project.

Overview. The Butte Fire Station Project involves demolition and replacement of existing facilities located on 4± acres located along Nelson Avenue within the City of Oroville, as noted in Figure 1. The project would not appreciably change the number of personnel operating from the site, and would alter the site access scheme slightly. The project would widen existing driveways to better accommodate trucks and would create improved path of travel through the site for trucks.

Project Characteristics

The characteristics of the project have been identified in terms of activities associated with project construction, with regular operation of the project and with special events.

Construction Trip Generation. The project will be constructed over an eighteen month period, with 10 to 20 construction employees on the site at various times. Typical construction equipment associated with the building trades would be transported to the site at various times depending on the nature of construction occurring at any time. At various times salvaged and waste materials would be transported from the site by truck, and building materials would arrive. On a daily basis, construction could generate 20 to 40 vehicle trips per day, with most of that activity concentrated into the beginning and ending of the work day.

Operational Trip Generation. Traffic to and from the site would also occur on a regular basis when the project is in operation, and the amount of traffic will vary seasonally. The Fire Station would be staffed at varying levels throughout the year with a maximum of 20 persons sleeping on-site during the summer. This is an increase from the 15 persons that are accommodated today. In addition to firefighters there are three maintenance employees associated with the auto shop and 28 administrative staff employees working year round. This is an increase from the 23 administrative staff employees at the site today.

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The number of persons at the site is different during other times of the year. During the winter off-season the facility would house four firefighters, but administrative personnel would remain at summer levels.

The station currently averages over 1,500 emergency responses per year and up to ten "peak events" during the summer. A peak event would include several additional fire control apparatus staging at the fire station or utilizing station facilities (auto shop / warehouse). Additional equipment could include up to 10 fire engines, 2 dozers, 6 fire crew busses and other miscellaneous vehicles.

The amount of vehicular traffic associate with the regular operation of the proposed project is noted in Table 1. As noted, the project could generate slightly more than 100 daily trips. Most of this traffic would occur when employees are traveling to and from the site, and a "worst case" estimate of peak hour trip generation is 31 trips during the a.m. and p.m. peak hour. However, implementation of the project would only result in a small traffic increase relative to the trip generation already occurring at the site. As noted earlier, additional trips may result from slightly increased levels of employment (i.e., 3-5 administrative employees) and slightly higher bunk capacity. Trip generation relative to fire response would not change. Thus, the net increase in site trip generation is estimated to be 10 daily and 3 peak hour trips.

Table 1
Regular Summer Trip Generation

Land Use	Quantity	Trips						
		Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Fire Station	20 persons	20	0	0	0	0	0	0
Auto Shop	3 employees	8	3	0	3	0	3	3
Warehouse	deliveries	6	0	0	0	0	0	0
Administrative Building	28 employees	70	28	0	28	0	28	28
Total		104	31	0	31	0	31	31
Increase above existing		**10**	**3**	**0**	**3**	**0**	**3**	**3**

The project's employees would continue to be drawn from locations throughout the Oroville area, and firefighters would continue to respond to incidents throughout the stations Butte County service area. As a result, State Route 70 and its interchange at Nelson Avenue would remain the primary regional access to the site

Physical Features. The project site has three existing points of access to the adjoining system that will remain when the project is completed. Both driveways on Nelson Avenue will be widened to better accommodate the turning requirements of trucks from both directions. Access improvements will also be made at the existing driveways on County Center Drive, and that route will primarily be an exit route.

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Environmental Setting

Existing Roadway Network. The project site adjoins Nelson Avenue which provides both regional and direct access to the site. Nelson Avenue links the site with SR 70 which lies roughly 700 feet west of the site. Other local roads to the south and east can be used to reach the site, including 2nd Street and 3rd Street which link the area with Grand Avenue.

State Route 70 (SR-70) is a state highway which parallels SR 99 through Marysville and Oroville. The highway connects to SR 149 north of Oroville (which in turn provides connection to SR 99), at which point the highway turns towards the northeast, then east, as the highway enters and traverses the Plumas National Forest. Within the immediate vicinity of the project, SR 70 is a 4-lane divided limited access freeway. SR 70 serves as the principle north-south facility providing regional access to the City of Oroville, with access provided at interchanges at Garden Drive, Nelson Avenue/Grand Avenue, Montgomery Street, and Oroville Dam Road (SR 162). The California Department of Transportation (Caltrans) published information regarding the volume of traffic on state highways, and SR 70 is reported to carry an *Annual Average Daily Traffic (AADT)* volume of 20,500 vehicles per day in the area north of its connection to Nelson Avenue.

Nelson Avenue is an east-west arterial roadway which extends across the northern section of Oroville. Nelson Avenue provides access to SR 70's southbound off ramp and northbound on ramp, and is linked to companion ramps on Grand Avenue via 3rd Street and 4th Street. The eastern section of Nelson Avenue between SR 70 and Table Mountain Boulevard contains a single through lane in each direction along with a two-way center left turn lane, although it is assumed the roadway will eventually be widened to match the City of Oroville's Transportation Capital Improvement Program (TCIP) functional classification as a 4-lane arterial. Nelson Avenue has class II bike lanes and either a parking lane or narrow paved shoulders along each side between Table Mountain Boulevard and the Home Depot driveway located ±300 ft. east of 3rd St. The Butte County Association of Governments (BCAG) reports that this segment of Nelson Avenue carries an average of approximately 7,850 vehicles per day. The posted speed limit along Nelson Avenue is 45 mph west of Table Mountain Boulevard increasing to 40 mph west of 5th Street.

Grand Avenue is an east-west roadway which runs parallel to (and south of) Nelson Avenue, with similar geometrics to Nelson Avenue. BCAG reports that Grand Avenue carries an average of approximately 6,400 vehicles per day. The posted speed limit along Grand Avenue is 35 mph between SR 70 and Table Mountain Boulevard.

County Center Drive is a two-lane roadway that adjoins the west side of the project. County Center Drive primarily serves Butte County's office buildings within the Butte County Government Center. The roadways beings on the north at table Mountain Boulevard and continues south to its terminus at a "tee" intersection on Nelson Avenue. Based on the traffic volume observed during peak hours, the daily traffic volume is estimated to be roughly 3,500 vehicles per day. The posted speed limit on County Center Drive is 25 mph.

3rd Street and 4th Street are parallel north-south frontage roads located to the immediate east and west, respectively, of SR-70. The roadways serve as connector roads for SR-70 ramps with 3rd Street

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connecting the northbound ramps and 4th Street connecting the southbound ramps. Both roadways are partially improved 2-lane roadways with posted speed limits of 25 mph.

2nd Street is a local north south road that connects Grand Avenue and Nelson Avenue in the immediate area of the project, 2nd Street begins at a "tee" intersection near the project's existing center aces and continues southerly along the area of the Home Depot store. 2nd Street is a two lane street with a posted speed limit of 25 mph.

Del Oro Avenue and Mono Avenue are local streets that serve the area east of the project site and connect Nelson Avenue with Table Mountain Blvd. Del Oro Avenue is a two lane street that begins at a "tee" on Nelson Avenue and continues northerly along the project site to Mono Avenue. Mono Avenue is a two lane east west road that extends from Del Oro Avenue to Table Mountain Road. The posted speed limit is 25 mph along these streets.

Traffic Impact Analysis Methodology. Quantitative Level of Service (LOS) analysis was performed for study area intersections based on the methodologies contained in the *2010 Highway Capacity Manual (2010 HCM)* published by the Transportation Research Board. At un-signalized intersections LOS analysis is used to identify the relative delay experienced by motorists who must yield the right of way. A grading scale of LOS "A" to LOS "F" is used to describe the quality of traffic flow, with LOS A representing shorter delays (i.e., < 10 seconds) and LOS F representing conditions where long delays are expected (i.e., > 50 seconds). The extent to which traffic volume satisfy MUTCD peak hour warrants for signalization was also a consideration.

Existing Traffic Operations. The quality of traffic operation in this area of Oroville was recently described in the EIR for the Martin Ranch East project[1]. That document identified weekday a.m. and p.m. peak hour volumes and Levels of Service at intersections in the general vicinity of the proposed project.

Table 2
Existing Intersection Level of Service

Intersection	Control	Existing Conditions			
		AM Peak Hour		PM Peak Hour	
		Average Delay (sec)	LOS	Average Delay (sec)	LOS
Nelson Ave / 4th Street / SR 70 SB ramps	NB/SB Stop				
Southbound approach		10.6	B	11.7	B
Northbound approach		**61.8**	**F**	**35.6**	**E**
Nelson Ave / 3rd Street / SR 70 NB ramps	NB Stop				
Northbound approach		14.5	B	16.0	S
Nelson Ave / County Center Dr	SB Stop				
Southbound approach		15.6	C	15.8	C

[1] Martin Ranch East Development Traffic Impact Study, Larry Wymer & Associates, 7/28/2013

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As indicated, the Nelson Avenue / 4th Street / 4th Street / SB SR 70 ramps intersections operates with LOS F conditions for motorists waiting on the southbound off ramp. The TCIP includes improvements to this intersection (i.e., signalization / roundabout). However current traffic volumes do not satisfy peak hour traffic signal warrants.

Transit Service. Local bus service is provided primarily by Butte Regional Transit (aka B-Line). B-Line is a regional public transit system which is the consolidation of OATS in Oroville, CATS in Chico, BCT in the County, and paratransit services in Oroville, Chico and Paradise. B-Line operates twenty fixed routes 7 days a week (excluding major holidays) that can be utilized by the general public either to travel locally in Oroville, Chico, and Paradise, or to travel between communities throughout Butte County. B-Line maintains a Transit Center within downtown Oroville at the corner of Mitchell Avenue/Spencer Avenue, with additional transit centers in downtown Chico and Paradise. Three B-line routes (20, 24, 31) pass the project site.

Cumulative Traffic Conditions

Background Cumulative Traffic Volumes. The Martin Ranch East Development EIR traffic study identified long term cumulative traffic conditions in the general area of the proposed project. These traffic volume forecasts are indicative of year 2035 conditions under the City of Oroville General Plan. The available volume forecasts presented in that report were drawn from the following two sources:

1) The BCAG regional travel demand forecasting model, and
2) The City of Oroville's *Transportation Capital Improvement Program (TCIP) and Traffic Impact Fee Update Report (Omni-Means, 12/2012).*

Review of those forecasts indicated that the volume of traffic on Nelson Avenue adjoining the proposed project is expected to increase by roughly 60% by 2035.

Anticipated Improvements. That document also identified circulation system improvements that are funded via the City of Oroville's Traffic Impact Fee, including:

1. Nelson Avenue / 4th Street / SB SR 70 ramps: roundabout or traffic signal with separate north-south left turn lanes.
2. Nelson Avenue / 3rd Street / NB SR 70 ramps: traffic signal.
3. Nelson Avenue / County Center Drive: traffic signal.

Year 2035 No Project Conditions. As noted in Table 3, with anticipated improvements already included in adopted funding mechanisms, the circulation system in the area of the proposed project is expected to operate with Levels of Service that satisfy the minimum LOS D standard.

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Table 2
Year 2035 Intersection Level of Service

Intersection	Control	Existing Conditions			
		AM Peak Hour		PM Peak Hour	
		Average Delay (sec)	LOS	Average Delay (sec)	LOS
Nelson Ave / 4th Street / SR 70 SB ramps	Signal	27.0	C	26.3	C
Nelson Ave / 3rd Street / SR 70 NB ramps	Signal	21.6	C	19,9	B
Nelson Ave / County Center Dr	Signal	40.6	D	23.8	C

STANDARDS OF SIGNIFICANCE / GOVERNING DOCUMENTS

Standards of significance policies which are applicable for this traffic study include those for the City of Oroville and Caltrans. Since no facilities analyzed are under the jurisdiction of Butte County, their standards of significance policies are not considered. The standards of significance policies for the City of Oroville and Caltrans are described in detail below, along with an explanation of how the policies were interpreted for this study.

City of Oroville Standards of Significance Criteria

Policy P2.1 of the Transportation and Circulation Element of the *City of Oroville 2030 General Plan* (adopted June 2, 2009) states the following regarding target levels of service goals for City of Oroville facilities: Maintain a minimum operating standard of LOS D as defined in the most current edition of the Highway Capacity Manual or subsequent revisions for all arterial, collector streets and intersections, except the following facilities where LOS E will be acceptable. *LOS E operations will be considered acceptable for intersection and roadway segment operations along Oroville Dam Boulevard between Highway 70 and Olive Highway.*

Caltrans Standards of Significance Criteria

Since some intersections are ramp intersections along Caltrans state highway SR 70, standards of significance criteria for Caltrans apply. The *Caltrans Guide for the Preparation of Traffic Impact Studies* (December 2002) includes the following generalized statement regarding target levels of service goals for Caltrans facilities.

Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities, however, Caltrans acknowledges that this may not be always feasible *and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than the appropriate target LOS, the existing Measure of Efficiency (MOE) should be maintained.*

Based on these standards, LOS D is the minimum acceptable LOS in the area of the project.

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Project Impacts

The impacts of the proposed project have been assessed based on roadway Level of Service and safety at the new access.

Level of Service. The project may add a handful of trips to the study area streets and intersections. This additional traffic would be infinitesimal in comparison to the volume of traffic already on the system or anticipated in the future. Because both existing and long term background conditions are shown to meet minimum LOS standards, and the project's additional traffic is slight, background conditions would be unlikely to change. Thus, the project's impact based on Level of Service is not significant.

Project Access – Existing and Proposed. The project will continue to use existing access locations to adjoining streets, and modifications to existing driveways will be made.

The project site has two driveways on Nelson Avenue. The most westerly driveway is roughly 100 feet from County Center Drive, measured centerline to centerline. This driveway is roughly 26 feet wide and includes 25 foot radius curb returns. This driveway is limited to right turns in and out by a striped median on Nelson Avenue. This driveway is to be widened to 44' to accommodate truck turns as part of the proposed project.

Today the center driveway on Nelson Avenue is roughly 240 feet from the western driveway and is also 26 feet wide. The driveway is opposite 2nd Street but slightly offset (i.e., 25 feet to the east) the Nelson Avenue / 2nd Street intersection has been striped to accommodate westbound left turn lanes (i.e., striped left turn lane), but the pained median is striped to preclude eastbound left turns into the project site. The proposed project is to widen the driveway to 60 feet to accommodate the turning requirements of trucks. This widened will be in both directions and will not change the off-set between the driveway and 2nd Street.

Today the site has three driveways on Del Oro Avenue. The most southerly driveway is roughly 100 feet north of Nelson Avenue measured centerline to centerline. This driveway is 26 feet wide and full access is permitted at this location today. This driveway will be closed and replaced by a small two-space handicap parking lot for visitors that would be roughly 140 feet from Nelson Avenue.

The existing central driveway on Del Oro Avenue is 200 feet from Nelson Avenue and is 18 feet wide. This driveway is limited to outbound traffic only. The most northerly driveway is immediately adjacent, and full access is permitted at this location. Together these driveways occupy roughly 90 feet of Del Oro Avenue. Under the proposed project these driveways will be replaced by a single multifunction driveway that will be roughly 100 feet long. The southern sixty feet will be an exit for a three-bay apparatus maintenance area. The most northerly 30 feet will be a gated access to the rear of the site.

Access Issues / Recommendations. There are three issues associated with providing acceptable access to the site.

KDA

Today full access is available at the western Nelson Avenue driveway. With the eventual installation of a traffic signal at Nelson Avenue / County Center Drive, this location will need to be limited to right turns in and out only.

Today the center driveway on Nelson Avenue does not accommodate eastbound left turns and the striping pattern on Nelson Avenue prohibits left turns into the site. With the proposed project eastbound left turns are planned. The striping on Nelson Avenue will need to be modified to make those turns legal and to provide an eastbound left turn lane.

As noted earlier, the site's central access and 2nd Street are slightly offset. Ideally, the planned improvements should be designed to line up the two approaches in order to minimize conflicts between approaching vehicles.

Please feel free to contact me at (916) 660-1555 if you have any questions.

Sincerely yours,

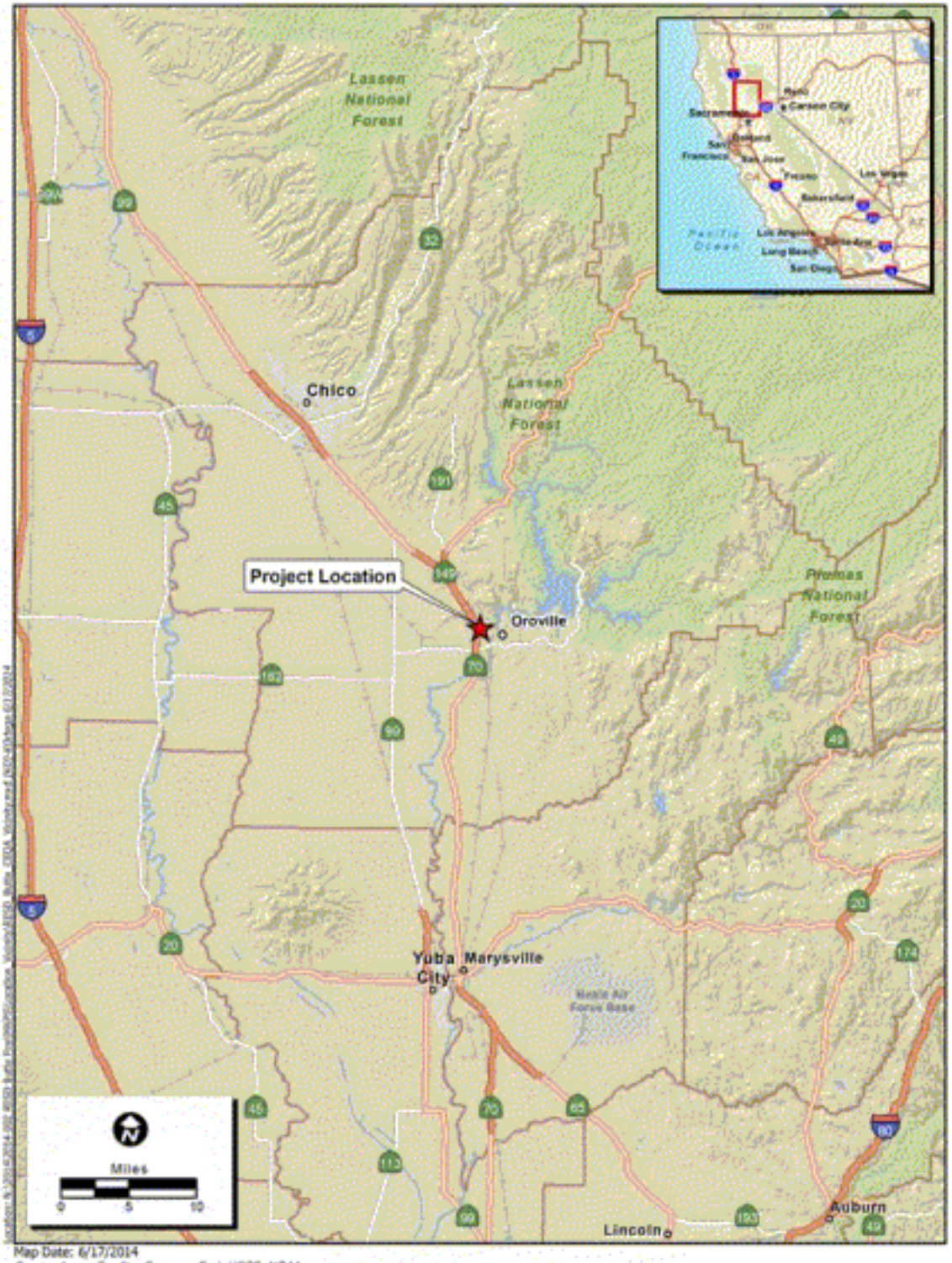
KD Anderson & Associates, Inc.

Kenneth D. Anderson, P.E.
President

Attachments: Vicinity Map, Site Plan, Exhibits from Martin Ranch East DEIR traffic Study

ECORP CDF Butte Fire Station.pro

KDA



Map Date: 6/17/2014
Service Layer Credits: Sources: Esri, USGS, NOAA

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Figure 1. Project Vicinity

2014-002 RESD Butte Fire

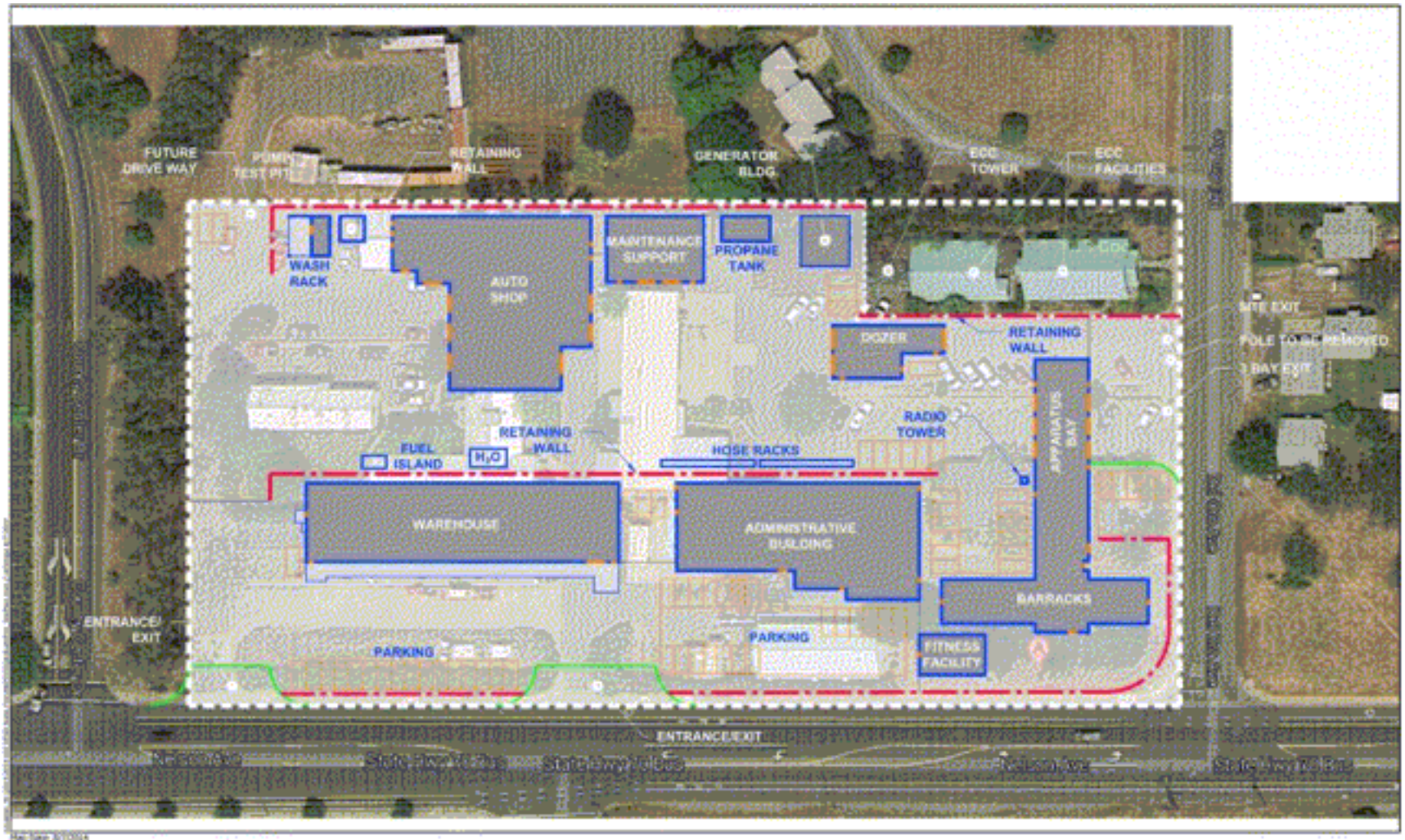
KD Anderson & Associates, Inc.
Transportation Engineers

2610-17 LT 9/8/2014

VICINITY MAP

Butte Fire Station and Unit Headquarters Replacement Project

figure 1



Map Date: 8/7/2014
Base Source: NRS

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Figure 4. Site Plan

2014-002 RESD Butte Fire

KD Anderson & Associates, Inc.
Transportation Engineers

2610-17 LT 9/8/2014

SITE PLAN

Butte Fire Station and Unit Headquarters Replacement Project

figure 2

Martin Ranch East Development Traffic Impact Study

Draft Report

Located In:
City of Oroville, Butte County, CA

Prepared For:
Hignell Development Group

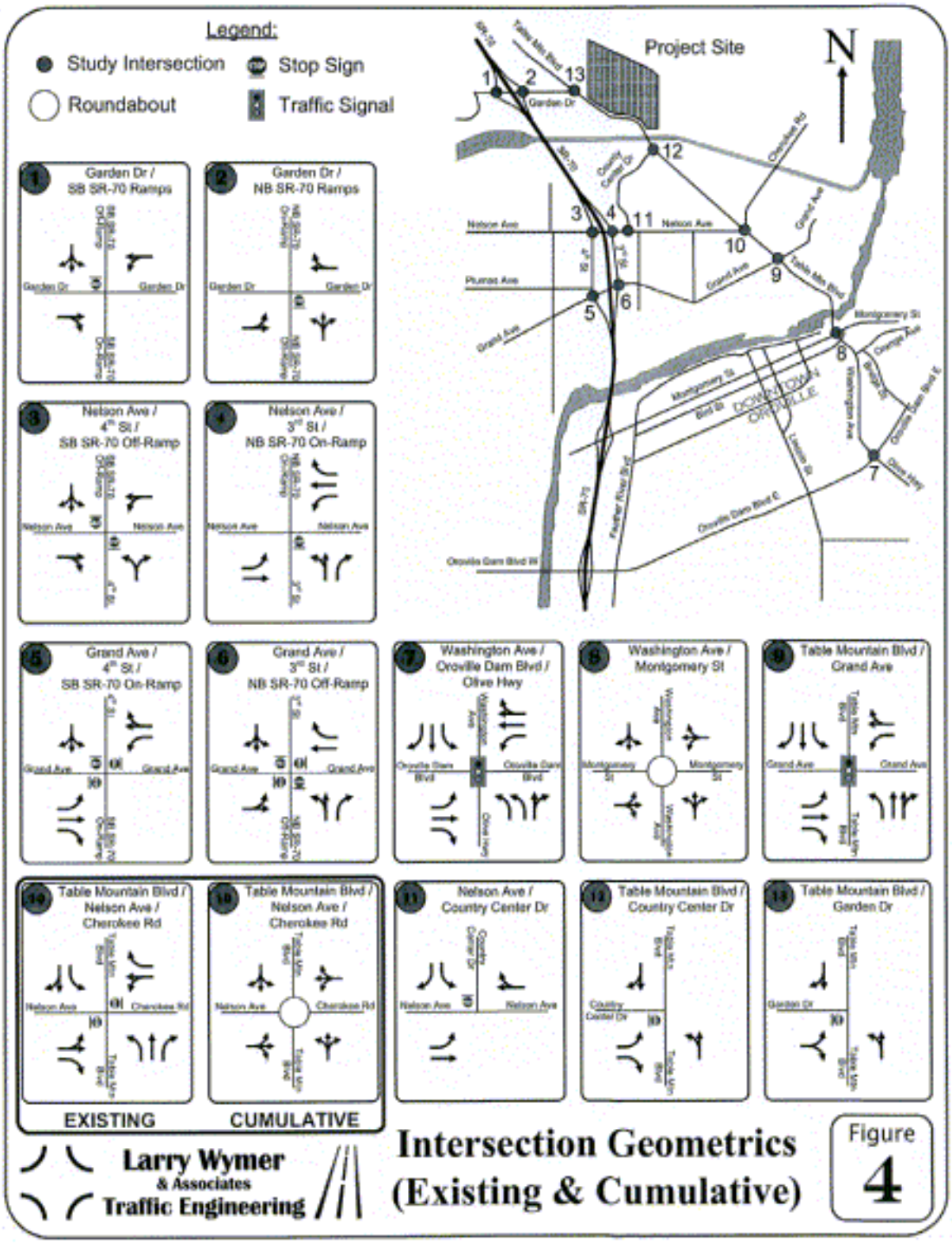
Prepared By:

Larry Wymer
& Associates
Traffic Engineering

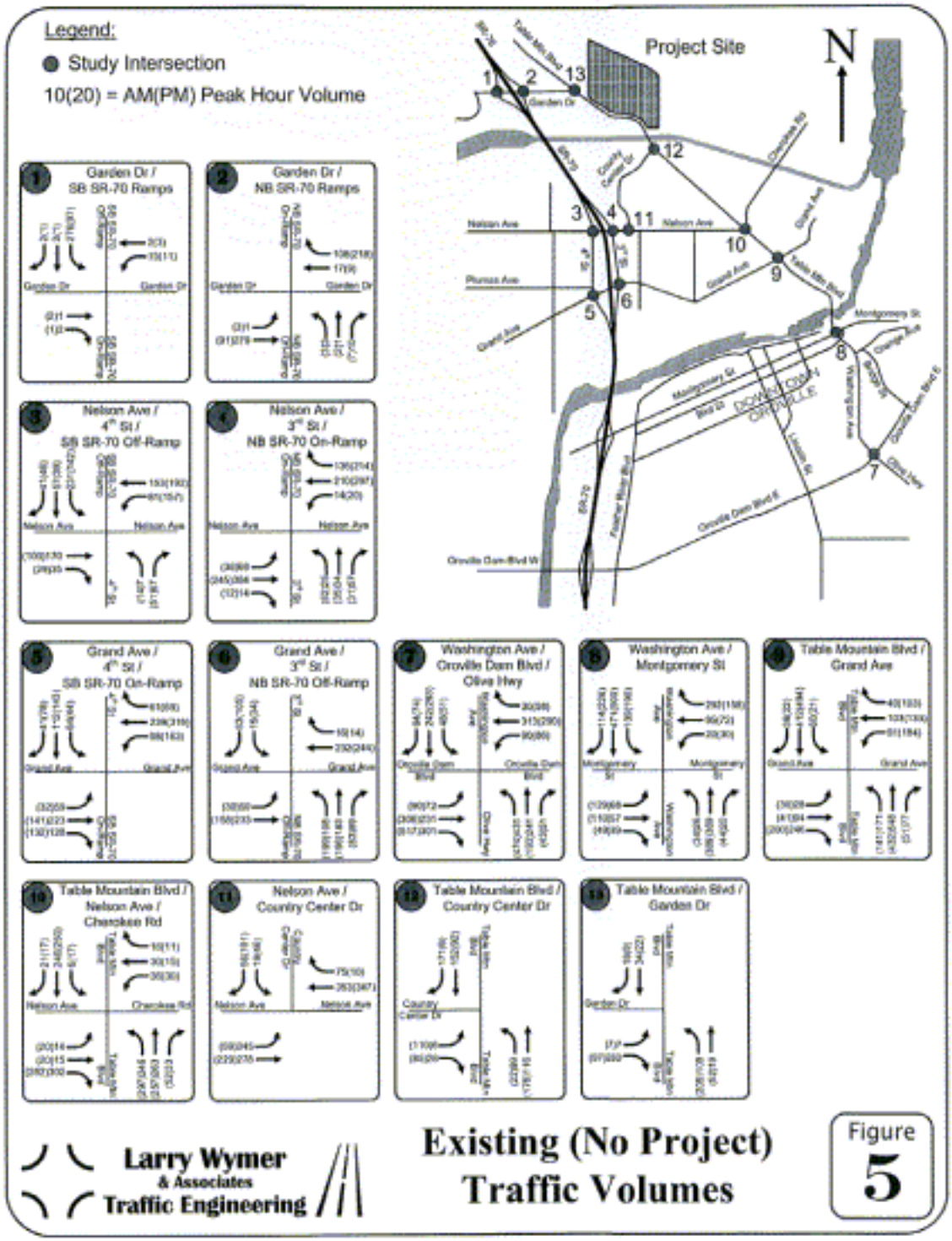
Larry C. Wymer, T.E.

Martin Ranch TIA (07-28-13c)

July 28, 2013



MARTIN RANCH EAST DEVELOPMENT – Butte County, CA



Larry Wymer & Associates Traffic Engineering

Existing (No Project) Traffic Volumes

Figure 5

TABLE 2
EXISTING (NO PROJECT) CONDITIONS:
INTERSECTION LEVELS OF SERVICE

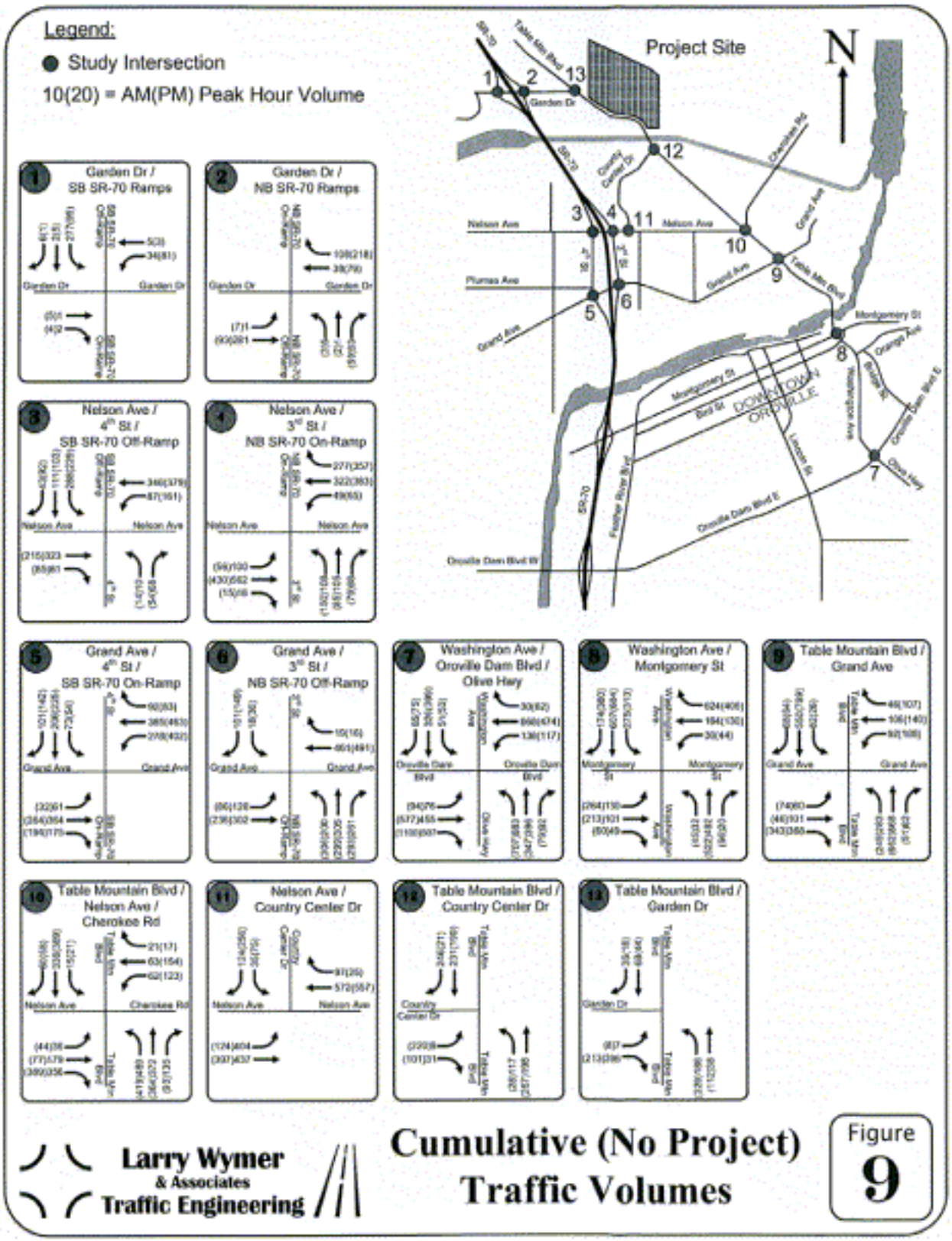
#	Intersection	Control Type	Target LOS	Approach	Existing (No Project)					
					AM Peak Hour			PM Peak Hour		
					Delay (sec)	LOS	Signal Warrant Met?	Delay (sec)	LOS	Signal Warrant Met?
1	Garden Drive / SR-70 SB Ramps	TWSC	D	EB	8.0	A		8.0	A	
				WB	6.4	A		5.7	A	
				SB	11.6	B		9.2	A	
				WORST	11.6	B	no	9.2	A	no
2	Garden Drive / SR-70 NB Ramps	TWSC	D	EB	8.0	A		8.3	A	
				WB	8.0	A		8.0	A	
				NB	11.2	B		9.4	A	
				WORST	11.2	B	no	9.4	A	no
3	Nelson Ave / 4th St / SR-70 SB Off-Ramp	TWSC	D	EB	8.0	A		8.0	A	
				WB	2.7	A		3.5	A	
				NB	10.6	B		11.7	B	
				SB	61.8	F		35.6	E	
				WORST	61.8	F	no	35.6	E	no
4	Nelson Ave / 3rd St / SR-70 NB On-Ramp	TWSC	D	EB	7.1	A		7.0	A	
				WB	6.3	A		6.3	A	
				NB	14.5	B		16.0	C	
				WORST	14.5	B	no	16.0	C	no
5	Grand Ave / 4th St / SR-70 SB On-Ramp	AWSC	D	EB	11.9	B		11.3	B	
				WB	17.5	C		24.7	C	
				SB	15.9	C		18.4	C	
				AVG ALL	14.9	B	no	19.6	C	YES*
6	Grand Ave / 3rd St / SR-70 NB Off-Ramp	AWSC	D	EB	18.6	C		15.5	C	
				WB	15.1	C		17.0	C	
				NB	17.2	C		25.7	C	
				SB	11.5	B		12.9	B	
				AVG ALL	16.6	C	no	19.0	C	no*
7	Oroville Dam Blvd / Washington Ave / Olive Hwy	Signal	E	---	18.8	C	--	37.3	D	---
8	Washington Ave / Montgomery St	Round-about	D	---	7.6	A	--	9.1	A	---
9	Table Mountain Blvd / Grand Ave	Signal	D	---	41.5	E	--	48.7	D	---
10	Table Mountain Blvd / Nelson Ave / Cherokee Rd	TWSC	D	EB	24.2	C		41.3	E	
				WB	>300	F		>300	F	
				NB	3.0	A		4.5	A	
				SB	0.2	A		0.5	A	
				WORST	>300	F	--	>300	F	---
11	Nelson Ave / Country Center Dr	TWSC	D	EB	5.5	A		1.8	A	
				WB	0.0	A		0.0	A	
				SB	15.6	C		15.8	C	
				WORST	15.6	C	no	15.8	C	no
12	Table Mountain Blvd / Country Center Dr	TWSC	D	EB	11.2	B		12.1	B	
				NB	3.9	A		0.8	A	
				SB	0.0	A		0.0	A	
				WORST	11.2	B	no	12.1	B	no
13	Table Mountain Blvd / Garden Dr	TWSC	D	EB	11.1	B		9.5	A	
				NB	6.3	A		6.3	A	
				SB	0.0	A		0.0	A	
				WORST	11.1	B	no	9.5	A	no

Notes: TWSC = Two Way Stop Control Unsignalized Intersection - Delays & LOS reported for (1) each individual approach; & (2) along the "WORST" approach (which establishes Delay/LOS for entire intersection per HCM 2010).

AWSC = All Way Stop Control Unsignalized Intersection- Delays & LOS reported for (1) each individual approach; & (2) an overall average for the intersection as a whole (which establishes Delay/LOS for entire intersection per HCM 2010).

* = Signal Warrant lies just under (i.e. no*), along (i.e YES*), or just over (i.e. YES*) the signal warrant threshold.

Deficient delays & LOS below the LOS threshold are shown in red bold.



Cumulative (No Project) Traffic Volumes

Figure 9

MARTIN RANCH EAST DEVELOPMENT – Butte County, CA

TABLE 4
CUMULATIVE (2035) NO PROJECT CONDITIONS:
INTERSECTION LEVELS OF SERVICE

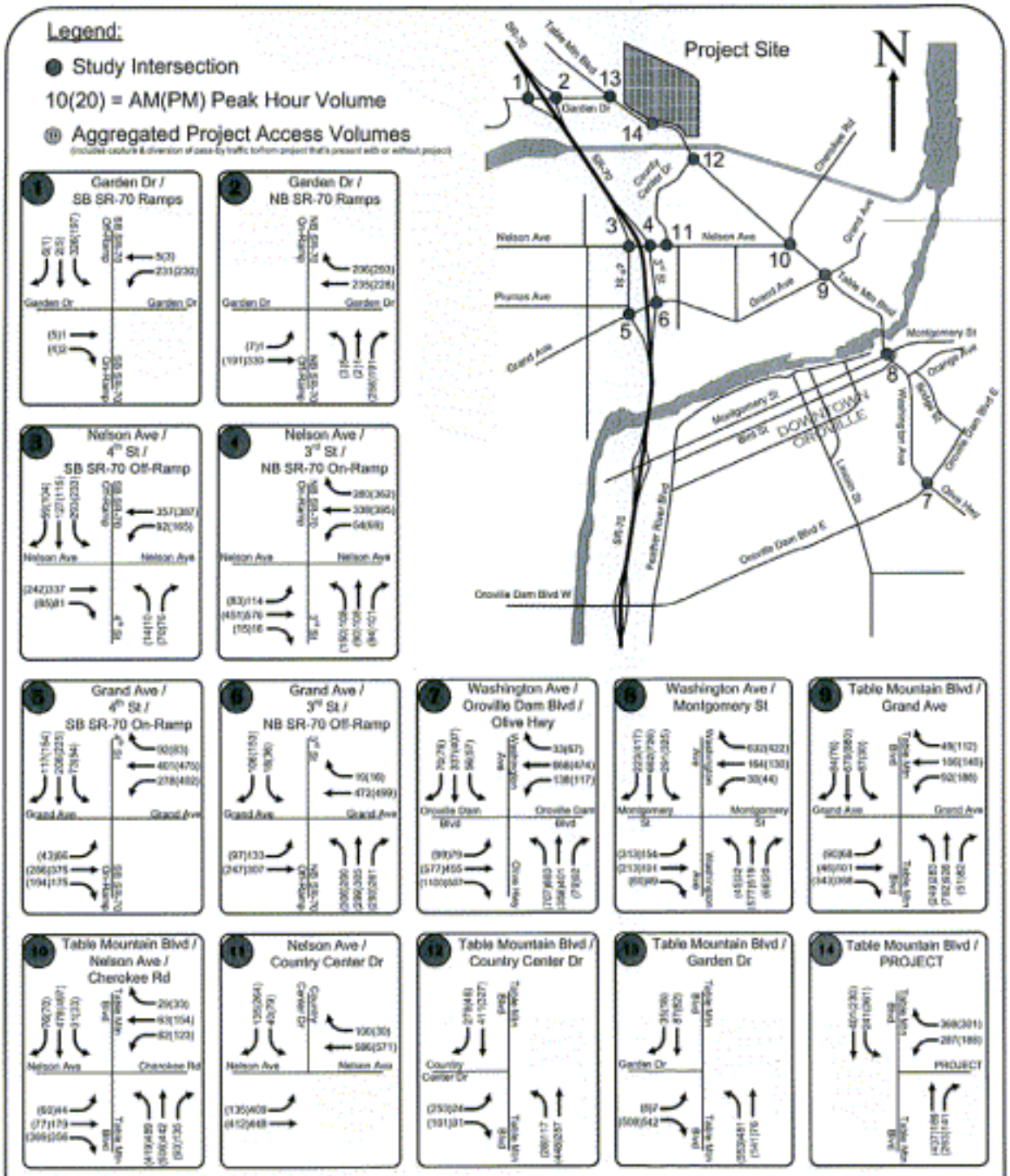
#	Intersection	Control Type	Target LOS	Approach	Cumulative (No Project)					
					AM Peak Hour			PM Peak Hour		
					Delay (sec)	LOS	Signal Warrant Met?	Delay (sec)	LOS	Signal Warrant Met?
1	Garden Drive / SR-70 SB Ramps	TWSC	D	EB	0.0	A		0.0	A	
				WB	6.4	A		7.1	A	
				SB	12.9	B		10.8	B	
				WORST	12.9	B	no	10.8	B	no
2	Garden Drive / SR-70 NB Ramps	TWSC	D	EB	0.0	A		0.6	A	
				WB	0.0	A		0.0	A	
				NB	12.6	B		9.5	A	
				WORST	12.6	B	no	9.5	A	no
3	Nelson Ave / 4th St / SR-70 SB Off-Ramp	TWSC	D	EB	0.0	A		0.0	A	
				WB	1.7	A		2.5	A	
				NB	18.0	C		25.7	D	
				SB	>500	F		>300	F	
				WORST	>500	F	no	>300	F	no
4	Nelson Ave / 3rd St / SR-70 NB On-Ramp	TWSC	D	EB	1.2	A		0.9	A	
				WB	0.7	A		0.7	A	
				NB	206.8	F		216.4	F	
				WORST	206.8	F	no	216.4	F	no
5	Grand Ave / 4th St / SR-70 SB On-Ramp	AWSC	D	EB	34.2	D		19.3	C	
				WB	60.7	F		71.3	F	
				SB	65.9	F		78.3	F	
				AVG ALL	52.7	F	no*	57.7	F	YES
6	Grand Ave / 3rd St / SR-70 NB Off-Ramp	AWSC	D	EB	73.8	F		51.9	F	
				WB	70.3	F		71.3	F	
				NB	55.9	F		58.9	F	
				SB	18.1	C		22.6	C	
				AVG ALL	61.5	F	YES	57.5	F	YES
7	Oroville Dam Blvd / Washington Ave / Olive Hwy	Signal	E	—	62.7	E	—	115.2	F	—
8	Washington Ave / Montgomery St	Round-about	D	—	51.6	F	—	55.3	F	—
9	Table Mountain Blvd / Grand Ave	Signal	D	—	132.4	F	—	107.5	F	—
10	Table Mountain Blvd / Nelson Ave / Cherokee Rd	Round-about	D	—	51.6	F	—	55.3	F	—
11	Nelson Ave / Country Center Dr	TWSC	D	EB	6.4	A		2.5	A	
				WB	0.0	A		0.0	A	
				SB	113.8	F		46.7	E	
				WORST	113.8	F	no	46.7	E	no
12	Table Mountain Blvd / Country Center Dr	TWSC	D	EB	13.7	B		39.3	E	
				NB	3.5	A		0.8	A	
				SB	0.0	A		0.0	A	
				WORST	13.7	B	no	39.3	E	no
13	Table Mountain Blvd / Garden Dr	TWSC	D	EB	15.3	C		11.3	B	
				NB	6.7	A		6.4	A	
				SB	0.0	A		0.0	A	
				WORST	15.3	C	YES	11.3	B	YES

Notes: TWSC = Two Way Stop Control Unsignalized Intersection - Delays & LOS reported for (1) each individual approach; & (2) along the "WORST" approach (which establishes Delay/LOS for entire intersection per HCM 2010).

AWSC = All Way Stop Control Unsignalized Intersections- Delays & LOS reported for (1) each individual approach; & (2) an overall average for the intersection as a whole (which establishes Delay/LOS for entire intersection per HCM 2010).

* = Signal Warrant lies just under (i.e. no*), along (i.e YES*), or just over (i.e. YES*) the signal warrant threshold.

Deficient delays & LOS below the LOS threshold are shown in red bold.



Larry Wymer & Associates Traffic Engineering

Cumulative Plus Project Traffic Volumes

Figure 15

TABLE 8
CUMULATIVE (2035) PLUS PROJECT CONDITIONS:
INTERSECTION LEVELS OF SERVICE

#	Intersection	Control Type	Target LOS	Approach	Cumulative (No Project) AM Peak Hour Delay (sec)	LOS	Signal Warrant Met?	PM Peak Hour Delay (sec)	LOS	Signal Warrant Met?	Cumulative Plus Project AM Peak Hour Delay (sec)	LOS	Signal Warrant Met?	PM Peak Hour Delay (sec)	LOS	Signal Warrant Met?
1	Cedar Drive / SR-70/SB Ramps	TWSC	D	EB	0.0	A		0.0	A		0.0	A		0.0	A	
				WB	0.4	A		7.1	A		7.6	A		7.6	A	
				SB	12.9	B		18.6	B		168.2	F		23.3	C	
				WORST	12.9	B	no	18.6	B	no	168.2	F	no	23.3	C	no
2	Harlan Drive / SR-70/NB Ramps	TWSC	D	EB	0.0	A		0.0	A		0.0	A		0.1	A	
				WB	0.0	A		0.0	A		0.0	A		0.0	A	
				NB	12.4	B		9.0	A		18.6	C		11.4	B	
				WORST	12.4	B	no	9.0	A	no	18.6	C	no	11.4	B	no
3	Nelson Ave / Ish St / SR-70/NB Off Ramp	TWSC	D	EB	0.0	A		0.0	A		0.0	A		0.0	A	
				WB	1.7	A		2.0	A		1.9	A		2.3	A	
				NB	18.0	C		25.3	D		21.9	C		31.6	D	
				SB	>100	F		>100	F		>100	F		>100	F	
				WORST	>100	F	no	>100	F	no	>100	F	YES	>100	F	YES
4	Nelson Ave / Ish St / SR-70/SB On Ramp	TWSC	D	EB	1.2	A		0.0	A		1.3	A		1.2	A	
				WB	0.7	A		0.1	A		0.1	A		0.1	A	
				SB	208.0	F		208.0	F		177.3	F		>100	F	
				WORST	208.0	F	no	208.0	F	no	177.3	F	YES	>100	F	YES
5	Grand Ave / Ish St / SR-70/SB On Ramp	AWSC	D	EB	24.2	D		19.3	C		38.4	E		23.8	C	
				WB	10.5	B		9.7	A		10.1	A		9.1	A	
				SB	60.9	F		59.3	F		71.4	F		70.9	F	
				AVG ALL	32.7	F	no*	37.7	F	YES	34.9	F	YES	31.9	F	YES
6	Grand Ave / Ish St / SR-70/SB Off Ramp	AWSC	D	EB	51.8	F		51.8	F		59.0	F		63.6	F	
				WB	59.3	F		76.3	F		70.6	F		72.3	F	
				NB	55.9	F		58.9	F		56.0	F		60.0	F	
				SB	18.1	C		22.6	C		18.4	C		24.0	C	
				AVG ALL	40.4	F	YES	47.8	F	YES	41.7	F	YES	48.9	F	YES
7	Oroville Dam Blvd / Washington Ave / Drive Way	Signal	E	—	80.7	E	—	113.2	F	—	84.7	E	—	113.4	F	—
8	Washington Ave / Montgomery St	Round-about	D	—	56.8	F	—	55.9	F	—	61.8	F	—	77.8	F	—
9	Table Mountain Blvd / Grand Ave	Signal	D	—	133.4	F	—	147.8	F	—	144.7	F	—	147.4	F	—
10	Table Mountain Blvd / Nelson Ave / Cherokee Rd	Round-about	D	—	50.8	F	—	56.3	F	—	61.3	F	—	77.2	F	—
11	Nelson Ave / Country Center Dr	TWSC	D	EB	0.9	A		2.5	A		0.4	A		3.6	A	
				WB	0.0	A		0.0	A		0.0	A		0.0	A	
				SB	163.8	F		46.7	E		118.0	F		56.1	F	
				WORST	163.8	F	no	46.7	E	no	118.0	F	YES	56.1	F	YES
12	Table Mountain Blvd / Country Center Dr	TWSC	D	EB	13.7	B		20.3	E		28.3	D		>100	F	
				NB	3.1	A		0.8	A		3.2	A		0.5	A	
				SB	0.0	A		0.0	A		0.0	A		0.0	A	
				WORST	13.7	B	no	20.3	E	no	28.3	D	no	>100	F	YES
13	Table Mountain Blvd / Harlan Dr	TWSC	D	EB	12.3	C		11.3	B		32.9	D		37.2	D	
				NB	0.7	A		0.4	A		0.8	A		0.6	A	
				SB	0.0	A		0.0	A		0.0	A		0.0	A	
				WORST	12.3	C	YES	11.3	B	YES	32.9	D	YES	37.2	D	YES

Notes: TWSC = Two Way Stop Control Unsignalized Intersection - Delays & LOS reported for (1) each individual approach; & (2) along the "WORST" approach (which establishes Delay/LOS for entire intersection per HCM 2010).

AWSC = All Way Stop Control Unsignalized Intersection- Delays & LOS reported for (1) each individual approach; & (2) an overall average for the intersection as a whole (which establishes Delay/LOS for entire intersection per HCM 2010).

* = Signal Warrant lies just under (i.e. no*), along (i.e YES*), or just over (i.e. YES*) the signal warrant threshold.

Deficient delays & LOS below the LOS threshold are shown in red bold.

As shown in the above table, two of the thirteen study intersections are projected to operate at acceptable levels of service for *Cumulative (2035) Plus Project* conditions during both the AM and PM peak hour periods.

Assuming existing control and geometrics at all of the study intersections (with the exception of #10 Table Mountain Blvd./Nelson Ave./Cherokee Rd.), the following eleven study intersections are projected to operate below target levels of service for *Cumulative (2035) Plus Project* conditions, with projected deficient LOS for (AM/PM) periods noted in bolded red font: