BUTTE COUNTY ASSOCIATION OF GOVERNMENTS

APPENDICIES TO SPECIAL PROVISIONS

FOR

BUTTE REGIONAL OPERATION CENTER
OFFSITE CONSTRUCTION

IN

BUTTE COUNTY
326 HUSS DRIVE
CHICO, CALIFORNIA

For use in Connection with Standard Specifications and Standard Plans of the California Department of Transportation, and the Labor Surcharge and Equipment Rental Rates in effect on the date the work is accomplished.

Bid Opening Date & Time: 10:00 AM, July 10th, 2014

Bid Opening Location: Butte County Association of Governments
2580 Sierra Sunrise Terrace, Suite 100
Chico, California 95928

APPENDICIES:

APPENDIX A
American Railway Engineering and Maintenance of Way Association (AREMA) Specifications – Manual for Railway engineering, latest Edition (html reference only provided);
http://www.arema.org/publications/mre/index.aspx

APPENDIX B
Union Pacific Railroad (UPRR) Company Technical Specifications for Construction of Industrial Tracks

APPENDIX C
California Public Utilities Commission (CPUC) General Orders (html reference only provided);
http://www.cpuc.ca.gov/PUC/documents/go.htm

APPENDIX D
Track Safety Standards of the Federal Railroad Administration; (html reference only provided) http://www.fra.dot.gov/Page/P0010

APPENDIX E
1) Geotechnical Engineering Investigation Report for the Butte Regional Transit Operations Center. By Holdredge & Kull, May 17, 2012.
2) Design Memorandum, "Recommendations for Subgrade Soil Stabilization Using Lime Treatment" by Holdredge & Kull, August 27, 2013.
3) "Limited Environmental Soil Assessment Results" by Holdredge & Kull, May 15, 2014.

APPENDIX F
1) U.S. Army Corps 404 permit Letter (SPK-2012-01307), July 11, 2013.
2) U.S. Fish & Wildlife Service Letter (08ESMF00-2013-I-0340-1), May 07, 2013.
3) Central Valley Regional Water Quality Control Board 401 Permit (WDID# 5A04CR00226), September 11, 2013.
4) Department of Fish & Wildlife (CA) 1600 Streambed Alteration Agreement (1600-2013-0167-R2) August 24, 2013.

APPENDIX G
1) Permit to Enter & Construct (Hegan Lane Partners), May 30, 2013.
2) Permit to Enter & Construct (Little Foot LLC), June 11, 2013.
3) City of Chico Encroachment Permit Process Letter (72173), June 9, 2013

APPENDIX H
Federal Minimum Wage Rate Tables to be used on this project.

APPENDIX A

APPENDIX A

American Railway Engineering and Maintenance of Way Association (AREMA) Specifications – Manual for Railway engineering, latest Edition (html reference only provided);
http://www.arema.org/publications/mre/index.aspx

APPENDIX B

Preface

The following information is provided to help guide you through the planning and construction process of developing a rail-served facility. Union Pacific is committed to working with you to develop the most efficient, cost-effective rail plan to meet your transportation needs.

The time required for rail spur construction depends largely on the magnitude of your project; averages presented below represent typical situations. Additional time may be necessary if your project involves road crossings, utilities or requires State permitting approval.

- Track construction without addition of a Union Pacific turnout averages eleven (11) months.
- Addition of a Union Pacific turnout averages fifteen (15) months.
- Addition of a Union Pacific turnout and signal facilities averages seventeen (17) months.

This technical manual and its drawings will be revised periodically. It is the responsibility of the user to update his/her copy with the most current information.

If you have any questions concerning this guideline or require further assistance, please contact the appropriate Manager-Industry and Public Projects.

Page last revised on 03/02/2009

NEW TRACK CONSTRUCTION OVERVIEW

Procedures for Development of Track Plans

The first step is for the customer to submit the Service Feasibility Questionnaire. This provides Union Pacific with the information necessary to evaluate your proposed project. If the customer is unable to process this online form, please contact the appropriate Marketing and Sales representative for assistance. If the customer has not already done so, the customer will need to select a qualified rail engineering consultant for the project. A list of consultants with experience in railroad construction projects is available for customer review at the following web site:

http://www.uprr.com/customers/ind-dev/contractor_list_construction.shtml

To begin the Location Analysis phase, the Regional Manager of Industrial Development (RMID) will contact the Customer to evaluate the proposed project, review Union Pacific's Industry Access Guidelines and establish an on-site meeting plan. If the customer has a consultant on board at the time of the on-site meeting, the consultant should attend the meeting with the customer. The Manager of Industrial and Public Projects (MIPP) and representatives from UPRR's local operating, maintenance, and signal departments should also attend the on-site meeting.

At this meeting, the project site will be reviewed, field data will be collected and UPRR's design requirements will be explained to the Customer. Track layout will be discussed along with operating, maintenance and signal issues and recommendations. The MIPP will provide the Customer with a Milepost (MP) tie in point to help the Customer's consultant establish MP ties to switches and other required locations on their drawings.

Drawings of Proposed Track Plans

All of the required plan sets (10% Concept Plan, 30% Track Plan, Complete Construction Drawings and Exhibit 'A' Print) are to be submitted to UPRR through UPRR's Engineering Document Exchange System (DES) website. The DES system will then distribute the plan sets to the appropriate UPRR departments for their review and approval. It is important that the Customer, or Customer's consultant, submit documents into the proper category (10% Concept Plan, 30% Track Plan, etc.) in the DES system, failure to do so may result in the documents being rejected. After all issues are resolved, the DES system will send notification of approval for each step to the Customer via the email address provided (in the DES system) by the Customer. Following is the address of UPRR's DES Website.

http://216.58.225.184/engr/exchange_docs/

Following the onsite meeting, the Customer, or Customer's consultant, will prepare a 10% Concept Plan (see **Section 2.01** below**)** for review and approval**.**

If the project's 10% Concept Plan receives UPRR's inter-departmental approval and the project will involve modifying UPRR's signal facilities the Customer, or Customer's consultant, will prepare and submit a 30% Track Plan (see **Section 2.02** below) for review and approval. This step in the process will allow signal design to begin. **UP's Signal Department will do all signal design work**.

Regardless of whether signal work is involved and dependant on UPRR inter-departmental approval, the Customer, or Customer's consultant, will prepare and submit a detailed and complete set of Construction plans for the proposed project (see **Section 2.03** below) for review and approval.

The Customer, or Customer's consultant, will also need to prepare and submit an Exhibit 'A' print (see **Section 2.04** below) for review and approval. The Exhibit 'A' print is actually a simplified track plan that will be inserted into the Industrial Track Agreement (ITA).

Any other documents submitted (pictures, construction schedules, reports, etc.) are to be loaded into the "Other" category in the DES.

After all issues are resolved, the project will receive final approval, a cost estimate will be generated and both parties will sign an Industry Track Agreement.

Construction Guidelines

Prior to performing any track construction on Union Pacific property, the following must occur:

a) A fully executed Industry Track Agreement is in effect.

b) The designated Railroad representative must be notified in writing at **least fifteen working days** prior to start of construction so that appropriate safety precautions may be taken. Any flagging protection provided by Union Pacific will be at customer expense.

c) Union Pacific's Telecommunications Operation Center must be contacted at 1-800-336-9193 for fiber optic information prior to track construction on Union Pacific's property. The Contractor is also responsible for securing dig permits for any other utility work within the work limits from the appropriate call before you dig service.

The industrial track(s) must be constructed per approved plans; written approval for any changes must be obtained prior to construction. The rail contractor must abide by the **Minimum Safety Requirements for Customer Contractors Entering Railroad Property** set forth in **Section 1.00**. Upon completion of the entire rail project, the MIPP must be contacted for inspection and final approval of all grading and track work. On the rare occasion that the actual track construction differs from the originally approved design, the Railroad may request "as built" drawings of the industrial track from the customer. The "as built" drawings will show the corrected stationing, geometry, structures, and clearances. The Industry Track Agreement will then be amended, if necessary.

Costs Associated with Track Construction

All design, engineering, and construction are at the Customer's expense, **including flagging protection**. Grading construction includes overhead or underground utility adjustments, the installation of drainage facilities or structures under or along the proposed trackage, clearing, grubbing, any required fill or excavation, compaction, stabilization, and placement of subballast both on and off Union Pacific property. Private track construction will include but is not limited to rail, ties, ballast, turnouts, road crossings, miscellaneous track material, and the labor.

Signal Work for Track Connection

Any signal work associated with connecting a new industry track to an existing Union Pacific owned track will be constructed by Union Pacific labor forces, at the Customer's expense. If the portion of track owned and operated by the Customer crosses public streets, all signal construction and maintenance work

will be completed by the Customer per Union Pacific Railroad specifications and American Railway Engineering and Maintenance-of-Way (AREMA) guidelines.

Road Crossings

As a general policy, Union Pacific prohibits the construction of new public or private roadways across its tracks. If a project requires the construction of a new grade crossing across Union Pacific owned or operated tracks, written approval will be required from Union Pacific management and any applicable State Regulatory Agency. If approved, a separate crossing agreement will be required. The industry will be responsible for obtaining all permits. Crossings may require the installation of automated crossing signals. All cost for both the crossing surfaces and signals will be at the customer's expense.

Portion of Track to be Constructed by Union Pacific

Typically, Union Pacific constructs, owns, and maintains the connection to any existing Union Pacific owned trackage from the switch connection (point of switch) to the 13-foot clearance point. The 13 foot clearance point is defined as the point on the track where the centerline of two tracks are separated by 13 feet such that a rail car either being moved or stored on the track will not interfere with the movement of other rail cars on adjacent main, branch or lead trackage owned by Union Pacific.

Materials For Track Construction

All materials used for the construction of the proposed track must meet Union Pacific standards as outlined in **Section 10.0**. Union Pacific prefers that our customer have their rail contractor furnish Union Pacific's track material. Once Union Pacific has approved the track design, a turnout with connecting rods, switch stand, and any other required track materials can be purchased from one of Union Pacific's approved vendors. The terms associated with the assembly and installation of this material will be outlined in the Industrial Track Agreement. Use of this option may be restricted depending on the location of the project and is subject to Union Pacific approval.

Last revised on 03/02/2009

1.00 - MINIMUM SAFETY REQUIREMENTS FOR CUSTOMERS OR CONTRACTORS ENTERING UNION PACIFIC RAILROAD PROPERTY

1.01 GENERAL SAFETY - Safety of personnel, property, rail operations and the public is of paramount importance in the prosecution of the work pursuant to the project. As reinforcement and in furtherance of overall safety measures to be observed (and not by way of limitation), the following special safety rules shall be followed. The Industry shall keep the job site free from safety and health hazards and ensure that its employees are competent and adequately trained in all safety and health aspects of the job. The Industry shall have proper first aid supplies available on the job site so that prompt first aid services can be provided to any person that may be injured on the job site. The Industry shall promptly notify the Union Pacific Railroad (UP) of any U.S. Occupational Safety and Health Administration reportable injuries occurring to any person that may arise during the work performed on the job site. The Industry shall have a non-delegable duty to control its employees, while they are on the job site or any other property of the UP, to be certain they do not use, be under the influence of, or have in their possession any alcoholic beverage or illegally obtained drug, narcotic or other substance that may inhibit the safe performance of work by an employee.

1.02 ATTIRE AND PERSONAL PROTECTIVE EQUIPMENT - The employees of the Industry shall be suitably dressed to perform their duties safely and in a manner that will not interfere with their vision, hearing or free use of their hands or feet. Only waist length shirts with sleeves and trousers that cover the entire leg are to be worn. If flare-legged trousers are worn, the trouser bottoms must be tied to prevent catching. The employees should wear sturdy and protective footwear. Employees shall not wear boots (other than work boots), sandals, canvas-type shoes or other shoes that have thin soles or heels that are higher than normal. In addition, the Industry shall require its employees to wear personal protective equipment as specified by UP rules, regulations or UP officials overlooking the work at the job site. In particular, the protective equipment to be worn shall be:

a) Protective headgear that meets American National Standard-Z89.1-latest revision, it is suggested that all hardhats be affixed with Industry's or industry's contractor's company logo or name.

b) Eye protection that meets American National Standard for occupational and educational eye and face protection, Z87.1-latest revision. Additional eye protection must be provided to meet specific job situations such as welding, grinding, burning, etc.

c) Hearing protection which affords enough attenuation to give protection from noise levels that will be occurring on the job site.

1.03 EQUIPMENT - All heavy equipment provided or leased by the Industry shall be equipped with audible backup warning devices. If in the opinion of the UP representative any of the Industry's, or any of it's subcontractors equipment, is unsafe for use on the UP's right-of-way, the Industry, at the request of the UP representative, shall remove such equipment from the UP's right-of-way.

2.00 - REQUIRED INFORMATION TO BE SHOWN ON SUBMITTALS

These requirements cover the following submittals:

1.) 10% design print submittal. After the initial onsite meeting with the Regional Manager of Industrial Development (RMID) and the Manager of Industry and Public Projects (MIPP) this "plan view only" print can be developed using the information collected at the onsite meeting, property plats, aerial photos, UP valuation maps etc., without the need of a formal site survey. This 10% drawing shall be used by the Union Pacific Railroad (UP) to determine the feasibility of proceeding with the project.

2.) 30% design print submittal. This submittal is required if the industry track project affects the UP's signal system. The need for this step will be determined during the review process of the 10% design print. **UP's Signal Department will do all signal design work**.

3.) Complete set of engineering drawings and specifications. These drawings and specifications should include all plan and profile drawings, material specifications, design calculations, etc. required to gain the UP's final approval and to construct the project.

4.) Exhibit 'A' print. This drawing is a simplified track plan included as an exhibit in the Industry Track Agreement (ITA). Because the ITA is a legally binding document, the Exhibit 'A' print must be accurate and easy to interpret.

2.01.00 - REQUIREMENTS FOR A 10% INDUSTRIAL TRACK DESIGN PRINT SUBMITTAL

The sample 10% submittal print (see UP **Exhibit '10% Design' Drawing**) and the **Exhibit** 'A-1' checklist (see UP **Exhibit 'A-1' Drawing**) should be used as guidelines for preparing the 10% submittal. **The preferred 10% submittal would be the proposed track layout information plotted on a scaled aerial photographic map**. The following are minimum requirements. If additional information is deemed beneficial, that information should be included on this submittal as well.

2.01.01 TURNOUTS - Show all existing turnouts (within 1500' of the limits of the construction area) and proposed turnouts, including size (No. 11, No. 15, etc). Show the Engineering Station (ES) of each point of switch. On all proposed single ended tracks, this shall be ES 0+00. If the proposed track is double ended, the turnout located closest to the UP's lesser Milepost (MP) shall be designated as ES 0+00. Each point of switch in a UP track shall also be identified by UP's ES and MP (i.e., UPRR ES 23+42/MP 46.90 = ES 0+00 Track 'A'). The MIPP can help you determine turnout sizes, ES, and MP locations.

2.01.02 TRACKS - Show a plan view of all track arrangements including existing tracks, proposed tracks, and future tracks. All existing tracks are to be designated by their unique track identification, Zone Track Spot (ZTS) number; (the RMID or the MIPP can provide these track numbers). All proposed or future tracks should be designated as Track 'A', Track 'B', etc. On all proposed tracks, show the ES of the thirteen-foot (13') clearance point, the ES of the derail (describe the type of derail), the ES of the point there the track centerline crosses UP R/W, if applicable, and the ES of the end of track (EOT), including the type of EOT device. On all

proposed tracks, show the right-angled center to center distances between any close (25’ or less) tracks.

2.01.03 TRACKS – PROPOSED SALE OR LEASE - Show any proposed sale or lease of an existing UP owned track (or portion thereof) that is required as part of the construction plan, including the ES for the beginning and end of the proposed sale or lease.

2.01.04 RIGHT OF WAY (R/W) - Show the existing UP R/W, if applicable, and the right-angled distance to the track the R/W is tied to. This information is shown on UP’s R/W maps.

2.01.05 ROAD CROSSINGS - Show the ES/MP location of the centerline of all existing and proposed roads crossing UP tracks, the type of crossing material (concrete, wood, etc.), the length of crossing, type (public/private), and the type of crossing warning device. All road crossings within fifteen hundred feet (1500’) of a proposed turnout that has any type of electric warning device must be located and shown on the print. **Be advised, if a new road crossing is proposed near an existing one, the crossing warning devices may have to be upgraded.**

2.01.06 BUILDINGS - Show all existing and proposed buildings adjacent to any existing or proposed tracks, including any unloading doors, ramps, docks, etc. Show the right-angled distance from any track within fifty-foot (50’) of these buildings, doors, ramps, and docks, etc.

2.01.07 HORIZONTAL CURVES - Horizontal curves are defined using the 100-foot chord definition method. Show a short line perpendicular to the beginning/end of spiral and curve points. Show the Degree of Curve and the ES of these curve points.

2.01.08 OPERATING PLAN - Provide an explanation of your proposed operating plan for the project. Operating plan should include number of cars delivered and released and the proposed timing of these movements. Plan should also include any additional movements (if necessary) planned within the facility. Include any other details as necessary. This information will be used by UP’s Transportation Department to determine if your plan is workable with existing UP operations.

2.01.09 SCOPE OF WORK - Provide a Scope of Work showing work to be performed by the UP and the Industry. Specifically define turnouts to be installed and length of track to be constructed by UP. In addition, define all work to be done by the Industry.

2.01.10 DRAWING STANDARDS - Your plans should have the approved UP drawing border and use UP Standard Legend and Abbreviations Drawing (see UP **Exhibit ‘GL001’ Drawing**) as a guideline. Acceptable plan scale: 1” = 100’ or 1” = 200’ in an 11”x17” Adobe Acrobat PDF format only. All pages constituting your 10% plan should be loaded as a single PDF file, with the exception that file size should not exceed 20 mg. If the file size exceeds 20 mg it should be split into pieces, not to exceed 20mg. Show a directional north arrow, the name of the main track, the Timetable direction of the track and the existing Timetable station on each side of the proposed turnout, or turnouts. The MIPP can help with getting this information. Plan scale of 1” = 400’ is also acceptable for the 10% Plan only.

2.01.11 INDUSTRIAL TRACK STANDARDS CHECKLIST - Include the Checklist for Industry Track Submittals (**Exhibit 'A-1'**) complete with the Industry's Name, Project Location, and the Design Firm's Name, Address, and Phone Number.

2.01.12 ROADS OR ROADWAY MODIFICATIONS - Show all proposed access roads or roadway modifications etc. not crossing UP tracks that would affect the amount of traffic crossing UP tracks. Include location, width, and type of roadway surface.

2.02.00 - REQUIREMENTS FOR A 30% INDUSTRIAL TRACK DESIGN PRINT SUBMITTAL

The 30% submittal (see UP **Exhibit '30% Design Drawing**) is required if there will be signal work associated with the industry track project. The need for this step will be determined during the review process of the 10% design print. **UP's Signal Department will do all signal design work.**

After the 10% print approval, the process of preparing the complete design prints begins. The purpose of the 30% print is to establish the exact location of the turnout in UP's track, at this point a signal design can begin. This "exact location" can be affected by a number of factors. Each project has its own particular circumstances that will affect the final turnout placement. **If the location of a turnout in UP's mainline has to be moved after the 30% Plan approval, the signal design will have to start over, causing delays and increased costs.** Following is information needed by UP's Signal Department to complete their design work. Some of this information will already be on the 10% submittal.

2.02.01 TURNOUTS - Show all existing turnouts (within 1500' of the limits of the construction area) and proposed turnouts, including size (No. 11, No. 15, etc). Show the Engineering Station (ES) of each point of switch. On all proposed single ended tracks, this shall be ES 0+00. If the proposed track is double ended, the turnout located closest to the UP's lesser Milepost (MP) shall be designated as ES 0+00. Each point of switch in a UP track shall also be identified by UP's ES and MP (i.e., UPRR ES 23+42/MP 46.90 = ES 0+00 Track 'A'). The MIPP can help you determine turnout sizes, ES, and MP locations.

2.02.02 TRACKS - Show a plan view of all track arrangements including existing tracks, proposed tracks, and future tracks. All existing tracks are to be designated by their unique track identification, Zone Track Spot (ZTS) number; (the RMID or the MIPP can provide these track numbers). All proposed or future tracks should be designated as Track 'A', Track 'B', etc. On all proposed tracks, show the ES of the thirteen-foot (13') clearance point, the ES of the derail (describe the type of derail), the ES of the point there the track centerline crosses UP R/W, if applicable, and the ES of the end of track (EOT), including the type of EOT device. On all proposed tracks, show the right-angled center to center distances between any close (25' or less) tracks.

2.02.03 TRACKS - PROPOSED SALE OR LEASE - Show any proposed sale or lease of an existing UP owned track (or portion thereof) that is required as part of the construction plan, including the ES for the beginning and end of the proposed sale or lease.

2.02.04 RIGHT OF WAY (R/W) - Show the existing UP R/W, if applicable, and the right-angled distance to the track the R/W is tied to. This information is shown on UP's R/W maps.

2.02.05 ROAD CROSSINGS - Show the ES/MP location of the centerline of all existing and proposed roads crossing UP tracks, the type of crossing material (concrete, wood, etc.), the length of crossing, type (public/private), and the type of crossing warning device. All road crossings within fifteen hundred feet (1500') of a proposed turnout that has any type of electric warning device must be located and shown on the print. **Be advised, if a new road crossing is proposed near an existing one, the crossing warning devices may have to be upgraded.**

2.02.06 BUILDINGS - Show all existing and proposed buildings adjacent to any existing or proposed tracks, including any unloading doors, ramps, docks, etc. Show the right-angled distance from any track within fifty-foot (50') of these buildings, doors, ramps, docks, etc.

2.02.07 HORIZONTAL CURVES - Horizontal curves are defined using the 100-foot chord definition method. Show a short line perpendicular to the beginning/end of spiral and curve points. Show the Degree of Curve and the ES of these curve points.

2.02.08 OPERATING PLAN - Provide an explanation of your proposed operating plan for the project. Operating plan should include number of cars delivered and released and the proposed timing of these movements. Plan should also include any additional movements (if necessary) planned within the facility. Include any other details as necessary. This information will be used by UP's Transportation Department to determine if your plan is workable with existing UP operations.

2.02.09 SCOPE OF WORK - Provide a Scope of Work showing work to be performed by the UP and the Industry. Specifically define turnouts to be installed and length of track to be constructed by UP. In addition, define all work to be done by the Industry.

2.02.10 DRAWING STANDARDS - Your plans should have the approved UP drawing border and use UP Standard Legend and Abbreviations Drawing (see UP **Exhibit 'GL001' Drawing**) as a guideline. Acceptable plan scale: 1" = 100' or 1" = 200' in an 11"x17" Adobe Acrobat PDF format only. All pages constituting your 30% plan should be loaded as a single PDF file, with the exception that file size should not exceed 20 mg. If the file size exceeds 20 mg it should be split into pieces, not to exceed 20mg. Show a directional north arrow, the name of the main track, the Timetable direction of the track and the existing Timetable station on each side of the proposed turnout, or turnouts. The MIPP can help with getting this information.

2.02.11 INDUSTRIAL TRACK STANDARDS CHECKLIST - Include the Checklist for Industry Track Submittals (**Exhibit 'A-1'**) complete with the Industry's Name, Project Location, and the Design Firm's Name, Address, and Phone Number.

2.02.12 ROADS OR ROADWAY MODIFICATIONS - Show all proposed access roads or roadway modifications etc. not crossing UP tracks that would affect the amount of traffic crossing UP tracks. Include location, width, and type of roadway surface.

2.02.13 SIGNAL INFORMATION REQUIRED - Show all existing insulated joints within five hundred feet (500') of any proposed turnout. Show all signal houses, bungalows, cases, etc. within five hundred feet (500') of any proposed turnout. Show the location of any overhead or

underground signal lines in the project area. The MIPP can help with getting the above signal information.

2.02.14 TRACKS (Additional Information) - On all tracks, show the total length, the ES of the thirteen-foot (13') clearance point, the ES of the derail (describe the type of derail), the ES of the point there the track centerline crosses UP R/W (if applicable) and the ES of the EOT including the type of EOT device. Show the right-angled center to center distances between all tracks.

2.02.15 EXISTING TRACK PROFILE - Provide a top of rail profile of the UP's existing track where the new turnout(s) will be installed. Maximum interval is one hundred foot (100'). The profile shall extend two hundred feet (200') ahead of the point of switch and two hundred feet (200') behind the end of the long switch ties.

2.02.16 UP STATIONING AND BENCHMARK - Provide a description and ES of the point that UP stationing was established from (existing turnout, bridge backwall, CL of road crossing, etc.); the MIPP can help with getting this information. Also provide a description and location of the benchmark used to establish elevations for the project.

2.02.17 CONSTRUCTION PLAN - Provide a construction schedule showing planned duration of major activities along with a proposed phasing plan.

2.03.00 - REQUIRED INFORMATION TO BE SHOWN ON COMPLETE PLANS

The following information is to be provided on the complete construction plan set. Some of the following required information will already be shown on the 10% and 30% (if applicable) Industrial Track Design Prints. The sample Exhibit 'A-1' (see UP **Exhibit 'A-1' Drawing**) should be used as guideline for preparing the complete plan set.

2.03.01 TURNOUTS - Show all existing turnouts (within 1500' of the limits of the construction area) and proposed turnouts, including size (No. 11, No. 15, etc). Show the Engineering Station (ES) of each point of switch. On all proposed single ended tracks, this shall be ES 0+00. If the proposed track is double ended, the turnout located closest to the UP's lesser Milepost (MP) shall be designated as ES 0+00. Each point of switch in a UP track shall also be identified by UP's ES and MP (i.e., UPRR ES 23+42/MP 46.90 = ES 0+00 Track 'A'). The MIPP can help you determine turnout sizes, ES, and MP locations.

2.03.02 TRACKS - Show a plan view of all track arrangements including existing tracks, proposed tracks, and future tracks. All existing tracks are to be designated by their unique track identification, Zone Track Spot (ZTS) number; (the RMID or the MIPP can provide these track numbers). All proposed or future tracks should be designated as Track 'A', Track 'B', etc. On all proposed tracks, show the ES of the thirteen-foot (13') clearance point, the ES of the derail (describe the type of derail), the ES of the point there the track centerline crosses UP R/W, if applicable, and the ES of the end of track (EOT), including the type of EOT device. On all proposed tracks, show the right-angled center to center distances between any close (25' or less) tracks.

2.03.03 TRACKS - PROPOSED SALE OR LEASE - Show any proposed sale or lease of an existing UP owned track (or portion thereof) that is required as part of the construction plan, including the ES for the beginning and end of the proposed sale or lease.

2.03.04 RIGHT OF WAY (R/W) - Show the existing UP R/W, if applicable, and the right-angled distance to the track the R/W is tied to. This information is shown on UP's R/W maps.

2.03.05 ROAD CROSSINGS - Show the ES/MP location of the centerline of all existing and proposed roads crossing UP tracks, the type of crossing material (concrete, wood, etc.), the length of crossing, type (public/private), and the type of crossing warning device. All road crossings within fifteen hundred feet (1500') of a proposed turnout that has any type of electric warning device must be located and shown on the print. **Be advised, if a new road crossing is proposed near an existing one, the crossing warning devices may have to be upgraded.**

2.03.06 BUILDINGS - Show all existing and proposed buildings adjacent to any existing or proposed tracks, including any unloading doors, ramps, docks, etc. Show the right-angled distance from any track within fifty-foot (50') of these buildings, doors, ramps, docks, etc.

2.03.07 HORIZONTAL CURVES - Horizontal curves are defined using the 100-foot chord definition method. Show a short line perpendicular to the beginning/end of spiral and curve points. Show the Degree of Curve and the ES of these curve points.

2.03.08 OPERATING PLAN - Provide an explanation of your proposed operating plan for the project. Operating plan should include number of cars delivered and released and the proposed timing of these movements. Plan should also include any additional movements (if necessary) planned within the facility. Include any other details as necessary. This information will be used by UP's Transportation Department to determine if your plan is workable with existing UP operations.

2.03.09 SCOPE OF WORK - Provide a Scope of Work showing work to be performed by the UP and the Industry. Specifically define turnouts to be installed and length of track to be constructed by UP. In addition, define all work to be done by the Industry.

2.03.10 DRAWING STANDARDS - Your plans should have the approved UP drawing border and use UP Standard Legend and Abbreviations Drawing (see UP **Exhibit 'GL001' Drawing**) as a guideline. Acceptable plan scale: 1" = 100' or 1" = 200' in an 11"x17" Adobe Acrobat PDF format only. All pages constituting your complete plans should be loaded as a single PDF file, with the exception that file size should not exceed 20 mg. If the file size exceeds 20 mg it should be split into pieces, not to exceed 20mg. Show a directional north arrow, the name of the main track, the Timetable direction of the track and the existing Timetable station on each side of the proposed turnout, or turnouts. The MIPP can help with getting this information.

2.03.11 INDUSTRIAL TRACK STANDARDS CHECKLIST - Include the Checklist for Industry Track Submittals (**Exhibit 'A-1'**) complete with the Industry's Name, Project Location, and the Design Firm's Name, Address, and Phone Number.

2.03.12 ROADS OR ROADWAY MODIFICATIONS - Show all proposed access roads or roadway modifications etc. not crossing UP tracks that would affect the amount of traffic crossing UP tracks. Include location, width, and type of roadway surface.

2.03.13 SIGNAL INFORMATION REQUIRED - Show all existing insulated joints within five hundred feet (500') of any proposed turnout. Show all signal houses, bungalows, cases, etc. within five hundred feet (500') of any proposed turnout. Show the location of any overhead or underground signal lines in the project area. The MIPP can help with getting the above signal information.

2.03.14 TRACKS (Additional Information) - On all tracks, show the total length, the ES of the thirteen-foot (13') clearance point, the ES of the derail (describe the type of derail), the ES of the point there the track centerline crosses UP R/W (if applicable) and the ES of the EOT including the type of EOT device. Show the right-angled center to center distances between all tracks.

2.03.15 EXISTING TRACK PROFILE - Provide a top of rail profile of the UP's existing track where the new turnout(s) will be installed. Maximum interval is one hundred foot (100'). The profile shall extend two hundred feet (200') ahead of the point of switch and two hundred feet (200') behind the end of the long switch ties.

2.03.16 UP STATIONING AND BENCHMARK - Provide a description and ES of the point that UP stationing was established from (existing turnout, bridge backwall, CL of road crossing, etc.); the MIPP can help with getting this information. Also provide a description and location of the benchmark used to establish elevations for the project.

2.03.17 CONSTRUCTION PLAN - Provide a construction schedule showing planned duration of major activities along with a proposed phasing plan.

2.03.18 WEIGHT OF RAIL - Show the weight of rail of all existing and proposed tracks and turnouts (MIPP can help with finding this information).

2.03.19 TRACK MATERIALS - UP's standard rail and tie configurations are to be used (see **Section 10.00**). If any other type of track support system is to be used detailed structural plans and calculations must be provided for review and approval.

2.03.20 TRACK CULVERTS - Show the ES (to centerline), the MP location (if UP track), the size, length and type of all existing and proposed culverts (or culvert modifications or extensions) under all existing and proposed tracks (see **Section 7.00** and UP **Bridge Standard Plan No. 680000, Sheets 1 and 2, Plan No. 680020, Sheets 1 and 2 and Plan No. 680030, Sheets 1 of 1**). The minimum culvert size allowed under UP owned or maintained track is thirty inches (30"). A detailed set of plans shall be submitted to UP's Structures Department for their approval.

2.03.21 TRACK BRIDGES - Show the ES (at each backwall), the MP location (if UP track), the length and type of all existing and proposed bridges (or bridge modifications or extensions) in all existing and proposed tracks (see **Section 7.00**). Also show the T/R to flowline distance. Insure that all existing UP bridges within five hundred foot (500') of any turnout are shown on the print. A detailed set of bridge (or bridge modification) plans (stamped and sealed by a registered Professional Engineer) shall be submitted to UP's Structures Department for their approval.

2.03.22 OTHER DRAINAGE STRUCTURES - Show all existing and proposed drainage structures under all existing and proposed roads and in the construction area that would affect drainage on UP property. Show the Direction of runoff across the project and in the vicinity of all tracks to indicate water flow after construction (see **Section 7.00**).

2.03.23 UNDER TRACK STRUCTURES - Show the ES of any existing or proposed under track structure. Provide detailed drawings of any proposed under track structures to UP's Structures Department for their approval. These drawings should include type of construction, placement and size of reinforcing steel in concrete, thickness of walls and floor, type and size of rail supporting beams, weight of rail to be used over the structure, and method of fastening the rail to the beams. All structural plans shall be stamped and sealed by a registered Professional Engineer.

2.03.24 OVERHEAD STRUCTURES - Show the ES of any existing or proposed overhead loading devices, clearance envelope must show the minimum clearances when the device is in use and in the retracted position for train movement (see UP **Standard Drawing No. 0038**). Detailed drawings of any proposed overhead loading devices, including side-unloading racks with retractable platforms shall be submitted to UP's Structures Department for their approval. Drawings should include size and location of supports, footings, vertical and horizontal clearance.

2.03.25 UTILITIES - All existing or proposed utilities that cross or run within close proximity of any existing or proposed track must be located. Typical utility location requirements are:

1.) Overhead wireline crossings, including location of poles and vertical clearance above top of rail, voltage of line, if applicable, and owner.
2.) Underground utility line crossings, including location and type of line, depth below base of rail, proposed encasement details and owner.
3.) Any underground or overhead utilities within close proximity of any existing or proposed track, including the track's right-angled centerline distance to line (and poles if applicable), type of utility and owner.

Be advised that no UP underground facilities will be located by the "One Call" service. The MIPP can help arrange for the UP's underground utility location.

Please note that fiber optic cable systems may be buried on UP Property within the limits of your project. UP's Telecommunications Operation Center must be contacted at 1-800-336-9193 prior to construction.

2.03.26 TRACKSIDE DEVICES - Show all car pulling or indexing devices including stationing and clearance.

2.03.27 ELECTRICAL SERVICE - The Customer shall provide electrical service when the proposed track project requires power for facilities such as wayside signals, active warning devices, illumination, impaired clearance signs, or other facilities. Show location, whether overhead or underground, and the size of proposed electrical service. Show location of poles and size of wireline for any overhead lights, etc.

2.03.28 FENCES - Show the ES and distance to all existing or proposed fences in the vicinity of any proposed or existing track; including the location of gates crossing tracks (see **Section 8.24** for UPRR fence specifications). Also, show the clearance from center of track when gate is open.

2.03.29 TRACK GROUNDING - Show any track, or segment of track, that will be used for loading or unloading of flammable commodities. This track, or segment of track, on which a tank car may stand while a flammable liquid or flammable compressed gas is being loaded or unloaded shall be bonded at each rail and grounded (see UP **Standard Drawing No. 6003**).

2.03.30 CLEARANCES - Show all horizontal clearances, at right angle from the track, to any obstruction within 12 feet (12') of the centerline of all proposed or existing tracks. Also show the above top of rail distance to all overhead crossings of any existing or proposed tracks (see UP **Standard Drawing No. 0038**).

2.03.31 PROPOSED TRACK PROFILES - Provide a top of rail profile of all proposed tracks. Maximum interval is one hundred foot (100'); include the ES of all vertical curve (see UP **Standard Drawing No. 0016**).

2.03.32 ROAD AND DITCH PROFILES - A top of road profile is required (at a maximum of fifty foot (50') intervals) of any proposed road that crosses UP tracks. A top of road profile is also required (at a maximum of fifty foot (50') intervals) of any existing road that the number of tracks crossing it is increased (existing and proposed elevations). The ES and elevation (existing and proposed) of all existing or proposed at grade crossings must be shown on the road profile. If applicable, show any drainage structures with invert elevations and ditch profiles (at a maximum of one hundred foot (100') intervals.

2.03.33 TYPICAL CROSS-SECTIONS - Provide typical cross-sections showing proposed track sections, any side ditches and all areas requiring a walkway (see UP **Exhibit 'E' Drawing**).

2.03.34 TURNOUT CONSTRUCTION PAD - Show details of the construction pad (see UP **Exhibit 'T.O.PAD' Drawing**) used to assemble and install any turnout installed in UP track.

2.04.00 - REQUIREMENTS FOR THE EXHIBIT 'A' PRINT SUBMITTAL

The sample Exhibit 'A' (see UP **Exhibit 'A' Drawing**), UP standard drawing border and UP Standard Legend and Abbreviations Drawing (see UP **Exhibit 'GL001' Drawing**) should be used as a guide preparing the Exhibit 'A' print.

All industry tracks operated by UP are covered by an ITA that specifies each party's responsibility for construction, maintenance and operations of the industry tracks. The Exhibit 'A' print is actually a simplified track plan inserted into the ITA, and because the ITA is a legally binding agreement, the Exhibit 'A' print must be accurate, easy to interpret and include the following:

2.04.01 TURNOUTS - Show all existing turnouts (within 1500' of the limits of the construction area) and proposed turnouts, including size (No. 11, No. 15, etc). Show the Engineering Station (ES) of each point of switch. On all proposed single ended tracks, this shall be ES 0+00. If the proposed track is double ended, the turnout located closest to the UP's lesser Milepost (MP) shall be designated as ES 0+00. Each point of switch in a UP track shall also be identified by UP's ES

and MP (i.e., UPRR ES 23+42/MP 46.90 = ES 0+00 Track 'A'). The MIPP can help you determine turnout sizes, ES, and MP locations.

2.04.02 TRACKS - Show a plan view of all track arrangements including existing tracks, proposed tracks, and future tracks. All existing tracks are to be designated by their unique track identification, Zone Track Spot (ZTS) number; (the RMID or the MIPP can provide these track numbers). All proposed or future tracks should be designated as Track 'A', Track 'B', etc. On all proposed tracks, show the ES of the thirteen-foot (13') clearance point, the ES of the derail (describe the type of derail), the ES of the point there the track centerline crosses UP R/W, if applicable, and the ES of the end of track (EOT), including the type of EOT device. On all proposed tracks, show the right-angled center to center distances between any close (25' or less) tracks.

2.04.03 TRACKS - PROPOSED SALE OR LEASE - Show any proposed sale or lease of an existing UP owned track (or portion thereof) that is required as part of the construction plan, including the ES for the beginning and end of the proposed sale or lease.

2.04.04 RIGHT OF WAY (R/W) - Show the existing UP R/W, if applicable, and the right-angled distance to the track the R/W is tied to. This information is shown on UP's R/W maps.

2.04.05 ROAD CROSSINGS - Show the ES/MP location of the centerline of all existing and proposed roads crossing UP tracks, the type of crossing material (concrete, wood, etc.), the length of crossing, type (public/private), and the type of crossing warning device. All road crossings within fifteen hundred feet (1500') of a proposed turnout that has any type of electric warning device must be located and shown on the print. **Be advised, if a new road crossing is proposed near an existing one, the crossing warning devices may have to be upgraded.**

2.04.06 BUILDINGS - Show all existing and proposed buildings adjacent to any existing or proposed tracks, including any unloading doors, ramps, docks, etc. Show the right-angled distance from any track within fifty-foot (50') of these buildings, doors, ramps, docks, etc.

2.04.08 OPERATING PLAN - Provide an explanation of your proposed operating plan for the project. Operating plan should include number of cars delivered and released and the proposed timing of these movements. Plan should also include any additional movements (if necessary) planned within the facility. Include any other details as necessary. This information will be used by UP's Transportation Department to determine if your plan is workable with existing UP operations.

2.04.09 SCOPE OF WORK - Provide a Scope of Work showing work to be performed by the UP and the Industry. Specifically define turnouts to be installed and length of track to be constructed by UP. In addition, define all work to be done by the Industry.

2.04.10 DRAWING STANDARDS - Your plans should have the approved UP drawing border and use UP Standard Legend and Abbreviations Drawing (see UP **Exhibit 'GL001' Drawing**) as a guideline. Acceptable plan scale: 1" = 100' or 1" = 200' in an 11"x17" Adobe Acrobat PDF format only. All pages constituting your Exhibit 'A' print should be loaded as a single PDF file, with the exception that file size should not exceed 20 mg. If the file size exceeds 20 mg it should be split into pieces, not to exceed 20mg. Show a directional north arrow, the name of the main

track, the Timetable direction of the track and the existing Timetable station on each side of the proposed turnout, or turnouts. The MIPP can help with getting this information.

2.04.11 INDUSTRIAL TRACK STANDARDS CHECKLIST - Include the Checklist for Industry Track Submittals (**Exhibit 'A-1'**) complete with the Industry's Name, Project Location, and the Design Firm's Name, Address, and Phone Number.

2.04.14 TRACKS (Additional Information) - On all tracks, show the total length, the ES of the thirteen-foot (13') clearance point, the ES of the derail (describe the type of derail), the ES of the point there the track centerline crosses UP R/W (if applicable) and the ES of the EOT including the type of EOT device. Show the right-angled center to center distances between all tracks.

2.04.20 TRACK CULVERTS - Show the ES (to centerline), the MP location (if UP track), the size, length and type of all existing and proposed culverts (or culvert modifications or extensions) under all existing and proposed tracks (see **Section 7.00** and UP **Bridge Standard Plan No. 680000, Sheets 1 and 2, Plan No. 680020, Sheets 1 and 2 and Plan No. 680030, Sheets 1 of 1**). The minimum culvert size allowed under UP owned or maintained track is thirty inches (30"). A detailed set of plans shall be submitted to UP's Structures Department for their approval.

2.04.21 TRACK BRIDGES - Show the ES (at each backwall), the MP location (if UP track), the length and type of all existing and proposed bridges (or bridge modifications or extensions) in all existing and proposed tracks (see **Section 7.00**). Also show the T/R to flowline distance. Insure that all existing UP bridges within five hundred foot (500') of any turnout are shown on the print. A detailed set of bridge (or bridge modification) plans (stamped and sealed by a registered Professional Engineer) shall be submitted to UP's Structures Department for their approval.

2.04.23 UNDER TRACK STRUCTURES - Show the ES of any existing or proposed under track structure. Provide detailed drawings of any proposed under track structures to UP's Structures Department for their approval. These drawings should include type of construction, placement and size of reinforcing steel in concrete, thickness of walls and floor, type and size of rail supporting beams, weight of rail to be used over the structure, and method of fastening the rail to the beams. All structural plans shall be stamped and sealed by a registered Professional Engineer.

2.04.24 OVERHEAD STRUCTURES - Show the ES of any existing or proposed overhead loading devices, clearance envelope must show the minimum clearances when the device is in use and in the retracted position for train movement (see UP **Standard Drawing No. 0038**). Detailed drawings of any proposed overhead loading devices, including side-unloading racks with retractable platforms shall be submitted to UP's Structures Department for their approval. Drawings should include size and location of supports, footings, vertical and horizontal clearance.

2.04.26 TRACKSIDE DEVICES - Show all car pulling or indexing devices including stationing and clearance.

2.04.28 FENCES - Show the ES and distance to all existing or proposed fences in the vicinity of any proposed or existing track; including the location of gates crossing tracks (see **Section 8.24** for UPRR fence specifications). Also, show the clearance from center of track when gate is open

2.04.30 CLEARANCES - Show all horizontal clearances, at right angle from the track, to any obstruction within 12 feet (12') of the centerline of all proposed or existing tracks. Also show the above top of rail distance to all overhead crossings of any existing or proposed tracks (see UP **Standard Drawing No. 0038**).

2.04.33 TYPICAL CROSS-SECTIONS - Provide typical cross-sections showing proposed track sections, any side ditches and all areas requiring a walkway (see UP **Exhibit 'E' Drawing**).

3.00 - TRACK ALIGNMENT SPECIFICATIONS

3.01 - Tracks should be designed with the minimum degree of curvature that is practicable and attainable. Horizontal curves of 10^{o} 00' (Chord Definition) (Radius = 573.69 feet) or less, any curvatures greater than 10^{o} will require the approval of the Manager of Industry and Public Projects (MIPP), up to a maximum of 12^{o} 30' (Radius = 459.28 feet). Curves greater than 12^{o} 30' must have approval of Union Pacific Railroad's (UP's) AVP Engineering – Design/Construction or his designated representative. Industry should provide justification to the MIPP when minimum design criteria for curvature cannot be met. For Unit Train Operations, more conservative design criteria may be required. Use the American Railway Engineering and Maintenance of Way Association (AREMA) chapter 14 Section 4.4.2.6.1 Track Geometry – Unit Trains for Guidance. Consultant MIPP prior to design to determine if more stringent design criteria will be required.

3.02 - The minimum tangent distance between curves greater than 07^{o} 30' shall be at least one car length (60 feet to 100 feet), use UP **Standard Drawing No. 0018** for guidance. For the minimum distance between facing point turnouts use UP **Standard Drawing No. 0017** for guidance.

3.03 - Industry track center minimums are as follows:

a) 15 feet preferred on tangent track.
b) 15 feet if spur is adjacent to a lead track or on a curve track.
c) 20 feet if spur is adjacent to a switching lead.
d) 25 feet if spur is adjacent to a main or branch line track.

3.04 - Horizontal curves must not begin on the long ties of a turnout.

3.05 - Turnouts: Consultant MIPP prior to design to determine if more stringent design criteria will be required.

UP **Standard Drawing No. 345000** - No. 15 turnouts will be required for all unit train operations and at other locations required by the UP. Installation may or may not require power operation. Main line turnouts are to be made of 136# rail unless specified and/or approved by UP's AVP Engineering – Design/Construction or a designated representative.

UP **Standard Drawing 343000**- No. 11 turnouts (minimum) are required out of all main tracks and located not closer than 300 ft. to a main line curve or bridge. Main line turnouts are to be made of 136# rail unless specified and/or approved by UP's AVP Engineering – Design/Construction or a designated representative

UP Standard Drawing 341000 - No. 9 turnouts are recommended for industrial lead and spur track installation other than main track. Turnouts maintained by UP are to be 136# rail unless specified and/or approved by UP's AVP Engineering – Design/Construction or a designated representative.

No. 7, No. 8, No. 8-1/2 or No. 10 turnouts will be considered where site conditions warrant in lieu of No. 9 turnouts on privately owned and maintained trackage, they must meet the latest edition of the AREMA Manual. UP will not own or maintain turnouts of these sizes.

All turnouts in UP owned or maintained track will be equipped with a new standard switch stand and target supplied by a UP approved vendor. Turnouts in UP owned or maintained track will be insulated. Type of switch stand to be designated by UP's AVP Engineering – Design/Construction or a designated representative (See UP **Standard. Drawing No. 2111, 2020 & 2050**).

If a new turnout is located within 500 feet of a bridge that does not have a footwalk with handrail on both sides, then its installation will be required. (See **Section 15)**

Any turnout placed within three hundred foot (300') of the edge of a road crossing's surface needs the prior approval of Union Pacific's VP Engineering, or his representative

Transition zones, associated with turnouts, are required on all tracks where maximum authorized speed is 20 MPH or greater (see UP **Standard Drawing No. 0220**).

If turnout is to be Power Operated Turnout (POTO), special ties and components might be required. Power Operated Derails may be required if POTO are used. NOTE: Special ties on Derail components are required if it is Power Operated.

3.06 - Stationing of each track should begin with 0+00 at the proposed point of switch for each new track. (**See Exhibit 'A'** and **Section 2.05**)

4.00 - TRACK PROFILE SPECIFICATIONS

4.01 - Vertical curves should have a minimum length of 100 feet and be designed for the longest curve practical, with a V/L not to exceed 1.2 for Sags and 2.00 for Summits, in which V = (Grade 1) minus (Grade 2) and L = Length of Curve in Stations. Rate of change V/L = Algebraic difference in grades divided by the length of the vertical curve in 100 foot stations. The track should be designed to minimize the number of grade changes and use the smallest V/L as practical (See Union Pacific (UP) **Standard Drawing No. 0016**). For Unit Train Operations, more conservative design criteria may be required. Use the American Railway Engineering and Maintenance of Way Association (AREMA) Chapter 14 Section 4.4.2.6.1 Track Geometry – Unit Trains for Guidance. Consult with the Manager of Industry and Public Projects (MIPP) prior to design to determine if more stringent design criteria will be required.

4.02 - Track Grade shall be designed for the least grade practical, but shall not exceed 2.00%. Grades on track at location used for spotting rail cars are not to exceed 0.4%. For Unit Train Operations, more conservative design criteria may be required. Use the AREMA Chapter 14 Section 4.4.2.6.1 Track Geometry – Unit Trains for Guidance. Consult with the MIPP prior to design to determine if more stringent design criteria will be required.

4.03 - Vertical curves must not begin on the long ties of a turnout. The grade from the point of switch through the long switch ties must be the same as the existing track that the turnout is coming out of.

4.04 - Top of rail of the existing track must be shown for a minimum of 200 feet in prior to the proposed point of switch and 200 feet from the last long switch tie.

4.05 - Description and location of benchmark used in determining elevations.

4.06 - All drainage devices including invert elevations will be shown on the profile and referenced to the top of rail. Show type and size of drainage device. (See UP **Bridge Standard Plan No. 680000, Sheets 1 and 2, Plan No. 680020, Sheets 1 and 2 and Plan No. 680030, Sheets 1 of 1** and **Section 7.00**).

4.07 - Any underground utility crossings under UPRR owned track(s) (see **Section 6.0**) will be shown and referenced to the top of rail. Show the type of utility and size of casing/pipeline being crossed by proposed and existing tracks.

4.08 - Typical cross section showing subgrade, walkway and ditch details (See UP **Standard. Drawing No. 0003** and UP **Exhibit 'E' Drawing**).

4.09 - Stationing of proposed track should begin with 0+00 at the proposed point of switch for each new track (See UP **Exhibit 'A' Drawing**).

5.00 - CLEARANCE REQUIREMENTS

5.01 - Horizontal: The minimum clearance shall be 9 feet at a right angle from the centerline tangent track to nearest obstruction, including car floor height loading docks. Clearances are to be increased (1 1/2") per degree of curve where facility is located adjacent to or within 80 feet of a turnout or curve limits (See Union Pacific Railroad (UP) **Standard. Drawing No. 0038 & 0035**).

5.02 - Vertical: The minimum clearance shall be 23 feet from top of rail to nearest overhead obstruction **(**See UP **Standard Drawing No. 0038 & 0035**).

For overhead wirelines see UPRR Web Site to find the "Wireline Clearance Chart" and/or refer to current National Electric Safety Code manual for wireline clearances. Site Address is: **http://www.uprr.com/reus/pipeline/install.shtml**

In some instances, certain states may accept vertical or horizontal clearances slightly less than UP standards. In these instances, Management normally will accept the State's lesser clearance requirements, although the Industry will be required to sign an Impaired Clearance Agreement with the UP. In any instance, when either horizontal or vertical clearance is less than those of the State Railway or Public Service Commission are, as the case may be, the Industry shall secure necessary approval from the appropriate State Authority for each impaired clearance. The agreement covering service to the Industry's track will include the specific reference to the substandard clearance involved. When state law requires clearances that are more restrictive, such laws will govern. Impaired Clearance Warning Signs shall be illuminated at night (See UP **Standard Drawing No. 0513**).

5.03 - Clearances with respect to installation of loading or unloading facilities for handling Liquefied Petroleum Gas (LPG), anhydrous ammonia, ethanol, or other Hazardous Materials as described under Sec. 172.101-Hazardous Materials Table, of the U.S. Dept. of Transportation's hazardous materials regulations.

Loading and unloading devices should not be closer than 9 feet from centerline of tangent track. Loading and unloading tracks, storage tanks and other permanent installations should be governed by the following table:

ACTIVITY	CLASS 3 (Combustible. Liquid) CLASS 8 (Corrosive Material) CLASS 9	ALL OTHER CLASSES OF HAZARDOUS MATERIALS
Loading and unloading	50 Feet	100 Feet
Storage of loaded tank cars	25 Feet	50 Feet
Storage in tanks	50 Feet	100 Feet

Exceptions to this clearance will require the approval of UP's Executive Vice President - Operations. Tracks on which tank cars of flammable liquids are spotted must be bonded, protected by insulated joints and grounded in accordance with UP's current standard for bonding tracks. Such insulated rail joints must not be bridged by rail equipment or other means during transfer operations (see UP **Standard Drawing 6003**).

6.00 - UNDERGROUND AND OVERHEAD PIPELINE AND WIRELINE CROSSINGS

Please refer to the Union Pacific Railroad Web Site for specifications for underground and overhead utilities. Site Address is: **http://www.uprr.com/reus/pipeline/install.shtml**

7.00 - DRAINAGE SYSTEMS

Union Pacific Railroad (UP) Hydraulic Design Criteria: A complete hydrology study is required when either additional drainage is added to the UP's right of way, or a drainage structure is being added, removed or its size changed.

7.01 - The hydrology study for UP owned or maintained track must include, but is not limited to:

a.) Top of rail elevation.
b.) The 50-year and 100-year water surface elevations for both the existing and proposed conditions.
c) Flow rates for both events.
d) Location map of drainage area including UP mileposts and Engr. stations.
e) Size of the drainage area.
f) Location of the water flowing along the right of way.
g) Location where the water leaves the right of way.

7.02 - The following UP criteria for sizing bridges and culverts on UPRR owned or maintained track is used to determine the adequacy of the existing structure and proposed structure:

a) The 50-year flood elevation should not come into contact with the crown of the culvert or the low chord of the bridge whichever is applicable.
b) The 100-year flood elevation should not exceed the track subgrade elevation at the structure.
c) Both the UP's criteria and local criteria shall be evaluated, and the more restrictive shall be adopted in sizing the drainage structure or replacement.
d) If the existing structure opening more than satisfies the foregoing criteria, a smaller section which satisfies the criteria set forth above may be recommended.
e) Minimum culvert size allowed under UP owned or maintained track is 30".
f) The use of any drainage culverts other than annular corrugated steel (CSP) will require prior approval by UPRR before installation.
g) The use of elliptical or arch pipe is strictly prohibited.

See UP **Bridge Standard Plan No. 680000, Sheets 1 and 2, Plan No. 680020, Sheets 1 and 2 and Plan No. 680030, Sheets 1 of 1**

7.03 - If the existing bridge or culvert does not meet the design criteria, an enlarged opening will be considered. To the extent possible, this enlargement will be made laterally. If it is found that the criteria cannot be met with maximum widening, the UP will be contacted to discuss consideration of relief bridges on the overbank floodplain, raising track grades, or other alternatives which should be evaluated. All structures shall be designed, at a minimum, to meet the latest edition of the American Railway Engineering and Maintenance of Way Association (AREMA) Manual. The link to the AREMA site is www.arema.org. If the bridge structures are in a FEMA designated floodplain, the water surface elevation for a 100-year event shall be determined regardless of line classification

7.04 - The hydrology study for Industry owned or maintained track must include, but not limited to:

a) Top of rail elevation.
b) The 25-year and 50-year water surface elevations for both the existing and proposed conditions.
c) Flow rates for both events.
d) Location map of drainage area including UP mileposts and Engr. stations.
e) Size of the drainage area.
f) Location of the water flowing along the right of way.
g) Location where the water leaves the right of way.

7.05 - The following UP criteria for sizing bridges and culverts on Industry owned or maintained track is used to determine the adequacy of the existing structure and proposed structure:

a) The 25-year flood elevation should not come into contact with the crown of the culvert or the low chord of the bridge whichever is applicable.
b) The 50-year flood elevation should not exceed the track subgrade elevation at the structure.
c) Both the UP's criteria and local criteria shall be evaluated, and the more restrictive shall be adopted in sizing the drainage structure or replacement.
d) If the existing structure opening more than satisfies the foregoing criteria, a smaller section which satisfies the criteria set forth above may be recommended.
e) Minimum culvert size allowed under UP owned or maintained track is 30".
f) The use of any drainage culverts other than annular corrugated steel (CSP) will require prior approval by UPRR before installation.
g) The use of elliptical or arch pipe is strictly prohibited.

See UP **Bridge Standard Plan No. 680000, Sheets 1 and 2, Plan No. 680020, Sheets 1 and 2 and Plan No. 680030, Sheets 1 of 1**

8.00 - TRACK ROADBED CONSTRUCTION SPECIFICATIONS

These Specifications are to be followed for all construction on Union Pacific Railroad (UP) property, for all tracks operated over by UP and as a guideline for all other construction. The term Engineer used in this section is defined as the UP's Manager of Industry and Public Projects (MIPP) or his authorized representative. For any specifications not covered here contact the local MIPP.

8.01 SAFETY AND HEALTH - At all times during the performance of the Work, the Industry shall exercise precaution for the protection of persons and property. The safety provisions of applicable laws, building, and construction codes shall be observed. Machinery, equipment, and other hazards shall be guarded in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America; to the extent such provisions are not inconsistent with applicable law or regulations. Also see **Section 1.0** "Minimum Safety Requirements for Industry's contractor(s) Entering UP Property" contained in these "Technical Specifications for Construction of Industrial Tracks".

8.02 FIRE PROTECTION - Only work procedures which minimize fire hazards to the extent practicable shall be used. Combustible debris and waste materials shall be collected and removed from the site each day. Fuels, solvents, and other volatile or flammable materials shall be stored in separate areas in well-marked, safe containers. Good housekeeping is essential to fire prevention and shall be practiced by the Industry throughout the construction period. The Industry shall follow the recommendations of the Associated General Contractors of America's "Manual of Accident Prevention in Construction" regarding fire hazards and prevention.

8.03 SECURITY - The Industry shall be responsible for all materials and equipment in its custody or placed in construction by it. Security methods shall be employed as required to ensure the protection of UP Property, of all materials, equipment, and construction work from theft, vandalism, fire, and all other damage and loss.

8.04 UTILITIES – The Industry has the responsibility to locate and protect all utilities on UP property within the limits of construction.

Please note that fiber optic cable systems may be buried on UP Property within the limits of this project. UP's Telecommunications Operation Center must be contacted at 1-800-336-9193 prior to construction.

8.05 CROSSINGS - Except as authorized by the Engineer, the Industry will not construct crossings over any track at any location on UP property. Where crossings are needed or desired, the Industry shall make arrangements directly with the Engineer. If a crossing or crossings are required to complete the Work as set forth in the Specifications, the Drawings, and the Agreement, such crossings shall be constructed by the UP unless the UP specifically authorizes the Industry to construct such crossings.

8.06 ACCESS ROADS - Industry shall ensure that any access roads used by the Industry or their contractor on UP property are maintained during construction and left in pre-construction condition when project is complete

Access roads and parking areas which the Industry needs to construct on the UP's Right of Way or property, which the UP has easement or interest in, shall be approved by the Engineer before such roads or parking areas are built. All access roads and parking areas constructed by the Industry that the Engineer deems unsuitable for future UP use shall be removed at Industry expense upon completion of the Work. The areas shall be stabilized with gravel or put back to preexisting conditions where required.

8.07 DUST CONTROL - Industry shall provide equipment for dust control during construction to provide for the safety of UP personnel and UP operations.

8.08 CLEAN UP - Upon completion of work, the Industry shall clean the location of the Work and all ground on UP property occupied by him in connection with the Work. The Industry shall remove all rubbish; excess materials, temporary structures, and equipment, leaving the location of the Work cleaned to the satisfaction of the Engineer.

8.09 ROADBED WIDTH - Roadbeds shall be constructed per UP's Engineering **Standard Drawing No. 0003**. On UP owned or maintained tracks, a twenty four foot roadbed will be required. Although a twenty-four foot roadbed is preferred, tracks not owned or maintained by UP may have a twenty two foot roadbed (with permission of UP's Engineering Department). **Additional roadbed width will be required along all turnouts and derails to provide adequate room for placement of walkways** (see UP **Exhibit 'E' Drawing)**.

8.10 CONSTRUCTION PAD - Industry shall provide a construction pad adjacent to the location where a turnout will be installed in UPRR track. The pad should be sufficiently sized to facilitate the assembly and installation of the turnout. At the direction of the Manager Track Maintenance or MIPP, the pad may have to be removed to facilitate proper drainage after the switch is installed. Construction Pad details should be included with the Construction Plans (see UP **Exhibit 'T.O.PAD Drawing**).

8.11 CLEARING AND GRUBBING - Areas required for embankment or excavation shall be cleared and grubbed. On areas required for excavation, all stumps, roots, etc., shall be removed to a minimum depth of two feet (2') below the sub-grade elevation. On areas required for embankment, all stumps, roots, etc., shall be removed to a minimum of two feet (2') below the existing ground. All holes remaining after clearing and grubbing shall be backfilled and compacted and the entire area bladed to provide drainage, except, in areas to be immediately excavated, the Engineer may direct that the holes not be backfilled. On areas required for borrow sites and material sources, all stumps and roots, (except for designated trees and shrubs) shall be removed to prevent such objectionable matter becoming mixed with the material to be used in construction.

Areas requiring minimal grubbing, as designated by the Engineer, shall have a minimum of six inches (6") of vegetation and topsoil removed from the construction area.

All cleared and grubbed material shall be either:

a) Stockpiled to be used as topsoil after grading is complete, if the Engineer has approved the material for this use.
b) Properly disposed of in a manner satisfactory to the Engineer and in compliance with Federal, State and Local regulations.

Some existing UP embankment slopes are very steep (1.5': 1' or less). T**hese slopes can not be cleared and grubbed along with the foundation of embankment areas**. These slopes must be cleared in steps (see **Section 8.14**, last paragraph) immediately ahead of placing embankment lifts and the cleared material wasted over the side of the new embankment. **No steps will be left uncovered overnight.**

8.12 UNSUITABLE MATERIALS - If unsuitable materials are encountered below the foundation of embankments, below subgrade elevation in excavation areas, or in excavated material to be used in embankments, such materials shall be disposed of properly.

Unsuitable material removed from below subgrade elevation in excavation areas and from under embankment foundations shall be replaced to proposed grade elevation with suitable materials, compacted to specification.

The Engineer shall identify such unstable materials, the limits of removal, and shall approve the replacement material.

8.13 EXCAVATION - Before excavation begins, the area shall be cleared and grubbed (see **Section 8.11**). The Industry shall perform all excavation to the elevations and grades shown on the Drawings and as staked in the field. This work shall consist of excavating the material from roadbed areas, or the borrow areas, and placing the material as embankment, shaping and sloping necessary for the construction, preparation and completion of roadbeds and other earthwork.

The Industry shall excavate all materials including rock and common materials that must be removed to accomplish the excavation as shown on the Drawings. All excavated materials will be used in the formation of embankments, roadbeds, and other earthwork so long as such excavation material is satisfactory for such use. **Materials must be tested by an independent testing laboratory and/or approved by the Engineer prior to placement**.

Where excess excavation materials or unsatisfactory material exists, such materials will be disposed of in areas on the Right of Way, approved by the Engineer, or off the Right of Way in a legal and proper manner. Industry shall provide the Engineer with a copy of agreements made with any landowner.

Excavation shall be done in a manner and sequence that will provide proper drainage at all times.

No blasting will be allowed without sufficient advanced notice given to the Engineer. This time will permit the safe and continuous operation of the UP.

The Industry shall construct intercepting ditches above the cut slopes where natural ground slopes toward the track (see UP Engineering **Standard Drawing No. 0003).**

After cut has been completed, the Industry shall scarify the top six inches (6") of material below the top of proposed subgrade, adjust moisture content, and compact such scarified material (see **Section 8.15**).

In cut sections where the material to be excavated is solid rock, the Industry shall excavate twelve inches (12") below the subgrade elevations as shown on the Drawings and shall replace such excavated twelve inches (12") of solid rock with embankment material approved by the Engineer. This twelve inches (12") of embankment shall have the moisture content adjusted and be compacted to specifications (see **Section 8.15**).

8.14 EMBANKMENT - Embankments shall be constructed and compacted to the elevations and grades set forth in the Drawings and as staked in the field.

After the required clearing and grubbing, the foundations for embankments shall be prepared by scarifying the top six inch (6") layer of existing ground, adjusting moisture content, and compacting such scarified material (see **Section 8.15**).

If the quantity of materials required for construction of embankments exceeds the quantity of materials removed from excavation necessary to complete the project, additional embankment material will be obtained by:

a) Widening cuts in the grading area. The Industry shall consult with the Engineer before widening any cuts. Cuts shall be cleared and grubbed and widened in such a manner as to:

1.) Be at least as stable as the original cut
2.) Provide adequate drainage for the roadbed
3.) Retain the same, or lesser degree of, slope lines as original cut

b) Establishing borrow areas within the right-of-way, if available, or from areas outside of the right-of-way, provided by the Industry, to obtain the additional embankment materials. All borrow areas shall be cleared and grubbed. **All imported materials shall be clean and free of any contaminated and hazardous materials. Materials are to be tested at the source by the Industry and approved by the Engineer prior to placement. Copies of laboratory tests are to be given to the Engineer.**

The Industry shall not place any material that is to be used in the construction of an embankment on top of a frozen surface. With the prior approval of the Engineer, the Industry shall remove all layers of frozen ground and frozen materials in order to prepare a proper foundation for construction of embankments. Furthermore, the material being placed for embankment shall contain no frozen material.

Wherever an embankment is placed on or against an existing embankment, the existing embankment side slope will be cut in steps to tie the new embankment into the existing side slope. These steps should not be over one foot (1') vertically and can not be cut until embankment material will be placed immediately following the cutting of these steps. **No steps will be left uncovered overnight.**

8.15 MOISTURE AND DENSITY REQUIREMENTS - In cut sections, after cut has been completed, the Industry shall scarify the six inches (6") of material below the top of proposed subgrade, adjust moisture content and compact the scarified material to a dense and unyielding condition and to a minimum of 95% (Modified Proctor) of maximum density. **After cut sections are excavated to subgrade, scarified and recompacted the Engineer shall observe and approve (by proof rolling or other methods) these areas before any subballast is placed.**

In cut sections where the material to be excavated is solid rock the Industry shall excavate twelve inches (12”) below the Subgrade elevations as shown on the Drawings. The Industry shall replace such excavated twelve inches (12”) of solid rock with embankment material approved by the Engineer, adjust the moisture content of this material and compact to a dense and unyielding condition and to a minimum of 95% (Modified Proctor) of maximum density.

After the required clearing and grubbing, the foundations for embankments shall be prepared by scarifying the top six inch (6”) layer of existing ground, adjusting moisture content, and compacting such scarified material to a dense and unyielding condition and to a minimum of 95% (Modified Proctor) of maximum density. **After the foundation areas are scarified and recompacted the Engineer shall observe and approve (by proof rolling or other methods) these foundation areas before any embankment material is placed.**

Embankments and backfills of less than three foot (3’) of fill shall be compacted to a dense and unyielding condition and to a minimum of 95% (Modified Proctor) of maximum density.

When embankments and backfills are composed of more than three foot (3’) of fill, the materials within three feet (3’) of the established subgrade (top of fill) elevation shall be compacted to a dense and unyielding condition and to a minimum of 95% (Modified Proctor) of maximum density. Material below said three foot (3’) from subgrade (top of fill) elevation shall be compacted to not less than 90% of maximum density.

Unless otherwise directed by the Engineer, the moisture content of the soil at the time of compaction shall be at the optimum moisture content or within minus four percentage points (4%) of the optimum moisture content as stated in ASTM D 1557 Modified and as determined by tests taken by the Engineer in accordance with ASTM standards.
Each embankment lift shall be tested for compaction compliance before the next lift is placed.

All compaction shall be determined using ASTM D 1556 for field tests and ASTM D 1557 for moisture and density.

Copies of all soils tests and observations shall be provided to the Engineer, the Engineer will not approve placing subballast before these tests are received.

8.16 FINISH GRADING - The Roadbed shall be finished to the lines and grades shown on the Drawings and as staked. The Industry shall protect finished roadbeds from damage, from all causes, until accepted by the UP.

Blue Tops (finished grade stakes) are required at one hundred foot (100’) intervals and are to be set at the shoulders and at the centerline. If the distance between the shoulder stake and the centerline stake is over one hundred foot (100’), an intermediate Blue Top will be required.

8.17 TOPSOIL - A minimum of six inches (6”) of topsoil consisting of friable, fertile soil of loamy character, containing an amount of organic matter normal to the region, capable of sustaining healthy plant life, and reasonably free from subsoil, roots, heavy or stiff clay, stones larger than two inches (2") in greatest dimension, noxious weeds, sticks, brush, litter and other deleterious matter will be placed on all excavation and embankment slopes and any disturbed soils that will not support plant

life and/or will cause or allow soil erosion. After placement of topsoil, all slopes over three foot (3') high shall be cat walked.

8.18 SLOPE PROTECTION AND EROSION CONTROL - This work shall consist of installing silt fence and ditch checks for controlling stormwater erosion during construction. A copy of the Industry's Storm Water Pollution Prevention Plan will be given to the Engineer before the beginning of construction.

8.19 SEEDING - This work shall consist of the preparing and seeding roadbed slopes, disturbed areas and areas designated by the Engineer. The areas involved will be comprised of cut and fill slopes and other areas disturbed by the construction, exclusive of rock slopes.
Seedbed preparation, seeding rates and mixtures, fertilizer rates and mulching requirements shall conform to the state DOT specification for the region.

8.20 RIPRAP - Riprap shall be hard, durable, angular in shape and shall be free of cracks, seams, expansive materials or other defects that would cause accumulated deterioration from exposure to climatic conditions.

RIP RAP CLASS	AVERAGE WEIGHT PER STONE (LBS.)	DIMENSION (INCHES)	LAYER THICKNESS	TYPICAL VELOCITIES
I	50 to 200	9 to 14	1'-6"	6 – 8 fps
II	400 to 1,000	17 to 24	2'-0"	8 – 12 fps
III	1,000 to 4,000	24 to 38	3'-0"	> 12 fps
IV	> 4,000	> 38	4'-0"	SPECIAL CASES

The Engineer shall specify the Class of riprap. Riprap shall be placed in such a manner as to avoid segregation of various sizes of rock and distributed so that there will be no large accumulation of either the larger or smaller sizes of stone. Individual rocks shall be placed in tight contact with one another in such a way as to produce the least amount of void spaces and providing adequate embankment protection and erosion control. The entire mass of riprap shall be well distributed within the limits specified. However, the following allowances shall be acceptable to produce the required riprap protection:

Riprap Class I	No allowances are permitted
Riprap Class II	15% of Riprap Class I
Riprap Class III	15% of Riprap Class I and 15% of Riprap Class II
Riprap Class IV	15% of Riprap Class I, 15% of Riprap Class II and 15% of Riprap Class III

8.21.00 CULVERTS – CORRUGATED STEEL AND CORRUGATED ALUMINUM ALLOY

These pipe culvert specifications cover the assembly and installation of:

a) Corrugated Steel Pipes - (CSP)
b) Corrugated Structural Plate Pipe - (SPP)
c) Corrugated Aluminum Alloy Pipe - (CAAP)

The above are hereinafter referred to as “pipe culverts”. Pipe culverts shall be assembled and installed in accordance with these Specifications and Chapter 1, Part 4 of the current American Railway Engineering and Maintenance of Way Association (AREMA) Specifications for culvert installation and UP **Bridge Standard Plan No. 680000, Sheets 1 and 2, Plan No. 680020, Sheets 1 and 2 and Plan No. 680030, Sheets 1 of 1**. The most restrictive provisions shall govern when there are differences in the requirements.

8.21.01 PIPE CULVERT MATERIAL - All pipe culverts will be furnished with annular corrugations and the exposed ends of all corrugated pipes shall be square. 3" x 1" annular corrugations shall be used for all CSP pipes with 36" diameters and larger; 2-2/3" x 1/2" or 3" x 1" annular corrugations shall be used for 30" diameter CSP pipes. 3" x 1" annular corrugations shall be used for all CAAP pipes. CSP and CAPP material furnished by the Industry, must meet the standards for pipe culverts set forth in Chapter 1, Part 4 of the current AREMA Manual for Railway Engineering, and UP Company **Bridge Standard Plan No. 680000, Sheets 1 and 2 and Plan No. 680020, Sheets 1 and 2**, or as required and approved by the Engineer. 6" x 2" annular corrugations and a Minimum of 4 bolts per foot shall be used for all SPP pipes. SSP material and connecting material shall be per the current AREMA Manual of Railway Engineering, chapter 1, part 4, Section 6 and UP Company **Bridge Standard Plan No. 680030, Sheets 1 of 1**. Any deviations of these Specifications are to be submitted to the Engineer for approval prior to starting construction.

8.21.02 HANDLING OF PIPE CULVERT MATERIAL - The Industry shall handle pipe culverts and the pipe culvert material carefully in order to prevent damage, including, but not limited to, distortion of the pipes, injury to bituminous and other pipe culvert coatings. Pipe culverts shall never be dragged over the ground, but shall be handled with skids, rolling slings, or cranes. The Industry shall promptly repair, to the satisfaction of the Engineer; any damage to the pipe culvert or pipe culvert material. In the event such damaged pipe culverts or pipe culvert material cannot be repaired to the satisfaction of the Engineer, replacement pipe culverts or pipe culvert material must be provided by the Industry.

8.21.03 EXCAVATION AND LOCATION - Pipe culverts shall be placed in excavations at the location, elevation and alignment shown on the Drawings and as staked. The Industry shall preserve all stakes until pipe culvert installation is complete.

Prior to pipe culvert excavation, embankment must be constructed to a height no less than two feet (2’) above the top of the proposed pipe culvert. When embankment is placed, alternate methods may be used if approved by the Engineer. Pipe culvert excavations shall be wide enough to permit thorough compaction of the backfill under and around the pipe culvert as required by **Section 8.21.10**. The BASE WIDTH of the pipe culvert excavation shall not exceed the external width of the pipe culvert plus:

a) 12 inches on each side for pipes less than 48 inches in diameter
b) 18 inches on each side for pipes 54-78 inches in diameter
c) 24 inches on each side for pipes 84 inches in diameter or larger

Pipe culvert excavation shall be deep enough to permit compliance with **Section 8.21.05**. Care shall be taken to insure drainage is diverted away from the pipe bed during preparation. The

Industry shall repair any damage to, or deterioration of, pipe bedding prior to installation, to the satisfaction of the Engineer.

The Industry shall comply with all current and applicable Federal, State and local rules and regulations governing the safety of men and materials during pipe culvert excavation, installation and backfilling operations. The Industry shall observe requirements of the Occupational Safety and Health Administration relating to excavations, trenching and shoring as set forth in Title 29, Part 1926, Subpart Paragraph P, Sections 1926.650 through 1926.653, Code of Federal Regulations, and any subsequent revisions. See also **Section 8.21.04** below.

8.21.04 SHORING - When working near UP tracks, temporary shoring may be required. UP's "Guidelines for Temporary Shoring" can be found on the Internet at:

http://www.uprr.com/aboutup/operations/specs/index.shtml.

Also see Union Pacific Railroad/ Burlington Northern Railroad **Common Standard Plan No. 710000, Sheet 1 of 1 and Plan No. 710001, Sheet 1 of 1**.

Before beginning any work that would require shoring, as determined by the above standards, the Industry shall provide detailed plans of the intended shoring. If the shoring falls within Zones A or B, the plans shall include design calculations. Plans and calculations must be signed and stamped by a Professional Engineer; licensed in the state the work will be done.

8.21.05 FOUNDATION, BEDDING, AND COMPACTION - Pipe culverts shall be placed at the flowline grade and elevation established by the Drawings and Specifications on a uniform bed of stable earth or granular material such as gravel or sand, (see UP **Bridge Standard Plan No.680000, Sheet 2 of 2**) and such bedding shall be compacted to not less than 95% (Modified Proctor) of maximum density determined by ASTM D 1557 with moisture content adjusted. The compacted bed shall contain the camber required by the Engineer or as covered by the Specifications listed below in **Section 8.21.06**. Where the granular material is used for bedding, the ends of the pipe culvert in embankment shall be sealed to prevent leaking and infiltration of water along the pipe culvert. Such sealing can often be accomplished by blanketing the ends of the pipe culvert embankment with well tamped clay. In all cases, the ends of pipe culverts shall be protected by riprap as outlined in **Section 8.21.07** and the UP Company **Bridge Standard Plan No. 680000, Sheet 2 of 2**.

Where the flowline grade crosses areas of soft soil, which will not provide a suitable uniform foundation for the pipe culvert bed, the Industry shall excavate eighteen inches (18") below the flowline grade for a width equal twice the outside width of the pipe culvert. Prior to backfilling, the Engineer shall inspect the excavation and the Industry shall perform any additional excavation required by the Engineer. Upon completion of the excavation, the Industry will backfill such excavation with granular material which shall be compacted and tested as required.

When the flowline grade passes over rock, the Industry shall excavate such rock to a depth, which is at least twelve inches (12") below the flowline grade. Excavations in rock shall maintain sufficient area so that the pipe culvert will not rest on rock at any point. The Industry will

backfill excavation in rock with granular material which shall be compacted and tested as required.

8.21.06 CAMBER - Camber shall be placed in all culverts where it is anticipated that the culvert will settle as the result of high embankment construction or compressible foundation soils below the culvert bedding. Unless otherwise specified by the Engineer, all culverts shall be cambered in accordance with the following:

a) The culvert shall not be cambered so high in the center that water will be pocketed at the inlet end of the pipe.
b) Culverts resting on rock foundations need not be cambered, refer to **Section 8.21.04**, last paragraph.
c.) Embankments up to 8 feet high (measured base of rail to flowline) require a 1-1/2 inch camber.
d) Embankments 8 feet to 12 feet high require a 2 - 1/2-inch camber.
e) Embankments 12 feet to 24 feet high require a 4-inch camber.
f) Embankments 24 feet to 36 feet high require a 6-in. camber.

The above camber standards, based on the height of embankments, may be adjusted in the field, where at the discretion of the Engineer a greater or lesser amount of camber should be built into pipe to adjust for soil conditions encountered at the site. For fills higher than 36 feet, the AVP Design will provide the camber requirements.

8.21.07 RIPRAP PROTECTION - Both the inlet and outlet ends of all culverts shall be protected by riprap. The riprap shall be installed per detail on UP Company **Bridge Standard Plan No. 680000, Sheet 2 of 2**, or as shown on the Drawings and Specifications.

8.21.08 ASSEMBELY - Pipe culverts shall be jointed with locking coupling bands in accordance with the provisions of the AREMA Manual for Railway Engineering Chapter 1, Part 4, Section 4.3.4. Coupling bands shall be of the same base material and finish as the pipe. Coupling bands for thirty inch (30”) or larger culvert pipe shall be two foot (2’) wide. The inside of the corrugated coupling bands and the outside of pipe culverts to be joined by corrugated coupling bands shall be kept clean and free of all dirt or gravel to ensure that the corrugations on the coupling bands and the pipe culvert fit snugly as the coupling bands are tightened. They should be tapped with a mallet or hard rubber hammer to ensure a tight joint. Coupling bands and the outside surface of the culvert pipe under the coupling bands often need to be lubricated with fuel oil or similar solvent to allow the coupling bands to be drawn firmly into place.

Corrugated structural plate pipe shall be assembled in accordance with the manufacturer's detailed assembly instructions and UP Company **Bridge Standard Plan No. 680030, Sheet 1 of 1**. Bolts shall be tightened progressively and uniformly, starting at one end of the corrugated structural plate pipe after all plates are in place. Tightening shall be repeated to ensure all bolts are tight.

When a power wrench is used for tightening bolts, the Industry shall check the tightening of the bolts with one handled structural or socket type torque wrench. Bolts shall be torqued uniformly to a minimum of 100 ft. lb. and a maximum of 300 ft. lb. or as specified in the manufacturer's detailed assembly instructions.

Where field cutting of culvert pipes is required, the Industry shall make saw cuts, torch burning will not be permitted.

8.21.09 LAYING CULVERT PIPE - Installation of culvert pipe shall conform to the current AREMA Manual for Railway Engineering, Chapter 1, Part 4 and UP Company **Bridge Standard Plan No. 680020, Sheet 1 of 2** for CSP and UP Company **Bridge Standard Plan No. 680030, Sheet 1 of 1** for SPP. Each pipe culvert shall be laid true to the flowline grade. The minimum gradient for any pipe culvert shall be zero point five percent (0.5%) or as directed by the Engineer. If two or more pipe culverts are to be laid parallel to each other, such parallel pipe culverts shall be spaced to permit thorough compaction of the backfill as required by **Section 8.21.10** below. Parallel culverts shall be separated by a distance of at least one-half (1/2) of the nominal diameter of the pipe culverts, but not less than twelve inches (12") nor shall it exceed forty eight inches (48"). Riveted corrugated metal pipe culverts must be placed with the inside circumferential laps pointing downstream. The Industry shall cover exposed metal on the surface of any bituminous coated pipe culvert before backfilling is commenced. Such exposed metal must be covered with material which is approved by the Engineer and which includes:

a) Fiber Bonded Bituminous (composite) coating ASTM A-825 (steel only)
b) Polymeric Coating - ASTM A762 or AASHTO M245 (steel only)
c) Galvanized - AASHTOM218 or Aluminum (Type 2) - AASHTO M274 (steel only)
d) Asphaltic Coating - AASHTO M190 (steel and aluminum) (only 3 and 4 for structural plate pipe)

Such material shall be applied to a thickness of approximately one sixteenth (1/16) of an inch.

All pipe culverts with a nominal diameter of 48 inches or greater shall be provided with a five percent (5%) vertical elongation. Field strutting shall be required only on very large structural steel pipes, ten foot (10') or greater, or as specified on Drawings or Specifications.

8.21.10 BACKFILLING AND COMPACTION - Backfill materials shall be placed simultaneously on both sides of the pipe culvert in uniform layers not to exceed six inches (6") in thickness. For multiple pipes the backfill shall be placed simultaneously in uniform six inch (6") layers between and outside of pipes. Each successive layer shall be compacted to not less than 95% (Modified Proctor) of maximum density as determined by ASTM D 1557 with moisture content adjusted if necessary, and each six inch (6") layer shall be properly compacted before the next layer is placed.

Backfilling shall be started and completed as quickly as possible after the pipe culvert has been assembled and placed on its bed.

Special care must be taken to obtain adequate compaction under the pipe culvert haunches; however, care must be exercised to avoid lifting of the pipe culvert as the result of tamping to compact material under the haunch. Where pipe culvert is placed in a confined area, making it difficult to obtain adequate compaction under the pipe culvert haunches though tamping, a Controlled Low-Strength Material (CLSM) fill may be used, see UP **Bridge Standard Plan No. 680000, Sheet 2 of 2**.

All backfilling material placed around and adjacent to pipe culverts and to a point at least one foot above the top of the pipe culvert shall consist of sand, gravel, sandy clay, or a combination thereof, free from all vegetation and rock or lumps greater than one and one-half inches (1-1/2") diameter in their greatest dimension. Granular material containing a small amount of silt or clay is an ideal backfill material because it makes a dense, stable fill.

Where granular material is used for backfill, the ends of the pipe culvert embankment shall be sealed with well tamped clay to prevent leaking and infiltration of water along the pipe culvert.

Materials used to complete the embankment over the pipe culvert should be essentially the same as the materials used for the pipe culvert backfill and should be placed and compacted in the same manner as pipe culvert backfill materials are placed. Such material must be used to complete the embankment at least to a height over the top of the pipe culvert equal to the nominal diameter of the pipe culvert, or if the height of the completed embankment over the top of the pipe culvert is less than the nominal diameter of the pipe culvert, then such material must be used to complete the embankment. The pipe culvert must be protected from damage during the entire construction period, especially if heavy compaction and/or construction equipment is used. Heavy equipment shall not be operated over the pipe culvert until it has been covered with compacted backfill material to a depth of twenty four inches (24").

Copies of all compaction tests shall be supplied to the Engineer.

8.21.11 RETIGHTENING OF BOLTS - As soon as possible after completion of the embankment over corrugated structural plate pipes, all bolts in the corrugated structural pipe must be retightened to the standards set forth in **Section 8.21.08** above. Such retightening must be started at one end of the pipe culvert and all bolts must be tightened progressively through the length of the pipe culvert.

8.21.12 REMOVAL OF EXISTING HEADWALLS OR CULVERTS IN PREPARATION FOR EXTENSION OF EXISTING PIPE CULVERTS - The Industry shall remove existing headwalls and/or culverts in whole or in part as shown on the Drawings and in the Specifications. The Industry shall perform all work called for, as shown on the Drawings and in the Specifications, which may be necessary to adapt existing pipe culverts for extension or reconstruction, including required excavation and backfilling. Except as otherwise provided for in these Specifications, the Industry will determine the method of extending existing pipe culvert structures by consulting with the Engineer. See also **Section 8.21.04**.

8.22.00 CULVERTS - REINFORCED CONCRETE PIPE (RCP)

These pipe culvert specifications cover the fabrication and installation of:

a) Round reinforced concrete pipes
b) Reinforced concrete manhole riser
c) Reinforced concrete flared end pipes

Each of which will be referred to as "pipe culverts". Pipe culverts may be for culverts, siphons, drains, and conduits as shown on the Plans or directed by the Engineer in accordance with these

Specifications and in all accordance with Chapter 8, Part 10 of the current AREMA Specifications for culverts. The most restrictive provisions shall govern when there are differences in the requirements.

8.22.01 PIPE CULVERT MATERIAL - Pipe culvert material must meet the standards set forth in Chapter 8, part 10 of the current AREMA Specifications. RCP pipe culvert materials shall be furnished in lengths not less than 4 feet. Material is to be new material. All pipe material shall be designed for Cooper E80 loading and no pipe lighter than Class IV will be permitted. The minimum factor of safety against formation of a 0.01 inch crack shall be 1.0. In lieu of design analysis, the Industry may furnish Class V pipe for installations with 14 feet maximum cover.

8.22.02 HANDLING OF PIPE CULVERT MATERIAL - The Industry shall handle pipe culverts, and the pipe culvert material, carefully in order to prevent damage including, but not limited to, injury to pipe culvert coatings, chipping or breaking culvert ends. The pipe culverts shall never be dragged over the ground but shall be handled with skids, rolling slings, or crane. The Industry shall promptly repair, to the satisfaction of the Engineer; any damage to the pipe culverts or culvert material which the Industry causes. In the event that such damage to culverts or pipe culvert material cannot be repaired to the satisfaction of the Engineer, replacement of pipe culvert and/or pipe culvert material must be provided by the Industry.

8.22.03 EXCAVATION AND LOCATION - Pipe culverts shall be placed in excavations at the location, elevation and alignment shown on the Drawings and as staked. The Industry shall preserve all stakes established until installation is complete.

Prior to pipe culvert excavation, embankment must be constructed to a height no less than two feet (2') above the top of the proposed pipe culvert. When embankment is placed, alternate methods may be used if approved by the Engineer. Pipe culvert excavations shall be wide enough to permit thorough compaction of the backfill under and around the pipe culvert as required by **Section 8.22.10**. The BASE WIDTH of the pipe culvert excavation shall not exceed the external width of the pipe culvert plus:

a) 12 inches on each side for pipes less than 48 inches in diameter.
b) 18 inches on each side for pipes 54-84 inches in diameter) 24 inches on each side for pipes 84 inches in diameter or larger.

Pipe culvert excavations shall be deep enough to permit compliance with **Sections 8.22.05**. Care shall be taken to insure drainage is diverted away from the pipe bed during preparation. The Industry shall repair any damage or deterioration of, pipe bedding prior to installation, to the satisfaction of the Engineer.

The Industry shall comply with all current applicable Federal, State and local rules and regulations governing the safety of men and materials during pipe culvert excavation, installation, and backfilling operations. The Industry shall comply with all requirements of the Occupational Safety and Health Administration relating to excavations, trenching and shoring as set forth in Title 29, Part 1926, Subpart Sections 1926.650 through 1926.653, Code of Federal Regulations, and any subsequent revisions. See also **Section 8.22.04** below.

8.22.04 SHORING - When working near UP tracks, temporary shoring may be required. UP's "Guidelines for Temporary Shoring" can be found on the Internet at:

http://www.uprr.com/aboutup/operations/specs/index.shtml.

Also see Union Pacific Railroad/ Burlington Northern Railroad **Common Standard Plan No. 710000, Sheet 1 of 1 and Plan No. 710001, Sheet 1 of 1**.

Before beginning any work that would require shoring, as determined by the above standards, the Industry shall provide detailed plans of the intended shoring. If the shoring falls within Zones A or B the plans shall include design calculations. Plans and calculations must be signed and stamped by a Professional Engineer; licensed in the state the work will be done.

8.22.05 FOUNDATION, BEDDING AND COMPACTION - Pipe culverts shall be placed at the flowline grade and elevation established by the Drawings and Specifications on a uniform bed of stable earth or granular material such as sand or gravel (see UP Company **Bridge Standard Plan No. 680000, Sheet 2 of 2**, this plan refers to steel pipe, but the Pipe Bedding section shall also apply to concrete pipe). Such bedding shall be compacted to not less than 95% (Modified Proctor) of maximum density as determined by ASTM D 1557, with moisture content adjusted as necessary. The compacted bed shall contain the camber required by the Engineer or as covered by the Specifications listed below in **Section 8.22.06**. The compacted bed shall be shaped to fit the bottom of the pipe and shall conform to Class A, B or C bedding (see Table 10.33.4 bedding factors) AREMA Specifications chapter 8-10. Where granular material is used for bedding, the ends of the pipe culvert excavation shall be sealed to prevent leaking and infiltration of water along the pipe culvert. Such sealing can often be accomplished by blanketing the ends of the pipe culvert embankment with well tamped clay. In all cases the ends of pipe culverts shall be protected by riprap as outlined in **Section 8.22.07** and the UP Company **Bridge Standard Plan No. 680000, Sheet 2 of 2**, this plan refers to steel pipe but the riprap section shall also apply to concrete pipe.

Where the flowline grade crosses areas of soft of soil, which will not provide a suitable uniform foundation for the pipe culvert bed, the Industry shall excavate eighteen inches (18”) below the flowline grade for a width equal to twice the outside width of the pipe culvert. Prior to backfilling, the Engineer shall inspect the excavation and the Industry shall perform any additional excavation required by the Engineer. Upon completion of the excavation, the Industry will backfill such excavation with granular material, which shall be compacted and tested as required.

When the flowline grade passes over rock, the Industry shall excavate such rock to a depth which is at least six inches (6”) below the flowline grade. The pipe culvert will not rest on rock at any point. The Industry will backfill excavations in rock with granular material, which shall compacted and tested as required.

8.22.06 CAMBER - Camber shall be placed in all culverts were it is anticipated that the culvert will settle as the result of high embankment construction or compressible foundation soils below the culvert bedding. Unless otherwise specified by the Engineer, all culverts shall be cambered in accordance with the following:

a) The culvert shall not be cambered so high in the center that water will be pocketed at the inlet end of the pipe.
b) Culverts resting on rock foundations need not be cambered. Refer to **Section 8.22.05**, last paragraph.
c) Embankments up to 8 feet high (measured base of rail to flowline) require 1-1/2 inch camber.
d) Embankments 8 feet to 12 feet high require a 2-1/2 inch camber.
e) Embankments 12 feet to 24 feet high require a 4-inch camber.
f) Embankments 24 feet to 36 feet high require a 6-inch camber.

The above camber standards, based on the height of embankments, may be adjusted in the field where, at the discretion of the Engineer, a greater or lesser amount of camber should be built into pipe to adjust for soil conditions encountered at the site. For fills higher than 36 feet, the AVP Design will provide the camber requirements.

8.22.07 RIPRAP PROTECTION - Both the inlet and outlet ends of all culverts shall be protected by riprap. The riprap shall be installed per detail on UP Company **Bridge Standard Plan No. 680000, Sheet 2 of 2** (this plan refers to steel pipe but the riprap section shall also apply to concrete pipe) or as shown on the Drawings and Specifications.

8.22.08 ASSEMBLY - Pipe may be bell and spigot or tongue and groove unless otherwise specified. When bell pipe is used, a shallow excavation shall be made underneath the bell of sufficient depth so the bell does not rest on the bedding material. Ends of reinforced concrete pipe shall be of such design that when properly laid, they shall have a smooth and uniform interior surface. In areas where the pipe will tend to separate, suitable ties shall be installed.

Joints shall be made with either mortar, grout, rubber gaskets, plastic mastic compounds, or by a combination of these types. Any joint system must be approved by the Engineer prior to installation.

In general, mild bends, no more than a fifteen (15) degree change in either vertical or horizontal alignment at fifty foot (50') intervals, should be used. Pipes used on curves shall have both ends beveled to provide a smooth curve. In no case shall any pipe end be beveled greater than seven and one-half (7-1/2) degrees, and suitable ties shall be installed. If the resulting gap is less than one inch, the resulting space is to be filled with mortar concrete. For gaps of one inch or greater, a reinforced concrete collar shall be poured around the joint as directed by the Engineer.

8.22.09 LAYING CULVERT PIPE - Installation of culvert pipe shall conform to the current AREMA Manual for Railway Engineering, Chapter 1, Part 4, each pipe culvert shall be laid true to the flowline grade. The minimum gradient for any pipe culvert shall be zero point five percent (0.5%) or as directed by the Engineer. If two or more pipe culverts are to be laid parallel to each other, such parallel pipe culverts shall be spaced to permit thorough compaction of the backfill as required by **Section 8.21.10** below. Parallel culverts shall be separated by a distance of at least one-half (1/2) of the nominal diameter of the pipe culverts, but not less than twelve inches (12") nor shall it exceed forty eight inches (48").

Pipe laying shall begin at the downstream end of the culvert. The bell or groove end of the pipe shall be placed facing upstream. No culvert shall be placed in service until a suitable outlet is provided.

8.22.10 BACKFILLING AND COMPACTION - Backfill materials shall be placed simultaneously on both sides of the pipe culvert in uniform layers not exceeding six inches (6") in thickness. For multiple pipes the backfill shall be placed simultaneously in uniform layers between and outside of the pipes. Each successive layer shall be compacted to not less than 95% (Modified Proctor) of maximum density as determined by ASTM D 1557, with moisture content adjusted if necessary, and each six inch (6") layers shall be properly compacted before the next layer is placed.

Backfilling shall be started and completed as quickly as possible after the pipe culvert has been assembled and placed on its bed.

Special care must be taken to obtain adequate compaction under the pipe culvert haunches; however, care must be exercised to avoid lifting of the pipe culvert as the result of tamping to compact material under the haunches. Where pipe culvert is placed in a confined area, making it difficult to obtain adequate compaction under the pipe culvert haunches through tamping, a Controlled Low-Strength Material (CLSM) fill may be used, see UP **Bridge Standard Plan No. 680000, Sheet 2 of 2** (this plan refers to steel pipe but the CLSM fill section shall also apply to concrete pipe. All backfill material placed around and adjacent to pipe culverts to a point at least one foot above the top of the pipe culvert shall consist of sand, gravel, sandy-clay, or a combination thereof, free from all vegetation and rock or lumps greater than one and one-half inches (1-1/2") in diameter in their greatest dimension. Granular material containing a small amount of silt or clay is an ideal backfill material because it makes a dense, stable fill. Where granular material is used for backfill, the ends of the pipe culvert embankment shall be sealed with well-tamped clay to prevent leaking and infiltration of water along the pipe culvert.

Materials used to complete the embankment over the pipe culvert should be essentially the same as the materials used for the pipe culvert backfill and should be placed and compacted in the same manner as pipe culvert backfill materials are placed. Such material must be used to complete the embankment at least to a height over the top of the pipe culvert equal to the nominal diameter of the pipe culvert, or if the height of the completed embankment over the top of the pipe culvert is less than the nominal diameter of the pipe culvert, then such material must be used to complete the embankment. The pipe culvert must be protected from damage during the entire construction period, especially if heavy compaction and/or construction equipment is used. Heavy equipment shall not be operated over the pipe culvert until it has been covered with compacted backfill material to a depth of twenty-four inches (24").

Copies of all compaction tests shall be supplied to the Engineer.

8.22.11 REMOVAL OF EXISTING HEADWALLS OR CULVERTS IN PREPARATION FOR EXTENSION OF EXISTING PIPE CULVERTS - The Industry shall remove existing headwalls and/or culverts in whole or in part as shown on the Drawings and in the Specifications. The Industry shall perform all work called for, as shown on the Drawings and in the Specifications, which may be necessary to adapt existing pipe culverts for extension or reconstruction, including required excavation and backfilling. Except as otherwise provided for

in these Specifications, the Industry will determine the method of extending existing pipe culvert structures by consulting with the Engineer. See also **Section 8.22.04.**

8.23.00 CULVERTS - SMOOTH STEEL PIPE (SSP) – JACK AND BORED

These pipe culvert specifications cover the assembly and installation of Smooth Steel Pipe.

Where conditions warrant the installation of pipe culverts by jacking and/or earth boring can be a viable alternative to more standard methods of installation. Smooth Steel Pipe shall be assembled and installed in accordance with these Specifications and Chapter 1, Part 4 of the current AREMA Specifications for culvert installation and UP Company **Bridge Standard Plan No. 680000, Sheets 1 and 2 and Plan No. 680010, Sheets 1 of 1**.

8.23.01 SAFETY - Trenching is one of the most dangerous situations in construction, since a jacking operation generally involves some form of trenching or pit construction, the jacking Industry shall strictly conform to all Federal, State and local regulations and in particular, the requirements of the Occupational Safety and Health Administration (OSHA).

8.23.02 JACKING AND BORING - Pipe boring and jacking operations shall be performed by an experienced specialty Industry normally engaged in performing this type of service. Excavation should not be carried more than a few inches ahead of the pipe. Jacking and boring shall be done continuously to minimize the tendency of the material to "freeze" around the pipe. However, lubricants such as bentonite slurry are available to minimize the freezing tendency. The bore hole diameter shall be essentially the same as the outside diameter of the pipe. Boring operations shall not be stopped if such a stoppage would be detrimental to the UP. A survey crew shall continually monitor the elevation and alignment of the UP track(s) during the jacking procedure and if there is track movement work must stop and the UP immediately notified. The Industry shall submit a corrective action plan to the Engineer for his approval and the approved repairs shall be completed as soon as possible.

8.23.03 JACKING AND BORING TOLERANCE - The tolerance from a true line is +/- 2" or less. Adjustments to the line and level shall be gradual to ensure that the pipe manufacture's stated angular deflection is not exceeded.

8.23.04 BORING PIT - The approach trench should be properly sheeted and braced on the sides and working face. Wet sandy soils can be de-watered by various means including well points. **A detailed plan of the bore pit, including shoring proposals, shall be approved by the Engineer before the Work is started**. See also **Section 8.21.04**.

8.23.05 FIELD WELDING - Smooth steel pipe sections shall be welded per UP **Bridge Standard Plan No. 6800100, Sheet 1 of 1**. Welders must possess valid certification.

8.23.06 PIPE CULVERT MATERIALS - Smooth steel pipe culvert material shall be in accordance with ASTM International A139. Pipe to be Grade B and steel shall have a minimum yield strength of 35 ksi. Smooth steel pipe shall have welded straight longitudinal seams. The ends of each section of pipe shall be square cut and one shall be suitably beveled for field welding sections together.

8.23.07 RIPRAP PROTECTION - Both the inlet and outlet ends of all culverts shall be protected by riprap. The riprap shall be installed per detail on UP Company **Bridge Standard Plan No. 680000, Sheet 2 of 2** or as shown on the Drawings and Specifications.

8.23.08 SMOOTH STEEL PIPE (SSP) - NOT JACK AND BORED - When smooth steel pipe is to be extended, by normal methods, from the end of the jack and bored sections, or is placed entirely by normal methods **Sections 8.21.00** through **Sections 8.21.10** shall be followed for any items not specifically covered by **Sections 8.23.00** to **Sections 8.23.06**.

8.22.04 SHORING - When working near UP tracks, temporary shoring may be required. UP's "Guidelines for Temporary Shoring" can be found on the Internet at:

http://www.uprr.com/aboutup/operations/specs/index.shtml.

Also see Union Pacific Railroad/ Burlington Northern Railroad **Common Standard Plan No. 710000, Sheet 1 of 1 and Plan No. 710001, Sheet 1 of 1**.

8.24.00 RIGHT OF WAY FENCES AND GATES

The extent of the Standard Right of Way fence and gates is as indicated on the Drawings and Specifications or as designated by the Engineer and in accordance with typical details shown on UP Engineering **Standard Drawing No. 0075**.

8.24.01 MATERIALS

Hog tight, woven wire - A twenty six inch (26") woven wire galvanized steel fabric is to be used with seven horizontal bars of No. 9 galvanized wire and stays on six inch (6") centers. Weight is approximately 266 pounds per 20 rod roll.

Line Posts - Use painted studded tee steel fence posts seven foot (7') long, with anchor plate, spaced as shown on UP **Standard Drawing NO. 0075**. Approximate weight 9.98 pounds each.

Corner Post - Use five percent (5%) solution penta treated wood posts, six inches (6") in diameter by nine foot (9') long or 7" x 9" second hand wood ties.

Brace Panel Posts - Use five percent (5%) solution penta treated wood posts, six inches (6") in diameter by nine foot (9') long or 7" x 9" second hand wood ties.

Horizontal Brace Posts - Use five percent (5%) solution penta treated wood posts, four inches (4") in diameter or 4" x 4" by nine foot (8') long.

Gate Posts - Use 7" x 9" x 9' second hand ties. Each side of gate shall have a brace panel constructed to support gate.

Barbed Wire - Shall be two-strand 12.5 galvanized wire, twisted, with 14-gauge 4-point barbs spaced not more than 5 inches center to center. Metal and finish to match fabric (galvanized).

Diagonal Tie Wire - Use double number 8 galvanized steel wire twisted.

Wire Clips - Use 12 gauge galvanized wire clips.

Wire Staples - Use 1.5 inch 9 gauge galvanized steel wire stapes.

Gates - Gate frames shall be constructed of 1.625 in. diameter steel tube with .066 wall. Rails shall be high strength 16 gauge S-bend shape. Stays shall be roll-formed 12 gauge welded in pairs. Latch shall be double pin 1/2" x 1" steel with lock and saddle horse type handle. Hinge shall be full wrap omega style 1/4' steel with bottom in fixed position and top will adjust vertically 5" between rails.

8.24.02 INSTALLATION

Do not begin installation and erection until timely notice has been given to the Engineer. The area along with the fence line shall be cleared enough to permit proper construction. Fence shall be installed per the Drawings and Specifications or as shown on UP **Standard Drawing No. 0075**.

9.00 - INDUSTRY SUBBALLAST/BASE MATERIAL REQUIREMENTS

9.01 Subballast - This item shall consist of a foundation course for Union Pacific Railroad (UP) ballast and shall be constructed in one or more courses in conformity with the typical sections shown on plans.

9.02 Material Requirements - Materials shall be 100% crushed stone produced from oversized quarried aggregate, sized by crushing and produced from a naturally occurring single source. Aggregate retained on a No. 10 sieve shall consist of hard, durable particles or fragments of stone. The subballast material shall have:

a) No more than approximately 10% freeze-thaw loss when tested in accordance with ASTM C 88-90, Standard Test Method for Soundness of Aggregate by Use of Sodium Sulfate (under 5 cycles of freeze-thaw with sodium sulfate solution)

b) No more than 50% loss when tested in accordance with ASTM C 131-89, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

Industry's Contractor shall provide certification that the subballast/base material meets UP's Specifications.

9.03 Gradation - Subballast shall consist of gradations as set forth in UP **Standard Drawing No. 0010**.

9.04 Design Requirements - Subballast and its minimum depth is set forth in UP **Standard Drawing No. 0010.**

10. 00 - TRACK MATERIAL

10.01 Rail - 112 lb. to 141 lb. relay rail is required. Rail must meet or exceed AREMA Class I Specifications if greater than three hundred (300) per year are anticipated. If less than three hundred (300) cars per year are anticipated Class II rail can be used.

Class 1		
Rail Weight	**Max. Vert. Wear**	**Max. Hor. Wear**
141	5/16"	1/8"
133-136	1/4"	1/8"
131-132	3/16"	1/8"
119	5/32"	1/16"
112-115	1/8"	1/16"
Corrugation up to .010 allowed		
Class 2		
Rail Weight	**Max. Vert. Wear**	**Max. Hor. Wear**
141	7/16"	1/4"
133-136	3/8"	1/4"
131-132	1/4"	1/4"
119	1/4"	1/8"
112-115	3/16"	1/8"
Two dime sized engine burns per 39' corrugation up to .020 and 1/4" field size lip allowed		

10.02 Fastenings:

a) Angle or Joint Bars, new or certified, to match rail section used. Industry to provide compromise joint bars or compromise welds to match Union Pacific's (UP) rail section at 13-foot clearance point or location designated by UP representative (See UP **Standard Drawing No. 0904 and 0948**).

b) Tie Plates, new or secondhand, and double shouldered plates no smaller than 2 times the base of the rail. Track to be fully plated. The use of single shoulder tie plates is prohibited.

c) Track Bolts, new or secondhand, appropriately sized for the boltholes in the rail section with length sufficient for a full nut and heavy-duty spring washers (new) (See UP **Standard Drawing No. 0438, 0439, 0440, 0441 & 0442**).

d) Track Spikes, new 5/8" x 6" or 5/8" x 6 1/4" installed per UP **Standard Drawing No. 130005 and 0453**.

e) Rail Anchors, new or reformed, box anchored every other tie. All switch ties will be completely box anchored. For crossties that use elastic fasteners, rail anchors are not required (See UP **Standard Drawing No. 0460**).

f) Compromise Joint Bars or Compromise Field Welds shall be utilized when rails of dissimilar rail sections are connected. Turnouts will use the same rail section on the running rail, closure rails, and turnout components through the body of the turnout. It is the Industry's responsibility to furnish, install and maintain compromise joint bars connecting to UP owned track. All rail joints and welds should be kept out of grade crossings, where possible (See UP **Standard Drawing No. 0948**).

g) Insulated Joints/I Bonds to be furnished by Industry and shall be all new material. Insulated joints/I bonds will be installed by industry at locations designated by UP's authorized representative (See UP **Standard Drawing No. 0960**).
h) Field Welding will be done in accordance with current UPRR or AREMA procedures (See **Section 16.00**).

10.03 Timber Ties (See UP Standard Drawing No. 0210):

Light Traffic	**<1000 cars per year**	**7" x 9" x 8' Ties @ 20 Ties per 39 ft. rail (24" on center)**
Medium Traffic	**>1000 & <2000 cars per year**	**7" x 9" x 8'6" Ties @ 22 Ties per 39 ft. rail (21.25" on center)**
Heavy Traffic	**>2000 cars per year**	**7" x 9" x 8'6"' Ties @ 24 Ties per 39 ft. rail (19.5" on center)**

a) New creosoted Oak or Douglas fir ties only for new construction.
b) Only new creosoted Oak or Douglas fir switch ties will be used to accommodate turnout pattern.

10.04 Concrete Ties:

Light Traffic	**<1500 cars per year**	**8' 3", 600 lb. tie at 26" centers 8' 6", 525 lb. Tie at 24" centers 8' 6", 720 lb. tie at 28" centers**
Medium/Heavy Traffic	**>1500 cars per year**	**8' 3", 600 lb. tie at 24" centers 8' 6", 720 lb. tie at 26" centers**

a) Continuous Welded Rail is recommended for use with Concrete Ties.
b) Concrete switch ties may be used where concrete standard ties are used.
c) Concrete ties must be new ties produced in accordance with UP's Concrete Tie Specifications for Construction.
d) See UP **Standard Drawing No. 0204** as an example of a 720 lb. Tie.

10.05 Steel Ties (See UP Standard Drawing No. 0240):

Levels of Traffic	**10 mm thickness**	**8' 6" ties @ 20 ties per 39 ft. rail @ 24" centers**

10.06 Composite Ties (See UP Standard Drawing No. 0210):

Light Traffic	**<1000 cars per year**	**6" x 8" x 8' Ties @ 20 ties per 39 ft. rail @ 24" centers**
Medium Traffic	**>1000 & <2000 cars per year**	**7" x 9" x 8' 6" Ties @ 22 ties per 39 ft. rail @ 21.25" centers**

Heavy Traffic	**>2000 cars per year**	**7” x 9” x 8’6”” Ties @ 24 ties per 39’ rail @ 19.5” centers**

10.07 Turnout Components - All turnout components shall be new or certified reconditioned material. All turnout components in UP owned or maintained track shall be new material supplied by UP or a UP approved vendor. The Industry and/or its Contractor need to provide verification that the turnout(s) are from a UP approved vendor.

10.08 Turnout Assembly - The Industry and/or its Contractor need to verify with the Manager Track Maintenance or the Manager Industry & Public Projects that the turnout(s) to be installed on the UP owned portion of the track will be provided loose or assembled. Turnouts to be provided must meet provisions of the local collective bargaining agreements. If the assembly of the Turnouts is by the Industry’s Contractor, the assembly in all cases must occur off of UP right of way.

11.00 - BALLAST REQUIREMENTS

Under light traffic, crushed rock ballast or equivalent material, per AREMA Standard 5 gradation must be utilized. Under heavy traffic, crushed rock ballast, main line quality, AREMA Standard 4A gradation must be utilized. Refer to Union Pacific Railroad (UP) **Standard Drawing No. 0010**. The allowable wear based on the Los Angeles Abrasion Test, not greater than 35%, per ASTM C-535. Minimum depth is 15" between top of subballast and top of timber, composite or concrete ties. The minimum depth for steel ties is 8” from top of subballast to top of tie. The full ballast section extends 9" beyond ends of tie for jointed rail and 12" for welded rail and thence to subgrade on not less than 3:1 slope. Ballast shall be quarried rock, crushed to proper gradation, with fully fractured faces. Industry’s Contractor shall provide certification that the ballast meet UP’s Specifications.

12.00 TRACK CONSTRUCTION SPECIFICATIONS

12.01 - Experienced personnel skilled in railroad track construction shall supervise track laying and surfacing.

12.02 - Ties shall be uniformly spaced center to center of tie. Ties shall be laid at right angles to the rail and at least one will be located at the joint location as required in the FRA track standards for the class of track it is intended for.

12.03 - When handling or spacing ties care shall be taken not to damage them with picks or hammers. Tie tongs shall be used for this purpose.

12.04 - The pulling of spikes, once driven, shall be avoided insofar as possible. When spikes are pulled, the holes shall be immediately plugged with creosoted tie plugs of the proper size to completely fill the hole, or an approved form of plugging compound must be used.

12.05 - The bottom of the rail, the tie plate and the wearing surface of the tie shall be cleaned before the rail is laid.

12.06 - Tie plates shall be applied at the time the rail is laid to avoid unnecessary spiking. Plate shoulder shall bear against the outside base of the rail.

12.07 - Rails shall be unloaded, stored or distributed along the roadbed in such a manner as to prevent damage.

12.08 - For jointed track rails should be laid with a 12-foot staggered joint arrangement.

12.09 - If a determination is made to stagger rail, then rails of miscellaneous lengths less than 39 feet shall be used at suitable intervals for maintaining the proper stagger of joints on curves.

12.10 - Rails less than 15 feet long shall not be used except for temporary closures.

12.11 - Expansion shims of hardwood or fiber shall be used to control expansion. The following table prescribes the correct thickness for the expansion shim for various ambient temperatures:

RAIL TEMPERATURE	33 FT. RAIL OPENING	39 FT. RAIL OPENING	78 FT. RAIL OPENING
Below 25° F.	1/4"	1/4"	1/2"
25° to 50° F.	1/8"	3/8" every other joint	3/8"
51° to 75° F.	1/8" every other joint	1/8"	1/4"
76° to 100° F.	1/8" every third joint	1/8" every other joint	1/8"
Above 100° F.			1/8" every other joint

12.12 - Rails shall be laid to ensure good alignment, and the rail ends must be brought squarely together against expansion shims and shall be bolted before spiking.

12.13 - Rails shall be cut square and clean by means of rail saws. Holes for complete bolting of cut rails shall be drilled according to Union Pacific Railroad's (UP) Specifications. Under no circumstances shall new holes be drilled between two holes already drilled. Cutting rails or drilling holes in cut rails by means of acetylene or electric torch will not be permitted.

12.14 - The appropriate number of bolts shall be applied according to the rail joint used. The nuts of all bolts shall alternate uniformly inside and outside of each joint. Each bolt shall be equipped with a spring washer of size required to fit the diameter of the bolts used.

12.15 - The right-hand rail going away from the switch points or the outside rail on curves shall first be spiked in position in its proper relation to the lined end of ties. The opposite rail shall then be spiked to true gage (4'-8 1/2"). Curved track shall be gauged as follows:

a) Lay track to standard gauge on tangents and curves of less than 6 degrees.
b) Lay track to a gauge of 56-3/4" on curves of 6 degrees or greater.

12.16 - On tangent track and on curves up to 4 degrees, two spikes (one inside and one outside the base of rail) shall be used to fasten each rail to each tie. On curves at least 4 degrees and less than 8 degrees, two spikes inside and two spikes outside, shall be used on each rail. On curves of 8 degrees or more, use three spikes inside and two spikes outside shall be used on each rail (See UP **Standard Drawing No. 0453**).

12.17 - Spikes shall be staggered so that the outside spikes shall be on the same side of the tie and the inside spikes on the opposite side (See UP **Standard Drawing No. 0453**).

12.18 - Rail shall not be struck with maul or heavy tool when spiking, gauging or lining.

12.19 - Spikes shall be started vertically and square and be driven straight with full bearing against the base of the rail. Straightening with maul or spikes started crooked will not be permitted. Spikes started crooked shall be pulled, the holes plugged and spikes redriven. Immediately after completion of track surfacing, spikes shall be settled in place with the underside of the head of the spike contacting the top of base with a minimum of pressure (See UP **Standard Drawing No. 0453**).

12.20 - Rail anchors control longitudinal rail movement on ties from temperature variations, traffic, grade, and train braking. Anchors are not required on ties with elastic fastening systems unless additional restraint is necessary to control undesired rail movement. Anchors should be new or reformed. On all tracks, apply rail anchors out-of-face along each rail, directly across from each other on the same tie. Use Standard Box Pattern (every other tie) or Solid Box Pattern (See UP **Standard Drawing No. 0460**).

12.21 - When the track has been raised to within 4 inches of final grade and properly compacted, the final lift shall be made by jacking the track up to the exact elevation provided by the grade stakes. The ballast shall then be tamped under the ties. The space extending from 15 inches inside either rail to the ends of the ties shall be thoroughly tamped. The tie centers shall be left untamped. Unless

otherwise authorized, this final lift shall be tamped with tamping bars, tamping picks or by approved tamping machines. In making the finishing lift, the spot board and level board shall be used with care and the track brought to a true surface and required elevation.

12.22 - After track has been brought to true surface, elevation and grade, it shall be given a final lining and placed in true alignment.

12.23 - Turnouts shall be constructed of all new or certified reconditioned rail and other track material. Unless otherwise approved by the UP's AVP Design/Construction, all turnouts must be fabricated to UP standards. **Turnouts in UP owned or maintained track will be constructed with all new rail and other track material supplied by a UP approved vendor.**

12.24 - Road crossings on industry-owned trackage may be constructed with plank and asphalt or entirely with asphalt. Maintain the flangeway opening along the gage side of the running rail at no less than 3 inches. All crossings on UP owned trackage will be constructed with UP precast concrete crossing material, per UP **Standard Drawing No. 0304, and 200100 through 200903**. Curved Concrete Panels, per UP **Standard Drawing No. 200902**, must be utilized as conditions warrant.

12.25 - Timber crossing materials shall conform to UP **Standard Drawing No. 0301** and shall be square-edged and of sound creosoted planks of fir or hemlock, or equal, with the height of plank equal the distance from top of tie to top of rail. The planks are to be fastened with countersunk 3/4" x 12" galvanized Lewis washer head drive spikes, in predrilled holes.

12.26 - Each crossing location will be evaluated individually by the UP (and Road Authority if applicable) to determine minimum crossing surface material requirements. Crossings may require the use of precast concrete materials. Determination of and type of warning devices on public roadways will be made by a joint recommendation of UP, Road Authority, and/or Government Regulatory Body.

12.27 - Earthen bumpers shall be used whenever possible. If Industry chooses to use other than an earthen bumper, they must submit to the UP the proposed device for review and approval. If bumping posts are used, they shall be Hayes Type WD with Shock Free Head, or equal. (See UP **Standard Drawing No. 0030**).

13.00 - DERAILS

13.01 - Derails must be clearly visible. A derail is required for all new construction or modifications of any existing trackage, and it shall be appropriately sized for the designated rail section, complete with proper length connecting rod and operating stand with target. The type of derail required, its placement, and type of switch stand to be used shall be determined by the Union Pacific's AVP Engineering – Design/Construction or his authorized representative, and will be dependent on track gradient, independent movement of cars by the customer, and anticipated track use, refer to Union Pacific Railroad (UP) **Standard Drawing No. 2000, 2005, 2006, 2007, 2020, and 2050**.

13.02 - Derails in signaled territory are to be placed at a point sufficiently ahead of insulated joints so equipment is derailed before fouling track circuit. Derails may require signal insulation material as required by UP. If insulation material is required, it will be installed by industry at locations designated by the UP. Walkways conforming to UP **Exhibit 'E' Drawing** must be installed around all derail switch stands.

13.03 - Consideration should be given for placement of derail to avoid conflicts with adjacent tracks, railroad signal installations, communication lines, power lines, pipelines (overhead or underground), roadways, ditches, waterways, storage tanks, buildings, or other structures.

13.04 - Power Operated Derails may be required if Power Operated Turnouts (POTO) are used.
NOTE: Special ties on Derail components are required if it is Power Operated.

14.00 - WALKWAY REQUIREMENTS

14.01 Safety - Walkways shall be constructed and maintained to provide a reasonable regular surface and shall be maintained in a safe condition clear of vegetation, debris, standing water, and other obstruction, which constitute a hazard.

14.02 Grades and Slopes - Walkways shall not have a grade and slope in excess of approximately 1 inch of elevation per each 8 inches of horizontal length in any direction. Excess slope is permissible where the proximity of adjacent tracks so long as the slope between tracks is constant.

14.03 Construction - For walkway standards refer to Union Pacific Railroad (UP) **Exhibit 'E' Drawing**. Walkways shall be constructed to a minimum width of 8' 6", as measured from the centerline of track. Walkways shall be constructed and maintained in such a manner that the elevation of its surface is at least level with the top of ties, but not higher than the top of rail. Walkways are to be constructed per AREMA Standard 57 ballast unless prior approval by UP's Chief Engineer is granted for alternate size material.

14.04 Requirements - Walkways shall be located along both sides of the track for a minimum distance of 125 feet on each side of every switch stand or other trackside switch-throwing mechanism. Walkways are required around all derail switch stands, in accordance with UP **Exhibit 'E' Drawing**.

14.05 Minimum Distances - Walkways shall be continuous and maintained from the switch stand through the switch frog and along the diverging track. An additional 3 feet of walkway width shall extend for a minimum distance of 4 feet in each direction from the switch stand or other trackside switch-throwing mechanism on the side of the track where said mechanism is located. This additional 3 feet of width shall be gradually tapered back to the 8' 6" minimum width, as measured from the centerline of track, a distance of not less than 20 feet.

14.06 Guideline - These specifications are provided only as a guideline for design and should not be taken as authority to construct walkways. All walkway construction must conform to the UP specifications or the federal, state or local specifications whichever is the most protective from the standpoint of public safety. All walkway construction shall comply with current and applicable federal, state and local laws. Industry shall be responsible for the proper construction of all walkways. In some areas, the Industry will be required to stockpile sufficient walkway ballast at a location designated by UP's authorized representative, for installation by UP forces.

15.00 - BRIDGE FOOT WALK AND HANDRAIL

Any bridge located within **500 feet** of a proposed or existing point of switch shall have a footwalk and handrail on both sides of the structure.

If the Structure is owned or maintained by the Union Pacific Railroad (UP), the design and installation of the walkway and handrail system shall be completed by the UP at Industry's Expense.

If the structure is owned or maintained by the Industry, the Industry will design and install the walkway and handrail system. The design of the walkway and handrail system must be approved by UP prior to construction. Detailed Construction Plans for walkway and handrail system must be stamped and sealed by a Registered Professional Engineer. Prior to designing the walkway and handrail system, contact the Manager of Industry and Public Projects for guidance.

16.0 - FIELD WELDING

Union Pacific Railroad (UP) approved welds must be installed. The welds currently approved are Railtech Boutet one shot kits and Orgo-Thermit single use kits. The Industry and the individual installing the welds must be qualified by the manufacturer of the kits being used and have documentation to support such qualification. All welds must conform **at a minimum, to meet the latest edition of the American Railway Engineering and Maintenance of Way Association (AREMA) Manual. The link to the AREMA site is** www.arema.org**.**

It is UP's policy that Field Welds made on UP owned or maintained track be inspected by the Director of Track Maintenance or his designated representative.

APPENDIX C

APPENDIX C

California Public Utilities Commission (CPUC) General Orders (html reference only provided);
http://www.cpuc.ca.gov/PUC/documents/go.htm

APPENDIX D

APPENDIX D

Track Safety Standards of the Federal Railroad Administration; (html reference only provided) http://www.fra.dot.gov/Page/P0010

APPENDIX E

GEOTECHNICAL ENGINEERING INVESTIGATION REPORT for the BUTTE REGIONAL TRANSIT OPERATIONS CENTER 326 Huss Drive, Chico, California

Prepared for:
TLCD Architecture
111 Santa Rosa Avenue, Suite 300
Santa Rosa, California 95404
Phone (707) 525-5600

Prepared by:
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8 Seville Court, Suite 100
Chico, California, 95928
Phone: (530) 894-2487
Fax: (530) 894-2437

Project No. 70395-01
May 17, 2012

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

May 17, 2012
Project No.: 70395-01

Mr. Don Tomasi, AIA
TLCD Architecture
111 Santa Rosa Avenue, Suite 300
Santa Rosa, California 95404
Phone (707) 525-5616

Reference: ***Butte Regional Transit Operations Center***
326 Huss Drive
Chico, Butte County, California

Subject: ***Geotechnical Engineering Investigation Report***

Dear Mr. Tomasi,

Holdrege & Kull (H&K) is pleased to have had this opportunity to provide geotechnical engineering services for development of the proposed Butte Regional Transit Operations Center to be located at 326 Huss Drive, Chico, California. Our geotechnical engineering investigation of the site was performed consistent with the scope of services presented in our December 27, 2012 proposal (PC11.077).

The findings, conclusions, and recommendations presented in this report are based on the following relevant information collected and evaluated by H&K: literature review, surface observations, subsurface exploration, laboratory test results, and our experience with similar projects, sites and conditions in the area. The proposed project will provide a new bus maintenance building, bus wash, bus parking lot, employee and visitor parking lot, operations building, and administration office. The new construction will utilize conventional design and construction practices. H&K has determined that the site is suitable for the proposed construction, as long as our recommendations for earthwork grading and structural improvements are followed.

It is our opinion that the site is suitable for the proposed construction provided the geotechnical engineering recommendations presented in this report are incorporated into the earthwork and structural improvements. This report should not be relied upon without review by H&K if a period of 24 months elapses between the issuance report date shown above and the date when construction commences.

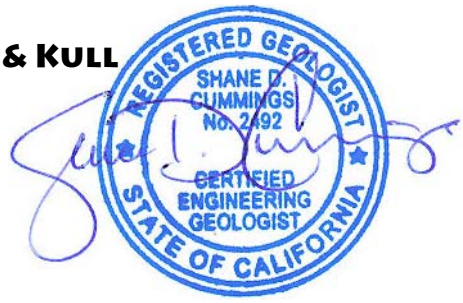
Our experience, and that of the civil engineering profession, clearly indicates that during the construction phase of a project the risks of costly design, construction, and maintenance problems can be significantly reduced by retaining the geotechnical engineering firm to review the project plans and specifications and to provide geotechnical engineering construction quality assurance (CQA) observation and testing services. Upon your request we will prepare a CQA geotechnical engineering services proposal that will present a work scope, tentative schedule, and fee estimate for your consideration and authorization.

If H&K is not retained to provide geotechnical engineering CQA services during the construction phase of the project, then H&K will not be responsible for geotechnical engineering CQA services provided by others nor any aspect of the project that fails to meet your or a third party's expectations in the future.

H&K appreciates the opportunity to provide geotechnical engineering services for this important project. If you have questions or need additional information, please do not hesitate to contact the undersigned at 530-894-2487.

Sincerely,

HOLDREGE & KULL



Shane D. Cummings, CEG 2492
Senior Engineering Geologist

Chuck R. Kull, G.E. 2359, CEG 1622
Principal Engineer

Copies To: Addressee (4 copies)

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1 INTRODUCTION

Holdrege & Kull (H&K) performed a geotechnical engineering investigation of the proposed Butte Regional Transit Operations Center (BRTOC) located at 326 Huss Drive in Chico, California consistent with the scope of services presented in our Geotechnical Engineering Investigation Proposal (PC11.077), dated December 27, 2011 and in general accordance with the 2010 California Building Code (CBC). A copy of the proposal, excluding the fee and contract sections, is included in Appendix A. Our findings, conclusions, and recommendations are presented herein.

For your review, Appendix B presents a document prepared by ASFE entitled *Important Information About Your Geotechnical Engineering Report.* This document summarizes project specific factors, limitations, content interpretation, responsibilities, and other pertinent information. Please read this document carefully.

1.1 SCOPE-OF-SERVICES

H&K performed a specific scope-of-services to develop geotechnical engineering design recommendations for earthwork and structural improvements. A brief description of each work scope task performed is presented below. A detailed description of each work scope task is presented in Section 2 (Site Investigation) of this report.

- **Task 1 Site Investigation:** H&K performed a site investigation to characterize the existing surface and subsurface soil, rock, and groundwater conditions encountered to the maximum depth excavated. H&K's field engineer/geologist made observations, collected representative soil samples, and performed field tests at a limited number of subsurface exploratory locations. H&K performed laboratory tests on selected soil samples to evaluate their geotechnical engineering material properties.
- **Task 2 Data Analysis and Engineering Design:** H&K evaluated the field and laboratory site data, proposed site improvements, and used this information to develop geotechnical engineering design recommendations for earthwork and structural improvements. Engineering judgment was used to extrapolate our observations and conclusions regarding the field and laboratory data to other areas located between and beyond the locations of our subsurface exploratory excavations.
- **Task 3 Report Preparation:** H&K prepared this report to present our findings, conclusions and recommendations.

1.2 SITE LOCATION AND DESCRIPTION

The proposed BRTOC site is located at 326 Huss Drive, in Chico, California, on a vacant unimproved lot north of the current B-line Transit Facility location. Our site investigation was performed on March 7 and 8, 2012 and at that time the property was flat with very little to no topographic relief and covered in native grasses and weeds. The surrounding property use includes developed industrial and commercial buildings and mixed agricultural plots. Figure 1 shows the site location and near vicinity.

1.3 PROPOSED IMPROVEMENTS

Although preliminary or final design and improvement plans were not available for review for preparation of this report, H&K was able to review the February 24, 2012 Site Concept G.2 to get an understanding of the proposed layout of each building and parking lot location. Based on our understanding of the project, H&K assumes that the construction of the BRTOC may consist of the following improvements: one story and two story buildings with steel column and/or wood framing, continuous spread and isolated foundations for the buildings, interior and exterior concrete slab-on-grade floors; drilled pier foundation for parking lot light poles, asphalt concrete (AC), permeable concrete, and rigid concrete paved roadway and parking lots, and landscaped areas. Figure 2 is a site sketch showing the site layout and proposed locations of the new buildings and improvements.

Earthwork grading may include general site preparation and minor cuts and fills required to balance the site to meet the proposed building and improvement grades.

1.4 INVESTIGATION PURPOSE

The purpose of our investigation is to obtain sufficient on-site information about the soil, rock, and groundwater conditions at the site to allow us to prepare a geotechnical engineering recommendations for construction of the proposed earthwork and structural improvements described in the preceding. H&K did not evaluate the site for the presence of hazardous waste, mold, asbestos, and radon gas. Therefore, the presence, removal, or mitigation of these hazardous materials are not discussed in this report.

2 SITE INVESTIGATION

H&K performed a site investigation to characterize the existing subsurface conditions beneath the proposed transit center to develop geotechnical engineering recommendations for earthwork and structural improvements. Each component of our site investigation is presented below.

2.1 LITERATURE REVIEW

H&K performed a limited review of available literature that was pertinent to the project site. The following summarizes our findings.

2.1.1 Site Improvement Plan Review

The preliminary and final site improvement plans were not available for review at the time this report was prepared. H&K was able to review a Site Concept G.2 plan (February 24, 2012) showing the proposed buildings and parking lot locations. The site concept plan was used to locate our exploratory borings during the site investigation. Prior to implementing grading and site improvements, H&K should be allowed to review the final plans to determine whether our recommendations have been implemented, and if necessary, to provide additional and/or modified recommendations.

2.1.2 Geologic Setting and Regional Faulting

The geology of the Chico and BRTOC area is comprised of Modesto Formation alluvium and fluvial sediments deposited during the Pleistocene Epoch (1.5 Million Years to 11,000 before present). According to the *Geologic Map of the Chico Monocline and Northeastern Part of the Sacramento Valley, California* (Harwood, et al. 1981) the alluvium fluvial sediments are composed of gravel, sand, silt and clay derived from the Tuscan Formation.

Regional faulting is associated with the northern extent of the Foothill Fault System which includes the Chico Monocline, Cohasset Ridge Fault, Paradise Fault, Magalia Fault, and the Cleveland Hill Fault. The Foothill Fault System is a broad zone of northwest trending east dipping normal faults formed along the margin of the Great Valley and the Sierra Nevada geologic provinces on the western flank of the Sierra Nevada and southern Cascade mountain ranges. The northern part of the fault zone is split in three branches: the Melones fault zone to the east, the Cleveland Hill fault to the south, and Chico Monocline to the north and northeast. The Based on review of the California Geological Survey Open File Report 96-08, *Probabilistic Seismic Hazard Assessment for the State of California*, and the 2002 update entitled *California Fault Parameters* no known active or inactive faults traces have been identified on site or adjacent to the project site. The closest fault identified on the Geologic Map of the Chico Quadrangle, published by the California Division of Mines and Geology, is the Chico Monocline Fault is located approximately 5 miles east of

the project site. The fault is identified as a major tectonic boundary with late Cenozoic displacement responsible for the formation of the Chico monocline. The fault is listed as Quaternary age and may have experienced anomalous aftershocks soon after the 1975 Oroville earthquake (Harwood and Helley, 1987).

According to the *Fault Activity Map of California and Adjacent Areas* (Jennings, 1994), the closest known active fault which has surface displacement within Holocene time (about the last 11,000 years) is the Cleveland Hill Fault. The Cleveland Hill Fault is located approximately 25 miles south of the subject site and is associated with ground rupture during the Oroville earthquakes of 1975.

2.2 FIELD INVESTIGATION

H&K performed a field investigation of the site on March 7 and 8, 2012. H&K's Field Engineer/Geologist described the surface and subsurface soil, rock, and groundwater conditions observed at the site using the procedures cited in the American Society for Testing and Materials (ASTM), Volume 04.08,*"Soil and Rock; Dimension Stone; and Geosynthetics"* as general guidelines for our field and laboratory procedures. The Field Engineer/Geologist described the soil color using the general guideline procedures presented in the Munsel Soil Color Chart. Engineering judgment was used to extrapolate the observed surface and subsurface soil, rock, and groundwater conditions to areas located between and beyond our subsurface exploratory locations. The surface, subsurface, and groundwater conditions observed during our field investigation are summarized below.

2.2.1 Surface Conditions

H&K observed the following surface conditions during our field investigation of the property. Figure 2 shows the project site boundaries and our subsurface exploration locations. The site has flat lying (≤ 1 degree slope angle) improved surfaces consisting of native grass. There were no surface conditions of concern identified during our site investigation.

2.2.2 Subsurface Conditions

The subsurface soil, rock and groundwater conditions were investigated by drilling exploratory borings at the site. The subsurface information obtained from these investigation methods are described herein.

2.2.2.1 Exploratory Boring Information

H&K provided engineering oversight for the advancement of 6 exploratory soil borings at the project site with a truck mounted CME 75 drill rig equipped with 7.25-inch outside diameter solid stem augers. Figure 2 shows the approximate locations of the subsurface exploratory excavations. The borings were advanced to depths ranging from 16 feet to 19.5 feet below ground surface (bgs) where refusal in very dense, gravel and cobbles occurred. Engineering judgment was used to extrapolate

the observed soil, rock, and groundwater conditions to areas located between and beyond our subsurface exploratory excavations.

H&K's Field Engineer/Geologist logged each exploratory boring using the Unified Soils Classification System (USCS) as guidelines for soil descriptions and the American Geophysical Union guidelines for rock descriptions. Representative relatively undisturbed soil samples were generally collected from the following depth intervals: 2.5-feet, 5-feet, 10-feet, and 15-feet bgs. Relatively undisturbed soil samples were collected with a 2.5-inch inside-diameter split-spoon sampler equipped with steel liner sample tubes and an unlined standard penetration test (SPT) split barrel sampler. The samplers were driven into the soil using a 140-pound automatic trip hammer with a 30-inch free fall. The steel liner tube samples were sealed with end-caps, labeled and transported to our soil laboratory facility.

A representative disturbed bulk soil sample was also collected from the upper five feet of boring B12-3. The bulk soil sample was placed in a plastic sack, labeled and transport to our soil laboratory facility. Selected soil samples were tested in our laboratory to determine their engineering material properties which included: natural moisture content, density, particle size gradation, plasticity, resistance value, unconfined shear strength, cohesion, and volume change potential. These soils engineering material properties are used to develop geotechnical engineering recommendations for: foundation, concrete slab-on-grade floors, continuous spread and isolated foundation footings, and asphalt concrete pavement design.

Detailed descriptions of the soil, rock, and groundwater conditions that were encountered in each subsurface exploratory location are presented on the exploratory boring logs included in Appendix C. The soil and rock descriptions are based on visual field estimates of the particle size percentages (by dry weight), color, relative density or consistency, moisture content, and cementation that comprise each soil material encountered.

A generalized profile of the soil, rock, and groundwater conditions encountered to the maximum depth drilled (19.5 feet) for the proposed BRTOC area is presented below. The soil and/or rock units encountered in our subsurface exploratory excavations were generally stratigraphically continuous across the site; however, the units may slightly vary in thickness. The units encountered in general stratigraphic sequence during our subsurface investigation of the site are described below.

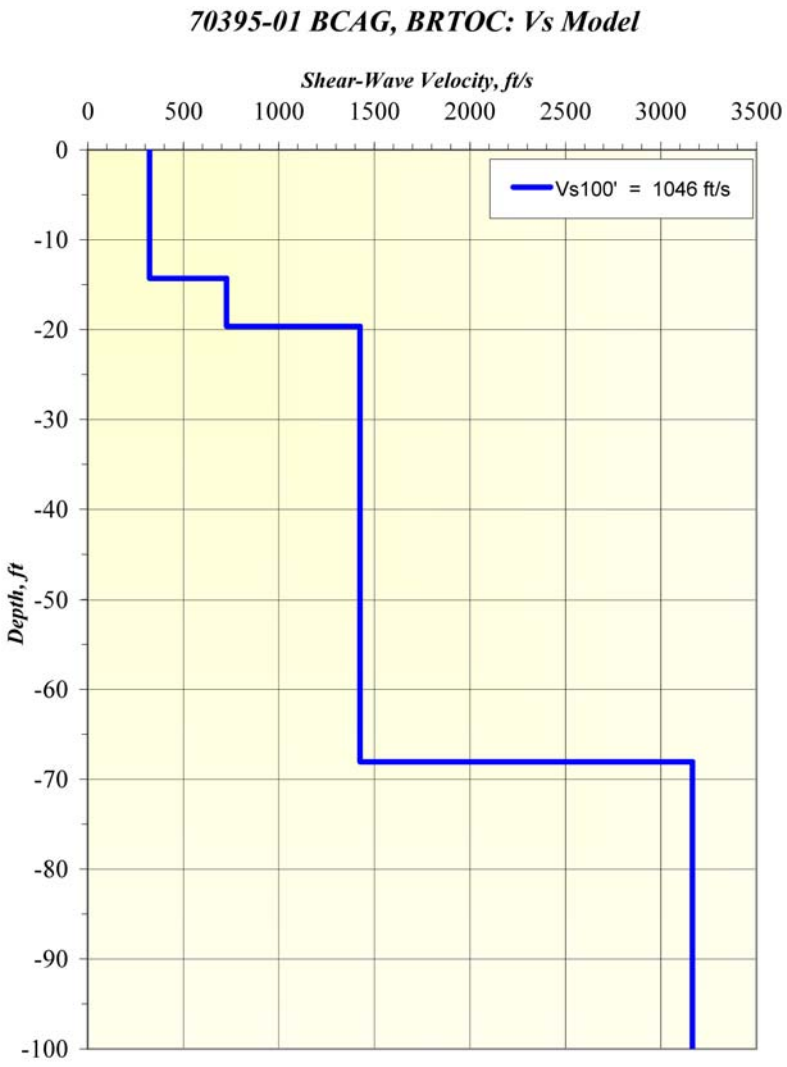
- **CL, Low Plasticity Clay Soil:** This soil consists of the following field estimated particle size percentages 65 percent low plasticity silt and clay size particles and 30 percent very fine to fine sand. This soil is predominantly dark brown with a Munsel Color Chart designation of (7.5YR 3/4). This soil was stiff and damp at the time of our subsurface investigation.
- **SM, Silty Sand Soil:** This soil consists of the following field estimated particle size percentages 60 percent very fine sand and 40 percent low plasticity fines.

This soil is predominantly brown with a Munsel Color Chart designation of (7.5YR 5/4). This soil was medium dense and dry to damp,a nd slightly cemented at the time of our subsurface investigation.

- **GM, Silty Gravel Soil:** This soil consists of the following field estimated particle size percentages 40 percent coarse gravel with cobbles, 30 percent fine to medium sand, and 30 percent low plasticity clay and silt size particles. This soil is predominantly brown with a Munsel Color Chart designation of (7.5YR 5/4). This soil was dense to very dense and dry at the time of our subsurface investigation.

2.2.2.2 Seismic Refraction Survey

H&K performed a seismic refraction microtremor survey at the BRTOC site using the SeisOpt® ReMi™ Vs30 method to determine the in-situ shear-wave (S-wave) velocity profile of the first 100-feet of soil beneath the site. H&K is using this ReMi™ Vs30 evaluation as additional support for our Site Class determination.



Based on the known subsurface geologic conditions at the BRTOC this evaluation was selected to determine the 2010 California Building Code (CBC) Site Class in accordance with Chapter 16, Section 1613.5.2. The seismic refraction survey was performed at the surface using conventional seismograph and vertical P-wave geophones used for refraction surveys. The seismic source consists of ambient seismic microtremors which were constantly being generated by cultural and natural noise in the area. H&K recorded the seismic vibrations generated by the drill rig, vehicle traffic along Huss Drive and Hagan Lane, and industrial operations in the area during the site investigation. The data was collected during a series of 25 recording periods that were each 30 seconds in duration. The Vs Model (depicted on this page) shows the subsurface shear-wave velocity profile that was developed for the site from the SeisOpt® ReMi™ data.

The resulting subsurface shear wave model for the site indicates that the harmonic mean seismic shear wave velocity for the upper 100 feet of the subsurface was 1,046 feet per second. This weighted shear wave velocity corresponds to the upper range of Site Class D, as described in Table 1613.5.2 of the 2010 CBC.

2.2.2.3 Groundwater Conditions

Groundwater not was encountered in the exploratory borings drilled at the site. Seasonal fluctuations in the local groundwater table at the project site and vicinity are unknown at this time; however it is generally understood that the groundwater table elevation is highest at the end of the winter rainy season and lowest at the end of the summer dry season. Therefore, H&K does not expect the construction activities to encountered shallow groundwater. Seasonal infiltration water may be encountered during the winter months in deep trenches.

3 LABORATORY TESTING

H&K performed laboratory tests on selected soil samples taken from the subsurface exploratory excavations to determine their engineering material properties. These engineering material properties were used to develop geotechnical engineering design recommendations for earthwork and structural improvements. The following laboratory tests were performed using the cited American Society for Testing and Materials (ASTM) and Caltrans Test Method (CTM) guideline procedures:

- ASTM D422 Particle Size Gradation (Sieve Only, Hydrometer Only or Both)
- ASTM D2266 Unconfined Compression
- ASTM D2216 Moisture Content
- ASTM D2844 Resistance (R) Value Test (CTM 301)
- ASTM D2937 Dry Density
- ASTM D3080 Direct Shear Test
- ASTM D4318 Atterberg Plasticity Indices
- ASTM D4829 Expansion Index (UBC Expansion Index)

Table 3-1 presents a summary of the laboratory test results. Appendix D presents the laboratory test data sheets.

Table 3-1. Laboratory Test Results

			Results											
ASTM Test Method			D2487 D2488	D2216	D2937	D422		D4318(1)		D4829(1)	D2844	D2166	D3080(2)	
Boring No.	Sample No.	Sample Depth (feet)	USCS (sym)	Moisture Content (%)	Dry Density (pcf)	Passing No. 4 (%)	Passing No. 200 (%)	Plasticity Index (%)	Liquid Limit (%)	Expansion Index (dim)	R-Value (dim)	Unconfined Shear Strength (psf)	Cohesion (psf)	Friction Angle (degree)
B12-3	030812A	0-5	CL			99.9	72.7	14	34	29	6			
B12-2	L1-1/1	2.5	CL										668 (P) 605 (R)	34.9 (P) 35.5 (R)
B12-2	L1-1/2	5	CL	16.4	92.5							2,835		
B12-2	L3-1/2	10	SM	26.6	91.4									
B12-1	L1-2/2	5	CL	17.6	88.7									
B12-1	L2-1/1	10	SM	9.9	107.5									

Notes:
(1) Corrected to 50% saturation.
(2) P indicates peak shear strength values and R indicates residual shear strength values.

ASTM = American Society for Testing and Materials
dim = dimensionless units
No. = number
pcf = pounds per cubic foot
psf = pounds per square foot
sym = symbol
% = percent

4 SEISMIC HAZARDS

To meet the requirements of the 2010 building code, the following seismic hazards evaluation was performed.

4.1.1 Liquefaction

Our determination of the potential for liquefaction occurring at this site is based on our subsurface exploratory boring SPT blow count and field data, probabilistic seismic expected ground acceleration analysis and literature review. Based on this information, H&K believes that the site soil and groundwater conditions make the probability of liquefaction occurring during a nearby earthquake to be very low.

Soil liquefaction results when the shear strength of a saturated soil decreases to zero during cyclic loading that is generally caused by machine vibrations or earthquake shaking. Generally, clean, loose, uniformly graded sand and loose, silty sand soils that are saturated are the most prone to undergo liquefaction; however, gravelly soil, and some clay-rich soil may be prone to liquefaction under certain conditions. The onsite soil is primarily composed of stiff to very stiff, dry to damp, cohesive soil and medium dense to very dense, damp, granular soil. During our site investigation shallow groundwater was not encountered within our exploratory borings advanced up to 19.5 feet bgs. The subsurface shear-wave velocities measured below 19.5 feet bgs exceed 1,400 feet/second. H&K evaluated the shear-wave velocity data and used the methods described in their paper *Liquefaction Resistance of Soils from Shear-Wave Velocity*, in the Journal of Geotechnical and Geoenvironmental Engineering, November 2000, by Andrus and Stokoe. The limiting upper value of the shear-wave velocity in gravelly soils was determined to be approximately 656 ft/s (200 m/s) for Holocene soils, such as sands and gravels (Andus & Stokoe, 2000). The site soil conditions make the probability of liquefaction occurring during the Maximum Creditable Earthquake to be very low for the proposed structural foot-print area.

We expect any seismically induced settlement of saturated and partially saturated soils at this site to be less than 1-inch with less than ½-inch differential settlement across the building pad.

5 CONCLUSIONS

The conclusions presented below are based on information developed from our field and laboratory investigations.

1. It is our opinion that the site is suitable for the proposed construction improvements provided that the geotechnical engineering design recommendations presented in this report are incorporated into the earthwork and structural improvement project plans.
2. Prior to construction, H&K should be allowed to review the proposed final earthwork grading plan and structural improvement plans to determine if our geotechnical engineering recommendations are applicable or need modifications.
3. Based on the site geology, the observations of our exploratory borings, and the SeisOpt ReMi Vs30 shear-wave profile analysis, the site soil profile can be modeled, according to the 2010 CBC, Chapter 16, Table 1613.5.2, and Section 1613.5.2, as a Site Class D (Stiff Soil Profile) designation for the purposes of establishing seismic design loads for the proposed improvements.
4. Based on our literature review and knowledge of the geology in the Chico area, no active or potentially active faults are known to underlie the BRTOC site.
5. Based on the subsurface exploratory boring SPT blow counts, field data, and literature review, H&K believes that the site soil and groundwater conditions makes the probability of liquefaction occurring during a nearby earthquake to be extremely low.
6. At the time of our investigation the site consisted of flat lying unimproved surface (grass and a few trees). The surrounding land use is mixed commercial and industrial.
7. The soil conditions observed to a maximum depth of 19.5 feet below the existing ground surface in our subsurface exploratory excavations generally consisted of (described relative to the existing ground surface): approximately 0 to 9-feet of dark brown, stiff to very stiff, damp, sandy clay (CL), underlain by up to 5 feet of dark brown, medium dense, damp silty sand (SM), underlain by brown, medium dense to very dense, moist to wet, silty gravel (GM). Based on the seismic refraction survey (ReMi) performed on the site, the estimated the total depth of the silty gravel (GM) unit is approximately 45 to 50 feet thick and is underlain by the Tuscan Formation measured at a depth of approximately 68 feet bgs.
8. Our field and laboratory test data indicates that the low plasticity sandy clay (CL) soil unit encountered beneath the site has the following general geotechnical engineering properties: stiff, moderate bearing capacity, a low expansion potential (volume change), and a low resistance (R) value .
9. At the time of our subsurface site investigation, no groundwater was encountered within our exploratory borings drilled to a depth of 19.5 feet bgs.

6 RECOMMENDATIONS

H&K developed geotechnical engineering design recommendations for earthwork and structural improvements from our field and laboratory investigation data. Our recommendations are presented hereafter.

6.1 EARTHWORK GRADING

Our earthwork grading recommendations include: clearing and grubbing, native soil preparation, fill construction, cut-fill transitions, fill slope grading, cut slope grading, erosion controls, underground utility trenches, construction de-dewatering, soil corrosion potential, subsurface drainage, surface water drainage, review of construction plans, and construction quality assurance/quality control (QA/QC) monitoring. Our earthwork grading recommendations are presented below.

6.1.1 Import Fill Soil

Import fill soil should meet the geotechnical engineering material properties described in Section 6.1.5.1 (Engineered Fill Construction With Non-Expansive Soil) of this report. Prior to importation to the site, the project geotechnical engineer should approve all proposed imported fill soil for use in constructing engineered fills at the site.

6.1.2 Temporary Excavations

All temporary excavations must comply with applicable local, state and federal safety regulations, including the current Occupational Safety and Hazards Administration (OSHA) excavation and trench safety standards. Construction site safety is the responsibility of the contractor, who is solely responsible for the means, methods, and sequencing of construction operations. Under no circumstances should the findings, conclusions and recommendations presented herein be inferred to mean that H&K is assuming any responsibility for temporary excavations, or for the design, installation, maintenance, and performance of any temporary shoring, bracing, underpinning or other similar systems. H&K could provide temporary cut slope gradients, if required.

6.1.3 Stripping and Grubbing

The site should be stripped and grubbed of vegetation and other deleterious materials as described below.

1. Strip and remove the top 2 to 4 inches of soil containing shallow vegetation roots and other deleterious materials. This highly organic topsoil can be stockpiled on-site and used for surface landscaping, but should not be used for constructing compacted engineered fills. Grub the underlying 6 to 8 inches of soil to remove any large vegetation roots or other deleterious material while leaving the soil in place. The project geotechnical engineer or his/her representative should

approve the use of any soil materials generated from the clearing and grubbing activities.

2. Remove all large shrub and tree roots and tree stumps. Excavate the remaining cavities or holes to a sufficient width so that an approved backfill soil can be placed and compacted in the cavity or holes. Sufficient backfill soil should be placed and compacted in order to match the surrounding elevations and grades. The project geotechnical engineer or his/her representative should observe and approve the preparation of the cavities and holes prior to placing and compacting engineered fill soil in the cavities and holes.
3. Remove all rocks greater than 3 inches in greatest dimension from the top 12 inches of the soil. Rocks with a greatest dimension larger than 6 inches will be referred to in this report as "over sized" rock materials. Over sized rock materials can be stockpiled on-site and used to construct engineered fills; however they must be placed at or near the bottom of deep fills but not shallower than 3 feet from the finished subgrade surface. The oversized rock should be placed with enough space between them to avoid clustering and the creation of void space. The project engineer or his/her representative should approve the use and placement of all over sized rock materials prior to constructing compacted engineered fills.
4. Excessively large amounts of vegetation, other deleterious materials, and over sized rock materials should be removed from the site.

6.1.4 Native Soil Preparation For Engineered Fill Placement

After completing site clearing and grubbing activities, the exposed native soil should be prepared for placement and compaction of engineered fills as described below.

1. The native soil should be scarified to a minimum depth of 8 inches below the existing land surface or cleared and grubbed surface and then uniformly moisture conditioned. If the soil is classified as a coarse-grained soil by the USCS (i.e., GP, GW, GC, GM, SP, SW, SC or SM) then it should be moisture conditioned to within $\pm$ 3 percentage points of the ASTM D1557 optimum moisture content. If the soil is classified as a fine-grained soil by the USCS (i.e., CL, ML) then it should be moisture conditioned between 2 to 4 percentage points greater than the ASTM D1557 optimum moisture content.
2. The native soil should then be compacted to achieve a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry unit weight (density). The moisture content, density, and relative percent compaction should be tested by the project engineer or the project engineer's field representative to evaluate whether the compacted soil meets or exceeds this minimum percent compaction and moisture content requirements. The earthwork contractor shall assist the project engineer or the project engineer's field representative by excavating test pads with the on-site earth moving equipment. Native soil preparation beneath concrete slab-on-grade structures (i.e., floors, sidewalks, patios, etc.), asphalt

concrete (AC) pavement should be prepared as specified in Section 6.2 (Structural Improvements).

3. The prepared native soil surface should be proof rolled with a fully loaded 4,000 gallon capacity water truck with the rear of the truck supported on a double-axel, tandem-wheel, undercarriage or approved equivalent. The proof rolled surface should be visually observed by the project engineer or the project engineer's field representative to be firm, competent and relatively unyielding. The project engineer or the project engineer's field representative may also evaluate the surface material by hand probing with a ¼-inch-diameter steel probe; however, this evaluation method should not be performed in place of proof rolling as described in the preceding.
4. Construction quality assurance (CQA) tests should be performed using the minimum testing frequencies presented in Table 6.1.4-1 or as modified by the project engineer to better suit the site conditions.

Table 6.1.4-1. Minimum Testing Frequencies

ASTM Number	Test Description	Minimum Test Frequency(1)
D1557	Modified Proctor Compaction Curve	1 per 40,000 sf Or Material Change (2)
D2922	Nuclear Moisture Content	1 per 5,000 sf
D3017	Nuclear Density	1 per 5,000 sf

Notes:
(1) These are minimum testing frequencies that may be increased or decreased at the project engineer's discretion on the basis of the site conditions encountered during grading.
(2) Whichever criteria provide the greatest number of tests.

ASTM = American Society for Testing and Materials
sf = square feet

5. The native soil surface should be graded to minimize ponding of water and to drain surface water away from the building foundations and associated structures. Where possible surface water should be collected, conveyed, and discharged into natural drainage courses, storm sewer inlet structures, permanent engineered storm water runoff percolation/evaporation basins, or engineered infiltration subdrain systems.

6.1.5 Engineered Fill Construction With Testable Earth Materials

Engineered fills are constructed to support structural improvements. Engineered fills should be constructed using non-expansive soil as described in Section 6.1.5.1. If possible, the use of expansive soil for constructing engineered fills should be avoided. If the use of expansive soil cannot be avoided then engineered fills should be constructed as described in Section 6.1.5.2 or as modified by the project engineer. If soil is to be imported to the site for constructing engineered fills, then H&K should be allowed to evaluate the suitability of the borrow soil source by taking representative soil samples for laboratory testing. Testable earth materials are generally considered to be soils with gravel and larger particle sizes retained on the

No. 4 mesh sieve that make up less than 30 percent by dry weight of the total mass. The relative percent compaction of testable earth materials can readily be determined by the following ASTM test procedures: laboratory compaction curve (D1557), field density (D2922) and field moisture content (D3017). Construction of engineered fills with non-expansive and expansive testable earth materials are described below.

6.1.5.1 Engineered Fill Construction With Non-Expansive Soil

Construction of engineered fills with non-expansive soil should be performed as described below.

1. Non-expansive soil used to construct engineered fills should consist predominantly of materials less than 1/2 inch in greatest dimension and should not contain rocks greater than 3 inches in greatest dimension (over sized material). Non-expansive soil should have a plasticity index (PI) of less than or equal to PI ≤ 15 as determined by ASTM D4318 Atterberg Indices test. Over sized materials should be spread apart to prevent clustering so that void spaces are not created. The project engineer or project engineer's field representative should approve the use of over sized materials for constructing engineered fills.
2. Non-expansive soil used to construct engineered fills should be uniformly moisture conditioned. If the soil is classified by the USCS as coarse grained (i.e., GP, GW, GC, GM, SP, SW, SC or SM), then it should be moisture conditioned to within ± 3 percentage points of the ASTM D1557 optimum moisture content. If the soil is classified by the USCS as fine grained (i.e., CL, ML), then it should be moisture conditioned to between 2 to 4 percentage points greater than the ASTM D1557 optimum moisture content.
3. Engineered fills should be constructed by placing uniformly moisture-conditioned soil in maximum 8-inch-thick loose lifts (layers) prior to compacting.
4. The soil should then be compacted to achieve a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry density.
5. The field and laboratory CQA tests should be performed consistent with the testing frequencies presented in Table 6.1.5.1-1 or as modified by the project engineer to better suit the site conditions.

Table 6.1.5.1-1 Minimum Testing Frequencies For Non-Expansive Soil

ASTM Number	Test Description	Minimum Test Frequency(1)
D1557	Modified Proctor Compaction Curve	1 per 1,500 cy Or Material Change (2)
D2922	Nuclear Moisture Content	1 per 250 cy
D3017	Nuclear Density	1 per 250 cy

Notes:
(1) These are minimum testing frequencies that may be increased or decreased at the project engineer's discretion on the basis of the site conditions encountered during grading.
(2) Whichever criteria provide the greatest number of tests.

cy = cubic yards

6. The moisture content, density, and relative percent compaction of all engineered fills should be tested by the project engineer's field representative during construction to evaluate whether the compacted soil meets or exceeds the minimum compaction and moisture content requirements. The earthwork contractor shall assist the project engineer's field representative by excavating test pads with the on-site earth moving equipment.
7. The prepared finished grade or finished subgrade soil surface should be proof rolled as mentioned above in Section 6.1.4, Paragraph 3.

6.1.5.2 Engineered Fill Construction With Expansive Soil

H&K did not observe moderately or highly expansive soil at the site during our subsurface investigation. If moderately or highly expansive soils are encountered during grading of the site and if the property owner desires to use expansive soil to construct engineered fills, then H&K should be notified to prepare recommendation options for constructing fills with potentially expansive soil.

6.1.6 Engineered Fill Construction With Non-Testable Earth Materials

The subsurface conditions beneath the site consisted of sandy clay (CL) soil. H&K anticipates that the majority of grading on site will not encounter cobbles during construction. However, if soil is encountered that meets the requirement of non-testable earth materials, and if these materials are used to construct engineered aerial fills and/or engineered utility trench backfills, then a performance (procedural) based CQA method shall be used to evaluate the compaction work performed by the earthwork contractor. If this occurs, H&K should be notified to prepare recommendation options for constructing fills with non-testable earth materials (i.e. cobbles).

6.1.7 Cut-Fill Transitions

H&K has not reviewed the final grading plan; however, we don't anticipate that site conditions during construction will generate a cut-fill transition with fills greater than 3 feet thick. If this condition does occur, H&K will provide additional

recommendations to properly construct the fill pad beneath the building location so that a cut-fill transition is not constructed that my be subject to differential settlement in the future.

6.1.8 Cut and Fill Slope Grading

We don't anticipate that grading of cut and fill slopes will be greater than 3 feet at the site. In general, both cut and fill slopes should be graded at a maximum slope gradient of 2H:1V (horizontal to vertical slope ratio). Surface water should not be allowed to flow over the cut and fill slopes graded at the site.

6.1.9 Erosion Controls

Erosion controls should be installed as described below.

1. Erosion controls should be installed on all cut and fill slopes to minimize erosion caused by surface water run off.
2. Install on all slopes either an appropriate hydroseed mixture compatible with the soil and climate conditions of the site as determined by the local U.S. Soil Conservation District or apply an appropriate manufactured erosion control mat.
3. Install surface water drainage ditches at the top of cut and fill slopes, (as necessary) to collect and convey both sheet flow and concentrated flow away from the slope face.
4. The intercepted surface water should be discharged into natural drainage course or into other collection and disposal structures.

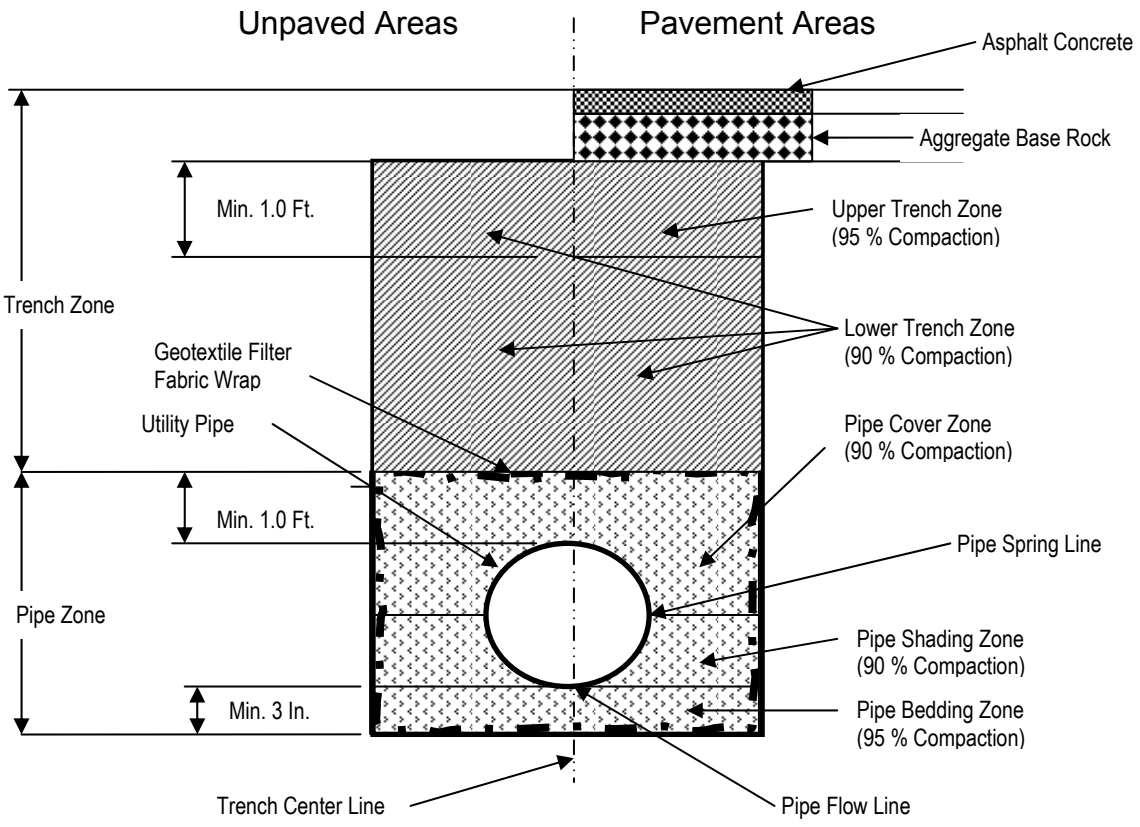
6.1.10 Underground Utility Trenches

Underground utility trenches should be excavated and backfilled as described below for each trench zone as shown in the figure below.

1. **Trench Excavation Equipment:** H&K anticipate that the contractor will be able to excavate all shallow underground utility trenches with a Case 580 Backhoe or equivalent, however, deeper utility trenches (10-feet or greater) may require larger equipment.
2. **Trench Shoring:** All utility trenches that are excavated deeper than 4 feet below the surrounding ground surface are required by the California Occupational Safety and Health Administration (OSHA) to be shored with bracing equipment or sloped back to an appropriate slope gradient prior to being entered by any individuals.
3. **Trench Dewatering:** H&K does not anticipate that the proposed underground utility trenches will encounter shallow groundwater. However, if the utility trenches are excavated during the winter rainy season, then shallow or perched groundwater may be encountered. The earthwork contractor may need to employ de-watering methods as discussed in Section 6.1.11 in order to excavate, place and compact the trench backfill materials.

4. **Pipe Zone Backfill Type and Compaction Requirements:** The backfill material type and compaction requirements for the pipe zone which includes the bedding zone, shading zone and cover zone as shown in the Figure 6.1.11-1 are described below.

FIGURE 6.1.11-1. TYPICAL TRENCH BACKFILL



- **Pipe Zone Backfill Material Type:** Trench backfill used within the pipe zone which includes the bedding zone, shading zone and cover zone should consist of ¾-inch minus, washed, and crushed rock. The crushed rock particle size gradation should meet the following requirements (percents are expressed as dry weights using ASTM D422 test method): 100 percent passing the 1.0 inch sieve, 80 to 100 percent passing the 3/4 inch sieve, 60 to 100 percent passing the 3/8 inch sieve, 0 to 30 percent passing the No. 4 sieve, 0 to 10 percent passing the No. 8 sieve, and 0 to 3 percent passing the No. 200 sieve.

  If groundwater is encountered within the trench during construction or if it is expected to rise during the rainy season due to the intended use as a storm

water infiltration trench to a elevation that will infiltrate the pipe zone within the trench, then the pipe zone material should be wrapped with a minimum 6 ounce per square yard, non-woven, geotextile filter fabric such as Amoco 4506 manufactured by Amoco Fabrics and Fibers Company or equivalent should be used. The geotextile seam should be located along the trench centerline and have a minimum 1-foot overlap. If the utility pipes are coated with a corrosion protection material, then the pipes should be wrapped with a minimum 6 ounce per square yard, non-woven, geotextile cushion fabric such as Amoco 4506 manufactured by Amoco Fabrics and Fibers Company or equivalent should be used. The geotextile cushion fabric should have a minimum 6-inch seam overlap. The geotextile cushion fabric will protect the pipe from being scratched by the crushed rock backfill material.

- **Pipe Bedding Zone Compaction:** Trench backfill soil placed in the pipe bedding zone (beneath the utilities) should be a minimum 3-inches thick, moisture conditioned to within $\pm$ 3 percentage points of the ASTM D1557 optimum moisture content and compacted to achieve a minimum relative compaction of 95 percent of the ASTM D1557 maximum dry density.
- **Pipe Shading Zone Compaction:** Trench backfill soil placed within the pipe-shading zone (above the bedding zone and to a height of one pipe radius length above the pipe spring line) should be moisture conditioned to within $\pm$ 3 percentage points of the ASTM D1557 optimum moisture content and compacted to achieve a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry density. The pipe shading zone backfill material should be **shovel sliced** to remove voids and to promote compaction.
- **Pipe Cover Zone Compaction:** Trench backfill soil placed within the pipe cover zone (above the pipe shading zone to one foot over the pipe top surface) should be moisture conditioned to within $\pm$ 3 percentage points of the ASTM D1557 optimum moisture content and compacted to achieve a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry density.

5. **Trench Zone Backfill And Compaction Requirements:** The trench zone backfill materials consists of both lower and upper zones as discussed below.
   - **Trench Zone Backfill Material Type:** Soil used as trench backfill within the lower and upper intermediate zones as shown on the preceding figure should consist of non-expansive soil with a plasticity index (PI) of less than or equal to PI $\leq$ 15 (based on ASTM D4318) and should not contain rocks greater than 3 inches in greatest dimension.
   - **Lower Trench Zone Compaction:** Soil used to construct the lower trench zone backfills should be uniformly moisture conditioned to within 0 to 4 percentage points of the ASTM D1557 optimum moisture content, placed in maximum 12-inch-thick loose lifts (layers) prior to compacting and compacted

to achieve a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry density.

- **Upper Trench Zone Compaction (Road And Parking Lot Areas):** Soil used to construct the upper trench zone backfills should be uniformly moisture conditioned to within 0 to 4 percentage points greater than the ASTM D1557 optimum moisture content, placed in maximum 8-inch-thick loose lifts (layers) prior to compacting and compacted to achieve a minimum relative compaction of 95 percent of the ASTM D1557 maximum dry density.
- **Upper Trench Zone Compaction (Non-Road And Non Parking Lot Areas):** Soil used to construct the upper trench zone backfills should be uniformly moisture conditioned to within 0 to 2 percentage points greater than the ASTM D1557 optimum moisture content, placed in maximum 6-inch-thick loose lifts (layers) prior to compacting and compacted to achieve a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry density.

6. **CQA Testing And Observation Engineering Services:** The moisture content, dry density, and relative percent compaction of all engineered utility trench backfills should be tested by project engineer's field representative during construction to evaluate whether the compacted trench backfill material meet or exceed the minimum compaction and moisture content requirements presented in this report. The earthwork contractor shall assist the project engineer's field representative by excavating test pads with the on-site earth moving equipment.

   - **Compaction Testing Frequencies:** The field and laboratory CQA tests should be performed consistent with the testing frequencies presented in Table 6.1.10-1 or as modified by the project engineer to better suit the site conditions.

Table 6.1.10-1. Minimum Testing Frequencies For Utility Trench Backfill

ASTM Number	Test Description	Minimum Test Frequency(1)
D1557	Modified Proctor Compaction Curve	1 per 500 cy Or Material Change (2)
D2922	Nuclear Moisture Content	1 per 100 lf per 24-Inch-Thick Compacted Backfill Layer (3) The maximum loose lift thickness shall not exceed 12-inches prior to compacting.
D3017	Nuclear Density	1 per 100 lf per 24-Inch-Thick Compacted Backfill Layer (3) The maximum loose lift thickness shall not exceed 12-inches prior to compacting.

Notes:
(1) These are minimum testing frequencies that may be increased or decreased at the project engineer's discretion on the basis of the site conditions encountered during grading.
(2) Whichever criteria provide the greatest number of tests
cy = cubic yards
lf = linear feet

- **Final Proof Rolling:** The prepared finished grade aggregate base (AB) rock surface and/or finished subgrade soil surface of utility trench backfills should be proof rolled as mentioned above in section 6.1.4, Paragraph 3.

6.1.11 Construction De-watering

H&K does not anticipate the need to perform de-watering of the site during earthwork grading. However, the earthwork contractor should be prepared to de-water the utility trench excavations and any other excavations if perched water or the groundwater table are encountered during grading. The following recommendations are preliminary and are not based on performing a groundwater flow analysis. A detailed de-watering analysis was not a part of our proposed work scope. It should be understood that it is the earthwork contractor's sole responsibility to select and employ a satisfactory de-watering method for each excavation.

1. H&K anticipates that de-watering of utility trenches can be performed by constructing sumps to depths below the trench bottom and removing the water with sump pumps.
2. Additional sump excavations and pumps should be added as necessary to keep the excavation bottom free of standing water and relatively dry when placing and compacting the trench backfill materials.
3. If groundwater enters the trench faster than it can be removed by the de-watering system thereby allowing the underlying compacted soil to become unstable while compacting successive soil lifts, then it may be necessary to remove the unstable soil and replace it with free draining, granular drain rock. Native backfill soil can again be used after placing the granular rock to an elevation that is higher than the groundwater table.
4. If granular rock is used it should be wrapped in a non-woven geotextile fabric such as Amoco 4506 manufactured by Amoco Fabrics and Fibers Company or equivalent should be used. The geotextile filter fabric should have minimum 1-foot overlap seems. The granular rock should meet or exceed the following gradation specifications (all percents are expressed as dry weights using ASTM D422 test method): 100 percent passing the 3/4 inch sieve, 80 to 100 percent passing the ½ inch sieve, 60 to 100 percent passing the 3/8 inch sieve, 0 to 30 percent passing the No. 4 sieve, 0 to 10 percent passing the No. 8 sieve, and 0 to 3 percent passing the No. 200 sieve.
5. H&K recommends that the utility trench excavations be performed as late in the summer months as possible to allow the groundwater table to reach its' lowest seasonal elevation.

6.1.12 Soil Corrosion Potential

The selected materials used for constructing underground utilities should be evaluated by a corrosion engineer for compatibility with the onsite soil and groundwater conditions. H&K did not perform a corrosion potential evaluation of the onsite soil and groundwater as part of our scope-of-services. In general, corrosive or

reactive soils, such as soils with high sulfate and chloride concentrations or pH below 5.5 are not common in the Chico area.

6.1.13 Subsurface Groundwater Drainage

H&K does not anticipate encountering prolonged perched groundwater or a shallow local groundwater table during the wet weather season construction. If groundwater is encountered during grading, then H&K should be allowed to observe the conditions and provide site-specific de-watering recommendations.

6.1.14 Surface Water Drainage

H&K recommends the following surface water drainage mitigation measures:

1. Grade all slopes drain away from building areas with a minimum 4 percent slope for a distance of not less than 10 feet from the building foundations.
2. Grade all landscape areas near and adjacent to buildings to prevent ponding of water.
3. Direct all building downspouts to solid pipe collectors which discharge to natural drainage courses, storm sewers, catchment basins, infiltration subdrains, or other drainage facilities.

6.1.15 Grading Plan Review and Construction Monitoring

Construction quality assurance includes review of plans and specifications and performing construction monitoring as described below.

1. H&K should be allowed to review the final earthwork grading improvement plans prior to commencement of construction to determine whether our recommendations have been implemented, and if necessary, to provide additional and/or modified recommendations.
2. H&K should be allowed to perform CQA monitoring of all earthwork grading performed by the contractor to determine whether our recommendations have been implemented, and if necessary, to provide additional and/or modified recommendations.
3. Our experience, and that of our engineering profession, clearly indicates that during the construction phase of a project the risks of costly design, construction and maintenance problems can be significantly reduced by retaining the design geotechnical engineering firm to review the project plans and specifications and to provide geotechnical engineering CQA observation and testing services. If H&K is not retained to provide geotechnical engineering CQA services during the construction phase of the project, then H&K will not be responsible for geotechnical engineering CQA services provided by others nor any aspect of the project that fails to meet your or a third party's expectations in the future.

6.2 STRUCTURAL IMPROVEMENTS

Our structural improvement design criteria recommendations include: seismic design parameters, shallow continuous strip and isolated foundations, retaining walls, concrete slab-on-grade floors, sidewalks, and pavement designs. These recommendations are presented here after.

6.2.1 Seismic Design Parameters

We used Section 1613 of the 2010 CBC and the USGS, *Java Ground Motion Parameter Calculator, Earthquake Ground Motion Tools, Version 5.1.0* to develop the code-based seismic design parameters listed in Table 6.2.1-1.

Table 6.2.1-1. 2010 CBC Seismic Design Parameters

Description	Value	Reference
Latitude	39.705 deg	Google Earth
Longitude	-121.821 deg	Google Earth
Site Coefficient, F_A	1.323	*2010 CBC, Table 1613.5.3(1), USGS, UHRS, v 5.1.0, 2011*
Site Coefficient, F_V	1.944	*2010 CBC, Table 1613.5.3(2), USGS, UHRS, v 5.1.0, 2011*
Site Class (Very Dense Soil and Soft Rock)	D	*2010 CBC, Section 1613.5.2, Table 1613.5.2*
Short (0.2 sec) Spectral Response, S_S	0.596 *g*	*2010 CBC, Figure 1613.5(3), USGS, UHRS, v 5.1.0, 2011*
Long (1.0 sec) Spectral Response, S_1	0.228 *g*	*2010 CBC, Figure 1613.5(4), USGS, UHRS, v 5.1.0, 2011*
Short (0.2 sec) MCE Spectral Response, S_{MS}	0.788 *g*	*2010 CBC, Section 1613.5.3, USGS, UHRS, v 5.1.0, 2011*
Long (1.0 sec) MCE Spectral Response, S_{M1}	0.443 *g*	*2010 CBC, Section 1613.5.3, USGS, UHRS, v 5.1.0, 2011*
Short (0.2 sec) Design Spectral Response, S_{DS}	0.525 *g*	*2010 CBC, Section 1613.5.4, USGS, UHRS, v 5.1.0, 2011*
Long (1.0 sec) Design Spectral Response, S_{D1}	0.295 *g*	*2010 CBC, Section 1613.5.4, USGS, UHRS, v 5.1.0, 2011*

Notes:
CBC = California Building Code
MCE = *Maximum Considered Earthquake*
UHRS = *Uniform Hazard Response Spectra*
USGS = *United States Geological Survey*

6.2.2 Shallow Foundations

Shallow foundations for load bearing walls should be designed as follows:

1. The base of all shallow foundations should bear on firm competent non-expansive native soil, or either non-expansive engineered fill or expansive engineered fill compacted consistent with the earthwork recommendations of Section 6.1.

2. Continuous strip foundations should be constructed with the following dimensions:
   a. Minimum Width = 12 Inches
   b. Minimum Embedment Depth below the lowest adjacent exterior surface grade as shown in Table 6.2.2.
3. The allowable bearing capacities to be used for structural design of shallow foundations founded in either non-expansive native soil or non-expansive engineered fill are presented in Table 6.2.2-1.

Table 6.2.2-1. Foundation Maximum Allowable Bearing Pressures

Minimum Foundation Embedment Depth (inches)	Maximum Bearing Pressures For Live + Dead Loads (pounds per square foot)	Maximum Bearing Pressures For Live + Dead + Wind or Seismic Loads (pounds per square foot)
12	2,500	3,300
18	2,750	3,600
24	3,000	4,000
30	3,500	4,700

4. Foundation lateral resistance may be computed from passive pressure along the side of the foundation and sliding friction resistance along the foundation base; however the larger of the two resistance forces should be reduced by 50 percent when combining these two forces. The passive pressure can be assumed to be equal to an equivalent fluid pressure per foot of depth. The passive pressure force and sliding friction coefficient for computing lateral resistance are as follows:
   a. Passive pressure = 275 (H), where H = foundation depth below lowest adjacent soil surface.
   b. Foundation bottom sliding friction coefficient = 0.40 (dimensionless).
5. Minimum steel reinforcement for continuous strip foundations should consist of two No. 4 bars with one bar placed near the top and one bar placed near the bottom of each foundation or as designated by a California licensed engineer.
6. The concrete should have a minimum 2,500 pounds per square inch compressive break strength after 28-days of curing and have a maximum water to cement ration of 0.50. Since, water is often added to uncured concrete to increase workability, it is important that strict quality control measured be employed during placement of the foundation concrete to insure that the water to cement ratio is not altered prior to or during placement.
7. Concrete coverage over steel reinforcements should be a minimum of 3 inches as recommended by the American Concrete Institute (ACI).
8. Prior to placing concrete in any foundation excavations the contractor shall remove all loose soil, rock, wood, and debris, or other deleterious materials from the foundation excavations.

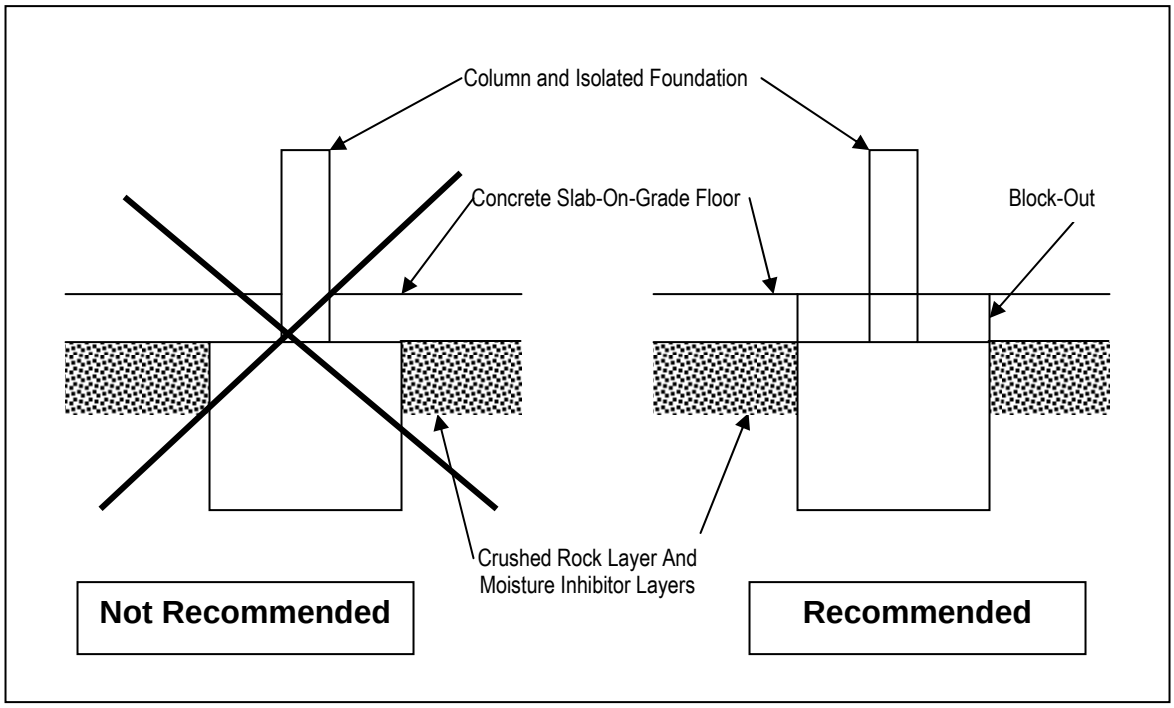
9. Foundation excavations should be saturated prior to placing concrete to aid the concrete curing process; however, concrete should not be placed in standing water.

10. Total settlement of individual foundations will vary depending on the plan dimensions of the foundation and actual structural loading. Based on the anticipated foundation dimensions and loads, we estimated that the total post-construction settlement of foundations designed and constructed in accordance with our recommendations will be on the order of 1/2 inch. Differential settlement between similarly loaded, adjacent foundations is expected to be about 1/4 inch, provided the foundations are founded into similar materials (e.g., all on competent and firm engineered fill, native soil or rock).

11. Prior to placing concrete in any foundation excavation the project geotechnical engineer or his/her field representative should observe the excavations to document that the following requirements have been achieved: minimum foundation dimensions, minimum reinforcement steel placement, and dimensions, removal of all loose soil, rock, wood, and debris, or other deleterious materials, and that firm and competent native or engineered fill soil is exposed along the entire foundation excavation bottom. Strict adherence to these requirements is paramount to the satisfactory behavior of a building foundation. Minor deviations of these requirements can cause the foundations to undergo minor to severe amounts of settlement which can result in cracks developing in the foundation and adjacent structural members such as concrete slab-on-grade floors.

12. We do not recommend that concrete slab-on-grade floors be placed in direct contact with the top surface of isolated column concrete foundations. Our experience is that during the curing period of the concrete slab-on-grade floors, a significant thermal gradient may develop between the portions of the slab placed directly on the typically more massive isolated column concrete foundations and the portions of the slab placed over the vapor-moisture retarder membrane and crushed rock of the slab support layers. **The development of adverse thermal gradients may cause the development of significant orthogonal and/or circular shrinkage cracks in the floor slab around the isolated column foundations.**

    Our opinion is that the slab can be cast over the footing by providing a block out of the slab around the footing, casting the slab, and then filling the block out void with concrete after the slab has cured. Another option would be to cast the footing and slab as shown on the detail and provide felt or an expansion joint between the entire steel column and slab. A thin (1- to 2-inch) sand layer should be placed in the bottom of the void created by the column (on top of the footing). The slab should be cured so that temperature and shrinkage are controlled. We recommend that the slab be moisture cured for a period of seven days after casting.



6.2.3 Concrete Slab-On-Grade Floors

In general, H&K recommends that subgrade elevations on which the concrete slab-on-grade floors are constructed be a minimum of 6 inches above the elevation of the surrounding parking driveway and landscaped areas. Elevating the building will reduce the potential for subsurface water to enter beneath the concrete slab-on-grade floors and exterior surfaces and underground utility trenches.

The concrete slab-on-grade building floors, patios and sidewalks, and driveway areas should be evaluated by a California licensed civil engineer for expected live and dead loads to determine if the minimum slab thickness and steel reinforcement recommendations presented in this report should be increased or redesigned.

H&K recommends using the guideline procedures, methods and material properties that are presented in the following ASTM and ACI documents for construction of concrete slab-on-grade floors:

- ACI 302.1R-04, Guide For Concrete Floor And Slab Construction, reported by ACI Committee 302.
- ASTM E1643-98 (Reapproved 2005), Standard Practice For Installation Of Water Vapor Retarders Used In Contact With Earth Or Granular Fill Under Concrete Slabs.
- ASTM E1745-97 (Reapproved 2004), Standard Specifications For Plastic Water Vapor Retarders Used In Contact With Soil Or Granular Fill Under Concrete Slabs.

- ASTM F710-5, Standard Practice For Preparing Concrete Floors To Receive Resilient Flooring.

6.2.3.1 Interior Floors with Non-Vehicle Traffic

The interior office concrete slab-on-grade floor components are described below from top to bottom. If static or intermittent live floor loads greater than 250 psf are anticipated, then a California licensed structural engineer should design the necessary concrete slab-on-grade floor thickness and steel reinforcements.

1. Minimum 4-Inch-Thick Concrete Slab: should be installed with a minimum 2,500 pounds per square inch (psi) compressive strength after 28 days of curing. H&K recommends that the concrete design uses a water to cement ratio between 0.40 and 0.50 and should be placed with minimum and maximum slumps of 4 and 6 inches, respectively. The concrete mix design is the responsibility of the concrete supplier.
2. Prior to applying construction loads, all exposed concrete slab-on-grade floors should be moisture cured for a minimum of 7 days following placement of the concrete. If concrete is placed during the hot summer months when the ambient air temperatures may be as low as 50 to 60 degrees Fahrenheit (F) in the early morning and in excess of 90 degrees F in the afternoon, then the contractor may need to implement special curing measures to reduce the development of shrinkage cracks. The concrete contractor is responsible for determining the appropriate curing process to be applied to the slab-on-grade floor.

   Concrete Slabs In Contact With Isolated Concrete Foundations: We do not recommend that concrete slab-on-grade floors be placed in direct contact with the top surface of isolated column concrete foundations. Our experience is that during curing period of the concrete slab-on-grade floors a significant thermal gradient may develop between the portions of the slab placed directly on the typically more massive isolated column concrete foundations and the portions of the slab placed over the vapor-moisture retarder membrane and crushed rock of the slab support layers. **The development of adverse thermal gradients may cause the development of significant orthogonal and/or circular shrinkage cracks around the isolated column foundations.**

3. Steel Reinforcement: should be used to improve the load carrying capacity and to reduce cracking caused by shrinkage during curing and from both differential and repeated loadings. It should be understood that it is nearly impossible to prevent all cracks from development in concrete slabs; in other words, it should be expected that some cracking will occur in all concrete slabs no matter how well they are reinforced. Concrete slabs that will be subjected to heavy loads should be designed with steel reinforcements by a California licensed structural engineer.

   Steel Rebar: As a minimum, use No. 3 ribbed steel rebar (ASTM A615/A 615M-04 Grade 60 deformed for reinforcement in concrete), tied and placed with 18-inch

centers in both directions (perpendicular) and supported on concrete "dobies" to position the rebar in the center of the slab during concrete pouring.

4. Underslab Vapor-Moisture Retarder Membrane: should be placed as a floor component that will minimize transmission of both liquid water and water vapor transmission through the concrete slab-on-grade floor. H&K recommends using at a minimum a Class A (ASTM E1745-97 [Reapproved 2004]), minimum 10-mil-thick, plastic, vapor-moisture, retarder membrane material such as: Stego Wrap® underslab vapor retarder membranes or equivalents. Additionally, the following materials are recommended: Stego® Tape and Stego® Mastic or equivalents to seal membrane joints and any utility penetrations.

   Regardless of the type of moisture-vapor retarder membrane used, moisture can wick up through a concrete slab-on-grade floor. Excessive moisture transmission through a concrete slab floor can cause adhesion loss, warping, and peeling of resilient floor coverings, deterioration of adhesive, seam separation, formation of air pockets, mineral deposition beneath flooring, odor and both fungi and mold growth. Slabs can be tested for water transmissivity in areas that are moisture sensitive. Commercial sealants, polymer additives to the concrete at the batch plant, entrained air, flyash, and reduced water to content ratio can be incorporated into the concrete slab-on-grade floor mix design to reduce its permeability and water-vapor transmissivity properties. A waterproofing consultant should be contacted to provide detailed recommendations if moisture sensitive flooring materials will be installed on the concrete slab-on-grade floors.

5. Minimum 6-Inch-Thick Crushed Rock Layer: should be placed and compacted to a minimum of 95 percent of the ASTM D1557 dry density with a moisture content of ± 3 percentage points of the ASTM D1557 optimum moisture content. The crushed rock should be washed to produce an ASTM D422 test particle size distribution of 100 percent (by dry weight) passing the ¾ inch sieve and 0 to 5 percent passing the No. 4 sieve and 0 to 3 percent passing the No. 200 sieve. This relatively clean (washed) crushed rock will act as a capillary break for free water moisture transmission, as well as, provide a uniform bearing surface for the concrete slab-on-grade floor.

6. Subgrade Soil Preparation: The subgrade soil should be prepared and compacted consistent with the recommendations of Section 6.1. The top 12 inches of the non-expansive soil should be compacted to a minimum of 90 percent of the ASTM D1557 dry density with relatively uniform moisture content within ± 3 percentage points of the ASTM D1557 optimum moisture content.

   Prior to placing concrete and the moisture barrier membrane, but after placing the overlying crushed rock layer, the subgrade soil must be moisture conditioned to achieve a uniform moisture content of between 2 and 6 percentage points greater than the ASTM D1557 optimum moisture content to a depth of 12 inches below the finished subgrade surface. Moisture conditioning should be performed for a minimum of 24 hours prior to concrete placement. If the soil is not moisture

conditioned prior to placing concrete, moisture could be wicked (transmitted) out of the concrete by the underlying potentially dryer soil, which could cause shrinkage cracks to develop in the concrete slab during the curing period.

Additionally, our opinion is that moisture conditioning the subgrade soil will reduce the swell (heave) potential of fine-grained soil with moderate to high expansion properties. Typically, concrete slabs impart relatively small loads on the order of about 50 pounds per square foot (psf) on the underlying subgrade soil. Therefore, some vertical movement of the concrete slab should be anticipated from possible expansion of the underlying subgrade soil, regardless of subgrade preparation.

7. Crack Control Grooves: should be installed during placement or saw cuts should be made in accordance with the ACI and Portland Cement Association (PCA) specifications. Generally, H&K recommends that expansion joints be provided between the slab and perimeter footings, and that crack control groves or saw cuts are installed on maximum 10-foot-centers in both directions (perpendicular).
8. Field Observations: should be made by an H&K construction monitor of all concrete slab-on-grade subgrade surfaces and installed steel reinforcements prior to placing concrete.

6.2.3.2 Interior Floors with Vehicle Traffic

The interior shop and maintenance building concrete slab-on-grade floor components for vehicle traffic areas are described below from top to bottom. If static or intermittent live floor loads greater than 250 psf are anticipated, then a California licensed structural engineer should design the necessary concrete slab-on-grade floor thickness and steel reinforcements.

1. Minimum 6-Inch-Thick Concrete Slab: should be installed with a minimum 4,000 pounds per square inch (psi) compressive strength after 28 days of curing. H&K recommends that the concrete design uses a water to cement ratio between 0.40 and 0.50 and should be placed with minimum and maximum slumps of 4 and 6 inches, respectively. The concrete mix design is the responsibility of the concrete supplier.
2. Prior to applying construction loads, all exposed concrete slab-on-grade floors should be moisture cured for a minimum of 7 days following placement of the concrete. If concrete is placed during the hot summer months when the ambient air temperatures may be as low as 50 to 60 degrees Fahrenheit (F) in the early morning and in excess of 90 degrees F in the afternoon, then the contractor may need to implement special curing measures to reduce the development of shrinkage cracks. The concrete contractor is responsible for determining the appropriate curing process to be applied to the slab-on-grade floor.

   Concrete Slabs In Contact With Isolated Concrete Foundations: We do not recommend that concrete slab-on-grade floors be placed in direct contact with the

top surface of isolated column concrete foundations. Our experience is that during curing period of the concrete slab-on-grade floors a significant thermal gradient may develop between the portions of the slab placed directly on the typically more massive isolated column concrete foundations and the portions of the slab placed over the vapor-moisture retarder membrane and crushed rock of the slab support layers. **The development of adverse thermal gradients may cause the development of significant orthogonal and/or circular shrinkage cracks around the isolated column foundations.**

3. Steel Reinforcement: should be used to improve the load carrying capacity and to reduce cracking caused by shrinkage during curing and from both differential and repeated loadings. It should be understood that it is nearly impossible to prevent all cracks from development in concrete slabs; in other words, it should be expected that some cracking will occur in all concrete slabs no matter how well they are reinforced. Concrete slabs that will be subjected to heavy loads should be designed with steel reinforcements by a California licensed structural engineer.

   Steel Rebar: As a minimum, use No. 4 ribbed steel rebar (ASTM A615/A 615M-04 Grade 60 deformed for reinforcement in concrete), tied and placed with 12-inch centers in both directions (perpendicular) and supported on concrete "dobies" to position the rebar in the center of the slab during concrete pouring.

4. Underslab Vapor-Moisture Retarder Membrane: should be placed as a floor component that will minimize transmission of both liquid water and water vapor transmission through the concrete slab-on-grade floor. H&K recommends using at a minimum a Class A (ASTM E1745-97 [Reapproved 2004]), minimum 10-mil-thick, plastic, vapor-moisture, retarder membrane material such as: Stego Wrap® underslab vapor retarder membranes or equivalents. Additionally, the following materials are recommended: Stego® Tape and Stego® Mastic or equivalents to seal membrane joints and any utility penetrations.

   Regardless of the type of moisture-vapor retarder membrane used, moisture can wick up through a concrete slab-on-grade floor. Excessive moisture transmission through a concrete slab floor can cause adhesion loss, warping, and peeling of resilient floor coverings, deterioration of adhesive, seam separation, formation of air pockets, mineral deposition beneath flooring, odor and both fungi and mold growth. Slabs can be tested for water transmissivity in areas that are moisture sensitive. Commercial sealants, polymer additives to the concrete at the batch plant, entrained air, flyash, and reduced water to content ratio can be incorporated into the concrete slab-on-grade floor mix design to reduce its permeability and water-vapor transmissivity properties. A waterproofing consultant should be contacted to provide detailed recommendations if moisture sensitive flooring materials will be installed on the concrete slab-on-grade floors.

5. Minimum 6-Inch-Thick Crushed Rock Layer: should be placed and compacted to a minimum of 95 percent of the ASTM D1557 dry density with a moisture content

of ± 3 percentage points of the ASTM D1557 optimum moisture content. The crushed rock should be washed to produce an ASTM D422 test particle size distribution of 100 percent (by dry weight) passing the ¾ inch sieve and 0 to 5 percent passing the No. 4 sieve and 0 to 3 percent passing the No. 200 sieve. This relatively clean (washed) crushed rock will act as a capillary break for free water moisture transmission, as well as, provide a uniform bearing surface for the concrete slab-on-grade floor.

6. Subgrade Soil Preparation: The subgrade soil should be prepared and compacted consistent with the recommendations of Section 6.1. The top 12 inches of the non-expansive soil should be compacted to a minimum of 90 percent of the ASTM D1557 dry density with relatively uniform moisture content within ± 3 percentage points of the ASTM D1557 optimum moisture content.

   Prior to placing concrete and the moisture barrier membrane, but after placing the overlying crushed rock layer, the subgrade soil must be moisture conditioned to achieve a uniform moisture content of between 2 and 6 percentage points greater than the ASTM D1557 optimum moisture content to a depth of 12 inches below the finished subgrade surface. Moisture conditioning should be performed for a minimum of 24 hours prior to concrete placement. If the soil is not moisture conditioned prior to placing concrete, moisture could be wicked (transmitted) out of the concrete by the underlying potentially dryer soil, which could cause shrinkage cracks to develop in the concrete slab during the curing period.

   Additionally, our opinion is that moisture conditioning the subgrade soil will reduce the swell (heave) potential of fine-grained soil with moderate to high expansion properties. Typically, concrete slabs impart relatively small loads on the order of about 50 pounds per square foot (psf) on the underlying subgrade soil. Therefore, some vertical movement of the concrete slab should be anticipated from possible expansion of the underlying subgrade soil, regardless of subgrade preparation.

7. Crack Control Grooves: should be installed during placement or saw cuts should be made in accordance with the ACI and Portland Cement Association (PCA) specifications. Generally, H&K recommends that expansion joints be provided between the slab and perimeter footings, and that crack control groves or saw cuts are installed on maximum 10-foot-centers in both directions (perpendicular).

8. Field Observations: should be made by an H&K construction monitor of all concrete slab-on-grade subgrade surfaces and installed steel reinforcements prior to placing concrete.

6.2.3.3 Exterior Sidewalks And Patios

The exterior concrete slab-on-grade surface components are described below from top to bottom. If static or intermittent live loads greater than 250 psf are anticipated, or if heavy traffic loads are anticipated, then a California licensed structural engineer should design the necessary concrete slab-on-grade floor thickness and steel reinforcements.

1. Minimum 4-Inch-Thick Concrete Slab: should be installed with a minimum 2,500 pounds per square inch (psi) compressive strength after 28 days of curing. H&K recommends that the concrete design uses a water to cement ratio between 0.40 and 0.45 and should be placed with minimum and maximum slumps of 4 and 6 inches, respectively. The concrete mix design is the responsibility of the concrete supplier.

2. Prior to applying construction loads, all exposed concrete slab-on-grade floors should be moisture cured for a minimum of 7 days following placement of the concrete. If concrete is placed during the hot summer months when the ambient air temperatures may be as low as 50 to 60 degrees F in the early morning and in excess of 90 degrees F in the afternoon, then the contractor may need to implement special curing measures to minimize the development of shrinkage cracks. The concrete contractor is responsible for determining the appropriate curing process to be applied to the slab-on-grade floors.

   Concrete Slabs In Contact With Isolated Concrete Foundations: We do not recommend that concrete slab-on-grade floors be placed in direct contact with the top surface of isolated column concrete foundations. Our experience is that during curing period of the concrete slab-on-grade floor a significant thermal gradient may develop between the portions of the slab placed directly on the typically more massive isolated column concrete foundations and the portions of the slab placed over a vapor-moisture retarder membrane and crushed rock layers. **The development of adverse thermal gradients may cause the development of significant orthogonal and/or circular shrinkage cracks around the isolated column foundations.**

3. Steel Reinforcement: should be used to improve the load carrying capacity and to reduce cracking caused by shrinkage during curing and from both differential and repeated loadings. It should be understood that it is nearly impossible to prevent all cracks from development in concrete slabs; in other words, it should be expected that some cracking will occur in all concrete slabs no matter how well they are reinforced or cured. Concrete slabs that will be subjected to heavy loads should be designed with steel reinforcements by a California licensed structural engineer.

   If the current property owner (developer) elects to eliminate the steel reinforcements from the exterior concrete slabs-on-grade for economic reasons, then there will be an inherent greater risk assumed by the developer for the development of both shrinkage and bearing related cracks in the associated slabs.

   Steel Rebar: As a minimum, use No. 3 ribbed steel rebar (ASTM A615/A 615M-04 Grade 60 deformed for reinforcement in concrete), tied and placed with 18-inch centers in both directions (perpendicular) and supported on concrete “dobies” to position the rebar in the center of the slab during concrete pouring.

4. Minimum 4-Inch-Thick Crushed Rock Layer: should be placed and compacted to a minimum of 95 percent of the ASTM D1557 dry density with a moisture content of ± 3 percentage points of the ASTM D1557 optimum moisture content. The crushed rock should be washed to produce a particle size distribution of 100 percent (by dry weight) passing the ¾ inch sieve and 5 percent passing the No. 4 sieve and 0 to 3 percent passing the No. 200 sieve. Just prior to pouring the concrete slab, the crushed rock layer should be moistened to a saturated surface dry (SSD) condition. This measure will reduce the potential for water to be withdrawn from the bottom of the concrete slab while it is curing and will help minimize the development of shrinkage cracks.

   If the current property owner (developer) elects to eliminate the crushed rock layer beneath the exterior concrete slabs-on-grade for economic reasons, then there will be an inherent greater risk assumed by the developer for the development of both shrinkage and bearing related cracks in the associated slabs.

5. Subgrade Soil Preparation: The subgrade soil should be prepared and compacted consistent with the recommendations of Section 6.1. The top 12 inches of the non-expansive soil should be compacted to a minimum of 90 percent of the ASTM D1557 dry density with a moisture content within ± 3 percentage points of the ASTM D1557 optimum moisture content.

   Prior to placing concrete and the moisture barrier membrane, but after placing the overlying crushed rock layer, the subgrade soil must be moisture conditioned to achieve a uniform moisture content of between 2 and 6 percentage points greater than the ASTM D1557 optimum moisture content to a depth of 18 inches below the finished subgrade surface. Moisture conditioning should be performed for a minimum of 24 hours prior to concrete placement. If the soil is not moisture conditioned prior to placing concrete, moisture could be wicked (transmitted) out of the concrete by the underlying potentially dryer soil, which could cause shrinkage cracks to develop in the concrete slab during the curing period. Prior to placing concrete, but after placing the overlying crushed rock layer, the subgrade soil must be moisture conditioned to achieve a saturation of

   Additionally, our opinion is that moisture conditioning the subgrade soil will reduce the swell (heave) potential of fine-grained soil with moderate to high expansion properties. Typically, concrete slabs impart relatively small loads on the order of about 50 pounds per square foot (psf) on the underlying subgrade soil. Therefore, some vertical movement of the concrete slab should be anticipated from possible expansion of the underlying subgrade soil, regardless of subgrade preparation.

6. Crack Control Grooves: should be installed during placement or saw cuts should be made in accordance with the ACI and PCA specifications. Generally, H&K recommends that expansion joints be provided between the slab and perimeter

footings, and that crack control groves or saw cuts are installed on 10-foot-centers in both directions (perpendicular).

7. Field Observations: should be made by an H&K construction monitor of all concrete slab-on-grade surfaces and installed steel reinforcements prior to pouring concrete.

6.2.4 Rigid Pavement Design and Construction

Recommendations for the design and construction of exterior concrete pavements for the project site should follow the California Department of Transportation (Caltrans) Design Manual, Chapter 620, Rigid Pavement.

Because the Caltrans Design Manual is intended for highway pavement design, Chapter 620 specifies the minimum limit Traffic Index (TI) of 9 for JPCP design purposes, which H&K considers very conservative for representing vehicle traffic for parking lots, industrial/commercial streets, minor arterial streets, major arterial streets, and truck route arterial streets. The actual TI for the project pavement areas should be determined in accordance with the Caltrans Highway Design Manual.

H&K obtained one sample of the on-site soil and rock during our field investigation that we anticipate will be representative of the subgrade soil for the roads, driveways and parking areas. The Resistance Value (R-Value) test results are included in Appendix D. Laboratory test results indicate an R-Value of 6 for the on-site materials tested. The actual subsurface soil conditions exposed at the finished subgrade surface of the roadways may be different from this R-Value. In accordance with Table 623.1A Relationship Between Subgrade Type of Chapter 620 of the Caltrans Highway Design Manual, the subgade is classified as Subgrade Type III (R-vlaue <10).

6.2.4.1 Permeable Concrete Pavement Design

Permeable concrete designs will be performed by others. The shallow subsurface soil is classified as stiff, low plasticity, sandy clay (CL). Sieve analysis indicate that 72% by dry weight pass a No.200 sieve with a Plasticity Index of 14. The soil has a low expansive potential and a very low Resistance Value of 6 for pavement design. Based on the soil type and consistency, the hydraulic conductivity of the shallow native subgrade soil is expected to be within the typical range for clay of $1x10^{-5}$ centimeters per second (cm/s) for undisturbed soil and as low as $1x10^{-9}$ cm/s following compaction. Based on the expected permeability range, vertical infiltration of storm water through the native subsurface soil will be slow. The subgrade soil and AB rock should be placed and compacted as described below.

1. The subgrade soil to a depth of 12 inches from the finished grade surface should be compacted to a minimum relative compaction of 95 percent of the ASTM D1557 maximum dry density and moisture conditioned between 2 to 4 percentage points greater than the ASTM D1557 optimum moisture content. The stability of the compacted subgrade soil should be evaluated by wheel rolling prior to placing

the overlying crushed rock drainage layer. Wheel rolling should be performed with a fully loaded water truck with tire pressures between 60 and 95 psi. The subgrade soil surface should exhibit only minor deflections as the wheel load passes by. Any unstable areas should be reworked and then retested for percent relative compaction and percent moisture content and then proof rolled again. This process should be repeated until the area appears to be relatively stable.

2. H&K recommends the the use of a minimum 8 ounce per square yard, woven, geotextile fabric between the subgrade soil and base rock material designed below the permeable concrete pavement. The geotextile fabric should be pulled tight to remove any folds or wrinkles and staked according to manufacture recommendations. A minimum 18 inch overlap is recommended along adjoining seams.
3. The clean (washed) crushed rock should be compacted to a minimum relative compaction of 95 percent of the ASTM D1557 maximum dry density with a moisture content of ± 3 percentage points of the ASTM D1557 optimum moisture content. Refer to the geotextile manufacture recommendations and limitations for the proper gradation (maximum size) of a crushed rock product.
4. The stability of the compacted crushed rock should be evaluated by wheel rolling prior to placing the overlying AC layer. Wheel rolling should be performed with a fully loaded water truck with tire pressures between 60 and 95 psi. The AB rock surface should exhibit only minor deflections as the wheel load passes by. Any unstable areas should be reworked and then retested for percent relative compaction and percent moisture content and then proof rolled again. This process should be repeated until the area appears to be relatively stable.
5. H&K recommends the the use of a minimum 8 ounce per square yard, woven, geosynthetic fabric between the subgrade soil and base rock material designed below the permeable concrete pavement. Based on the particle size distribution of the sandy clay (CL) subgrade soil the

6.2.4.2 Jointed Plain Concrete Pavement (JPCP) Design

Recommendations for the design and construction of JPCP should follow the Caltrans Design Manual. If JPCP is selected for use onsite, lime treatment of the subgrade soil will be necessary to improve the R-Value of the soil. The design should follow Table 623.1G Rigid Pavement Catalog (Inland Valley, Type II Subgrade Soil) for the appropriate TI listed. The following presented the minimum recommendations for subgrade treatment to increase the R-Value

The subgrade soil and AB rock should be placed and compacted as described below.

1. The subgrade soil to a depth of 12 inches from the finished grade surface should be stabilized by mixing non-hydrated high calcium lime (commonly referred to as quick-lime). Assuming that the dry unit weight of the untreated soil is about 115 pounds per cubic foot (pcf); the application rate of 3 percent by dry weight will require about 3.5 pounds per square foot of lime to be applied to each 12 inch

thick layer of soil to be treated. Each application of lime should be checked prior to mixing by measuring the weight of lime applied to a pan that is placed in line with the direction of the applicator truck. Each 12 inch thick soil layer and applied lime should be uniformly mixed together using a rototiller type mixer and then allowed to cure for a minimum of 16 hours. Following the 16 hour curing period the treated soil should be uniformly mixed again and then compacted.

2. The subgrade soil should be compacted to a minimum relative compaction of 93 percent of the ASTM D1557 maximum dry density with a moisture content of ± 3 percentage points of the ASTM D1557 optimum moisture content. The stability of the compacted subgrade soil should be evaluated by wheel rolling prior to placing the overlying AB rock layer. Wheel rolling should be performed with a fully loaded water truck with tire pressures between 60 and 95 psi. The subgrade soil surface should exhibit only minor deflections as the wheel load passes by. Any unstable areas should be reworked and then retested for percent relative compaction and percent moisture content and then proof rolled again. This process should be repeated until the area appears to be relatively stable.
3. The Caltrans Class II AB rock should be compacted to a minimum relative compaction of 95 percent of the ASTM D1557 maximum dry density with a moisture content of ± 3 percentage points of the ASTM D1557 optimum moisture content. The stability of the compacted AB rock should be evaluated by wheel rolling prior to placing the overlying rigid pavement layer, as detailed above. The AB rock surface should exhibit only minor deflections as the wheel load passes by. Any unstable areas should be reworked and then retested for percent relative compaction and percent moisture content and then proof rolled again. This process should be repeated until the area appears to be relatively stable.
4. Concrete cut-off curbs should be constructed around all landscaped areas that are adjacent to AC paved driveways and parking areas. The curbs should extend to a minimum depth of 8 inches into the underlying subgrade soil. The extended curbs will reduce migration of irrigation and rain waters originating in the landscaped areas form entering the AB rock materials underlying the rigid pavement material. This design is intended to minimize failures of the paved areas due to saturation of the underlying AB rock and subgrade soils.

6.2.4.3 Continuously Reinforced Concrete Pavement (CRCP) Design

Recommendations for the design and construction of CRCP are described below from top to bottom. If static or intermittent live floor loads greater than 250 psf are anticipated, then a California licensed structural engineer should design the necessary concrete slab-on-grade floor thickness and steel reinforcements.

1. Minimum 6-Inch-Thick Concrete Slab: should be installed with a minimum 4,000 pounds per square inch (psi) compressive strength after 28 days of curing. H&K recommends that the concrete design uses and water to cement ratio between 0.40 and 0.45 and should be placed with minimum and maximum slumps of 4 and

6 inches, respectively. Air entrainment should be approximately 4%. The concrete mix design is the responsibility of the concrete supplier.

Prior to applying construction loads all exposed concrete slab-on-grade floors should be moisture cured for a minimum of 7 days following placement of the concrete. If concrete is placed during the hot summer months when the ambient air temperatures may be as low as 50 to 60 degrees F in the early morning and in excess of 90 degrees F in the afternoon, then the contractor may need to implement special curing measures to minimize the development of shrinkage cracks. The concrete contractor is responsible for determining the appropriate curing process to be applied to the slab-on-grade floor.

2. Steel Reinforcements: should be used to improve the load carrying capacity and to minimize cracking caused by shrinkage during curing and from both differential and repeated loadings. It should be understood that it is nearly impossible to prevent all cracks from development in concrete slabs; in other words, it should be expected that some cracking will occur in all concrete slabs no matter how well they are reinforced. Concrete slabs that will be subjected to heavy loads should be designed with steel reinforcements by a California licensed structural engineer.

   If the property owner (developer) elects to eliminate the steel reinforcements from the exterior concrete slabs-on-grade for economic reasons, then there will be an inherent greater risk assumed by the developer for the development of both shrinkage and bearing related cracks in the associated slabs.

   Steel Rebar: Use No. 4 ribbed steel rebar (ASTM A615/A 615M-04 Grade 60 deformed for reinforcement in concrete), tied and placed with 12-inch centers in both directions (perpendicular) and supported on concrete “dobies” to position the rebar in the center of the slab during concrete pouring.

3. Minimum 6-Inch-Thick Crushed Rock Layer: should be placed and compacted to a minimum of 95 percent of the ASTM D1557 dry density with a moisture content of ± 3 percentage points of the ASTM D1557 optimum moisture content. The crushed rock should be washed to produce an ASTM D422 test particle size distribution of 100 percent (by dry weight) passing the ¾ inch sieve and 0 to 5 percent passing the No. 4 sieve and 0 to 3 percent passing the No. 200 sieve. This relatively clean (washed) crushed rock will act as a capillary break for free water moisture transmission, as well as, provide a uniform bearing surface for the concrete slab-on-grade floor.
4. Subgrade Soil Preparation: The subgrade soil should be prepared and compacted consistent with the recommendations of Section 6.1. The top 12 inches of the non-expansive soil should be compacted to a minimum of 95 percent of the ASTM D1557 dry density with relatively uniform moisture content of from 0 to 4 percentage points greater than the ASTM D1557 optimum moisture content.

After placing the overlying crushed rock layer, the subgrade soil must be moisture conditioned to achieve uniform moisture content of between 2 and 6 percentage points greater than the ASTM D1557 optimum moisture content to a depth of 12 inches below the finished subgrade surface. Moisture conditioning should be performed for a minimum of 24 hours prior to concrete placement. If the soil is not moisture conditioned prior to placing concrete, moisture could be wicked (transmitted) out of the concrete by the underlying potentially dryer soil, which could cause shrinkage cracks to develop in the concrete slab during the curing period.

Additionally, we believe that moisture conditioning the subgrade soil will reduce the swell (heave) potential of fine-grained soil with moderate to high expansion properties. Typically, concrete slabs impart relatively small loads on the order of about 50 pounds per square foot (psf) on the underlying subgrade soil. Therefore, some vertical movement of the concrete slab should be anticipated from possible expansion of the underlying subgrade soil, if it is not properly moisture conditioned as describe in the preceding.

5. Crack Control Grooves: should be installed during placement or saw cuts should be made in accordance with the ACI and PCA specifications. Generally, H&K recommend that expansion joints be provided between the slab and perimeter footings, and that crack control groves or saw cuts are installed on no greater than 10-foot-centers in both directions (perpendicular).
6. Field Observations: should be made by an H&K construction monitor of all concrete slab-on-grade subgrade surfaces and installed steel reinforcements prior to placing concrete.

6.2.5 Flexible Pavement Design and Construction

Recommendations for the design and construction of asphalt concrete (AC) pavements for the project site are discussed below.

6.2.5.1 Asphalt Concrete Pavement Design

H&K used the Caltrans Design Method D301 to develop several asphalt concrete (AC) pavement and aggregate base (AB) rock design alternatives to allow for different traffic loading conditions. H&K used a Traffic Index (TI) of from 4 to 8 which represents typical vehicle traffic for parking lots, residential streets, collector streets, industrial/commercial streets, minor arterial streets, major arterial streets, and truck route arterial streets. The actual TI for the project pavement areas should be determined in accordance with Chapter 600 of the Caltrans Highway Design Manual.

H&K obtained one sample of the on-site soil and rock during our field investigation that we anticipate will be representative of the subgrade soil for the roads, driveways and parking areas. The R-Value test results are included in Appendix D. Laboratory test results indicate an R-Value of 6 for the on-site materials tested. The actual

subsurface soil conditions exposed at the finished subgrade surface of the roadways may be different from this R-Value. Please note that the Caltrans design method requires that the maximum R-Value of the subgrade soil not exceed 50.

H&K assumed that the pavement layers will be constructed with Class 2 Aggregate Base Rock (Minimum R-Value = 78) and Type A Asphalt Concrete in accordance with the requirements of Section 26 of the Caltrans Standard Specifications. Table 6.2.4.1-1 presents the road, driveway, and parking pavement design section. H&K recommends that the AB rock layer be constructed with a minimum thickness of 6-inches for constructability issues and to achieve a higher level of confidence that the road will achieve the expected service life.

Table 6.2.4.1-1 Flexible Pavement Design

Parameters	Design Values				
Traffic Description (approximate)	Light Autos	Light to Medium Autos and Trucks	Medium to Heavy Trucks	Heavy Trucks	Very Heavy Trucks
Traffic Index (TI)	4	5	6	7	8
Design R-Values Class II AB Rock Subgrade Soil	 78 6	 78 6	 78 6	 78 6	 78 6
AC Thickness (inch)(1)	2.50	3.00	3.50	4.00	4.5
AB Rock Thickness (inch)(2) (95% Relative Compaction)	8.0	10.5	13.0	15.5	18.0
Subgrade Soil Thickness (inch) (95% Relative Compaction)	12.0	12.0	12.0	12.0	12.0

Notes:
(1) The asphalt concrete thickness includes the Caltrans safety factor.
(2) H&K recommends a minimum thickness of 6 inches of AB rock, regardless of what the Caltrans design method indicates. This minimum thickness is necessary for constructability issues and will increase the level of confidence that the roads will achieve the expected service life

The subgrade soil and AB rock should be placed and compacted as described below.

1. The subgrade soil to a depth of 12 inches from the finished grade surface should be compacted to a minimum relative compaction of 95 percent of the ASTM D1557 maximum dry density with a moisture content of ± 3 percentage points of the ASTM D1557 optimum moisture content. The stability of the compacted subgrade soil should be evaluated by wheel rolling prior to placing the overlying AB rock layer. Wheel rolling should be performed with a fully loaded water truck with tire pressures between 60 and 95 psi. The subgrade soil surface should exhibit only minor deflections as the wheel load passes by. Any unstable areas should be reworked and then retested for percent relative compaction and percent moisture content and then proof rolled again. This process should be repeated until the area appears to be relatively stable.

2. The Caltrans Class II AB rock should be compacted to a minimum relative compaction of 95 percent of the ASTM D1557 maximum dry density with a moisture content of ± 3 percentage points of the ASTM D1557 optimum moisture content.
3. The stability of the compacted AB rock should be evaluated by wheel rolling prior to placing the overlying AC layer. Wheel rolling should be performed with a fully loaded water truck with tire pressures between 60 and 95 psi. The AB rock surface should exhibit only minor deflections as the wheel load passes by. Any unstable areas should be reworked and then retested for percent relative compaction and percent moisture content and then proof rolled again. This process should be repeated until the area appears to be relatively stable.
4. Concrete cut-off curbs should be constructed around all landscaped areas that are adjacent to AC paved driveways and parking areas. The curbs should extend to a minimum depth of 8 inches into the underlying subgrade soil. The extended curbs will reduce migration of irrigation and rain waters originating in the landscaped areas form entering the AB rock materials underlying the AC pavement material. This design is intended to minimize failures of the paved areas due to saturation of the underlying AB rock and subgrade soils.

6.2.5.2 Asphalt Concrete Pavement Construction

1. Asphalt concrete (AC) pavement should be constructed as required in Section 39 of the Caltrans Standard Specifications and these requirements.
2. Asphalt Concrete Materials: Asphalt concrete should comply with the following criteria:
   - An asphalt concrete mix design should be submitted for review and approval by the project geotechnical engineering prior to placement of the asphalt concrete at the site. The mix design should include the following information at a minimum: asphalt viscosity AR grade designation, aggregate particle size gradation (CTM202), percentage crushed particles (CTM205), LA abrasion (CTM211), Kc, Kf and surface area (CTM303), coarse aggregate specific gravity (CTM206) fine aggregate specific gravity (CTM208), fine aggregate sand equivalent (CTM217), optimum asphalt content (CTM367), percent air voids (CTM 367), stabilometer value (CTM366 and 308/309), swell (CTM305), unit weight (CTM308), and maximum theoretical density (CTM309).
   - Asphalt concrete should be a Type "A" Medium gradation. The maximum nominal aggregate size should be 1/2 inch for residential collector and 3/4 inch for arterial streets.
   - Asphalt concrete samples should be taken for mixture verification testing in accordance with CTM 125. The location of each sample should be noted on the test report.

- Asphalt concrete mixture verification tests should be performed at the rate of one set of tests per each 250-tons of AC placed and compacted. A minimum of one test should be performed for each day of paving.
- The following mixture tests should be performed on each AC bulk sample:

Table 6.2.4.2-1. Asphalt Concrete Testing

Test Method	Description	Requirement
CTM202	Sieve Analysis Of Fine And Coarse Aggregates	Operating Range And Contract Compliance Range
CTfM304	Preparation Of Bituminous Mixtures For Testing	Not Applicable
CTM308	Bulk Specific Gravity And Density	Maximum Values
CTM309	Theoretical Maximum Specific Gravity And Density	Maximum Values
CTM310	Asphalt And Moisture Content(1)	±0.5 percent of design mix
CTM366	Stabilometer Value	Minimum = 35
CTM367	Optimum Bitumen Content	Mix Voids = 3 to 5 percent
CTM375	In-Place Density And Relative Compaction	Field Test Values
CTM382	Asphalt Binder Content(1)	±0.5 percent of design mix

Note:
(1) Asphalt content may be determined by test methods CTM310 or CTM382.

3. Minimum Thickness and Grade Tolerances: The minimum AC grade thickness and grade tolerances are described below.
   - The minimum AC construction placement lift thickness should be 1½-inch for ½-inch material and 2-inches for ¾-inch material. The average finished AC pavement thickness should be equal to or greater than the design thickness.
   - Layer thickness should be verified either by continuous inspection or by coring. If continuous visual inspection is used, a minimum lay-down thickness of 1.25 times the design layer thickness should be used. If the thickness is verified by coring, then randomly selected core sample will be required as described in "Compaction Testing" below.
4. Compaction Testing: Compaction testing of asphalt concrete should be performed using both field and laboratory test methods as described below.
   - Compaction testing of asphalt concrete should be performed consistent with CTM 375 using a both a nuclear gauge and core samples. Core sample density should be taken consistent with CTM308. If a core correlation correction factor is applied to the nuclear test method compaction test results, then core sample correlation test results should be provided with each set of test material results.
   - Compaction of asphalt concrete should comply with the following criteria:

Table 6.2.4.2-2. Asphalt Concrete Relative Compaction Criteria				
Street Area Description	CTM 309 Percent Compaction		CTM 308 Percent Compaction	
Residential, Collector Or Arterial Roads	93.0 % Average	91.5 % Minimum	96.0 % Average	95.0 % Minimum
Shoulders, Non-Traffic Areas And Trench Patches Less Than 5-Feet-Wide	91.5 % Average	90.0 % Minimum	94.5 % Average	93.5 % Minimum

- Asphalt concrete cores should be collected at the rate of one test per 2,500-square feet of pavement area with a minimum of 3 core samples for any street segment or cul-de-sac. The location of each sample should be noted on the test report. Sample location should include at a minimum the following locations: 1-foot from left lip of gutter, 1-foot from crown (either side), and 1-foot from right lip of gutter.
- One density test should be taken for each 2,500-square feet of pavement area with a minimum of 3 tests per street segment. Each street segment may be averaged if the minimum numbers of tests per pavement area are met as shown below.

Table 6.2.4.2-3. Asphalt Concrete Pavement Testing Criteria	
Pavement Area	Minimum Number Of Density Tests
0 to 5,000-square feet (sf)	3
>5,000-sf to 10,000-sf	5
>10,000-sf to 15,000-sf	8
Over 15,000-sf	10 or 1 per 2,500-sf (whichever is greater)

- If the average pavement compaction test results, obtained by the nuclear gauge method, fail to meet the requirements of presented in the above, then cores samples of the AC should be taken approximately 10-feet away from the original failing test location. If the average of these three tests fail to meet the minimum compaction requirements, then the pavement area should be cold planed (grind) to the depth of the underlying pavement course layer or aggregate base layer and replaced with new asphalt concrete.
- The core test results should govern when compaction is being determined by both core samples and nuclear gauge tests. If the average test results obtained from the cores fail to meet the minimum average compaction requirement, because one specific area has low test results, then the asphalt concrete pavement in the area of low test results should be removed and replaced. If no one distinct area can be identified, then the entire pavement layer should be removed and replaced for the full width of the pavement and to the limits of the failing areas.

7 REFERENCES

The following presents the references cited in this report:

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Andrus and Stokoe, 2000, Liquefaction Resistance of Soils from Shear-Wave Velocity, Journal of Geotechnical and Geoenvironmental Engineering, November

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Bryant, A., Martin, R., Wong, P., Maldonado, D., Wampole, J., and Dixon, D., 2002, GIS Files of Official Alquist –Priolo Earthquake Fault Zones Northern and Eastern Region, California Geological Survey, California Department of Conservation, CD 2001-06, May 31.

California Geological Survey (CGS) Open File Report 96-08, 1996, Probabilistic Seismic Hazard Assessment for the State of California.

California Geological Survey, 1997, Special Publication 43, Fault Rupture Hazard Zones in California.

Harwood, D.S., Helley, J.H., and Doukas, M.P., 1981, Geologic Map of the Chico Monocline and Northeastern Part of the Sacramento Valley, California, United States Geological Survey, Department of Interior.

Helley, J.H., Harwood, D.S., 1985, Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California, United States Geological Survey, Department of Interior.

Jennings, C.W., 1994, Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions, California Department of Conservation, Division of Mines and Geology.

Martin, G.R., and Lew, M., 1999, Recommended Procedures for the Implementation of DMG Special Publication 117-A, Guidelines for Analyzing and Mitigating Liquefaction Hazard in California, March.

Saucedo, G.J., and Wagner, C.L., 1992, Geologic Map of the Chico Quadrangle, California, Department of Conservation, Division of Mines and Geology.

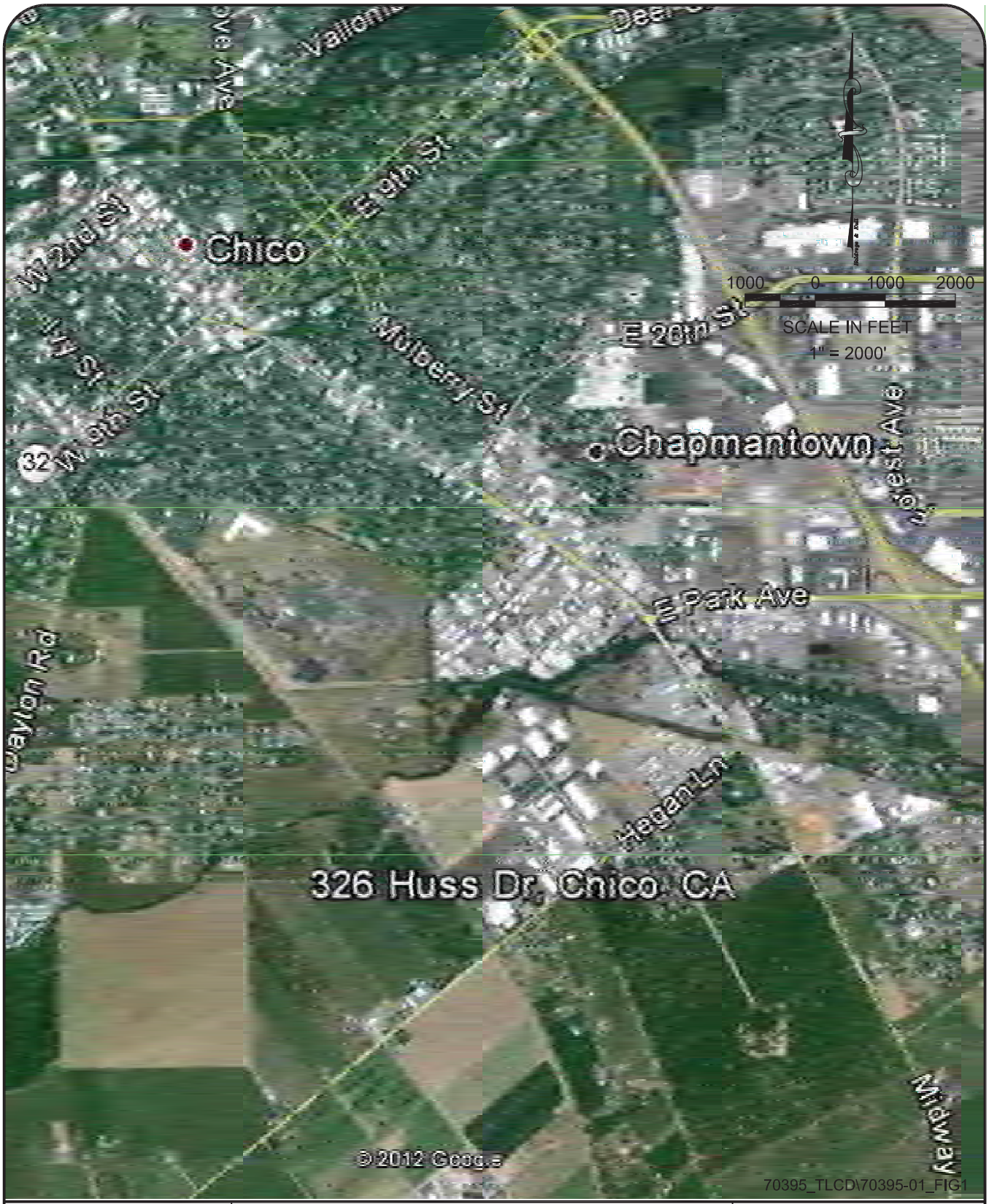
8 LIMITATIONS

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

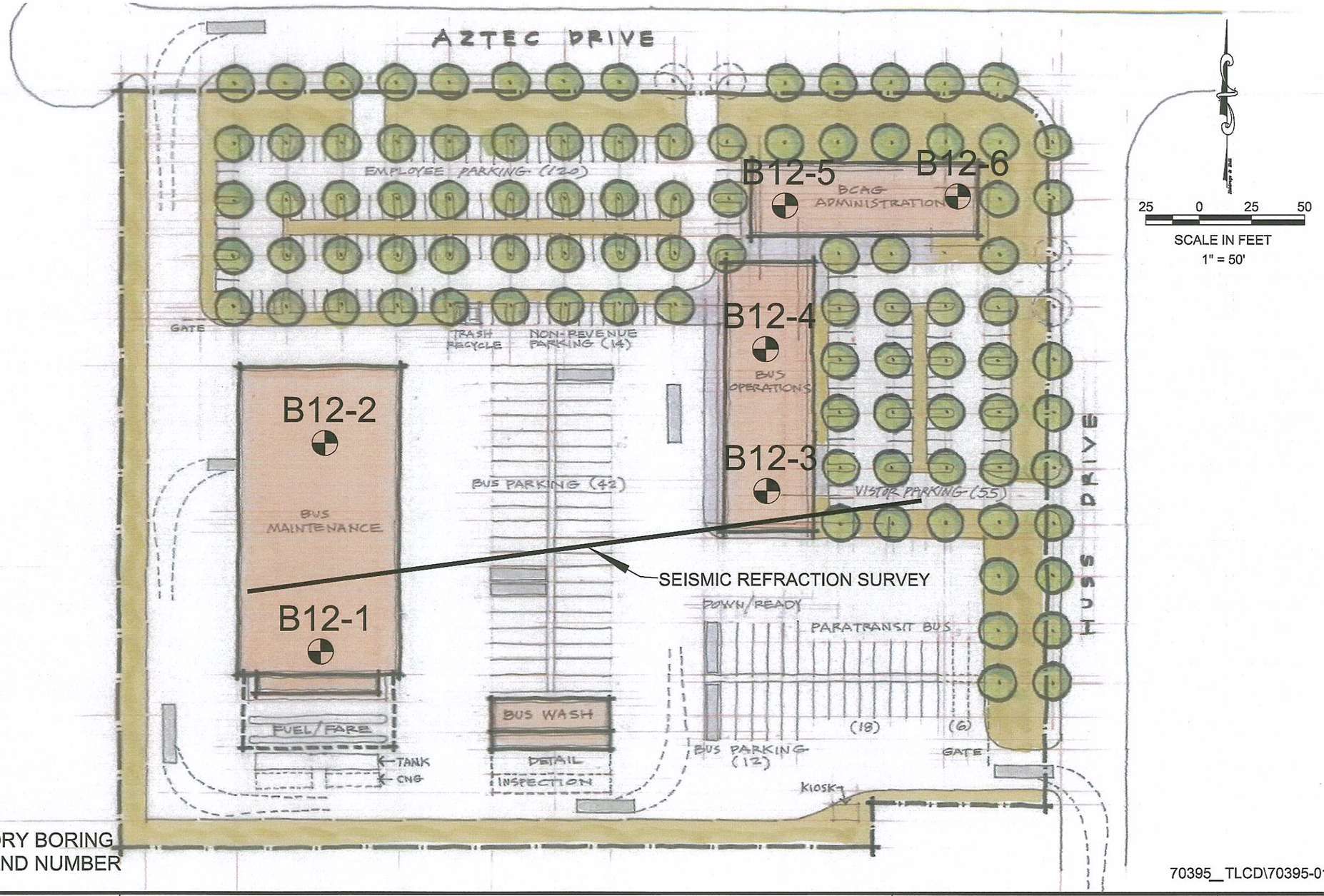
1. This report should not be relied upon without review by H&K if a period of 24 months elapses between the issuance report date shown above and the date when construction commences.
2. Our professional services were performed consistent with the generally accepted geotechnical engineering principles and practices employed in northern California. This warranty is in lieu of all other warranties, either expressed or implied.
3. H&K provided engineering services for the site project consistent with the work scope and contract agreement presented in our proposal and agreed to by our client. The findings, conclusions and recommendations presented in this report apply to the conditions existing when H&K performed our services and are intended only for our client, purposes, locations, time frames, and project parameters described herein. H&K are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to completing our services. H&K do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report. This report is solely for the use of our client unless noted otherwise. Any reliance on this report by a third party is at the party's sole risk.
4. If changes are made to the nature or design of the project as described in this report, then the conclusions and recommendations presented in this report should be considered invalid by all parties. The validity of the conclusions and recommendations presented in this report can only be made by our firm; therefore, H&K should be allowed to review all project changes and prepare written responses with regards to their impacts on our conclusions and recommendations. However, additional fieldwork and laboratory testing may be required for us to develop any modifications to our recommendations. The cost to review project changes and perform additional fieldwork and laboratory testing necessary to modify our recommendations is beyond the scope-of-services presented in this report. Any additional work will be performed only after receipt of an approved scope-of-work, budget and written authorization to proceed.
5. The analyses, conclusions an recommendations presented in this report are based on the site conditions as they existed at the time H&K performed the surface and subsurface field investigations. H&K have assumed that the subsurface soil and groundwater conditions encountered at the location of the exploratory borings are generally representative of the subsurface conditions throughout the entire project site. However, if the actual subsurface conditions encountered during construction are different than those described in this report, then H&K should be notified immediately so that we can review these differences and, if necessary, modify our recommendations.

6. The elevation or depth to the groundwater table underlying the project site may differ with time and location. Therefore, the depth to the groundwater table encountered in our exploratory borings is only representative of the specific time and location where it was observed.
7. The project site map shows approximate exploratory boring and/or boring locations as determined by pacing distances from identifiable site features; therefore, their locations should not be relied upon as being exact nor located with the accuracy of a California licensed land surveyor.
8. Our geotechnical investigation scope-of-services did not include an evaluation of the project site for the presence of hazardous materials. Although, H&K did not observe the presence of hazardous materials at the time of our field investigation all project personnel should be careful and take the necessary precautions should hazardous materials be encountered during construction.
9. Our geotechnical investigation scope-of-services did not include an evaluation of the project site for the presence of mold nor for the future potential development of mold at the project site. If an evaluation of the presence of mold and/or for the future potential development of mold at the site is desired, then the property owner should contact a consulting firm specializing in these types of investigations. Holdrege & Kull does not perform mold evaluation investigations.
10. Our experience and that of the civil engineering profession clearly indicates that during the construction phase of a project the risks of costly design, construction and maintenance problems can be significantly reduced by retaining the design geotechnical engineering firm to review the project plans and specifications and to provide geotechnical engineering CQA observation and testing services. Upon your request we will prepare a CQA geotechnical engineering services proposal that will present a work scope, tentative schedule and fee estimate for you consideration and authorization. If H&K is not retained to provide geotechnical engineering CQA services during the construction phase of the project, then H&K will not be responsible for geotechnical engineering CQA services provided by others nor any aspect of the project that fails to meet your or a third party's expectations in the future.

FIGURES:



HOLDREGE & KULL CONSULTING ENGINEERS • GEOLOGISTS 8 SEVILLE CT., SUITE 100 CHICO, CA 95928 (530) 894-2487 FAX 894-2437	SITE LOCATION MAP BUTTE REGIONAL TRANSIT OPERATIONS CENTER CHICO, BUTTE COUNTY, CALIFORNIA	PROJ NO.: 70395-01 DATE: MAY,2012 FIGURE NO.: 1



LEGEND

B12-1 — EXPLORATORY BORING LOCATION AND NUMBER

70395_TLCD\70395-01.FIG2

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS
8 SEVILLE COURT, SUITE 100
CHICO, CA 95928
530-894-2487 FAX 894-2437

SITE SKETCH AND
EXPLORATORY BORING LOCATION MAP
BUTTE REGIONAL TRANSIT OPERATIONS CENTER
CHICO, BUTTE COUNTY, CALIFORNIA

DRAWN BY: SDC
CHECKED BY: SDC
PROJECT NO.: 70395-01
DATE: MAY,2012

FIGURE NO.: 2

APPENDIX A:

Proposal for Geologic Hazards Evaluation and Geotechnical Engineering Services for the Butte Regional Transit Operations Center (fee and contract agreement sections excluded).

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

December 27, 2011
Proposal No.: PC11.077

Mr. Don Tomasi, AIA
TLCD Architecture
111 Santa Rosa Avenue, Suite 300
Santa Rosa, California 95404
Phone (707) 525-5616

REFERENCE: ***Butte County Association of Governments, Butte Regional Transit Operations Center***
Chico, Butte County, California

SUBJECT: ***Proposal for Geotechnical Engineering Services***

Dear Mr. Tomasi,

In accordance with your request, Holdrege & Kull (H&K) prepared this proposal to provide geotechnical engineering services for the development of the above referenced transit center project. As part of our geotechnical engineering services, H&K will prepare a geotechnical engineering investigation report addressing the proposed development and present our findings, conclusions, and recommendations for earthwork grading and structural improvements. The following presents our understanding of the project and our proposed engineering services.

1.0 PROJECT DESCRIPTION

The site for the proposed transit facility will include the surrounding 10 acre vacant property located adjacent B-Line Transit Facility, 326 Huss Drive, Chico, California. Details of the proposed project can be founding the September 30, 2011, *Consultant Request for Proposals to Develop Plans, Specifications, Estimate and Environmental Documents fro Butte Regional Transit Operations Center, City of Chico, CA*. H&K understands that the proposed development will include the construction of multiple buildings including offices, maintenance shops, and bus wash. H&K assumes that the expansion will consist of the following improvements: one story and two story buildings with steel column and/or wood framing, continuous spread and isolated foundations for the buildings, interior and exterior concrete slab-on-grade floors; drilled pier foundation for parking lot light poles, asphalt concrete (AC) paved roadway and parking lots, and landscaped areas. Earthwork grading will include minor cuts and engineered fills to meet the proposed building grade.

2.0 SCOPE OF SERVICES

H&K proposes to perform the following tasks as basic services with no other additional services included: Task 1 Site Investigation and Laboratory Testing, Task 2 Data Analysis and Engineering Design, Task 3 Report Preparation, and Task 4 Final Design Review. Each task is described in the following:

2.1 Task 1 Site Investigation

H&K will perform a site investigation to characterize the soil, rock and groundwater conditions encountered at the surface and beneath the site to the maximum depth explored. The site investigation information will be used to prepare geotechnical engineering recommendations for earthwork and structural improvements. Our site investigation will include the following components, which are described below: Surface Reconnaissance Investigation, Subsurface Investigation, and Laboratory Testing. This surface and subsurface investigations does not include the evaluation of the site for the presence of hazardous waste materials, groundwater pollutants nor the presence of geologic hazards included in a California Geologic Survey regulated geologic hazards investigation (i.e., hazards from earthquake induced faulting, shaking, liquefaction, landslides, settlement, tsunamis, and sieches, nor hazards from flooding, volcanic activity, naturally occurring asbestos, past and present mining activities, and compressive and expansive soils). Regional faulting and liquefaction potential will be addressed in our report and if other geologic hazards are identified during our site investigation. If a complete geologic hazards evaluation is needed, or geologic conditions are encountered that warrant further investigation and delineation, H&K can revise our proposal to include the hazards listed above.

2.1.1 Surface Reconnaissance Investigation

H&K will perform a surface reconnaissance of the project site to identify surface conditions that may impact the proposed site development plans. In general, H&K's field engineer/geologist will observe and describe surface exposures of the following existing site conditions:

- Site and surrounding land uses.
- Surface soil conditions.
- Existing site improvements including earthwork grading and structures.
- Site topography and drainage.
- Vegetation.

2.1.2 Subsurface Investigation

A minimum of 48 hours prior to performing the subsurface investigation H&K will mark the proposed subsurface exploratory locations with white paint and notify Underground Services Alert (USA) as required by California state law. USA members will inspect each proposed subsurface exploratory location to determine if any underground utilities are present at these locations. The property owner is responsible for marking all known utilities inside the subject property. If USA

identifies the presence of underground utilities at any of the proposed exploratory locations then we will move the excavation location to an area that is clear of underground utilities.

H&K will perform a subsurface investigation to obtain an understanding of the soil, rock and groundwater conditions underlying the project site to the maximum depth drilled. As deemed necessary by our field geologist, up to a maximum of 6 exploratory borings will be advanced using a hollow stem auger drill rig. Each boring will be excavated up to a depth of 20 feet below the existing surface or until refusal is encountered, which ever occurs first. H&K will attempt to locate the exploratory borings at the approximate location of proposed building footprints or where deep foundations may be required and spaced across the site to provide an extrapolated representation of the site subsurface geology. Each exploratory boring will be backfilled immediately after logging and sampling activities are completed using drill cuttings.

H&K' field engineer/geologist will collect both relatively undisturbed and disturbed soil samples from each exploratory trench. Relatively undisturbed soil samples will be collected with a standard penetration test (SPT) sampler and a 2.5-inch-diameter (inside diameter) split-spoon barrel sampler equipped with brass liner tubes. Generally, soil samples will be collected at the following depths below the existing ground surface: 0 feet, 2.0 feet, 5 feet, 10 feet, and continuing on five foot intervals, or change in geologic material, until the boring is terminated. Additional soil samples may be collected and/or the sample intervals may be changed depending upon the soil conditions encountered. The soil samples will be labeled, sealed, and transported to our laboratory facility where selected samples will be tested to determine their engineering material properties. If the groundwater table is encountered, the depth to groundwater below the existing ground surface will be measured.

H&K will perform an in-situ shear-wave velocity profile of the upper 30 meters of the site using SeisOpt® ReMi™ Vs30 Method for shear-wave profiling. The shear wave velocity data will be used to determine a Site Class and seismic design parameters in accordance with Chapter 16 of the 2010 CBC (2009 IBC), and for evaluating the liquefaction potential of the subsurface soil. Each seismic survey line will include 12 geophones on approximate 8-meter spacing, for a total seismic line length of 96 meters. A 48-channel, microprocessor control signal enhancement seismograph will be used to record ambient seismic noise, or micro-tremors, which are constantly being generated by cultural and natural noise. Additional ambient noise will be initiated from vehicles and during exploratory excavations on site.

2.1.3 Laboratory Testing Investigation

H&K will perform laboratory tests on selected soil samples to determine their engineering material properties. All laboratory tests will be performed consistent with the guidelines of the American Society for Testing and Materials (ASTM). The ASTM soil characterization tests may include:

- D2487, Unified Soil Classification System
- D2488, Soil Description Visual Manual Method
- D2937 & D2216, Density and Moisture Content
- D422, Particle Size Distribution, Sieve and Hydrometer Analysis
- D3080, Direct Shear Strength
- D4318, Atterberg Plasticity Indices
- D4829, Expansion Index
- D2844, Resistance Value (R-Value)

If soil is encountered with a high potential for volume change (i.e., expansion or consolidation), then H&K may recommend additional laboratory testing to evaluate expansion or consolidation impacts and provide appropriate recommendations on the proposed earthwork and structural improvements. Additional testing may include ASTM D2435 one-dimensional consolidation, ASTM D4546 one-dimensional swell, and ASTM D4767 consolidated-undrained triaxial shear strength. The costs to perform these additional tests are not included in the fee estimate presented herein. H&K will not perform these additional tests without written authorization to proceed and a budget augmentation to cover the cost of performing these additional laboratory tests.

2.2 Task 2, Data Analysis and Engineering Design

H&K will use the state-of-the practice geotechnical engineering analyses methods to evaluate the on-site soil properties. These analyses methods may include but will not be limited to the following:

2.2.1 Data Analysis Methods

- Soil and rock stratigraphy.
- Soil bearing capacity for shallow and deep foundations.
- Lateral earth pressures.
- Soil-Concrete friction coefficients.
- Soil shear strength.
- Soil plasticity indices.
- Soil expansion potential.
- Building and surcharge loads.
- Groundwater seepage and drainage controls
- Pavement design for driveway and parking areas

H&K will develop geotechnical engineering recommendations for earthwork and structural improvements and provide applicable recommendations. The geotechnical engineering recommendations may include but not be limited to the following:

2.2.2 Earthwork Improvement Recommendations

- Site clearing and soil subgrade preparation.
- Exclusion of over size fill soil materials.
- Aerial fill moisture conditioning and compaction requirements.
- Fill soil loose lift (layer) thickness requirements.
- Utility trench backfill material placement and compaction requirements.
- Surface water drainage.
- Expansive soil mitigation (not including lime, flyash or cement treatment details).
- Temporary construction de-watering methods.
- Subdrain systems (if necessary).

2.2.3 Structural Improvements

- Shallow foundation types, dimensions and embedment depths.
- Shallow foundation soil bearing capacity pressures.
- Foundation-soil sliding friction coefficients.
- Concrete slab-on-grade floors.
- Design criteria for roads and parking lot area asphalt concrete pavement.
- Seismic (earthquake shaking) design parameters.

2.3 Task 3 Report Preparation

H&K will prepare a geotechnical engineering report that will present our findings, conclusions, and recommendations. Our geotechnical engineering investigation report will meet or exceed the requirements of the 2010 California Building Code and the accepted geotechnical engineering principals and practices performed in northern California. This report will include descriptions of the site conditions, field investigation, laboratory testing, and geotechnical engineering design recommendations for the proposed earthwork and structural improvements. The report will also include a site plan showing the approximate locations of the exploratory borings, proposed building, parking lot areas, and property boundaries. The report appendices will present the exploratory boring logs and laboratory test data.

H&K will deliver four bound copies of the final report to the address shown on page one of this proposal. The report will be signed and stamped a responsible California licensed civil engineer for this project.

2.3 Task 3 Report Preparation

H&K will review the final earthwork grading and foundation improvement plans and project specifications prior to final submittal for plan review and commencement of construction to determine whether our geotechnical engineering recommendations have been implemented, and if necessary, to provide additional and/or modified recommendations.

3.0 SCHEDULE

Our proposed work schedule is based on our present and expected workload. H&K is prepared to commence work on this project following receipt of a sign contract and notice to proceed. H&K understands that time may be of the essence in the performance of this work, therefore, we will perform our field investigation within two weeks of receiving authorization to proceed, weather and subcontractor availability permitting. H&K can provide verbal preliminary design recommendations immediately following the site investigation based on the field investigation data; however, the final recommendations will be developed from both the field and laboratory data. Therefore, the final recommendations will govern the design. The final report will be submitted within three weeks following completion of our field investigation.

The time required to complete our geotechnical investigation field work may be increased as a result of encountering unforeseen subsurface conditions, adverse weather conditions, soil stability, property access agreement delays or issues, or scheduling of exploratory equipment.

4.0 COST ESTIMATE

H&K proposes to perform the geotechnical investigation for a **lump sum cost of $** , in accordance with the attached 2011 fee schedule and the professional services agreement between TLCD and H&K. This fee includes the cost of a truck mounted drill rig and operator. If the site is not accessible with a truck mounted drill rig due to wet weather, a track mounted drill rig would be required to complete the investigation. An additional fee of $ would be required above and beyond the cost estimate presented above. Invoices will be prepared on a monthly basis as a percent complete, payment terms are NET 30 days. Full payment is due upon completion of the work and issuance of the report.

This cost estimate may require modification if unusual or unexpected site conditions are encountered which significantly change the work scope and increase the associated costs, if the client requests an expansion of the work scope, or if the City of Chico or Butte County requires the purchase of any additional permits. H&K will not perform additional work outside the scope of services presented above until a written authorization to proceed and an approved budget augmentation is received.

4.0 CLOSING

Please sign with blue ink both copies of the attached contract agreement form to indicate your acceptance of this proposed work scope, schedule, and fee estimate. **Return two original signature copies to H&K.** Your signature indicates that you accept the terms and conditions of this contract agreement and is a written authorization for us to proceed with the work scope presented in this proposal and authorizations to enter the proposed properties and perform the subsurface exploration work. H&K will sign the agreement forms and return one fully executed copy to the client.

Holdrege & Kull appreciates the opportunity to provide you with a proposal on this important project. If you should have questions or comments, please do not hesitate to contact the undersigned at (530) 894-2487.

Sincerely,

Holdrege & Kull

Shane D. Cummings, PG, CHG, CEG
Operations Manager

Attachments:

Attachment 1, Holdrege & Kull 2011 Fee Schedule
Attachment 2, Terms & Conditions Contract Agreement Form

APPENDIX B:

Important Information About Your Geotechnical Engineering Investigation Report (Presented with permission of ASFE, Copyright 2004)

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you —* should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

ASFE
The Best People on Earth

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

IIGER06045.0M

APPENDIX C:

Exploratory Boring Logs

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

EXPLORATORY BORING LOG

8 SEVILLE COURT, SUITE 100, CHICO, CA 95928
(530) 894-2487 FAX 894-2437

Boring No. B12-1

Project Name: BCAG BRTOC | **Project No.:** 70395-01 | **Task:** 1 | **Start:** 03/07/12

Location: HUSS DRIVE, CHICO, CA | **Ground Elev. (Ft. MSL):** | **Finish:** 03/07/12 | **Sheet:** 1 of 2

Logged By: CUMMINGS, SHANE | **Drilling Cmpny:** PC EXPLORATION | **Drill Rig Type:** CME 75

Driller: NATE | **Drilling Method:** HOLLOW STEM AUGER | **Hammer Type:** 140 LB AUTO HAMMER

Boring Diam (In.): 7.25 | **Total Depth (Ft.):** 19 | **Backfill or Well Casing:** NATIVE CUTTINGS

Ground Water Information

Date	03/07/12			
Time	14:45			
Depth (ft)	NONE			

Time (H:M)	Pocket Penetrometer (TSF)	Uncorrected Blow Counts (Blows / 6-inch)	Drilling Method and/or Sampler Type	Sample Recovery (Ft./Ft.)	Sample No.	Depth B.G.S. (Ft.)	Sample Interval And Symbol	Well Construction Detail	Graphic Log	Soil and/or Rock Descriptions
										(USCS Symbol; Partical Size (%); Color; Density/Consistency; Moisture; Gradation; Dilatancy; Plasticity; Structure; Cementation; Organics, Fill Material; Other)
14:05			HSA			1				(CL) SANDY CLAY, FLD. EST: 65% LOW PLASTICITY FINES , 35% VERY FINE TO FINE SAND, DARK BROWN (7.5YR 3/4), STIFF, DAMP
						2				
						3				
						4				
						5				
		7	2.5SS			6				
		9			2/2					
14:10	>4.75	10		0.8	L-1	7				
			HSA							
						8				(SM) SILTY SAND, FIELD ESTIMATE: 60% VERY FINE TO FINE SAND , 40% LOW PLASTIC FINES; BROWN (7.5YR, 5/4), MEDIUM DENSE, DRY TO DAMP, SLIGHTLY CEMENTED
						9				
						10				
14:15		6	2.5SS			11				
		17			1/1					
	>4.75	28		1.2	L-2	12				(GM) SITLY GRAVEL, FLD. EST: 40% FINE TO COURSE GRAVEL, 30% FINE TO MEDIUM SAND, 30% LOW PLASTICITY FINES; BROWN (7.5YR 5/4), DENSE, DRY
			HSA							
						13				
						14				SLOW DRILLING
						15				60% GRAVEL, 20% SAND, 20% LOW PLASTICITY FINES
14:30		27	SPT			16				COBBLES
		30								
	>4.75	19		0.5	--	17				
			HSA							
						18				
						19				
14:45										REFUSAL @ 19 FEET
						20				

NOTES:

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

EXPLORATORY BORING LOG

8 SEVILLE COURT, SUITE 100, CHICO, CA 95928
(530) 894-2487 FAX 894-2437

Boring No. B12-2

Project Name: BCAG BRTOC | **Project No.:** 70395-01 | **Task:** 1 | **Start:** 03/07/12 | **Sheet:** 1 of 1

Location: HUSS DRIVE, CHICO, CA | **Ground Elev. (Ft. MSL):** | **Finish:** 03/07/12

Logged By: CUMMINGS, SHANE | **Drilling Cmpny:** PC EXPLORATION | **Drill Rig Type:** CME 75

Driller: NATE | **Drilling Method:** HOLLOW STEM AUGER | **Hammer Type:** 140 LB AUTO HAMMER

Boring Diam (In.): 7.25 | **Total Depth (Ft.):** 16 | **Backfill or Well Casing:** NATIVE CUTTINGS

Ground Water Information

Date	03/07/12			
Time	15:30			
Depth (ft)	NONE			

Time (H:M)	Pocket Penetrometer (TSF)	Uncorrected Blow Counts (Blows / 6-inch)	Drilling Method and/or Sampler Type	Sample Recovery (Ft./Ft.)	Sample No.	Depth B.G.S. (Ft.)	Sample Interval And Symbol	Well Construction Detail	Graphic Log
15:00			HSA			1			
						2			
15:05		6	2.5SS			3			
		12			1/2				
	2.5	11		1.2	L-1	4			
			HSA			5			
15:10		9	2.5SS						
		10			1/1	6			
	2.5	12		0.9	L-2	7			
			HSA						
						8			
						9			
						10			
15:20		6	2.5SS						
		16			2/2	11			
	4.5	15		1.1	L-3	12			
			HSA						
						13			
						14			
						15			
15:30			SPT						
		13				16			
	>4.75	25		1.0	--				
						17			
						18			
						19			
						20			

Soil and/or Rock Descriptions

(USCS Symbol; Partical Size (%); Color; Density/Consistency; Moisture; Gradation; Dilatancy; Plasticity; Structure; Cementation; Organics, Fill Material; Other)

(CL) SANDY CLAY, FLD. EST: 65% LOW PLASTICITY FINES , 35% VERY FINE TO FINE SAND, DARK BROWN (7.5YR 3/4), STIFF, DAMP

(SM) SILTY SAND, FIELD ESTIMATE: 60% VERY FINE TO FINE SAND , 40% LOW PLASTIC FINES; BROWN (7.5YR, 5/4), MEDIUM DENSE, DRY TO DAMP, SLIGHTLY CEMENTED

(GM) SITLY GRAVEL, FLD. EST: 40% FINE TO COURSE GRAVEL, 30% FINE TO MEDIUM SAND, 30% LOW PLASTICITY FINES; BROWN (7.5YR 5/4), DENSE, DRY
VERY HARD DRILLING, COBBLES
REFUSAL @ 16 FEET

NOTES:

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

EXPLORATORY BORING LOG

8 SEVILLE COURT, SUITE 100, CHICO, CA 95928
(530) 894-2487 FAX 894-2437

Boring No. B12-3

Sheet: 1 of 1

Project Name: BCAG BRTOC	**Project No.:** 70395-01	**Task:** 1	**Start:** 03/08/12
Location: HUSS DRIVE, CHICO, CA	**Ground Elev. (Ft. MSL):**		**Finish:** 03/08/12
Logged By: CUMMINGS, SHANE	**Drilling Cmpny:** PC EXPLORATION		**Drill Rig Type:** CME 75
Driller: NATE	**Drilling Method:** HOLLOW STEM AUGER		**Hammer Type:** 140 LB AUTO HAMMER
Boring Diam (In.): 7.25	**Total Depth (Ft.):** 19.5		**Backfill or Well Casing:** NATIVE CUTTINGS

Ground Water Information

Date	03/08/12			
Time	09:50			
Depth (ft)	NONE			

Time (H:M)	Pocket Penetrometer (TSF)	Uncorrected Blow Counts (Blows / 6-inch)	Drilling Method and/or Sampler Type	Sample Recovery (Ft./Ft.)	Sample No.	Depth B.G.S. (Ft.)	Sample Interval And Symbol	Well Construction Detail	Graphic Log	Soil and/or Rock Descriptions (USCS Symbol; Partical Size (%); Color; Density/Consistency; Moisture; Gradation; Dilatancy; Plasticity; Structure; Cementation; Organics, Fill Material; Other)
09:20			HSA			1				(CL) SANDY CLAY, FLD. EST: 65% LOW PLASTICITY FINES , 35% VERY FINE TO FINE SAND, DARK BROWN (7.5YR 3/4), STIFF, DAMP
						2				BULK SAMPLE ID: 030712A, COLLECTED FROM 0 TO 5 FEET
09:25		5	SPT			3				
		2								
	1.5	3		1.5	--	4				
			HSA			5				
09:30		2	SPT							
		5				6				
	2.0	4		1.5	--					
			HSA			7				
						8				
						9				
						10				
09:35		5	SPT							
		8				11				
	2.0	10		1.5	--					(SM) SILTY SAND, FIELD ESTIMATE: 60% VERY FINE TO FINE SAND , 40% LOW PLASTIC FINES; BROWN (7.5YR, 5/4), MEDIUM DENSE, DRY TO DAMP, SLIGHTLY CEMENTED
			HSA			12				
						13				
						14				
						15				
09:40		4	SPT							
		7				16				
	3.75	11		1.5	--					
			HSA			17				
						18				
						19				(GM) SITLY GRAVEL, FLD. EST: 40% FINE TO COURSE GRAVEL, 30% FINE TO MEDIUM SAND, 30% LOW PLASTICITY FINES; BROWN (7.5YR 5/4), DENSE, DRY
09:50						20				REFUSAL @ 19.5 FEET

NOTES:

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

EXPLORATORY BORING LOG

8 SEVILLE COURT, SUITE 100, CHICO, CA 95928
(530) 894-2487 FAX 894-2437

Boring No. B12-4

Project Name: BCAG BRTOC | **Project No.:** 70395-01 | **Task:** 1 | **Start:** 03/08/12 | **Sheet:** 1 of 1

Location: HUSS DRIVE, CHICO, CA | **Ground Elev. (Ft. MSL):** | **Finish:** 03/08/12

Logged By: CUMMINGS, SHANE | **Drilling Cmpny:** PC EXPLORATION | **Drill Rig Type:** CME 75

Driller: NATE | **Drilling Method:** HOLLOW STEM AUGER | **Hammer Type:** 140 LB AUTO HAMMER

Boring Diam (In.): 7.25 | **Total Depth (Ft.):** 18 | **Backfill or Well Casing:** NATIVE CUTTINGS

Ground Water Information

Date	03/08/12			
Time	10:35			
Depth (ft)	NONE			

Time (H:M)	Pocket Penetrometer (TSF)	Uncorrected Blow Counts (Blows / 6-inch)	Drilling Method and/or Sampler Type	Sample Recovery (Ft./Ft.)	Sample No.	Depth B.G.S. (Ft.)	Sample Interval And Symbol	Well Construction Detail	Graphic Log	Soil and/or Rock Descriptions
10:00			HSA			1				(CL) SANDY CLAY, FLD. EST: 65% LOW PLASTICITY FINES , 35% VERY FINE TO FINE SAND, DARK BROWN (7.5YR 3/4), STIFF, DAMP
						2				
10:05		4	SPT			3				
		3								
	0.5	4		0.8	--	4				
			HSA			5				
10:10		3	SPT							
		4				6				
	2.0	10		1.2	--	7				
			HSA							
						8				
						9				
						10				
10:20		4	SPT							
		6				11				
	2.0	8		1.5	--					(SM) SILTY SAND, FIELD ESTIMATE: 60% VERY FINE TO FINE SAND , 40% LOW PLASTIC FINES; BROWN (7.5YR, 5/4), MEDIUM DENSE, DRY TO DAMP, SLIGHTLY CEMENTED
			HSA			12				
						13				
						14				
						15				
10:25		2	SPT							
		8				16				
	2.5	10		1.5	--					
			HSA			17				
										(GM) SITLY GRAVEL, FLD. EST: 40% FINE TO COURSE GRAVEL, 30% FINE TO MEDIUM SAND, 30% LOW PLASTICITY FINES; BROWN (7.5YR 5/4), DENSE, DRY
10:35						18				REFUSAL @ 18 FEET
						19				
						20				

NOTES:

HOLDREGE & KULL
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EXPLORATORY BORING LOG

8 SEVILLE COURT, SUITE 100, CHICO, CA 95928
(530) 894-2487 FAX 894-2437

Boring No. B12-5

Project Name: BCAG BRTOC | **Project No.:** 70395-01 | **Task:** | **Start:** 03/08/12 | **Sheet:** 1 of 1

Location: HUSS DRIVE, CHICO, CA | **Ground Elev. (Ft. MSL):** | **Finish:** 03/08/12

Logged By: CUMMINGS, SHANE | **Drilling Cmpny:** PC EXPLORATION | **Drill Rig Type:** CME 75

Driller: NATE | **Drilling Method:** HOLLOW STEM AUGER | **Hammer Type:** 140 LB AUTO HAMMER

Boring Diam (In.): 7.25 | **Total Depth (Ft.):** 18 | **Backfill or Well Casing:** NATIVE CUTTINGS

Ground Water Information

Date	03/08/12			
Time	11:20			
Depth (ft)	NONE			

Time (H:M)	Pocket Penetrometer (TSF)	Uncorrected Blow Counts (Blows / 6-inch)	Drilling Method and/or Sampler Type	Sample Recovery (Ft./Ft.)	Sample No.	Depth B.G.S. (Ft.)	Sample Interval And Symbol	Well Construction Detail	Graphic Log	Soil and/or Rock Descriptions
10:45			HSA			1				(CL) SANDY CLAY, FLD. EST: 65% LOW PLASTICITY FINES , 35% VERY FINE TO FINE SAND, DARK BROWN (7.5YR 3/4), STIFF, DAMP
						2				
10:50		3	SPT			3				
		3								
	2.5	3		1.5	--	4				
			HSA			5				
10:55		3	SPT							
		6				6				
	2.25	4		0.7	--	7				
			HSA							
						8				
						9				
						10				
11:05		4	SPT							
		4				11				
	2.5	5		1.5	--	12				(SM) SILTY SAND, FIELD ESTIMATE: 60% VERY FINE TO FINE SAND , 40% LOW PLASTIC FINES; BROWN (7.5YR, 5/4), MEDIUM DENSE, DRY TO DAMP, SLIGHTLY CEMENTED
			HSA			13				
						14				
						15				(GM) SITLY GRAVEL, FLD. EST: 40% FINE TO COURSE GRAVEL, 30% FINE TO MEDIUM SAND, 30% LOW PLASTICITY FINES; BROWN (7.5YR 5/4), DENSE, DRY
11:10		35	SPT							
	--	50/4		--	--	16				REFUSAL @ 16.5 FEET
11:20			HSA			17				
						18				
						19				
						20				

NOTES:

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EXPLORATORY BORING LOG

8 SEVILLE COURT, SUITE 100, CHICO, CA 95928
(530) 894-2487 FAX 894-2437

Boring No. B12-6

Sheet: 1 of 1

Project Name: BCAG BRTOC	**Project No.:** 70395-01	**Task:**	**Start:** 03/08/12
Location: HUSS DRIVE, CHICO, CA	**Ground Elev. (Ft. MSL):**		**Finish:** 03/08/12
Logged By: CUMMINGS, SHANE	**Drilling Cmpny:** PC EXPLORATION		**Drill Rig Type:** CME 75
Driller: NATE	**Drilling Method:** HOLLOW STEM AUGER		**Hammer Type:** 140 LB AUTO HAMMER
Boring Diam (In.): 7.25	**Total Depth (Ft.):** 17.5	**Backfill or Well Casing:** NATIVE CUTTINGS	

Ground Water Information

Date	03/08/12			
Time	12:05			
Depth (ft)	NONE			

Time (H:M)	Pocket Penetrometer (TSF)	Uncorrected Blow Counts (Blows / 6-inch)	Drilling Method and/or Sampler Type	Sample Recovery (Ft./Ft.)	Sample No.	Depth B.G.S. (Ft.)	Sample Interval And Symbol	Well Construction Detail	Graphic Log	Soil and/or Rock Descriptions
										(USCS Symbol; Partical Size (%); Color; Density/Consistency; Moisture; Gradation; Dilatancy; Plasticity; Structure; Cementation; Organics, Fill Material; Other)
11:30			HSA			1				(CL) SANDY CLAY, FLD. EST: 65% LOW PLASTICITY FINES , 35% VERY FINE TO FINE SAND, DARK BROWN (7.5YR 3/4), STIFF, DAMP
						2				
11:35		5	SPT			3				
		2								
	1.5	4		1.5	--	4				
			HSA			5				
11:40		4	SPT							
		6				6				
	1.5	5		1.5	--					
			HSA			7				
						8				
						9				
						10				(SM) SILTY SAND, FIELD ESTIMATE: 60% VERY FINE TO FINE SAND , 40% LOW PLASTIC FINES; BROWN (7.5YR, 5/4), MEDIUM DENSE, DRY TO DAMP, SLIGHTLY CEMENTED
11:45		4	SPT							
		5				11				
	--	3		--	--					
			HSA			12				
						13				
						14				
						15				
12:00		3	SPT							
		4				16				
	--	8		--	--					
			HSA			17				
12:05						18				(GM) SITLY GRAVEL, FLD. EST: 40% FINE TO COURSE GRAVEL, 30% FINE TO MEDIUM SAND, 30% LOW PLASTICITY FINES; BROWN (7.5YR 5/4), DENSE, DRY
										REFUSAL @ 17.5 FEET
						19				
						20				

NOTES:

APPENDIX D:

Soil Laboratory Test Sheets

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

Moisture & Density

ASTM D2216 & D2937

DSA File #:
DSA Appl #:

Project No.:	70395-01	Project Name:	BCAG-Butte Regional Operation Transit Center	Date:	3/14/2012
Lab No.:	15-12-026	Performed By:	MLH	Checked By:	JHA

Boring/Trench No.	Units	B12-1	B12-1	B12-2	B12-2					
SAMPLE LOCATION DATA										
Sample No.		L1-1/2	L2-1/1	L2-1/1	L3-1/2					
Depth Interval	(ft.)	5	10	5	10					
Sample Description		Reddish Brown (5YR 4/3) Lean Clay with Sand	Reddish Brown (5YR 4/4) Silty Sand with Gravel	Reddish Brown (5YR 4/3) Lean Clay with Sand (unconfined test performed on sample)	Reddish Brown (5YR 4/3) Silty Sand					
USCS Symbol										
SAMPLE DIMENSION AND WEIGHT DATA										
Sample Length	(in)	5.940	6.000	5.490	6.000					
Sample Diameter	(in)	2.430	2.430	2.430	2.430					
Sample Volume	(cf)	0.0159	0.0161	0.0147	0.0161					
Wet Soil + Tube Wt.	(gr)	906.00	1135.30	873.20	1118.90					
Tube Wt.	(gr)	151.82	272.80	154.20	273.50					
Wet Soil Wt.	(gr)	754.18	862.50	719.00	845.40					
MOISTURE CONTENT DATA										
Tare No.		B2	EZ1	nb	OJ					
Tare Wt.	(gr)	151.82	155.26	154.20	166.11					
Wet Soil + Tare Wt.	(gr)	269.20	313.50	288.10	245.10					
Dry Soil + Tare Wt.	(gr)	251.64	299.30	269.24	228.49					
Water Wt.	(gr)	17.56	14.20	18.86	16.61					
Dry Soil Wt.	(gr)	99.82	144.04	115.04	62.38					
Moisture Content	(%)	17.6	9.9	16.4	26.6					
TEST RESULTS										
Wet Unit Wt.	(pcf)	104.3	118.1	107.6	115.7					
Moisture Content	(%)	17.6	9.9	16.4	26.6					
Dry Unit Wt.	(pcf)	88.7	107.5	92.4	91.4					
MOISTURE CORRECTION DATA										
Gauge Moisture	(%)									
K Value Correction Factor										
COMPACTION CURVE DATA (ASTM D698, ASTM D1557, or CAL216)										
Test Method										
Curve No.										
Max Wet Unit Wt.	(pcf)									
Max Dry Unit Wt.	(pcf)									
Optimum Moisture	(%)									
Wet Relative Comp.	(%)									
Dry Relative Comp.	(%)									

HOLDREGE & KULL

(530) 478-1305 - Fax (530) 478-1019 - 792 Searls Ave.- Nevada City, CA 95959 - A California Corporation

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Atterberg Indices

ASTM D4318

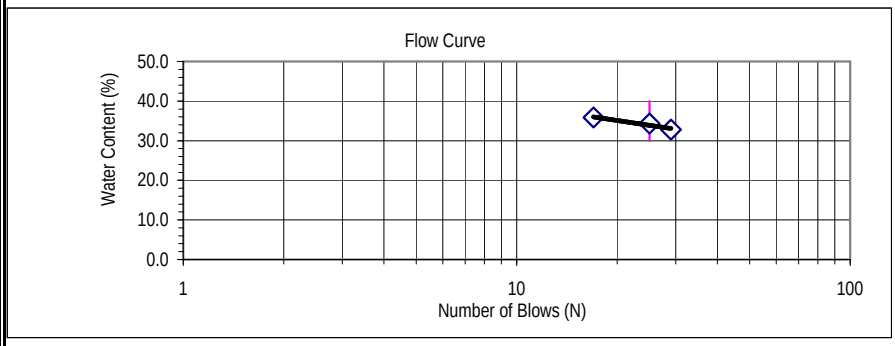
DSA File #:
DSA Appl #:

Project No.:	**70395-01**	Project Name:	**BCAG-Butte Regional Operation Transit Center**	Date:	**3/14/2012**
Sample No.:	**030812A**	Boring/Trench:	**B12-3**	Depth, (ft.): **0-5**	Tested By: **MLH**
Description:	**Reddish Brown (5YR 4/3) Lean Clay with Sand**			Checked By:	**JHA**
Sample Location:				Lab. No.:	**15-12-026**

Estimated % of Sample Retained on No. 40 Sieve: <10% Sample Air Dried: yes

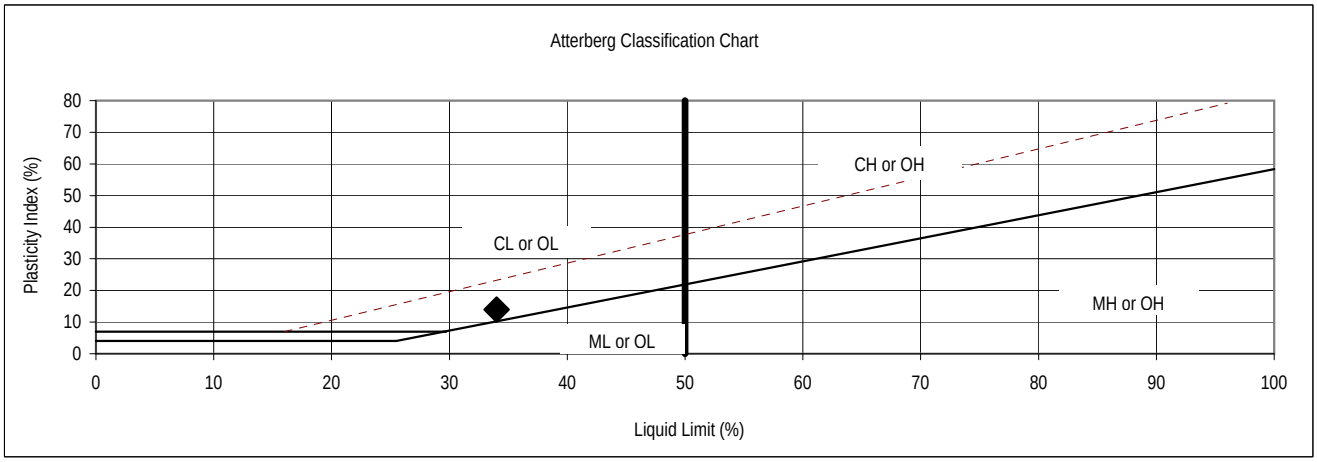
Test Method A or B: A

	LIQUID LIMIT:					PLASTIC LIMIT:		
Sample No.:	1	2	3	4	5	1	2	3
Pan ID:	LC	HK	AT			25	LD	
Wt. Pan (gr)	15.01	14.92	15.27			15.29	15.20	
Wt. Wet Soil + Pan (gr)	27.41	27.09	28.30			20.53	20.82	
Wt. Dry Soil + Pan (gr)	24.35	23.98	24.86			19.65	19.90	
Wt. Water (gr)	3.06	3.11	3.44			0.88	0.92	
Wt. Dry Soil (gr)	9.34	9.06	9.59			4.36	4.70	
Water Content (%)	32.8	34.3	35.9			20.2	19.6	
Number of Blows, N	29	25	17					
				LIQUID LIMIT =	34		PLASTIC LIMIT =	20



Plasticity Index = 14

Group Symbol = CL



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PARTICLE SIZE DISTRIBUTION TEST WORK SHEET

ASTM D422

DSA File #:
DSA Appl #:

Sieve Only Analysis Worksheet

Project No.:	**70395-01**	Project Name:	**BCAG-Butte Regional Operation Transit Center**			Date:	**3/14/2012**
Sample No.:	**030812A**	Boring/Trench:	**B12-3**	Depth, (ft.):	**0-5**	Tested By:	**MLH**
Description:	**Reddish Brown (5YR 4/3) Lean Clay with Sand**					Checked By:	**JHA**
Sample Location:						Lab. No.:	**15-12-026**

Moisture Content Data:

Pan ID	17B	
Pan Weight	50.59	(gm)
Wet Soil + Pan	111.11	(gm)
Dry Soil + Pan	109.69	(gm)
Water Weight	1.42	(gm)
Dry Soil Weight	59.10	(gm)
Moisture Content	2.4	(%)

Total Material Sample Data:

Pan ID	0	
Pan Weight	0.00	(gm)
Wet Soil + Pan Wt.	1,178.58	(gm)
Total Wet Weight	1,178.58	(gm)
Total Dry Weight	1,150.94	(gm)
Total Dry Wt. >#4 Sieve	0.78	(gm)
Total Dry Wt.<#4 Sieve	1,150.16	(gm)
Total Dry Wt. <#200 Sieve	836.57	(gm)
Total Percent <#200 Sieve	72.69	(%)

GRAVEL PORTION SIEVE ANALYSIS
(Portion Retained On > #4 Sieve)

Sieve Size	Particle Diameter		Wet Weight	Dry Weight			
	Inches (in.)	Millimeter (mm)	Retained On Sieve (gm)	Retained On Sieve (gm)	Accum. On Sieve (gm)	Passing Sieve (gm)	Percent Passing (%)
6 Inch	6.0000	152.40			0.00	1,150.94	100.0
3 Inch	3.0000	76.20			0.00	1,150.94	100.0
2 Inch	2.0000	50.80			0.00	1,150.94	100.0
1.5 Inch	1.5000	38.10			0.00	1,150.94	100.0
1.0 Inch	1.0000	25.40			0.00	1,150.94	100.0
3/4 Inch	0.7500	19.05			0.00	1,150.94	100.0
1/2 Inch	0.5000	12.70			0.00	1,150.94	100.0
3/8 Inch	0.3750	9.53	0.00	0.00	0.00	1,150.94	100.0
#4	0.1870	4.75	0.78	0.78	0.78	1,150.16	99.9
PAN			1,177.80	1,150.16	1,150.94	0.00	

SAND PORTION SIEVE ANALYSIS
(Portion Retained On < #4 Sieves)

Representative Sample Data:

Pan ID	X1	
Pan Weight	151.88	(gm)
Wet Soil + Pan	204.95	(gm)
Wet Soil	53.07	(gm)
Dry Soil	51.82	(gm)

#200 Wash Data:

Portion >#200 Sieve:	14.13	(gm)
Portion <#200 Sieve:	37.69	(gm)
Percent <#200 Sieve	72.74	(%)
Total Wt. <#200 Sieve	836.57	(gm)

Sieve Size	Particle Diameter		Dry Weight Rep. Sample		Total Sample Weight Retained (gm)	Accum. Grand Total On Sieve (gm)	Total Percent Passing (%)
	Inches (in.)	Millimeter (mm)	Retained On Sieve (gm)	Percent Retained (%)			
#10	0.079	2.000	0.19	0.37	4.22	5.00	99.6
#20	0.033	0.850	0.35	0.68	7.77	12.76	98.9
#40	0.017	0.425	0.78	1.51	17.31	30.08	97.4
#60	0.010	0.250	1.74	3.36	38.62	68.69	94.0
#100	0.006	0.150	3.71	7.16	82.34	151.03	86.9
#200	0.003	0.075	7.36	14.20	163.34	314.37	72.7
PAN			Discard				

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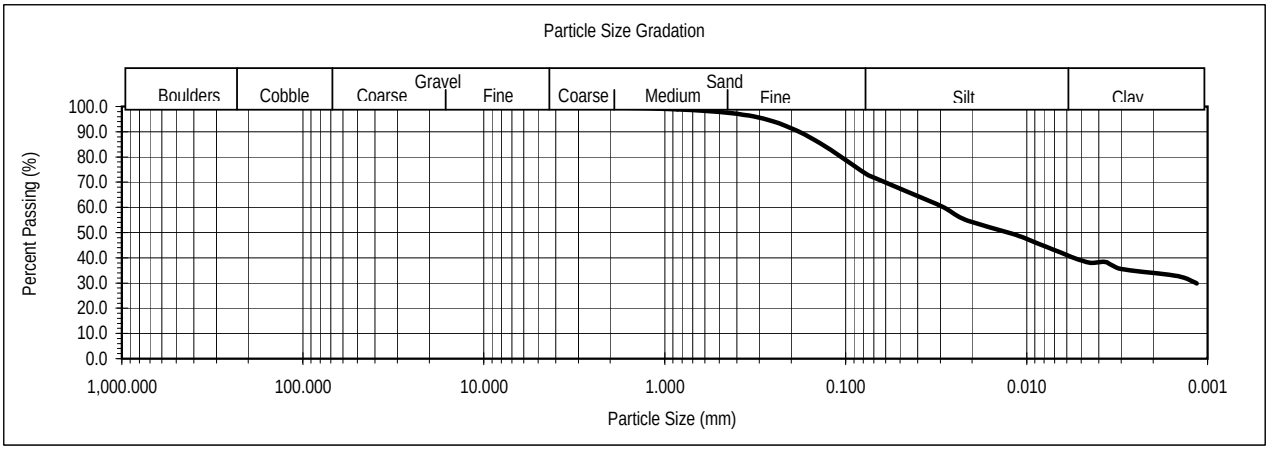
Particle Size Distribution

ASTM D422

Project No.:	**70395-01**	Project Name:	**BCAG-Butte Regional Operation Transit Center**	Date:	**3/14/2012**
Sample No.:	**030812A**	Boring/Trench:	**B12-3**	Depth, (ft.): **0-5**	Tested By: **MLH**
Description:	**Reddish Brown (5YR 4/3) Lean Clay with Sand**			Checked By:	**JHA**
Sample Location:				Lab. No.:	**15-12-026**

Sieve Size	Particle Diameter		Dry Weight on Sieve			Percent
	Inches	Millimeter	Retained On Sieve	Accumulated On Sieve	Passing Sieve	Passing
(U.S. Standard)	(in.)	(mm)	(gm)	(gm)	(gm)	(%)
6 Inch	6.0000	152.4		0.0	1,150.9	100.0
3 Inch	3.0000	76.2		0.0	1,150.9	100.0
2 Inch	2.0000	50.8		0.0	1,150.9	100.0
1.5 Inch	1.5000	38.1		0.0	1,150.9	100.0
1.0 Inch	1.0000	25.4		0.0	1,150.9	100.0
3/4 Inch	0.7500	19.1		0.0	1,150.9	100.0
1/2 Inch	0.5000	12.7		0.0	1,150.9	100.0
3/8 Inch	0.3750	9.5	0.00	0.0	1,150.9	100.0
#4	0.1870	4.7500	0.78	0.8	1,150.2	99.9
#10	0.0787	2.0000	4.22	5.0	1,145.9	99.6
#20	0.0335	0.8500	7.77	12.8	1,138.2	98.9
#40	0.0167	0.4250	17.31	30.1	1,120.9	97.4
#60	0.0098	0.2500	38.62	68.7	1,082.3	94.0
#100	0.0059	0.1500	82.34	151.0	999.9	86.9
#200	0.0030	0.0750	163.34	314.4	836.6	72.7
		0.0300				60.6
		0.0218				55.1
		0.0119				49.5
		0.0094				46.7
		0.0075				43.9
Hydrometer		0.0047				38.3
		0.0037				38.3
		0.0030				35.5
		0.0015				32.7
		0.0011				29.9



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Expansion Index/Swell

ASTM D4829

DSA File #:
DSA Appl #:

Project No.:	70395-01	Project Name:	BCAG-Butte Regional Operation Transit Center	Date:	3/14/2012
Sample No.:	030812A	Boring/Trench No.:	B12-3	Depth (ft.) 0-5	Tested By: MLH
Soil Description:	Reddish Brown (5YR 4/3) Lean Clay with Sand				Checked By: JHA
Estimated % of sample retained on #4:	<10%	Notes:	Initial % saturation outside guidelines		Lab. No.: 15-12-026

Specimen Type:	Undisturbed:		Disturbed:		Remolded to:		ASTM Guidelines	
Tube Dia. (Inch) =		Ring Dia. (Inch) =	4	Ring Height (Inch) =	1.00			

FIELD DATA Tube Sample Moisture & Density			LAB DATA		Test wt. Initial	144 Final	Test wt. Initial	Final	Test wt. Initial	Final
Tare Tube Number			Tare Number		NB					
Tare Weight	(gr)		Tare Ring Weight	(gr)	200.93	200.93				
Wet Soil + Tare	(gr)		Tare Pan Weight	(gr)	0.00	154.29				
Dry Soil + Tare	(gr)		Wet Soil + Tare	(gr)	554.61	758.85				
Weight of Water	(gr)	0.00	Dry Soil + Tare	(gr)	513.73	668.02	0.00		0.00	
Dry Soil Weight	(gr)	0.00	Weight of Water	(gr)	40.88	90.83	0.00	0.00	0.00	0.00
Moisture Content	(%)	0.00	Dry Soil Weight	(gr)	312.80	312.80	0.00	0.00	0.00	0.00
Soil Height	(In.)		Moisture Content	(%)	13.07	29.04	0.00	0.00	0.00	0.00
Wet Unit Weight	(pcf)		Wet Unit Weight	(pcf)	107.23	118.62				
Dry Unit Weight	(pcf)		Dry Unit Weight	(pcf)	94.84	91.92				
			Sample Height	(Inches)	1.00	1.032				
Specific Gravity		2.7	Percent Saturation		45.44	94.14				

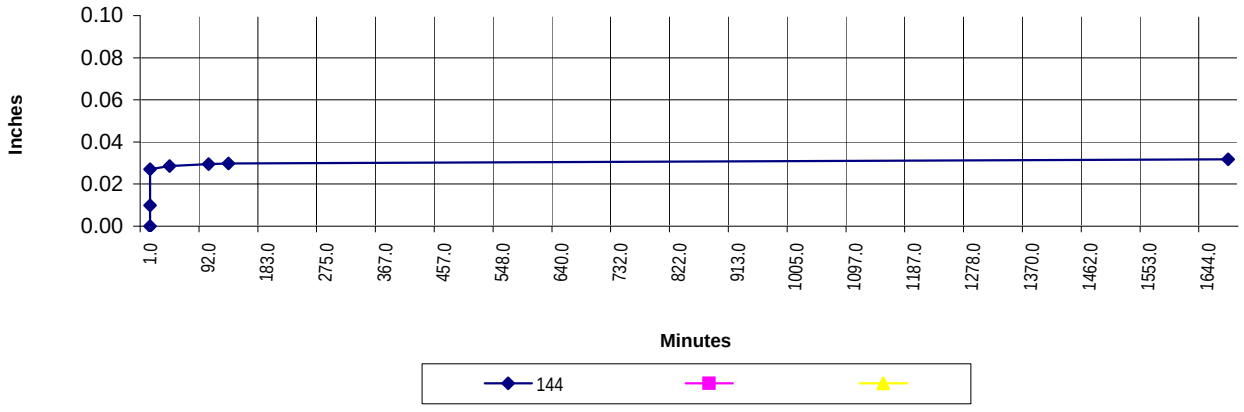
Expansion Index Number

Surcharge (psf)		Uncorrected	Corrected to 50% Saturation
Test wt.	144	32	29
Test wt.			
Test wt.			

Elapsed Time (m:s)	Change in Height (Inches)	Elapsed Time (m:s)	Change in Height (Inches)	Elapsed Time (m:s)	Change in Height (Inches)
2.0	0.0000				
4.0	0.0099				
20.0	0.0270				
44.0	0.0285				
107.0	0.0295				
150.0	0.0298				
1693.0	0.0317				

Expansion Index Values and Descriptions	
Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High

Expansion Versus Time



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UNCONFINED COMPRESSION

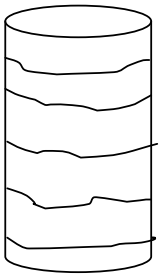
ASTM D2166

DSA File #:
DSA Appl #:

Project No.:	70395-01	Project Name:	BCAG-Butte Regional Operation Transit Center			Date:	3/14/2012
Sample No.:	L2-1/1	Boring/Trench No.:	B12-2	Depth (ft.)	5	Tested By:	MLH
Soil Description:	Reddish Brown (5YR 4/3) Lean Clay with Sand					Check By:	JHA
Sample Location:						Lab No.:	15-12-026

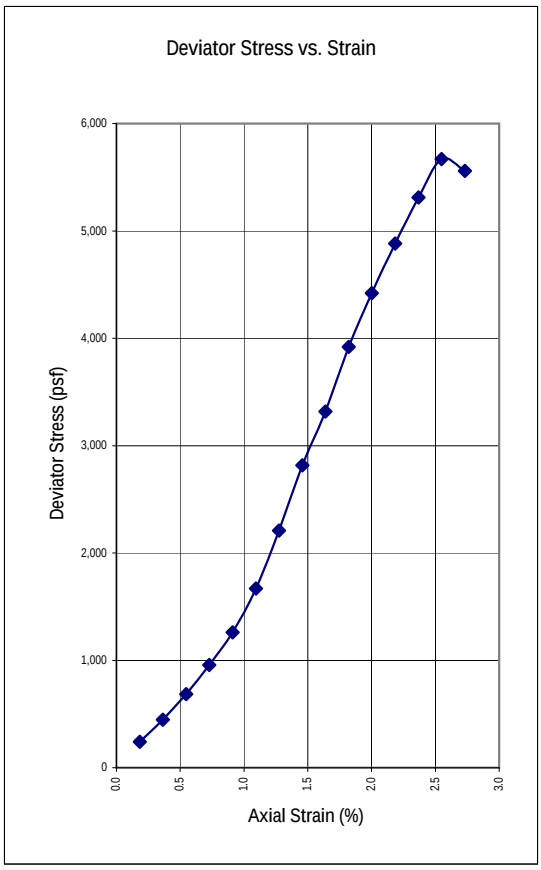
Sample Data		
Tare Tube Number	I.D.	NB
Tare Weight	(gm)	154.20
Wet Soil + Tare	(gm)	873.20
Dry Soil + Tare	(gm)	771.90
Weight of Water	(gm)	101.30
Dry Soil Weight	(gm)	617.70
Moisture Content	(%)	16.40
Soil Height	(cm)	13.95
Sample Diameter	(cm)	6.17
Wet Unit Weight	(pcf)	107.62
Dry Unit Weight	(pcf)	92.46
Specific Gravity	(dim)	2.70
Saturation	(%)	53.85
Strain Rate	(%)	0.01
Proving Ring Constant	(lbs/unit)	1.108

Sample Sketch At Failure



Unconfined Shear Strength = 2,835.0 psf

Elapsed Time (Minutes)	Strain Units (0.001in/unit)	Strain Percent (%)	Area (cm^2)	Load Dial (units)	Load Force (lbs)	Deviator Stress (psf)
12:00:00	10	0.18	29.95	7	7.76	240.6
12:00:30	20	0.36	30.01	13	14.40	445.9
12:01:00	30	0.55	30.06	20	22.16	684.8
12:01:30	40	0.73	30.12	28	31.02	957.0
12:02:00	50	0.91	30.17	37	41.00	1262.2
12:02:30	60	1.09	30.23	49	54.29	1668.5
12:03:00	70	1.27	30.29	65	72.02	2209.3
12:03	80	1.46	30.34	83	91.96	2815.9
12:04:00	90	1.64	30.40	98	108.58	3318.6
12:04:30	100	1.82	30.45	116	128.53	3920.9
12:05:00	110	2.00	30.51	131	145.15	4419.7
12:05:30	120	2.18	30.57	145	160.66	4883.0
12:06:00	130	2.37	30.62	158	175.06	5310.8
12:06:30	140	2.55	30.68	169	187.25	5670.0
12:07	150	2.7311828	30.738776	166	183.93	5558.9



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DIRECT SHEAR TEST

ASTM D3080

DSA File #:

DSA Appl #:

Project No.:	70395-01	Project Name:	BCAG-BRTC			Date:	3/14/2012
Sample No.:	L1-1/1	Boring/Trench No.:	B12-2	Depth (ft.)	2.5	Tested By:	MLH
Soil Description:	Reddish Brown (5YR 4/3) Lean Clay with Sand					Checked By:	JHA
Sample Location:						Lab. No.:	15-12-026

Specimen Type:	Undisturbed:		Disturbed:		Remolded to:		
Tube Dia. (In.) =		Ring Dia. (In.) =	2.43	Ring Height (In.) =	1.00		

FIELD DATA Tube Sample Moisture & Density			LAB DATA	Test No.	1	Test No.	2	Test No.	3
				Initial	Final	Initial	Final	Initial	Final
Tare Tube Number			Tare Number	TK		TC		ST	
Tare Weight	(gr)		Tare Ring Weight (gr)	35.80	0.00	35.79	0.00	42.27	0.00
Wet Soil + Tare	(gr)		Tare Pan Weight (gr)	50.66	50.66	50.66	50.66	50.82	50.82
Dry Soil + Tare	(gr)		Wet Soil + Tare (gr)	212.56	184.51	219.07	189.01	233.60	192.20
Weight of Water	(gr)	0.00	Dry Soil + Tare (gr)	187.30	151.50	196.39	160.60	207.54	165.27
Dry Soil Weight	(gr)	0.00	Weight of Water (gr)	25.26	33.01	22.68	28.41	26.06	26.93
Moisture Content	(%)		Dry Soil Weight (gr)	100.84	100.84	109.94	109.94	114.45	114.45
Soil Height	(In.)		Moisture Content (%)	25.05	32.74	20.63	25.84	22.77	23.53
Wet Unit Weight	(pcf)		Wet Unit Weight (pcf)	103.59	116.36	108.95	120.27	115.43	122.91
Dry Unit Weight	(pcf)		Dry Unit Weight (pcf)	82.84	87.66	90.32	95.58	94.02	99.50

Normal	psf	500	1000	2000	3000	4000	5000	Other Test Parameters
Loading	2.0"	10.26	20.53	41.05	61.58	82.11	102.64	
Legend	2.5"	16.10	32.21	64.41	96.62	128.82	161.03	

Test No.	1	N. Load	1000	Test No.	2	N. Load	2000	Test No.	3	N. Load	4000
SATURATION & CONSOLIDATION				SATURATION & CONSOLIDATION				SATURATION & CONSOLIDATION			
Time (m:s)	Deflect. (Inch)	Time (m:s)	Deflect. (Inch)	Time (m:s)	Deflect. (Inch)	Time (m:s)	Deflect. (Inch)	Time (m:s)	Deflect. (Inch)	Time (m:s)	Deflect. (Inch)
0:00	0.000	4	0.054	0:00	0.000	4	0.093	0:00	0.000	4	0.074
1	0.050	5	0.055	1	0.086	5	0.095	1	0.071	5	0.075
2	0.053			2	0.091			2	0.072		
3	0.053			3	0.092			3	0.073		
Total Deflection =			0.055	Total Deflection =			0.095	Total Deflection =			0.075
SHEAR DATA				SHEAR DATA				SHEAR DATA			
Elapsed Time (m:s)	Shear Strain Inches	Normal Strain Inches	Shear Load (lbs.)	Elapsed Time (m:s)	Shear Strain Inches	Normal Strain Inches	Shear Load (lbs.)	Elapsed Time (m:s)	Shear Strain Inches	Normal Strain Inches	Shear Load (lbs)
12:00:00	0	0	16	12:02:00	0	0.001	17	12:00:00	0	0	16
12:01:00	0.001	0.001	16	12:04:00	0	0.002	17	12:02:00	0	0	17
12:02:00	0.001	0.001	17	12:09:00	0.012	0.007	41	12:05:00	0	0	19
12:04:00	0.001	0.001	17	12:10:00	0.026	0.009	46	12:07:00	0.004	0.001	35
12:05:00	0.001	0.001	18	12:11:00	0.041	0.011	50	12:08:00	0.01	0.002	46
12:06:00	0.001	0.001	19	12:11:30	0.048	0.012	52	12:09:00	0.022	0.004	62
12:07:00	0.006	0.002	24	12:12:00	0.056	0.013	54	12:10:00	0.036	0.005	77
12:08:00	0.018	0.005	28	12:12:30	0.063	0.014	55	12:11:00	0.048	0.006	88
12:10:00	0.037	0.008	32	12:13:00	0.07	0.015	55	12:12:00	0.062	0.007	94
12:11:00	0.052	0.01	35	12:13:30	0.077	0.015	56	12:13:00	0.074	0.008	100
12:13:00	0.083	0.015	38	12:14:00	0.085	0.015	56	12:14:00	0.087	0.008	104
12:14:00	0.099	0.016	40	12:14:30	0.092	0.017	57	12:15:00	0.1	0.009	106
12:15:00	0.105	0.018	40	12:15:00	0.1	0.017	58	12:16:00	0.113	0.009	109
12:16:00	0.131	0.02	41	12:16:00	0.115	0.018	59	12:17:00	0.126	0.01	109
12:17:00	0.147	0.02	42	12:17:00	0.13	0.019	59	12:20:00	0.164	0.01	111
12:18:00	0.162	0.021	43	12:18:00	0.144	0.02	60	12:21:00	0.177	0.012	111
12:19:00	0.178	0.022	43	12:19:30	0.166	0.022	60	12:22:00	0.189	0.013	111
12:20:00	0.193	0.023	43	12:20:00	0.173	0.022	61	12:23:00	0.201	0.013	111
12:21:00	0.208	0.024	44	12:21:00	0.188	0.022	61	12:24:00	0.214	0.014	111
12:22:00	0.223	0.026	44	12:22:00	0.203	0.023	62	12:25:00	0.226	0.013	111
12:23:00	0.238	0.026	44	12:24:00	0.231	0.024	63	12:26:00	0.238	0.014	112
12:24:00	0.253	0.027	45	12:25:00	0.243	0.025	63	12:27:00	0.25	0.015	112
12:25:00	0.268	0.029	44	12:27:00	0.271	0.025	65	12:28:00	0.262	0.016	112

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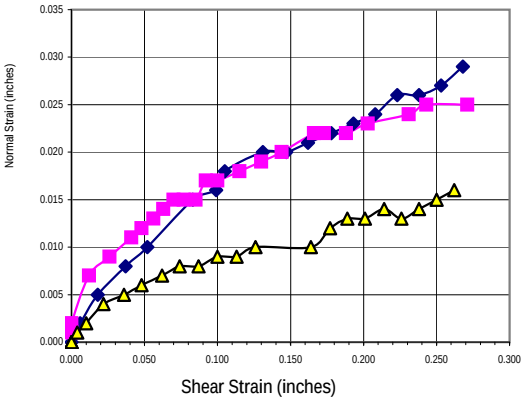
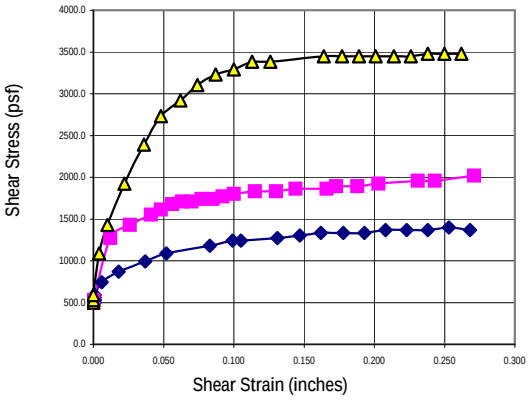
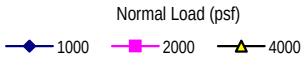
DIRECT SHEAR
TEST RESULTS

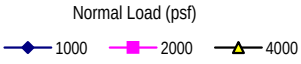
Shear Strain vs. Normal Strain



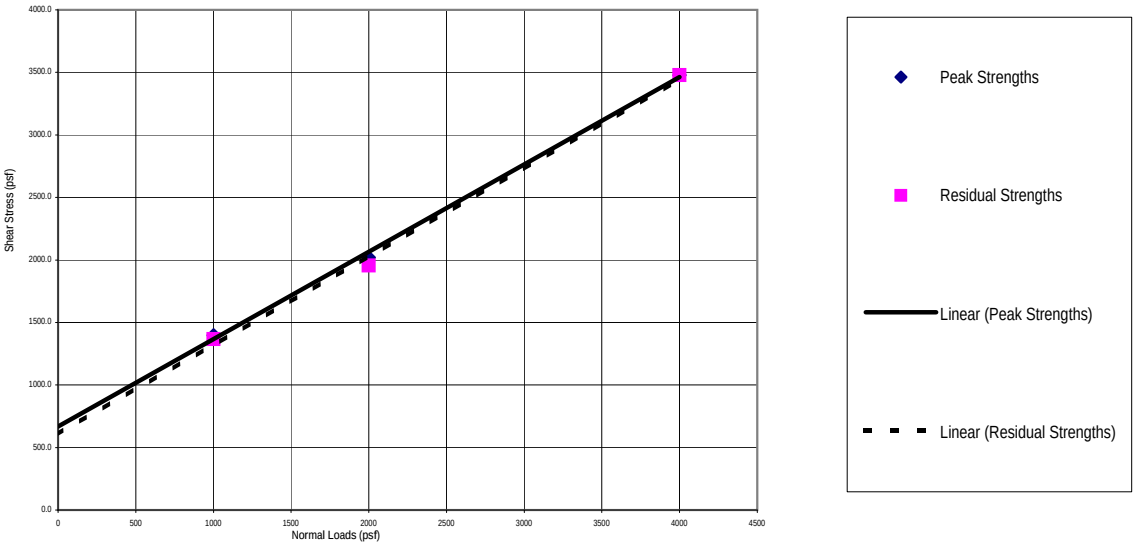
Shear Strain vs. Shear Stress







Mohr-Coulomb Failure Envelope



SHEAR STRENGTH TEST RESULTS		
PARAMETERS	PEAK STRENGTH:	RESIDUAL STRENGTH:
FRICTION ANGLE, (Degree)	34.9	35.5
COHESION, (psf)	668.0	605.0

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PROJECT NAME:	BCAG-BRTC		
PROJECT NO.:	70395-01	DATE:	3/14/2012
BORING / TRENCH NO.:	B12-2	**LAB NO.**	15-12-026
SAMPLE NO.:	L1-1/1	**SAMPLE DEPTH (ft.):**	2.5
DESCRIPTION:	Reddish Brown (5YR 4/3) Lean Clay with Sand		

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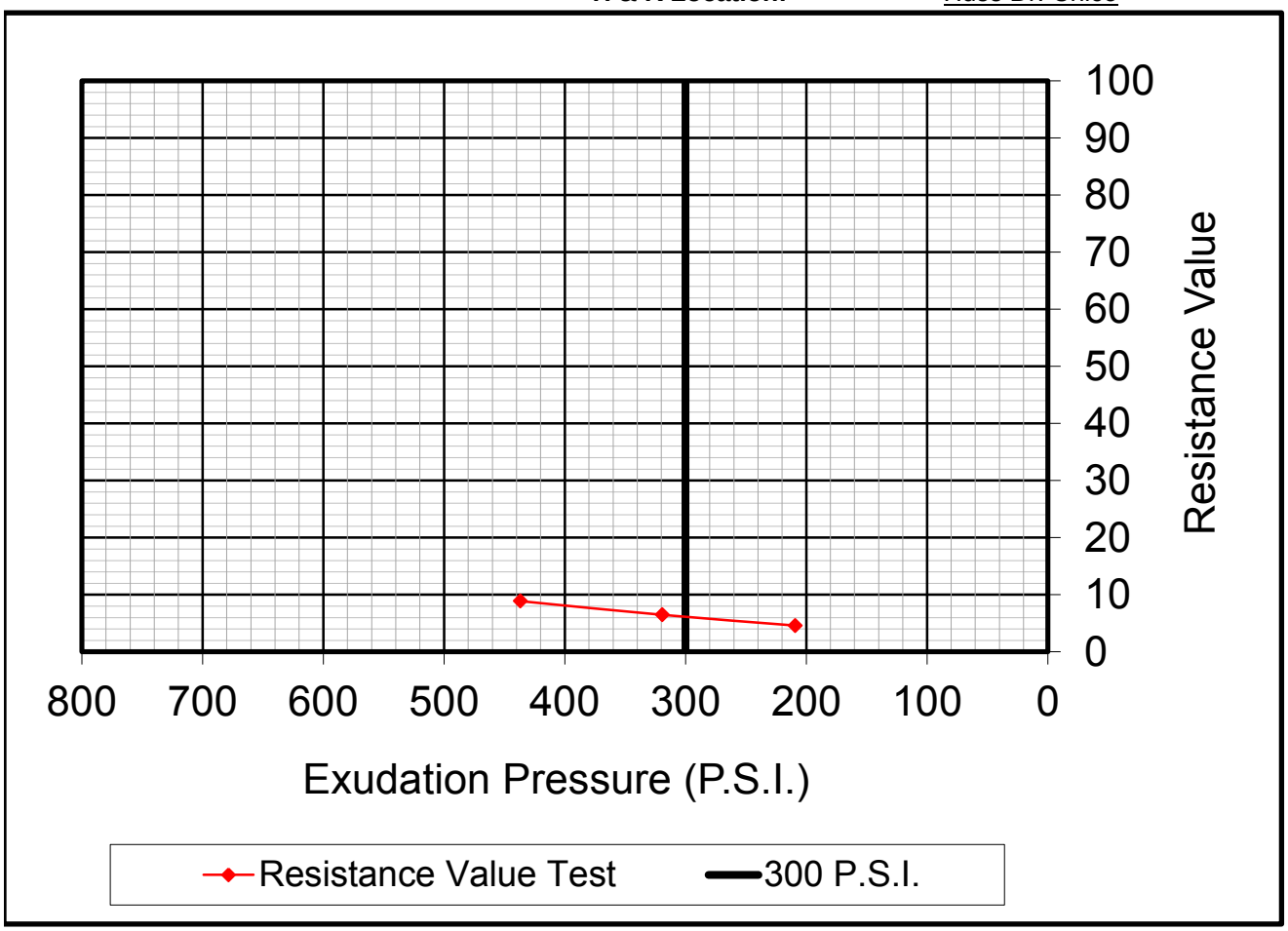
Civil Engineering • Landscape Architecture
CalTrans/AMRL QC/QA • Construction Management

RESISTANCE (R) VALUE TEST

ASTM D 2844

PEI Laboratory No.:	L120115	**H & K Project Name:**	BCAG-BRTC
PEI Client:	Holdrege and Kull-Chico	**H & K Project No.:**	70395
PEI Project Name:	H&K 2012 Laboratory Tes	**H & K Task No.:**	01
PEI Project No.:	120013-02	**H & K Office:**	Chico
Report Date:	February 16, 2012	**H & K Engineer:**	Shane Cummings
Sample Description:	Brown Clay	**H & K Sample No.:**	030812A
		H & K Location:	Huss Dr. Chico



Specimen No.	1	2	3
Moisture Content (%)	20.7	21.4	21.9
Dry Density (PCF)	106.4	106.4	106.6
Resistance Value (R)	9	6	5
Exudation Pressure (PSI)	437	319	209
Expansion Pressure	17	4	0

RESISTANCE VALUE AT 300 P.S.I. 6

AASHTO R18

Reviewed By: _____

Brandon Howard
Assistant Laboratory Manager

3820 Cypress Drive, Suite 3 • Petaluma, CA • 94954-5613 • Tel. (707) 769-5330 • Fax (707) 769-5333
20260 Skypark Drive • Redding, CA • 96002-9221 • Tel. (530) 224-4535 • Fax (530) 224-4539
3485 Sacramento Drive, Suite A • San Luis Obispo, CA • 93401-7156 • Tel. (805) 781-2265 • Fax (805) 781-2267

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

8 Seville Court, Suite 100
Chico, California, 95728
Phone: 530-894-2487
Fax: 530-894-2437

Design Memorandum

Date: August 27, 2013	**Number of Pages Sent:** 3 (including cover)
To: **Don Tomasi**	**From:** **Shane Cummings**
Representing TLCD Architecture 111 Santa Rosa Avenue, Suite 300 Santa Rosa, CA 95404 don.tomasi@tlcd.com	**Fax Number:** **Phone Number:** (707) 525-5616
Reference Project Name or Proposal Name: Butte Regional Transit Operation Center	**Project or Proposal Number:** 70395-02
Subject: Recommendations for Subrade Soil Stabilization Using Lime Treatment	
If faxed, then hard copy to follow by mail:	☐ Yes ☒ No
Requested Action: ☐ Urgent ☐ Comment ☐ Review ☐ Approve ☒ For Your Use	

Comments:

Dear Mr. Tomasi,

Holdrege & Kull (H&K) prepared the following recommendations for amending, moisture conditioning, and compacting the subgrade soil and engineered fill beneath the building pads, parking lots, and roadways by mixing non-hydrated high calcium lime (commonly referred to as quick-lime) with general use Portland cement, such as the product Quicklime Plus, produced by Griffin Soil, or equivalent. The lime-cement soil amendment should be performed at the finished subgrade or in areas that require stabilization for winter work, if needed. The recommendations below are specific for roadways, however, H&K can provide additional recommendations for the application of lime-cement treatment to be used to stabilize site soil to allow winter earthwork.

1. Roadways and Parking Lot Subgrade

    a. Apply non-hydrated, high calcium, lime treatment and general use Portland cement, such as Quicklime Plus, or equivalent to the top 12 inches of the finished subgrade soil below the roadways and parking lots at the site. If the grade of the roadway sections requires more than 12-inches of engineered fill to be placed and the soil moisture content of the finished subgrade soil exceeds the requirements to meet compaction requirements, a thicker section of lime treatment may be required to be performed in separate loose lifts not to exceed 12-inches.

    b. The lime treatment application rate for each 12 inch thick soil layer should be 3 percent by dry weight of the soil to be treated. Assuming that the dry unit weight of the untreated soil is about 110 pounds per cubic foot (pcf); therefore the application rate of 3 percent by dry weight will require about 3.3 pounds per square foot of lime to be applied to each 12 inch thick layer of finished subgrade soil to be treated. Each application of lime-cement should be checked prior to mixing by measuring the weight of lime applied to a pan that is placed in

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Design Memorandum

line with the direction of the applicator truck. The proportioning and spreading should follow the manufacture recommendations.

c. The Quicklime Plus shall be spread and mixed using mechanical equipment. Tailgate spreading, as defined as a manual control of spreading, is not permitted. The spreader truck shall demonstrate the ability to maintain a constant spread rate over the variable travel speeds.

d. Each 12 inch thick soil layer and applied lime should be uniformly spread and mixed together using the mechanical equipment, such as a rototiller type mixer, and then allowed to cure for a minimum of 18 hours. Mixing equipment shall be equipped with a visible depth indicator showing the mixing depth, and odometer or foot meter to indicate travel speed and a controllable water additive system to regulating moisture conditioning and hydrating. No traffic other than the mixing equipment or other related construction equipment will be allowed to pass over the spread Quicklime Plus until after completion of mixing. The moisture content of the mixed section should be approximately 3 percent over optimum as determined by the American Society for Testing and Materials. (ASTM) D1557 method. Following the 18 hour curing period the treated soil should be uniformly mixed again and then compacted. Mixing and re-mixing shall continue until the material is uniformly mixed, free of streaks or pockets of Quicklime Plus or native soil.

e. Each lime treated 12 inch thick soil layer should be initially compacted using a kneading foot compactor and finished using a steel tire or pneumatic tired roller. The maximum compacted thickness of a single layer, shall not exceed 12-inches, however must be demonstrated to the Engineer that the equipment and method of operation will provide the required compacted density throughout the 12-inch layer.

f. Each 18 inch thick lime treated soil layer should be compacted to achieve a minimum relative compaction of 93 percent of the ASTM D1557 maximum dry density with the moisture content between 0 and 3 percentage points of the ASTM D1557 optimum moisture content.

Asphalt Concrete Pavement Design using Quicklime Plus Treated Subgrade

H&K used the Caltrans Design Method D301 to develop several asphalt concrete (AC) pavement and aggregate base (AB) rock design alternatives with the Quicklime Plus, or equivalent amended soil to allow for different traffic loading conditions. H&K used a Traffic Index (TI) of from 4 to 8 which represents typical vehicle traffic for parking lots, residential streets, collector streets, industrial/commercial streets, minor arterial streets, major arterial streets, and truck route arterial streets. The actual TI for the project pavement areas should be determined in accordance with Chapter 600 of the Caltrans Highway Design Manual.

H&K obtained one sample of the on-site soil that we anticipate will be representative of the subgrade soil for the onsite and offsite roads, driveways and parking areas. The soil was tested using mixtures of 2 percent and 4 percent lime and Quicklime Plus by weight. Based on those test results, H&K recommended an application of Quicklime Plus, or equivalent product, at approximately 3 percent by dry weight per cubic foot and used an R-Value of 40 for pavement section recommendations. The actual subsurface soil conditions exposed at the finished subgrade surface of the roadways may be different from this R-Value. The application rate and the finished subgrade soils should be verified at the time of

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Design Memorandum

construction. If a change in material occurs across the site, or if imported fill material is used, these recommendations may need to be modified. The following table presented our pavement design recommendations for 3 percent Quicklime Plus treated subgrade.

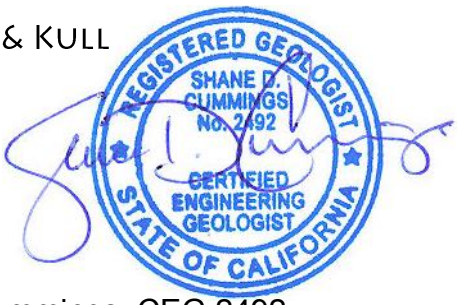
Flexible Pavement Design Using Lime Treated Sugbrade

Parameters	Design Values				
Traffic Description (approximate)	Light Automobiles	Light to Medium Autos and Trucks	Medium to Heavy Trucks	Heavy Trucks	Very Heavy Trucks
Traffic Index (TI)	4	5	6	7	8
Design R-Values Class II AB Rock Subgrade Soil	 78 40	 78 40	 78 40	 78 40	 78 40
AC Thickness (inch)(1)	2.50	3.00	3.50	4.00	5.00
AB Rock Thickness (inch)(2)	6.0	6.0	6.0	7.5	8.5
Subgrade Soil Thickness (inch)	12.0	12.0	12.0	12.0	12.0

Notes:
(1) The asphalt concrete thickness includes the Caltrans safety factor.
(2) H&K recommend that the minimum thickness of AB rock should be 6 inches regardless of what the Caltrans design method indicates. This minimum thickness is necessary for constructability issues and will increase the level of confidence that the roads will achieve the expected service life

H&K appreciates this opportunity to provide geotechnical engineering and construction quality assurance services on this important project. If you have questions, comments, or require additional information, please do not hesitate to contact the undersigned.

Sincerely,
HOLDREGE & KULL



Shane D. Cummings, CEG 2492
Senior Engineering Geologist

Chuck R. Kull, G.E. 2359, CEG 1622
Principal Engineer

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

May 15, 2014
Project No.: 70395A-01

Mr. Andy Newsum
Butte County Association of Governments
2580 Sierra Sunrise Terrace, Suite 100
Chico, California 95928

Reference: ***Butte Regional Transit and Operations Center***
Huss Drive
Chico, Butte County, California

Subject: ***Limited Environmental Soil Assessment Results***

Dear Mr. Newsum,

Holdrege & Kull (H&K) prepared this letter to document soil sampling and the results of laboratory analyses conducted to assess the presence of contaminants along the proposed underground stormwater utility alignment that is adjacent to and parallel with the Sierra Nevada Brewery (SNB) and Union Pacific Railroad (UPRR) tracks in Chico, California. A site location map is provided as Figure 1. The new stormwater alignment will extend past the proposed termination of Aztec Lane, cross the rail line leading to the SNB shipping center parallel along the east side of the UPRR tracks and terminating at Comanche Creek.

Soil along railways have the potential to be impacted by the operation of the railway system and can include the use of creosote, diesel and motor oil hydrocarbons and contain aerially deposited asbestos from historical use in the train break systems.

SOIL SAMPLING AND ANALYSIS

On May 6, 2014, H&K performed soil sampling using a hand auger at two locations (HA1 and HA2) along the proposed stormwater utility alignment and collected 6 discrete soil samples from the upper 4 feet of soil. The soil sample locations are shown on Figure 2. Samples were collected at the surface (i.e., 0 feet below ground surface [bgs]), at 2 feet bgs, and 4 feet bgs. Sampling equipment was cleaned between sample locations using non-phosphate detergent and rinsed with distilled water. Samples were collected in clean containers appropriate for the analyses to be performed. The 6 samples were submitted to SunStar Laboratories, Inc. (SunStar) of Lake Forest California (Environmental Laboratory Accreditation Program [ELAP] No. 2250) for the following analyses:

- Creosote by Environmental Protection Agency (EPA) Method 8270C; and
- Diesel and Motor Oil Hydrocarbons by EPA Method 8015B.

One surface sample was additionally analyzed for the following:

- Organochlorine Pesticides by EPA Method 8081A;
- Organophosphorus Pesticides by EPA Method 8141A; and
- Chlorinated Herbicides by EPA Method 8151A

Each of the six samples was also sent to EMSL Analytical, Inc. (EMSL) of San Leandro, California (ELAP No. 2235) for the following analysis:

- Asbestos in soil by California Air Resources Board method PLM 435 A.

RESULTS

No analytes were detected at concentrations greater than their respective laboratory reporting limits (RLs).

DATA VALIDATION

Project data were reviewed to assess the accuracy of data recording, processing, and transmittal. Field and laboratory quality control data were reviewed for completeness. Sample preservation and holding times were verified. Laboratory RLs were lower than the corresponding California Human Health Screening Levels (CHHSLs) set forth by the California Office of Environmental Health Hazard Assessment (OEHHA) (accessed on May 28, 2014 at url: http://www.oehha.org/risk/chhsltable.html).

The following quality control flags were reported by SunStar:

- Surrogate recovery in the laboratory control sample duplicate for Method 8270C was outside of established control limits. The laboratory accepted the data based on valid recovery of the remaining surrogates.

No quality control flags were reported by EMSL. Based on a review of the quality control data, the laboratory analysis data was accepted by SunStar and EMSL.

CONCLUSIONS

No increase of risk to human health is anticipated at the site from the compounds analyzed in site soils. Soils at the site are suitable for reuse within the project.

LIMITATIONS OF THE SOIL ASSESSMENT

The information provided in this report is not meant to be comprehensive, to identify all potential concerns, or to eliminate the risk associated with environmental conditions. H&K used professional judgment and experience to arrive at the conclusions presented herein. Therefore, the conclusions are not to be considered scientific certainties.

H&K prepared and issued this report for the exclusive use of our client. The information, conclusions, and recommendations presented apply only to conditions

H&K observed during the corrective action. H&K is not responsible for any other party's interpretations of the reported information.

H&K performed this work in accordance with present, regional, generally accepted standards of care. This report does not represent a legal opinion. No warranty, expressed or implied, including any implied warranty of merchantability or fitness for the purpose, is made or intended in connection with the work.

The findings of this report are valid as of the issue date. However, changes in the conditions of the property can occur with the passage of time. The changes may be due to natural processes or to the works of man, on the project site or adjacent properties. Changes in regulations, interpretations, and/or enforcement policies may occur at any time. Such changes may affect the extent of mitigation required.

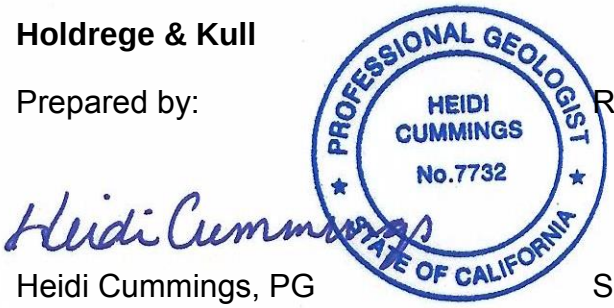
CLOSING

Holdrege & Kull appreciates the opportunity to provide you with environmental services for this important project. Should have questions or comments, please do not hesitate to contact the undersigned at (530) 894-2487.

Sincerely,

Holdrege & Kull

Prepared by: Reviewed by:

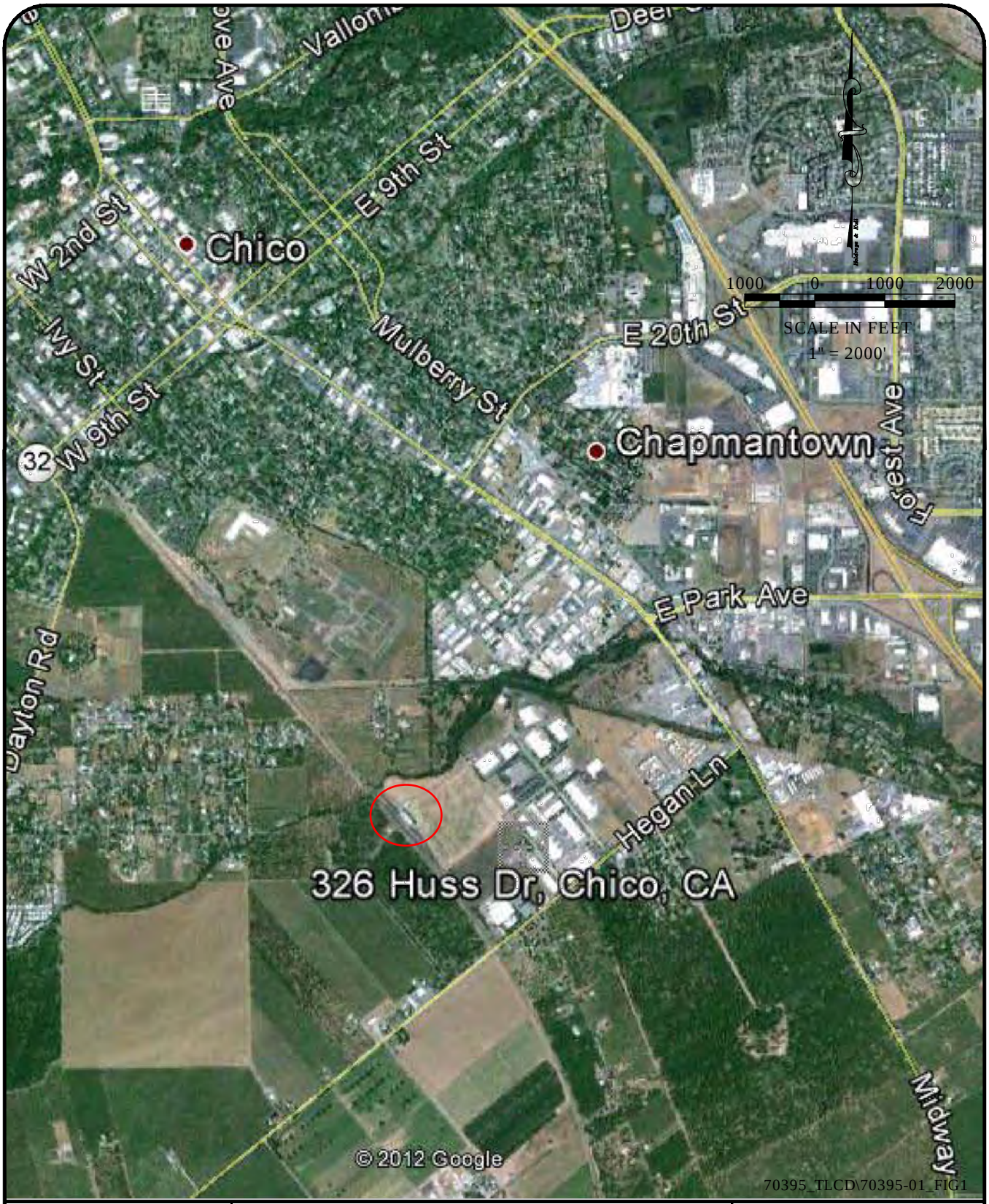


Heidi Cummings, PG
Project Geologist

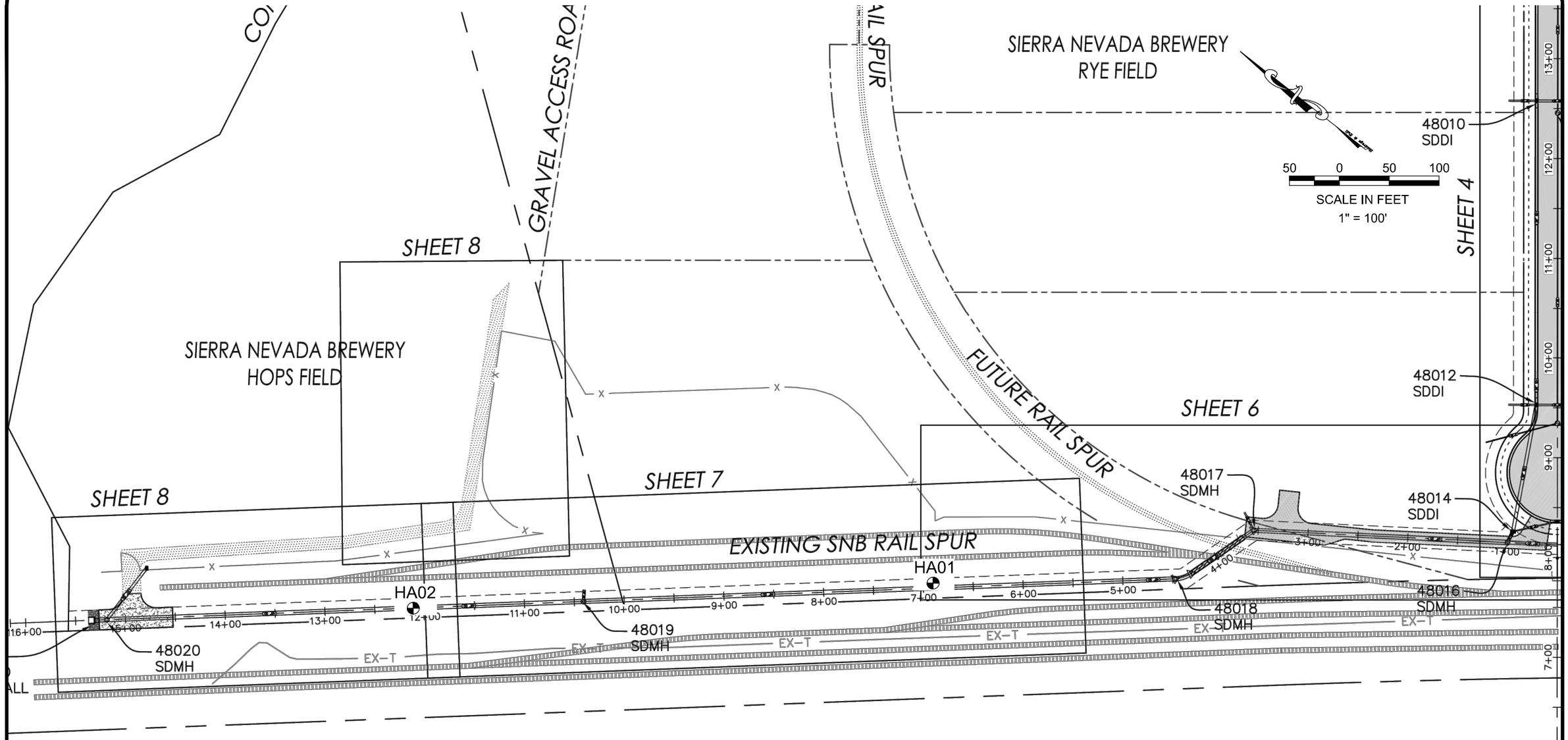
Shane D. Cummings, PG, CHG, CEG
Engineering Geologist

cc: Kirk Sheeley, Kitchell

Attachments: Figure 1 Site Location Map
Figure 2 Sample Location Map
Laboratory Reports (SunStar and EMSL)



HOLDREGE & KULL CONSULTING ENGINEERS • GEOLOGISTS 8 SEVILLE CT., SUITE 100 CHICO, CA 95928 (530) 894-2487 FAX 894-2437	SITE LOCATION MAP BUTTE REGIONAL TRANSIT OPERATIONS CENTER CHICO, BUTTE COUNTY, CALIFORNIA	PROJ NO.: 70395A-01 DATE: MAY,2014 FIGURE NO.: 1



LEGEND

HA01 SOIL SAMPLE LOCATION

NOTE: DRAFT SITE PLAN FROM NORTHSTAR ENGINEERING, DATED APRIL 21, 2014,

Z:\CAD\70395_TLCD\70395-01_FIG2.DWG

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8 SEVILLE COURT, SUITE 100
CHICO, CA 95928
530-894-2487 FAX 894-2437

SITE SKETCH AND
SOIL SAMPLE LOCATION MAP
BUTTE REGIONAL TRANSIT OPERATIONS CENTER
CHICO, BUTTE COUNTY, CALIFORNIA

DRAWN BY: SDC
CHECKED BY: SDC
PROJECT NO.: 70395A-01
DATE: MAY,2014

FIGURE NO.: 2

EMSL Analytical, Inc
2235 Polvorosa Ave , Suite 230, San Leandro, CA 94577
Phone/Fax: (510) 895-3675 / (510) 895-3680
http://www.EMSL.com sanleandrolab@emsl.com

EMSL Order:	091406890
CustomerID:	HOLD34
CustomerPO:	70395A
ProjectID:	

Attn: **Shane Cummings**
Holdrege & Kull
8 Seville Court
Suite 100
Chico, CA 95928

Phone:	(530) 894-2487
Fax:	(530) 894-2437
Received:	05/07/14 9:00 AM
Analysis Date:	5/13/2014
Collected:	5/6/2014

Project: **70395A**

Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method with CARB 435 Prep (Milling) Level A for 0.25% Target Analytical Sensitivity

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
HA01-0 *091406890-0001*		Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**
HA01-2 *091406890-0002*		Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**
HA01-4 *091406890-0003*		Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**
HA02-0 *091406890-0004*		Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**
HA02-2 *091406890-0005*		Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**
HA02-4 *091406890-0006*		Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**

Analyst(s)

Adam C. Fink (6)

Israel Gutierrez
or other approved signatory

Initial report from 05/13/2014 22:35:45

OrderID: 091406890

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Asbestos Chain of Custody

EMSL Order Number *(Lab Use Only)*:

№ 091406890

EMSL Analytical, Inc.
2235 Polvorosa Avenue
Suite 230
San Leandro, CA 94577
PHONE: (510) 895-3675
FAX: (510) 895-3680

Company : Holdrege & Kull	**EMSL-Bill to:** ☐ Different ☑ Same If Bill to is Different note instructions in Comments** *Third Party Billing requires written authorization from third party*
Street: 8 Seville court Suite 100	
City: Chico **State/Province:** CA	**Zip/Postal Code:** 95928 **Country:** United States
Report To (Name): Shane Cummings	**Telephone #:** 5308942487
Email Address: sdcummings@handk.net	**Fax #:** 5308942437 **Purchase Order:**
Project Name/Number: 70395A	**Please Provide Results:** ☐ FAX ☑ E-mail ☐ Mail
U.S. State Samples Taken: CA	**Connecticut Samples:** ☐ Commercial ☐ Residential

Turnaround Time (TAT) Options* – Please Check

☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 48 Hour ☐ 72 Hour ☐ 96 Hour ☑ 1 Week ☐ 2 Week

**For TEM Air 3 hr through 6 hr, please call ahead to schedule.*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.*

PCM - Air ☐ Check if samples are from NY
- ☐ NIOSH 7400
- ☐ w/ OSHA 8hr. TWA

PLM - Bulk (reporting limit)
- ☐ PLM EPA 600/R-93/116 (<1%)
- ☐ PLM EPA NOB (<1%)

Point Count
- ☐ 400 (<0.25%) ☐ 1000 (<0.1%)

Point Count w/Gravimetric
- ☐ 400 (<0.25%) ☐ 1000 (<0.1%)
- ☐ NYS 198.1 (friable in NY)
- ☐ NYS 198.6 NOB (non-friable-NY)
- ☐ NIOSH 9002 (<1%)

TEM – Air ☐ **4-4.5hr TAT (AHERA only)**
- ☐ AHERA 40 CFR, Part 763
- ☐ NIOSH 7402
- ☐ EPA Level II
- ☐ ISO 10312

TEM - Bulk
- ☐ TEM EPA NOB
- ☐ NYS NOB 198.4 (non-friable-NY)
- ☐ Chatfield SOP
- ☐ TEM Mass Analysis-EPA 600 sec. 2.5

TEM – Water: EPA 100.2
- Fibers >10µm ☐ Waste ☐ Drinking
- All Fiber Sizes ☐ Waste ☐ Drinking

TEM- Dust
- ☐ Microvac - ASTM D 5755
- ☐ Wipe - ASTM D6480
- ☐ Carpet Sonication (EPA 600/J-93/167)

Soil/Rock/Vermiculite
- ■ PLM CARB 435 - A (0.25% sensitivity)
- ☐ PLM CARB 435 - B (0.1% sensitivity)
- ☐ TEM CARB 435 - B (0.1% sensitivity)
- ☐ TEM CARB 435 - C (0.01% sensitivity)
- ☐ TEM Qual. via Filtration Technique
- ☐ TEM Qual. via Drop-Mount Technique

Other:
- ☐

☐ **Check For Positive Stop – Clearly Identify Homogenous Group** **Filter Pore Size (Air Samples):** ☐ **0.8µm** ☐ **0.45µm**

Samplers Name: Heidi Cummings **Samplers Signature:**

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
HA01-0	sandy silt	bulk	050614/1405
HA01-2	sandy silt	bulk	050614/1410
HA01-4	sandy silt	bulk	050614/1415
HA02-0	sandy silt	bulk	050614/1435
HA02-2	sandy silt	bulk	050614/1440
HA02-4	sandy silt	bulk	0506141445

Client Sample # (s): HA01-0 HA01-2 HA01-4 HA02-0 HA02-2 HA02-4 **Total # of Samples:** 6

Relinquished (Client): Heidi Cummings **Date:** 050614 **Time:** 1700

Received (Lab): RB **Date:** 5.7.14 **Time:** 9am

Comments/Special Instructions:
7-day TAT
Fax

Page 1 of 1 pages

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

15 May 2014

Shane Cummings
Holdrege & Kull -- Chico
8 Seville Court Suite 100
Chico, CA 95928

RE: BRTOC

Enclosed are the results of analyses for samples received by the laboratory on 05/07/14 10:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Katherine RunningCrane

Katherine RunningCrane
Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
HA01-0	T140893-01	Soil	05/06/14 14:05	05/07/14 10:00
HA01-2	T140893-02	Soil	05/06/14 14:10	05/07/14 10:00
HA01-4	T140893-03	Soil	05/06/14 14:15	05/07/14 10:00
HA02-0	T140893-04	Soil	05/06/14 14:35	05/07/14 10:00
HA02-2	T140893-05	Soil	05/06/14 14:40	05/07/14 10:00
HA02-4	T140893-06	Soil	05/06/14 14:45	05/07/14 10:00

DETECTIONS SUMMARY

Sample ID: HA01-0 **Laboratory ID:** T140893-01

No Results Detected

Sample ID: HA01-2 **Laboratory ID:** T140893-02

No Results Detected

Sample ID: HA01-4 **Laboratory ID:** T140893-03

No Results Detected

Sample ID: HA02-0 **Laboratory ID:** T140893-04

No Results Detected

SunStar Laboratories, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Katherine RunningCrane

Katherine RunningCrane, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

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Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

Sample ID: HA02-2 **Laboratory ID:** T140893-05

No Results Detected

Sample ID: HA02-4 **Laboratory ID:** T140893-06

No Results Detected

Katherine RunningCrane

Katherine RunningCrane, Project Manager

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

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Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

HA01-0

T140893-01 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015C									
C13-C28 (DRO)	ND	10	mg/kg	1	4050724	05/07/14	05/09/14	EPA 8015C	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*102 %*	*65-135*		"	"	"	"	
Organochlorine Pesticides by EPA Method 8081A									
alpha-BHC	ND	5.0	ug/kg	1	4050627	05/09/14	05/12/14	EPA 8081A	
gamma-BHC (Lindane)	ND	5.0	"	"	"	"	"	"	
beta-BHC	ND	5.0	"	"	"	"	"	"	
delta-BHC	ND	5.0	"	"	"	"	"	"	
Heptachlor	ND	5.0	"	"	"	"	"	"	
Aldrin	ND	5.0	"	"	"	"	"	"	
Heptachlor epoxide	ND	5.0	"	"	"	"	"	"	
gamma-Chlordane	ND	5.0	"	"	"	"	"	"	
alpha-Chlordane	ND	5.0	"	"	"	"	"	"	
Endosulfan I	ND	5.0	"	"	"	"	"	"	
4,4´-DDE	ND	5.0	"	"	"	"	"	"	
Dieldrin	ND	5.0	"	"	"	"	"	"	
Endrin	ND	5.0	"	"	"	"	"	"	
4,4´-DDD	ND	5.0	"	"	"	"	"	"	
Endosulfan II	ND	5.0	"	"	"	"	"	"	
4,4´-DDT	ND	5.0	"	"	"	"	"	"	
Endrin aldehyde	ND	5.0	"	"	"	"	"	"	
Endosulfan sulfate	ND	5.0	"	"	"	"	"	"	
Methoxychlor	ND	10	"	"	"	"	"	"	
Endrin ketone	ND	5.0	"	"	"	"	"	"	
Toxaphene	ND	200	"	"	"	"	"	"	
Surrogate: Tetrachloro-meta-xylene		*67.6 %*	*35-140*		"	"	"	"	

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

HA01-0

T140893-01 (Soil)

SunStar Laboratories, Inc.

Organophosphorus Pesticides by EPA Method 8141A

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Dichlorvos	ND	5.0	ug/kg	1	4050748	05/07/14	05/13/14	8141a	
Mevinphos	ND	5.0	"	"	"	"	"	"	
Demeton-s	ND	10	"	"	"	"	"	"	
Ethoprophos	ND	5.0	"	"	"	"	"	"	
Phorate	ND	10	"	"	"	"	"	"	
Naled	ND	5.0	"	"	"	"	"	"	
Sulfotep	ND	10	"	"	"	"	"	"	
Diazinon	ND	5.0	"	"	"	"	"	"	
Disulfoton	ND	5.0	"	"	"	"	"	"	
Demeton-o	ND	10	"	"	"	"	"	"	
Dimethoate	ND	5.0	"	"	"	"	"	"	
Ronnel	ND	10	"	"	"	"	"	"	
Merphos	ND	10	"	"	"	"	"	"	
Chlorpyrifos	ND	5.0	"	"	"	"	"	"	
Fenthion	ND	5.0	"	"	"	"	"	"	
Trichloronate	ND	5.0	"	"	"	"	"	"	
Methyl parathion	ND	5.0	"	"	"	"	"	"	
Malathion	ND	10	"	"	"	"	"	"	
Tokuthion (Prothiofos)	ND	5.0	"	"	"	"	"	"	
Parathion	ND	5.0	"	"	"	"	"	"	
Stirophos (Tetrachlorvinphos)	ND	5.0	"	"	"	"	"	"	
Bolstar	ND	5.0	"	"	"	"	"	"	
Fensulfothion	ND	5.0	"	"	"	"	"	"	
EPN	ND	5.0	"	"	"	"	"	"	
Azinphos methyl	ND	10	"	"	"	"	"	"	
Coumaphos	ND	5.0	"	"	"	"	"	"	
Surrogate: Tributylphosphate		*60.0 %*	*40-125*		"	"	"	"	

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Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

HA01-0

T140893-01 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chlorinated Herbicides by EPA Method 8151A									
2,4,5-T	ND	5.00	ug/kg	1	4050741	05/07/14	05/13/14	8151	
2,4,5-TP (Silvex)	ND	5.00	"	"	"	"	"	"	
2,4-D	ND	5.00	"	"	"	"	"	"	
2,4-DB	ND	5.00	"	"	"	"	"	"	
3,5-Dichlorobenzoic acid	ND	5.00	"	"	"	"	"	"	
4-Nitrophenol	ND	5.00	"	"	"	"	"	"	
Acifluorfen	ND	5.00	"	"	"	"	"	"	
Bentazon	ND	5.00	"	"	"	"	"	"	
Chloramben	ND	5.00	"	"	"	"	"	"	
Dalapon	ND	30.0	"	"	"	"	"	"	
DCPA diacid	ND	5.00	"	"	"	"	"	"	
Dicamba	ND	5.00	"	"	"	"	"	"	
Dichloroprop	ND	5.00	"	"	"	"	"	"	
Dinoseb	ND	5.00	"	"	"	"	"	"	
Pentachlorophenol	ND	5.00	"	"	"	"	"	"	
Picloram	ND	5.00	"	"	"	"	"	"	
Surrogate: 2,4-DCAA		*86.5 %*	*35-150*		"	"	"	"	
Semivolatile Organic Compounds by EPA Method 8270C									
Creosote	ND	300	ug/kg	1	4050742	05/07/14	05/14/14	EPA 8270C	
Acenaphthene	ND	10	"	"	"	"	"	"	
Pyrene	ND	10	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*37.6 %*	*14.3-83.1*		"	"	"	"	
Surrogate: Phenol-d6		*48.1 %*	*12-95.6*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*57.3 %*	*21.3-119*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*52.9 %*	*32.4-102*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*51.5 %*	*18.1-101*		"	"	"	"	
Surrogate: Terphenyl-dl4		*56.7 %*	*29.1-130*		"	"	"	"	

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Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

HA01-2

T140893-02 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015C									
C13-C28 (DRO)	ND	10	mg/kg	1	4050724	05/07/14	05/09/14	EPA 8015C	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*94.4 %*	*65-135*		"	"	"	"	
Semivolatile Organic Compounds by EPA Method 8270C									
Creosote	ND	300	ug/kg	1	4050742	05/07/14	05/14/14	EPA 8270C	
Acenaphthene	ND	10	"	"	"	"	"	"	
Pyrene	ND	10	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*38.2 %*	*14.3-83.1*		"	"	"	"	
Surrogate: Phenol-d6		*47.1 %*	*12-95.6*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*63.0 %*	*21.3-119*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*59.1 %*	*32.4-102*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*68.2 %*	*18.1-101*		"	"	"	"	
Surrogate: Terphenyl-dl4		*71.2 %*	*29.1-130*		"	"	"	"	

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Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

HA01-4

T140893-03 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015C									
C13-C28 (DRO)	ND	10	mg/kg	1	4050724	05/07/14	05/09/14	EPA 8015C	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*92.4 %*	*65-135*		"	"	"	"	
Semivolatile Organic Compounds by EPA Method 8270C									
Creosote	ND	300	ug/kg	1	4050742	05/07/14	05/14/14	EPA 8270C	
Acenaphthene	ND	10	"	"	"	"	"	"	
Pyrene	ND	10	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*56.2 %*	*14.3-83.1*		"	"	"	"	
Surrogate: Phenol-d6		*59.6 %*	*12-95.6*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*58.1 %*	*21.3-119*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*75.4 %*	*32.4-102*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*80.2 %*	*18.1-101*		"	"	"	"	
Surrogate: Terphenyl-dl4		*78.7 %*	*29.1-130*		"	"	"	"	

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Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

HA02-0

T140893-04 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015C									
C13-C28 (DRO)	ND	10	mg/kg	1	4050724	05/07/14	05/09/14	EPA 8015C	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*90.6 %*	*65-135*		"	"	"	"	
Semivolatile Organic Compounds by EPA Method 8270C									
Creosote	ND	300	ug/kg	1	4050742	05/07/14	05/14/14	EPA 8270C	
Acenaphthene	ND	10	"	"	"	"	"	"	
Pyrene	ND	10	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*47.5 %*	*14.3-83.1*		"	"	"	"	
Surrogate: Phenol-d6		*66.0 %*	*12-95.6*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*54.5 %*	*21.3-119*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*68.6 %*	*32.4-102*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*68.7 %*	*18.1-101*		"	"	"	"	
Surrogate: Terphenyl-dl4		*73.4 %*	*29.1-130*		"	"	"	"	

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Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

HA02-2

T140893-05 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015C									
C13-C28 (DRO)	ND	10	mg/kg	1	4050724	05/07/14	05/09/14	EPA 8015C	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*108 %*	*65-135*		"	"	"	"	
Semivolatile Organic Compounds by EPA Method 8270C									
Creosote	ND	300	ug/kg	1	4050742	05/07/14	05/14/14	EPA 8270C	
Acenaphthene	ND	10	"	"	"	"	"	"	
Pyrene	ND	10	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*43.4 %*	*14.3-83.1*		"	"	"	"	
Surrogate: Phenol-d6		*43.4 %*	*12-95.6*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*39.5 %*	*21.3-119*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*58.6 %*	*32.4-102*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*68.1 %*	*18.1-101*		"	"	"	"	
Surrogate: Terphenyl-dl4		*71.7 %*	*29.1-130*		"	"	"	"	

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Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

HA02-4

T140893-06 (Soil)

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Extractable Petroleum Hydrocarbons by 8015C									
C13-C28 (DRO)	ND	10	mg/kg	1	4050724	05/07/14	05/09/14	EPA 8015C	
C29-C40 (MORO)	ND	10	"	"	"	"	"	"	
Surrogate: p-Terphenyl		*95.2 %*	*65-135*		"	"	"	"	
Semivolatile Organic Compounds by EPA Method 8270C									
Creosote	ND	300	ug/kg	1	4050742	05/07/14	05/14/14	EPA 8270C	
Acenaphthene	ND	10	"	"	"	"	"	"	
Pyrene	ND	10	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*36.6 %*	*14.3-83.1*		"	"	"	"	
Surrogate: Phenol-d6		*50.6 %*	*12-95.6*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*44.8 %*	*21.3-119*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*64.3 %*	*32.4-102*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*69.8 %*	*18.1-101*		"	"	"	"	
Surrogate: Terphenyl-dl4		*74.7 %*	*29.1-130*		"	"	"	"	

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Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

Extractable Petroleum Hydrocarbons by 8015C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4050724 - EPA 3550B GC										
Blank (4050724-BLK1)				Prepared: 05/07/14 Analyzed: 05/08/14						
C13-C28 (DRO)	ND	10	mg/kg							
C29-C40 (MORO)	ND	10	"							
Surrogate: p-Terphenyl	*103*		"	*100*		*103*	*65-135*			
LCS (4050724-BS1)				Prepared: 05/07/14 Analyzed: 05/08/14						
C13-C28 (DRO)	500	10	mg/kg	500		101	75-125			
Surrogate: p-Terphenyl	*98.1*		"	*100*		*98.1*	*65-135*			
Matrix Spike (4050724-MS1)	**Source: T140891-01**			Prepared: 05/07/14 Analyzed: 05/09/14						
C13-C28 (DRO)	480	10	mg/kg	499	ND	96.8	75-125			
Surrogate: p-Terphenyl	*88.6*		"	*99.8*		*88.7*	*65-135*			
Matrix Spike Dup (4050724-MSD1)	**Source: T140891-01**			Prepared: 05/07/14 Analyzed: 05/09/14						
C13-C28 (DRO)	450	10	mg/kg	498	ND	89.6	75-125	8.01	20	
Surrogate: p-Terphenyl	*88.4*		"	*99.6*		*88.8*	*65-135*			

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Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

Organochlorine Pesticides by EPA Method 8081A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4050627 - EPA 3550 ECD/GCMS										
Blank (4050627-BLK1)				Prepared: 05/06/14 Analyzed: 05/12/14						
alpha-BHC	ND	5.0	ug/kg							
gamma-BHC (Lindane)	ND	5.0	"							
beta-BHC	ND	5.0	"							
delta-BHC	ND	5.0	"							
Heptachlor	ND	5.0	"							
Aldrin	ND	5.0	"							
Heptachlor epoxide	ND	5.0	"							
gamma-Chlordane	ND	5.0	"							
alpha-Chlordane	ND	5.0	"							
Endosulfan I	ND	5.0	"							
4,4´-DDE	ND	5.0	"							
Dieldrin	ND	5.0	"							
Endrin	ND	5.0	"							
4,4´-DDD	ND	5.0	"							
Endosulfan II	ND	5.0	"							
4,4´-DDT	ND	5.0	"							
Endrin aldehyde	ND	5.0	"							
Endosulfan sulfate	ND	5.0	"							
Methoxychlor	ND	10	"							
Endrin ketone	ND	5.0	"							
Toxaphene	ND	200	"							
Surrogate: Tetrachloro-meta-xylene	*9.11*		*"*	*10.0*		*91.1*	*35-140*			
LCS (4050627-BS1)				Prepared: 05/06/14 Analyzed: 05/12/14						
gamma-BHC (Lindane)	77.5	5.0	ug/kg	100		77.5	40-120			
Heptachlor	70.6	5.0	"	100		70.6	40-120			
Aldrin	88.5	5.0	"	100		88.5	40-120			
Dieldrin	95.4	5.0	"	100		95.4	40-120			
Endrin	69.3	5.0	"	100		69.3	40-120			
4,4´-DDT	98.6	5.0	"	100		98.6	33-147			
Surrogate: Tetrachloro-meta-xylene	*9.81*		*"*	*10.0*		*98.1*	*35-140*			

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Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

Organochlorine Pesticides by EPA Method 8081A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4050627 - EPA 3550 ECD/GCMS										
Matrix Spike (4050627-MS1)	**Source: T140879-17**			Prepared: 05/06/14	Analyzed: 05/12/14					
gamma-BHC (Lindane)	78.0	5.0	ug/kg	100	ND	78.0	30-120			
Heptachlor	56.3	5.0	"	100	ND	56.3	30-120			
Aldrin	77.3	5.0	"	100	ND	77.3	30-120			
Dieldrin	101	5.0	"	100	ND	101	30-120			
Endrin	74.2	5.0	"	100	ND	74.2	30-120			
4,4´-DDT	80.6	5.0	"	100	ND	80.6	30-120			
Surrogate: Tetrachloro-meta-xylene	*8.14*		*"*	*10.0*		*81.4*	*35-140*			
Matrix Spike Dup (4050627-MSD1)	**Source: T140879-17**			Prepared: 05/06/14	Analyzed: 05/12/14					
gamma-BHC (Lindane)	84.4	5.0	ug/kg	100	ND	84.4	30-120	7.85	30	
Heptachlor	63.0	5.0	"	100	ND	63.0	30-120	11.2	30	
Aldrin	82.7	5.0	"	100	ND	82.7	30-120	6.77	30	
Dieldrin	94.6	5.0	"	100	ND	94.6	30-120	6.55	30	
Endrin	76.9	5.0	"	100	ND	76.9	30-120	3.52	30	
4,4´-DDT	61.9	5.0	"	100	ND	61.9	30-120	26.2	30	
Surrogate: Tetrachloro-meta-xylene	*8.63*		*"*	*10.0*		*86.3*	*35-140*			

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Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

Organophosphorus Pesticides by EPA Method 8141A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4050748 - EPA 3550 ECD/GCMS										
Blank (4050748-BLK1)				Prepared: 05/07/14 Analyzed: 05/13/14						
Dichlorvos	ND	5.0	ug/kg							
Mevinphos	ND	5.0	"							
Demeton-s	ND	10	"							
Ethoprophos	ND	5.0	"							
Phorate	ND	10	"							
Naled	ND	5.0	"							
Sulfotep	ND	10	"							
Diazinon	ND	5.0	"							
Disulfoton	ND	5.0	"							
Demeton-o	ND	10	"							
Dimethoate	ND	5.0	"							
Ronnel	ND	10	"							
Merphos	ND	10	"							
Chlorpyrifos	ND	5.0	"							
Fenthion	ND	5.0	"							
Trichloronate	ND	5.0	"							
Methyl parathion	ND	5.0	"							
Malathion	ND	10	"							
Tokuthion (Prothiofos)	ND	5.0	"							
Parathion	ND	5.0	"							
Stirophos (Tetrachlorvinphos)	ND	5.0	"							
Bolstar	ND	5.0	"							
Fensulfothion	ND	5.0	"							
EPN	ND	5.0	"							
Azinphos methyl	ND	10	"							
Coumaphos	ND	5.0	"							
Surrogate: Tributylphosphate	*20.8*		*"*	*20.0*		*104*	*40-125*			

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Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

Organophosphorus Pesticides by EPA Method 8141A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4050748 - EPA 3550 ECD/GCMS										
LCS (4050748-BS1)				Prepared: 05/07/14 Analyzed: 05/13/14						
Diazinon	41.8	5.0	ug/kg				60-130			
Chlorpyrifos	41.7	5.0	"				60-130			
Methyl parathion	38.1	5.0	"				60-130			
Stirophos (Tetrachlorvinphos)	38.0	5.0	"				60-130			
Surrogate: Tributylphosphate	*14.7*		*"*	*20.0*		*73.3*	*40-125*			
Matrix Spike (4050748-MS1)		**Source: T140893-01**		Prepared: 05/07/14 Analyzed: 05/13/14						
Diazinon	37.9	5.0	ug/kg		ND		60-130			
Chlorpyrifos	39.1	5.0	"		ND		60-130			
Methyl parathion	37.7	5.0	"		ND		60-130			
Stirophos (Tetrachlorvinphos)	37.3	5.0	"		ND		60-130			
Surrogate: Tributylphosphate	*16.0*		*"*	*20.0*		*80.0*	*40-125*			
Matrix Spike Dup (4050748-MSD1)		**Source: T140893-01**		Prepared: 05/07/14 Analyzed: 05/13/14						
Diazinon	38.9	5.0	ug/kg		ND		60-130	2.61	20	
Chlorpyrifos	37.1	5.0	"		ND		60-130	5.23	20	
Methyl parathion	34.3	5.0	"		ND		60-130	9.42	20	
Stirophos (Tetrachlorvinphos)	37.8	5.0	"		ND		60-130	1.37	20	
Surrogate: Tributylphosphate	*18.3*		*"*	*20.0*		*91.3*	*40-125*			

Katherine RunningCrane

Katherine RunningCrane, Project Manager

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

Chlorinated Herbicides by EPA Method 8151A - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4050741 - 8151 Prep										
Blank (4050741-BLK1)				Prepared: 05/07/14 Analyzed: 05/13/14						
2,4,5-T	ND	5.00	ug/kg							
2,4,5-TP (Silvex)	ND	5.00	"							
2,4-D	ND	5.00	"							
2,4-DB	ND	5.00	"							
3,5-Dichlorobenzoic acid	ND	5.00	"							
4-Nitrophenol	ND	5.00	"							
Acifluorfen	ND	5.00	"							
Bentazon	ND	5.00	"							
Chloramben	ND	5.00	"							
Dalapon	ND	30.0	"							
DCPA diacid	ND	5.00	"							
Dicamba	ND	5.00	"							
Dichloroprop	ND	5.00	"							
Dinoseb	ND	5.00	"							
Pentachlorophenol	ND	5.00	"							
Picloram	ND	5.00	"							
Surrogate: 2,4-DCAA	*164*		*"*	*200*		*82.2*	*35-150*			
LCS (4050741-BS1)				Prepared: 05/07/14 Analyzed: 05/13/14						
2,4,5-T	76.8	5.00	ug/kg	100		76.8	20-150			
2,4,5-TP (Silvex)	76.2	5.00	"	100		76.2	20-150			
2,4-D	75.1	5.00	"	100		75.1	20-150			
Surrogate: 2,4-DCAA	*170*		*"*	*200*		*85.2*	*35-150*			
LCS Dup (4050741-BSD1)				Prepared: 05/07/14 Analyzed: 05/13/14						
2,4,5-T	92.1	5.00	ug/kg	100		92.1	20-150	18.1	30	
2,4,5-TP (Silvex)	83.9	5.00	"	100		83.9	20-150	9.64	30	
2,4-D	84.8	5.00	"	100		84.8	20-150	12.2	30	
Surrogate: 2,4-DCAA	*137*		*"*	*200*		*68.4*	*35-150*			

Katherine RunningCrane

Katherine RunningCrane, Project Manager

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

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949.297.5020 Phone
949.297.5027 Fax

Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control

SunStar Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4050742 - EPA 3550 ECD/GCMS										
Blank (4050742-BLK1)				Prepared: 05/07/14 Analyzed: 05/14/14						
Creosote	ND	300	ug/kg							
Acenaphthene	ND	10	"							
Pyrene	ND	10	"							
Surrogate: 2-Fluorophenol	*611*		"	*1670*		*36.6*	*14.3-83.1*			
Surrogate: Phenol-d6	*1270*		"	*1670*		*76.3*	*12-95.6*			
Surrogate: Nitrobenzene-d5	*968*		"	*1670*		*58.1*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*944*		"	*1670*		*56.7*	*32.4-102*			
Surrogate: 2,4,6-Tribromophenol	*1060*		"	*1670*		*63.5*	*18.1-101*			
Surrogate: Terphenyl-dl4	*1360*		"	*1670*		*81.5*	*29.1-130*			
LCS (4050742-BS1)				Prepared: 05/07/14 Analyzed: 05/14/14						
Creosote	ND	300	ug/kg				75-125			
Acenaphthene	975	10	"	1670		58.5	46-118			
Pyrene	1440	10	"	1670		86.2	26-127			
Surrogate: 2-Fluorophenol	*690*		"	*1670*		*41.4*	*14.3-83.1*			
Surrogate: Phenol-d6	*1110*		"	*1670*		*66.7*	*12-95.6*			
Surrogate: Nitrobenzene-d5	*644*		"	*1670*		*38.6*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*969*		"	*1670*		*58.2*	*32.4-102*			
Surrogate: 2,4,6-Tribromophenol	*1210*		"	*1670*		*72.9*	*18.1-101*			
Surrogate: Terphenyl-dl4	*1200*		"	*1670*		*71.9*	*29.1-130*			
LCS Dup (4050742-BSD1)				Prepared: 05/07/14 Analyzed: 05/14/14						
Creosote	ND	300	ug/kg				75-125		20	
Acenaphthene	774	10	"	1670		46.4	46-118	23.0	31	
Pyrene	1310	10	"	1670		78.4	26-127	9.48	31	
Surrogate: 2-Fluorophenol	*182*		"	*1670*		*10.9*	*14.3-83.1*			*S-GC*
Surrogate: Phenol-d6	*1010*		"	*1670*		*60.5*	*12-95.6*			
Surrogate: Nitrobenzene-d5	*641*		"	*1670*		*38.5*	*21.3-119*			
Surrogate: 2-Fluorobiphenyl	*729*		"	*1670*		*43.7*	*32.4-102*			
Surrogate: 2,4,6-Tribromophenol	*1040*		"	*1670*		*62.1*	*18.1-101*			
Surrogate: Terphenyl-dl4	*1040*		"	*1670*		*62.3*	*29.1-130*			

Katherine RunningCrane

Katherine RunningCrane, Project Manager

SunStar Laboratories, Inc.
PROVIDING QUALITY ANALYTICAL SERVICES NATIONWIDE

25712 Commercentre Drive
Lake Forest, California 92630
949.297.5020 Phone
949.297.5027 Fax

Holdrege & Kull -- Chico	Project: BRTOC	
8 Seville Court Suite 100	Project Number: 70395A-01	**Reported:**
Chico CA, 95928	Project Manager: Shane Cummings	05/15/14 08:31

Notes and Definitions

S-GC	Surrogate recovery outside of established control limits. The data was accepted based on valid recovery of the remaining surrogate(s).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

SunStar Laboratories, Inc.
25712 Commercentre Dr
Lake Forest, CA 92630
949-297-5020

Chain of Custody Record

Client: Holdrege & Kull
Address: 8 Senile Ct, Ste 8
Phone: 530-894-2484 Fax: 530-894-2437
Project Manager: Shane Cummings SDCUMMINGS@handk.net

Date: 050614 Page: 1 Of 1
Project Name: BRTOC
Collector: SDC/AJC Client Project #: 70395A-01
Batch #: 7140893 EDF #:

Sample ID	Date Sampled	Time	Sample Type	Container Type	8260	8260 + OXY	8260 BTEX, OXY only	8270	8021 BTEX	8015M (gasoline)	8015M (diesel) & Motor oil	8015M Ext./Carbon Chain	6010/7000 Title 22 Metals	X Creosote 8270D	X Organochlorine Pest 8081	X Organophosphorus Pest 8141	X Chlorinated Herbicides 8051	Laboratory ID #	Comments/Preservative	Total # of containers
HA01-0	050614	1405	SOIL	BAG							X			X	X	X	X	01		
HA01-2		1410																02		
HA01-4		1415																03		
HA02-0		1435																04		
HA02-2		1440																05		
HA02-4		1445																06		

Relinquished by: (signature) Shane Cummings Date / Time 050614 / 1700
Relinquished by: (signature) FedEx 5-7-14 10:00 Date / Time
Relinquished by: (signature) Date / Time

Received by: (signature) FedEx Date / Time 050614 / 1700
Received by: (signature) 5-7-14 10:00 Date / Time
Received by: (signature) Date / Time

Total # of containers
Chain of Custody seals Y/N/NA
Seals intact? Y/N/NA
Received good condition/cold 2.0

Turn around time: standard

Notes
Please RETURN ICECHEST !!

Sample disposal Instructions: Disposal @ $2.00 each ___ Return to client ___ Pickup ___

COC 90233

SunStar Laboratories, Inc.
Providing Quality Analytical Services Nationwide

SAMPLE RECEIVING REVIEW SHEET

BATCH # T140893

Client Name: Holdrege & Kull - Chico Project: BRTOC

Received by: Sunny Date/Time Received: 5.7.14 / 10:00

Delivered by : ☐ Client ☐ SunStar Courier ☐ GSO ☒ FedEx ☐ Other _____

Total number of coolers received 1 **Temp criteria = 6°C > 0°C (no frozen containers)**

Temperature: cooler #1 2.2 °C +/- the CF (- 0.2°C) = 2.0 °C corrected temperature

cooler #2 _____ °C +/- the CF (- 0.2°C) = _____ °C corrected temperature

cooler #3 _____ °C +/- the CF (- 0.2°C) = _____ °C corrected temperature

Samples outside temp. but received on ice, w/in 6 hours of final sampling.	☒Yes	☐No*	☐N/A
Custody Seals Intact on Cooler/Sample	☐Yes	☐No*	☒N/A
Sample Containers Intact	☒Yes	☐No*	
Sample labels match COC ID's	☒Yes	☐No*	
Total number of containers received match COC	☒Yes	☐No*	
Proper containers received for analyses requested on COC	☒Yes	☐No*	
Proper preservative indicated on COC/containers for analyses requested	☐Yes	☐No*	☒N/A

Complete shipment received in good condition with correct temperatures, containers, labels, volumes preservatives and within method specified holding times. ☒ **Yes** ☐**No***

* Complete Non-Conformance Receiving Sheet if checked Cooler/Sample Review - Initials and date SL 5.7.14

Comments:

APPENDIX F

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

July 11, 2013

Regulatory Division (SPK-2012-01307)

Butte County Association of Governments
Attn: Mr. Andy Newsum
2580 Sierra Sunrise Terrace, Suite 100
Chico, California 95928-8441

Dear Mr. Newsum:

We are responding to your agent's December 11, 2012, request for a Department of the Army Nationwide Permit (NWP) verification for the BCAG Transit Facility Property Acquisition project. This approximately 28-acre project involves activities, including discharges of dredged or fill material, in waters of the U.S. to construct a 54-inch diameter storm drain and pipe outfall into Comanche Creek. The project is located on Comanche Creek in Section 2, Township 21 North, Range 1 East, Mount Diablo Meridian, Latitude 39.704929°, Longitude -121.823765°, Chico, Butte County, California.

Based on the information your agent provided, the proposed activity, resulting in approximately 300 square feet of permanent and 85-square feet of temporary impacts to waters of the U.S., is authorized by NWP 7- Outfall Structures and Associated Intake Structures. **However, until Section 401 Water Quality Certification for the activity has been issued or waived, our authorization is denied without prejudice. Once you have provided us evidence of water quality certification, the activity is authorized and the work may proceed subject to the conditions of certification and the NWP.** Your work must comply with the general terms and conditions listed in the enclosed 2012 NWP 7 summary sheets, the Final Sacramento District NWP Regional Conditions for California, and the following special conditions:

Special Conditions

1. To ensure your project complies with the Federal Endangered Species Act, you must implement all of the mitigating measures proposed as part of your project description, which are identified in the enclosed U.S. Fish and Wildlife Service letter of concurrence (Service File Number 08ESMF00-2013-I-0340-1, dated May 7, 2013). If you are unable to implement any of the proposed measures, you must immediately notify this office and the U.S. Fish and Wildlife Office, so we may consult as appropriate, prior to initiating the work, in accordance with federal law.

Contractor (construct) BCAG (monitor)

2. To mitigate for impacts to Comanche Creek and associated habitat, you shall plant the authorized rip-rap areas with native trees or shrubs, appropriate for the impact area, using the enclosed vegetated rip-rap techniques or other approved methods. You shall implement plantings concurrently with construction activities, and complete planting implementation no more than 30-days after completion of the authorized work. Plantings shall be monitored for 3 years or until success criteria have been met, whichever is greater.

BCAG (completed)

3. To ensure compliance with Special Condition 2 above, you shall develop a final comprehensive restoration plan, which must be approved by this office prior to initiation of construction activities within waters of the U.S. The plan shall include; mitigation location and design drawings, vegetation plans including target species to be planted, final success criteria, and monitoring methods. The plan shall be presented in the format of the Sacramento District's Habitat Mitigation and Monitoring Proposal Guidelines, dated December 30, 2004.

Contractor

4. You are prohibited from any activity (e.g. equipment usage or materials storage) that impacts waters of the U.S. outside of the permit area, as shown on the drawing prepared by NorthStar Environmental entitled *Figure 3. BCAG Transit Facility Property Acquisition, Draft Delineation of the Waters of the U.S. Impacts* dated June 27, 2013.

Contractor

5. Excavated materials from the permit area shall not be stockpiled or disposed of outside the permit area. Disposal and stockpile areas must be reviewed and approved by this office prior to commencement of construction activities. Plans, maps and/or drawings may be submitted electronically to regulatory-info@usace.army.mil.

Contractor

6. No construction activities shall occur within standing or flowing waters. In perennial streams, this may be accomplished through dewatering the work area. Dewatering plans must be approved, in writing, by this office prior to commencement of construction activities. Plans, maps and/or drawings may be submitted electronically to cespk-regulatory-info@usace.army.mil.

BCAG (completed)

7. This permit is contingent upon the permittee obtaining water quality certification under Section 401 of the Clean Water Act. Evidence of a water quality certification must be submitted to the Corps, prior to commencing work in waters of the United States. All terms and conditions of the Section 401 water quality certification are expressly incorporated as conditions of this permit.

Contractor

8. If any of the above conditions are violated or unauthorized activities occur, you shall stop work immediately and notify this office. You shall provide us with a detailed description of the unauthorized activity(s), photo documentation, and any measures taken to remedy the violation.

You must sign the enclosed Compliance Certification and return it to this office within 30 days after completion of the authorized work.

This verification is valid until March 18, 2017, when the existing NWPs are scheduled to be modified, reissued, or revoked. Furthermore, if you commence or are under contract to commence this activity before the date that the relevant NWP is modified, reissued or revoked, you will have twelve (12) months from the date of the modification, reissuance or revocation of the NWP to complete the activity under the present terms and conditions. Failure to comply with the General and Regional Conditions of this NWP, or the project-specific Special Conditions of this authorization, may result in the suspension or revocation of your authorization.

We would appreciate your feedback. At your earliest convenience, please tell us how we are doing by completing the customer survey on our website under *Customer Service Survey*.

Please refer to identification number SPK-2012-01307 in any correspondence concerning this project. If you have any questions, please contact me at our California North Branch Office at 1325 J Street, Room 1350, Sacramento, California 95814-2922, by email *Leah.M.Fisher@usace.army.mil*, or by telephone at 916-557-6639. For more information regarding our program, please visit our website at *www.spk.usace.army.mil/Missions/Regulatory.aspx*.

Sincerely,

Leah M. Fisher
Senior Regulatory Project Manager,
California North Branch

Enclosures

cc: (wo/encls)

Ms. Elena Gregg, NorthStar Engineering, 111 Mission Ranch Blvd., Suite 100, Chico, California 95926
Mr. Scott Zaitz, California Regional Water Quality Control Board, Central Valley Region, 364 Knollcrest Drive, Suite 205, Redding, California 96002
Ms. Tina Bartlett, California Department of Fish and Wildlife, Northern Central Region, 1701 Nimbus Road, Rancho Cordova, California 95670
Ms. Lily Douglas, U.S. Fish and Wildlife Service, Endangered Species Division, 2800 Cottage Way, Suite W2605, Sacramento, California 95825-3901
Mr. Paul Jones, U.S. Environmental Protection Agency, Wetland Regulatory Office (WTR-8), 75 Hawthorne Street, San Francisco, California 94105

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To
08ESMF00-2013-I-0340-1

MAY 07 2013

Ms. Nancy Arcady Haley
Chief, California North Branch
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814

Subject: Informal Consultation on the Proposed BCAG Transit Facility Property Acquisition Project, Butte County, California (SPK-2012-01307)

Dear Ms. Arcady Haley:

This letter is in response to your January 2, 2013, letter and supporting documentation requesting informal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed BCAG Transit Facility Property Acquisition Project (proposed project) in Butte County, California, for potential effects to the federally-listed as threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (beetle) and the federally-listed as threatened giant garter snake (*Thamnophis gigas*) (snake). We received your request on January 4, 2013. You requested our concurrence with your determination that the proposed project may affect, but is not likely to adversely affect the beetle and the snake. Critical habitat for the beetle has been designated; however, none will be affected by the proposed project. Critical habitat for the snake has not been designated. Our primary concern is the protection of federally-listed species pursuant to the Endangered Species Act of 1973, as amended (16 U.S.C. §1531 *et seq.*) (Act).

The findings and recommendations in this consultation are based on: (1) your January 2, 2013, letter initiating consultation; (2) the November 2012, *BCAG Transit Facility Property Acquisition Project, Chico, Butte County, CA Natural Environment Study* (NES) prepared by NorthStar Environmental (consultant); (3) the December 2012, *BCAG Transit Facility Property Acquisition Project Nationwide Permit 7 Application* prepared by the consultant; (4) email and telephone correspondence between the Service and the Corps and/or the consultant; and (5) other information available to the Service.

The proposed project area is located off of Huss Lane within the southern city limits of Chico, adjacent to existing commercial buildings to the south, train tracks and orchards to the west, an alfalfa field and commercial buildings to the east, and Comanche Creek and orchards to the north. The area is primarily composed of disturbed annual grassland dominated by non-native herbaceous plant species. The banks of Comanche Creek are shaded by valley oak trees and an overgrowth of blackberry and wild grape.

The proposed project includes the acquisition of a 10-acre portion of the 34-acre parcel immediately adjacent to the existing BCAG transit facility and installation of a storm drain extension and outfall into Comanche Creek. The storm drain extension will be necessary to drain on-site runoff and will consist of installing a 54-inch diameter pipe in an underground trench. The outfall will be placed within Comanche Creek and result in the cut of 60 cubic yards of material and placement of 20 cubic yards of rip-rap along a 30-foot-long by 10-foot-wide (0.0069 acre) area of the bank. Work within the creek will occur during low water flow, but may require the installation of a small coffer dam. All other work will be done on the south side of Comanche Creek. Work is expected to be completed in one season.

Elderberry shrubs with stems measuring 1.0 inch or greater at ground level occur outside of the proposed project area on private land on the north bank of Comanche Creek. The shrubs are located within 20 feet of construction activities, across the narrow creek from the proposed outfall. However, construction will not occur on the north bank, and no impacts to the root systems or crowns of elderberry shrubs are expected to occur.

Comanche Creek is hydrologically connected to Butte Creek, known aquatic habitat for the snake, and may be used as a migration corridor. The banks are shaded by oak trees and the overgrowth of blackberry and wild grape, providing poor basking habitat for the snake. Therefore, the 0.0069 acre of permanent impact from the installation of rip-rap surrounding the outfall will not affect the snake. The annual grassland on top of the banks could provide marginal upland basking habitat; therefore, the proposed project will temporarily impact 0.02 acre of suitable upland habitat for the snake.

The applicant has proposed avoidance and minimization measures which will minimize the effects to the beetle and the snake. These measures are also described on pages 22 and 25-27 of the NES, respectively.

Proposed Conservation Measures for the Valley Elderberry Longhorn Beetle

Contractor • No pesticides or herbicides will be used within 1,500 feet of any elderberry shrubs.

Contractor • Dust abatement measures will be implemented during construction within 100 feet of elderberry shrubs.

Contractor • Construction workers will not be allowed to access the north bank of Comanche Creek.

Proposed Conservation Measures for the Giant Garter Snake

Contractor • All construction activities within 200 feet of Comanche Creek will occur between May 1 and October 1.

Contractor • If installation of a coffer dam is necessary, dewatered habitat in Comanche Creek will remain dry for at least 15 consecutive days after April 15 and prior to excavation or filling.

BCAG (to present) Contractor (to attend)
- Construction personnel will participate in an environmental awareness training program designed to protect potential habitat for the snake. Under this program, workers will be informed of the potential for this species to be present, the associated habitat for the snake, and that it is unlawful to take, harm, or harass the snake.

BCAG
- Within 24 hours prior to commencement of construction activities, the site will be inspected by a Service-approved biologist. If a snake is found on-site, the biologist will immediately stop all work and notify the Service.

Contractor
- The clearing of vegetation will be confined to the minimal area necessary and excavation equipment will be located and operated from the top of the south bank.

Contractor
- To minimize habitat disturbance, movement of heavy equipment to and from the site will be restricted to established roadways and no staging or storing of equipment will occur within 200 feet of Comanche Creek.

Contractor
- To avoid inadvertent impacts to adjacent habitat suitable for the snake, the construction area will be limited to the smallest area needed. Areas outside of the construction area will be designated as Environmentally Sensitive Areas and will be flagged or fenced off using orange barrier fencing.

Contractor
- Following construction, any temporary water diversion structures and debris will be removed and the disturbed bank will be restored to pre-construction height and slope and revegetated with an appropriate native seed mix.

BCAG
- Restored habitat will be monitored for one year following construction. Photo documentation and a letter report will be provided to the Service documenting pre- and post-construction conditions.

Based on our review of the information provided, the Service concurs with your determination that the proposed project is not likely to adversely affect the beetle or the snake. No work will occur on the north bank of Comanche Creek, where habitat for the beetle occurs just outside of the project area. Construction will occur during the active period for the snake and the banks of Comanche Creek provide minimal habitat. The proposed project will temporarily affect 0.02 acre of marginally suitable upland habitat for the snake. Therefore, the Service considers effects to the snake to be insignificant. In addition, the applicant has proposed conservation measures which further reduce the likelihood of any adverse effects occurring to either the beetle or the snake from the proposed project.

Therefore, unless new information reveals effects of the proposed action that may affect listed species in a manner or to an extent not considered, or a new species or critical habitat is designated that may be affected by the proposed action, no further action pursuant to the Act is necessary.

If you have any questions regarding the proposed BCAG Transit Facility Property Acquisition Project, please contact Lily Douglas, Fish and Wildlife Biologist, at (916) 414-6645.

Sincerely,

Kellie Berry
Chief, Sacramento Valley Division

cc:
Andy Newsum, Butte County Association of Governments, Chico, CA
Elena Gregg, NorthStar Environmental Division, Chico, CA

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

11 September 2013

Mr. Andy Newsum
Butte County Association of Governments
2580 Sierra Sunrise Terrace, Suite 100
Chico, CA 95928

CLEAN WATER ACT §401 TECHNICALLY CONDITIONED WATER QUALITY CERTIFICATION FOR DISCHARGE OF DREDGED AND/OR FILL MATERIALS FOR THE BCAG TRANSIT FACILITY PROPERTY ACQUISITION PROJECT (WDID#5A04CR00226), CHICO, BUTTE COUNTY

ACTION:

1. ☐ Order for Standard Certification
2. ■ Order for Technically-conditioned Certification
3. ☐ Order for Denial of Certification

WATER QUALITY CERTIFICATION STANDARD CONDITIONS:

1. This certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to §13330 of the California Water Code and §3867 of Title 23 of the California Code of Regulations (23 CCR).

2. This certification action is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to 23 CCR subsection 3855(b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

3. The validity of any non-denial certification action shall be conditioned upon total payment of the full fee required under 23 CCR §3833, unless otherwise stated in writing by the certifying agency.

4. Certification is valid for the duration of the described project. Butte County Association of Governments shall notify the Central Valley Water Board in writing within 7 days of project completion.

ADDITIONAL TECHNICALLY CONDITIONED CERTIFICATION CONDITIONS:

In addition to the four standard conditions, Butte County Association of Governments shall satisfy the following:

BCAG 1. Butte County Association of Governments shall notify the Central Valley Water Board in writing 7 days in advance of the start of any in-water activities.

Contractor 2. Except for activities permitted by the U.S. Army Corps under §404 of the Clean Water Act, soil, silt, or other organic materials shall not be placed where such materials could pass into surface water or surface water drainage courses.

Contractor 3. All areas disturbed by project activities shall be protected from washout or erosion.

BCAG 4. Butte County Association of Governments shall maintain a copy of this Certification and supporting documentation (Project Information Sheet) at the Project site during construction for review by site personnel and agencies. All personnel (employees, contractors, and subcontractors) performing work on the proposed project shall be adequately informed and trained regarding the conditions of this Certification.

Contractor 5. An effective combination of erosion and sediment control Best Management Practices (BMPs) must be implemented and adequately working during all phases of construction.

Contractor 6. All temporarily affected areas will be restored to pre-construction contours and conditions upon completion of construction activities.

Contractor 7. Butte County Association of Governments shall perform surface water sampling: 1) When performing any in-water work; 2) In the event that project activities result in any materials reaching surface waters or; 3) When any activities result in the creation of a visible plume in surface waters. The following monitoring shall be conducted immediately upstream out of the influence of the project and 300 feet downstream of the active work area. Sampling results shall be submitted to this office within two weeks of initiation of sampling and every two weeks thereafter. The sampling frequency may be modified for certain projects with written permission from the Central Valley Water Board.

Parameter	Unit	Type of Sample	Frequency of Sample
Turbidity	NTU	Grab	Every 4 hours during in water work
Settleable Material	ml/l	Grab	Same as above.
Visible construction related pollutants	Observations	Visible Inspections	Continuous throughout the construction period

Contractor 8. Activities shall not cause turbidity increases in surface water to exceed:

(a) where natural turbidity is less than 1 Nephelometric Turbidity Units (NTUs), controllable factors shall not cause downstream turbidity to exceed 2 NTU;
(b) where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU;
(c) where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent;
(d) where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs;
(e) where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

Except that these limits will be eased during in-water working periods to allow a turbidity increase of 15 NTU over background turbidity as measured in surface waters 300 feet downstream from the working area. In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected. Averaging periods may only be assessed by prior permission of the Central Valley Water Board.

Contractor 9. Activities shall not cause settleable matter to exceed 0.1 ml/l in surface waters as measured in surface waters 300 feet downstream from the project.

Contractor 10. The discharge of petroleum products or other excavated materials to surface water is prohibited. Activities shall not cause visible oil, grease, or foam in the work area or downstream. Butte County Association of Governments shall notify the Central Valley Water Board immediately of any spill of petroleum products or other organic or earthen materials.

Contractor to notify BCAG 11. Butte County Association of Governments shall notify the Central Valley Water Board immediately if the above criteria for turbidity, settleable matter, oil/grease, or foam are exceeded.

12. Butte County Association of Governments shall comply with all Department of Fish and Wildlife 1600 requirements for the project.

Contractor 13. Butte County Association of Governments must obtain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities issued by the State Water Resources Control Board for any project disturbing an area of 1 acre or greater.

14. The Conditions in this water quality certification are based on the information in the attached "Project Information." If the information in the attached Project Information is modified or the project changes, this water quality certification is no longer valid until amended by the Central Valley Water Board.

Contractor 15. In the event of any violation or threatened violation of the conditions of this Order, the violation or threatened violation shall be subject to any remedies, penalties, process, or

sanctions as provided for under State law and section 401 (d) of the federal Clean Water Act. The applicability of any State law authorizing remedies, penalties, process, or sanctions for the violation or threatened violation constitutes a limitation necessary to ensure compliance into this Order.

a. If Butte County Association of Governments or a duly authorized representative of the project fails or refuses to furnish technical or monitoring reports, as required under this Order, or falsifies any information provided in the monitoring reports, the applicant is subject to civil monetary liabilities, for each day of violation, or criminal liability.

b. In response to a suspected violation of any condition of this Order, the Central Valley Water Board may require Butte County Association of Governments to furnish, under penalty of perjury, any technical or monitoring reports the Central Valley Water Board deems appropriate, provided that the burden, including cost of the reports, shall be in reasonable relationship to the need for the reports and the benefits to be obtained from the reports.

c. Butte County Association of Governments shall allow the staff(s) of the Central Valley Water Board, or an authorized representative(s), upon the presentation of credentials and other documents, as may be required by law, to enter the project premises for inspection, including taking photographs and securing copies of project-related records, for the purpose of assuring compliance with this certification and determining the ecological success of the project.

ADDITIONAL STORM WATER QUALITY CONDITIONS:

Butte County Association of Governments shall also satisfy the following additional storm water quality conditions:

Contractor 1. During the construction phase, Butte County Association of Governments must employ strategies to minimize erosion and the introduction of pollutants into storm water runoff. These strategies must include the following:

(a) the Storm Water Pollution Prevention Plan (SWPPP) must be prepared during the project planning and design phases and before construction;
(b) an effective combination of erosion and sediment control Best Management Practices (BMPs) must be implemented and adequately working prior to the rainy season and during all phases of construction.

BCAG 2. Butte County Association of Governments must minimize the short and long-term impacts on receiving water quality from the BCAG Transit Facility Property Acquisition Project by implementing the following post-construction storm water management practices:

(a) minimize the amount of impervious surface;
(b) reduce peak runoff flows;
(c) provide treatment BMPs to reduce pollutants in runoff;
(d) ensure existing waters of the State (e.g., wetlands, vernal pools, or creeks) are not used as pollutant source controls and/or treatment controls;

(e) preserve and, where possible, create or restore areas that provide important water quality benefits, such as riparian corridors, wetlands, and buffer zones;
(f) limit disturbances of natural water bodies and natural drainage systems caused by development (including development of roads, highways, and bridges);
(g) use existing drainage master plans or studies to estimate increases in pollutant loads and flows resulting from projected future development and require incorporation of structural and non-structural BMPs to mitigate the projected pollutant load increases in surface water runoff;
(h) identify and avoid development in areas that are particularly susceptible to erosion and sediment loss, or establish development guidance that protects areas from erosion/ sediment loss;
(i) control post-development peak storm water run-off discharge rates and velocities to prevent or reduce downstream erosion, and to protect stream habitat.

BCAG 3. Butte County Association of Governments must ensure that all development within the project provides verification of maintenance provisions for post-construction structural and treatment control BMPs. Verification shall include one or more of the following, as applicable:

(a) the developer's signed statement accepting responsibility for maintenance until the maintenance responsibility is legally transferred to another party; or
(b) written conditions in the sales or lease agreement that require the recipient to assume responsibility for maintenance; or
(c) written text in project conditions, covenants and restrictions for residential properties assigning maintenance responsibilities to a home owner's association, or other appropriate group, for maintenance of structural and treatment control BMPs; or
(d) any other legally enforceable agreement that assigns responsibility for storm water BMP maintenance.

BCAG 4. Staff of the Central Valley Water Board has prepared total maximum daily load (TMDL) allocations that, once approved, would limit methylmercury in storm water discharges to the Sacramento-San Joaquin Delta. The Central Valley Water Board has scheduled these proposed allocations to be considered for adoption. When the Central Valley Water Board adopts the TMDL and once approved by the Environmental Protection Agency, the discharge of methylmercury may be limited from the proposed project. The purpose of this condition is to provide notice to Butte County Association of Governments that methylmercury discharge limitations and monitoring requirements may apply to this project in the future and also to provide notice of the Central Valley Water Board's TMDL process and that elements of the planned construction may be subject to a TMDL allocation.

REGIONAL WATER QUALITY CONTROL BOARD CONTACT PERSON:

Scott A. Zaitz, R.E.H.S., Redding Branch Office, 364 Knollcrest Drive, Suite 205, Redding, California 96002, szaitz@waterboards.ca.gov, (530) 224-4784

WATER QUALITY CERTIFICATION:

I hereby issue an order certifying that any discharge from Butte County Association of Governments, BCAG Transit Facility Property Acquisition Project (WDID# 5A04CR00226) will comply with the applicable provisions of §301 ("Effluent Limitations"), §302 ("Water Quality Related Effluent Limitations"), §303 ("Water Quality Standards and Implementation Plans"), §306 ("National Standards of Performance"), and §307 ("Toxic and Pretreatment Effluent Standards") of the Clean Water Act. This discharge is also regulated under State Water Resources Control Board Water Quality Order No. 2003-0017 DWQ "Statewide General Waste Discharge Requirements For Dredged Or Fill Discharges That Have Received State Water Quality Certification (General WDRs)."

Except insofar as may be modified by any preceding conditions, all certification actions are contingent on (a) the discharge being limited and all proposed mitigation being completed in strict compliance with Butte County Association of Governments' project description and the attached Project Information Sheet, and (b) compliance with all applicable requirements of the Water Quality Control Plan *for the Sacramento River and San Joaquin River*, Fourth Edition, revised September 2009 (Basin Plan).

Any person aggrieved by this action may petition the State Water Quality Control Board to review the action in accordance with California Water Code § 13320 and California Code of Regulations, title 23, § 2050 and following. The State Water Quality Control Board must receive the petition by 5:00 p.m., 30 days after the date of this action, except that if the thirtieth day following the date of this action falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Quality Control Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

(for) PAMELA C. CREEDON
Executive Officer

SAZ:lmw

Enclosure: Water Quality Order No. 2003-0017 DWQ

cc w/o encl: Ms. Krystel Bell, U.S. Army Corp of Engineers, Sacramento
Department of Fish and Wildlife, Region 2, Rancho Cordova
City of Chico Planning Department, Chico
U.S. Fish and Wildlife Service, Sacramento
Mr. Bill Jennings, CALSPA, Stockton

cc by email w/o encl: U.S. EPA, Region 9, San Francisco
Mr. Bill Orme, SWRCB, Certification Unit, Sacramento

PROJECT INFORMATION

Application Date: 24 July 2013

Applicant: Butte County Association of Governments, Attn: Andy Newsum

Applicant Representatives: NorthStar Engineering, Attn: Ms. Elena Gregg

Project Name: BCAG Transit Facility Property Acquisition Project

Application Number: WDID No. 5A04CR00226

U.S. Army Corps File Number: SPK-2012-01307

Type of Project: Acquiring a portion of 34 acres adjacent to the existing BCAG transit facility, located at Huss Lane.

Project Location: Section 1/2, Township 21 North, Range 1 East, MDB&M. Latitude: 39°42'25" and Longitude: -121°49'40"

County: Butte County

Receiving Water(s) (hydrologic unit): Comanche Creek, which is tributary to Sacramento River. Colusa Basin Hydrologic Unit-Butte Basin Hydrologic Area No. 520.40

Water Body Type: Streambed

Designated Beneficial Uses: The Basin Plan for the Central Valley Water Board has designated beneficial uses for surface and ground waters within the region. Beneficial uses that could be impacted by the project include: Agricultural Supply (AGR); Groundwater Recharge, Water Contact Recreation (REC-1); Warm Freshwater Habitat (WARM); Cold Freshwater Habitat (COLD); Cold Migration of Aquatic Organisms (MIGR); Warm Spawning, Reproduction, and /or Early Development (SPWN); and Wildlife Habitat (WILD).

Project Description (purpose/goal): The BCAG Transit Facility Property Acquisition Project consists of the acquisition of a portion of the 34-acre parcel that is immediately adjacent to the existing BCAG transit facility, located on Huss Lane and the creation of an approximately 10-acre parcel that is contiguous with the existing transit facility site. Due to storm drainage constraints within the area, the future expansion of the existing BCAG facility will require the installation of a new 48 inch diameter storm drain pipe and outfall. From the BCAG expansion area, the pipe will traverse annual grassland along an approximately 1,943 linear foot alignment to Comanche Creek. The storm water outfall will occur along Comanche Creek and will require impacts to the bank of Comanche Creek within the ordinary high water mark of the creek. The outfall will result in the cut of 60 cubic yards of material for the outfall installation. The native material will be backfilled, however, a total of 20 cubic yards of vegetated rip-rap (minimum ¼ ton size) will be placed surrounding the outfall along the bank. The vegetated rip-rap will directly impact ta 30-foot long by 10-foot wide area of the bank (300 square feet, or approximately 0.0069 acre).

Preliminary Water Quality Concerns: Construction activities may impact surface waters with increased turbidity and settleable matter.

Proposed Mitigation to Address Concerns: Butte County Association of Governments will implement Best Management Practices (BMPs) to control sedimentation and erosion. All temporary affected areas will be restored to pre-construction contours and conditions upon completion of construction activities. Butte County Association of Governments will conduct turbidity and settleable matter testing during in-water work, stopping work if Basin Plan criteria are exceeded or are observed.

Fill/Excavation Area: Project implementation will permanently impact 0.0069 acres of un-vegetated streambed.

Dredge Volume: 60 cubic yards of native soil.

U.S. Army Corps of Engineers Permit Number: Nationwide Permit #7 (Outfall Structures and Associated Intake Structures)

Department of Fish and Wildlife Streambed Alteration Agreement: Butte County Association of Governments applied for a Streambed Alteration Agreement in July 2013. Lake & Streambed Alteration Agreement Number: 1600-2013-0167-R2

Possible Listed Species: None

Status of CEQA Compliance: The Butte County Association of Governments issued a final Notice of Determination approving a Mitigated Negative Declaration on 28 February 2013 in compliance with Section 21108 or 21152 of the Public Resources Code, stating the project will not have a significant effect on the environment. Mitigation measures were made a condition of approval. A statement of overriding consideration was not adopted for this project. A Negative Declaration was prepared for this project pursuant to the provisions of CEQA. (State Clearinghouse Number 2012122045).

Compensatory Mitigation: Not Applicable

Application Fee Provided: On 24 July 2013 a certification application fee of $944.00 was submitted as required by 23 CCR §3833b(3)(A) and by 23 CCR §2200(e). A remaining certification fee of $283 was received on 25 August 2013 as required by 23 CCR §3833b(2)(A) and by 23 CCR § 2200(e).

State of California – The Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
North Central Region
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670-4599
916-358-2900
www.wildlife.ca.gov

EDMUND G. BROWN, Jr. Governor
Charlton H. Bonham, Director

AUG 2 4 2013
Date

Andy Newsum
Butte County Association of Governments
2580 Sierra Sunrise Terrace, Suite 100
Chico, CA 95928
anewsum@bcag.org

Subject: Final Lake or Streambed Alteration Agreement
Notification No. 1600-2013-0167-R2
Comanche Creek; BCAG Transit Facility Property Acquisition Project

Dear Mr. Newsum:

Enclosed is the final Streambed Alteration Agreement (Agreement) for the BCAG Transit Facility Property Acquisition Project (Project). Before the California Department of Fish and Wildlife (Department) may issue an Agreement, it must comply with the California Environmental Quality Act (CEQA). In this case, the Department, acting as a responsible agency, filed a notice of determination (NOD) on the same date it signed the Agreement. The NOD was based on information contained in the Mitigated Negative Declaration the lead agency prepared for the Project.

Under CEQA, filing a NOD starts a 30-day period within which a party may challenge the filing agency's approval of the project. You may begin your project before the 30-day period expires if you have obtained all necessary local, state, and federal permits or other authorizations. However, if you elect to do so, it will be at your own risk.

If you have any questions regarding this matter, please contact Tanya Sheya, Environmental Scientist at (916) 358-2953 or Tanya.Sheya@wildlife.ca.gov.

Sincerely,

Tina Bartlett
Regional Manager

ec: Tanya Sheya, Environmental Scientist
Tanya.Sheya@wildlife.ca.gov

Elena Gregg, NorthStar Engineering
egregg@northstareng.com

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
NORTH CENTRAL REGION
1701 NIMBUS ROAD
RANCHO CORDOVA, CA 95670

STREAMBED ALTERATION AGREEMENT
NOTIFICATION NO. 1600-2013-0167-R2
COMANCHE CREEK

BUTTE COUNTY ASSOCIATION OF GOVERNMENTS
BCAG TRANSIT FACILITY PROPERTY ACQUISITION

This Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Wildlife (Department) and Butte County Association of Governments (Permittee) as represented by Andy Newsum.

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) section 1602, Permittee notified the Department on July 24, 2013, that Permittee intends to complete the project described herein.

WHEREAS, pursuant to FGC section 1603, the Department has determined that the project could substantially adversely affect existing fish or wildlife resources and has included measures in the Agreement necessary to protect those resources.

WHEREAS, Permittee has reviewed the Agreement and accepts its terms and conditions, including the measures to protect fish and wildlife resources.

NOW THEREFORE, Permittee agrees to complete the project in accordance with the Agreement.

PROJECT LOCATION

The project is located at Comanche Creek, in the County of Butte, State of California; Latitude 39°42'25.49"N, Longitude 121°49'40.21"W; Township 21N, Range 01E, Sections 1 and 2 of the Chico U.S. Geological Survey (USGS) Quadrangle; Assessor's Parcel Number 039-410-038. See Exhibit A.

PROJECT DESCRIPTION

The project is limited to the installation of a new regional storm drainage infrastructure and outfall into Comanche Creek.

The storm drain system will drain excess onsite surface storm water through a 48-inch diameter storm drain pipe and outfall. The storm drain will terminate at an outfall on the south bank of Comanche Creek. At the Creek, a concrete outfall will be placed in the

south bank. The outfall structure will require the cut of 60- cubic yards of material. The disturbed material will be backfilled, with approximately 20- cubic yards of vegetated rip-rap (minimum ¼ ton in size) placed surrounding the outfall along the bank. The vegetated rip-rap will directly impact 300-square feet of the bank (see Exhibit B). The project will not require the removal of trees.

Construction activities will occur when water levels are low within Comanche Creek. If necessary, a small coffer dam will be used to divert water around the construction zone and remain dry for at least 15 days prior to beginning work. BMPs, including the use of straw wattles and silt fences, will prevent sediment and silt from entering the creek.

All equipment will be limited to the smallest feasible construction envelope and the top of the bank to avoid sensitive habitats and the creek. Orange barrier fencing will be established along the project envelope to ensure all construction activities remain within the project area only. The areas disturbed during construction will be re-graded to pre-project conditions and seeded with a native seed mix following the completion of the pipe installation.

PROJECT IMPACTS

Existing fish or wildlife resources the project could substantially adversely affect include: Giant garter snake (*Thanmophis gigas*), Elderberry longhorn beetle (*Desmocerus californicus dimorphus*), other nesting birds, amphibians, and other aquatic and terrestrial plant and wildlife species.

The adverse effects the project could have on the fish or wildlife resources identified above include: soil compaction or other disturbance to soil layer, loss of natural bank, temporary impacts from dewatering, temporary contamination (i.e. incidental from construction), construction trench that could entrap wildlife, disruption to nesting birds, reptiles and other wildlife.

MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

BCAG

1. Administrative Measures

Permittee shall meet each administrative requirement described below.

1.1 Documentation at Project Site. Permittee shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials and California Environmental Quality Act (CEQA) documents, readily available at the project site at all times and shall be presented to the Department personnel, or personnel from another state, federal, or local agency upon request.

1.2 Providing Agreement to Persons at Project Site. Permittee shall provide copies of the Agreement and any extensions and amendments to the Agreement to all

persons who will be working on the project at the project site on behalf of Permittee, including but not limited to contractors, subcontractors, inspectors, and monitors.

1.3 Notification of Conflicting Provisions. Permittee shall notify the Department if Permittee determines or learns that a provision in the Agreement might conflict with a provision imposed on the project by another local, state, or federal agency. In that event, the Department shall contact Permittee to resolve any conflict.

1.4 Project Site Entry. Permittee agrees that the Department personnel may enter the project site at any time to verify compliance with the Agreement.

1.5 Notification of Project Modification. Permittee agrees to notify the Department of any modifications made to the project plans submitted to the Department.

1.6 Change of Conditions and Need to Cease Operations. If conditions arise, or change, in such a manner as to be considered deleterious to the stream or wildlife, operations shall cease until corrective measures approved by the Department are taken.

1.7 Does Not Authorize "Take." This Agreement does not authorize "take" of any listed species. Take is defined as hunt, pursue, catch, capture or kill or attempt to hunt, pursue, catch, capture, or kill. If there is potential for take of any listed species to occur, the Permittee shall consult with the Department as outlined in FGC Section 2081 and shall obtain the required state and federal threatened and endangered species permits.

2. Avoidance and Minimization Measures

To avoid or minimize adverse impacts to fish and wildlife resources identified above, Permittee shall implement each measure listed below.

Contractor

2.1 Work Period. Work shall be conducted within the time frame established in the CEQA document (SCH# 2012122045). If water is present at the time of construction, water shall be diverted around the work area and work shall begin after the site is dry. The time period for completing the work within the flowing or standing water of the watercourses shall be further confined to the period between May 1 and October 1 of the same calendar year. Work within the dry portion of the stream shall be timed with awareness of precipitation forecasts and likely increases in stream flow. Construction activities within the stream shall cease until all reasonable erosion control measures, have been implemented prior to all storm events. Construction equipment and material shall be removed from the floodplain if inundation is likely. Revegetation, restoration and erosion control work is not confined to this time period.

Contractor with BCAG Approval

2.2 Work Period Modification. If Permittee needs more time to complete the project activity, the work may be permitted outside of the work period and extended on a day-to-day basis (or for some other set period of time) by the Department representative who reviewed the project, or if unavailable, through contact with the Regional office (see Contact Information). Permittee shall submit a written request for a work period variance to the Department. The work period variance request shall: 1) describe the extent of work already completed; 2) detail the activities that remain to be completed; 3) detail the time required to complete each of the remaining activities; and 4) provide photographs of both the current work completed and the proposed site for continued work. The work period variance request should consider the effects of increased stream flows, rain delays, increased erosion control measures, limited access due to saturated soil conditions, and limited growth of erosion control grasses due to cool weather. Work period variances are issued at the discretion of the Department. The Department will review the written request to work outside of the established work period. The Department will have ten calendar days to review the proposed work period variance. The Department reserves the right to require additional measures to protect fish and wildlife resources as a condition for granting the variance.

BCAG

2.3 Biological Monitor. A biological monitor is an individual experienced with construction level biological monitoring and who is able to recognize species in the project area and who is familiar with the habits and behavior of those species. Biological monitors shall have academic and professional experience in biological sciences and related resource management activities as it pertains to this project. All biological monitors for the project shall be submitted to the Department prior to commencement of construction activities.

BCAG

2.4 Biological Monitor On-site with Stop work Authorization. Permittee shall have a biological monitor on site daily during construction activities to ensure that Agreement conditions are being met and recommendations listed in the Biological Resources Assessment are being implemented to minimize impacts to fish and wildlife species and habitat. The biological monitor shall be responsible for conducting pre-construction surveys within the construction zone and monitoring all construction related activities, including any ground- or vegetation-disturbing activities subject to this Agreement. The biological monitor shall have the authority to immediately stop any activity that is not in compliance with this Agreement, and/or to order any reasonable measure to avoid or minimize impacts to fish and wildlife resources. If any sensitive State listed Species of Special Concern, or threatened or endangered species are found, the biologist shall inform the Department. If there is a threat of harm to any sensitive species, or other aquatic wildlife the biologist shall halt construction and notify the Department immediately.

Contractor

2.5 Cover Excavations and open pipes. Unattended, open excavations shall be properly covered to prevent wildlife entrapment. Open ends of pipes, conduits and

similar materials shall be covered to exclude wildlife. Such materials shall be checked for signs of wildlife prior to disturbance.

BCAG provided Contractor attended

2.6 Environmental Awareness Training. All construction personnel shall receive worker environmental awareness training conducted by a qualified biologist. This training shall instruct workers to recognize giant garter snakes, their habitat(s), and nature and purpose of protection measures, and the terms and conditions of any permit applicable to the Project.

Contractor

2.7 Spoil Placement. To prevent burying, trapping, or crushing giant garter snakes, spoil from project operations shall not be placed on or near the canal banks where near is a risk of covering rodent burrows or bank-top soil crevices.

Contractor

2.8 Speed Limits. Where practical and safe to do so, vehicle speed within giant garter snake habitat areas of the Project shall be limited to 20 mph on unimproved access routes and roadways to avoid running over snakes.

Contractor

2.9 Check for Snakes Under Vehicles. The biological monitor as well as all construction personnel shall visually check for snakes under parked vehicles and equipment within giant garter snake habitat area prior to moving them. If snakes or other listed species are observed by crews, construction personnel will contact the onsite monitor.

Contractor

2.10 Giant Garter Snake Encounters. Permittee will comply with avoidance and minimization measures as stated in the project's CEQA document (SCH# 2012122045) if a giant garter snake is encountered during construction or preconstruction surveys.

Contractor

2.11 Stream Diversions / Dewatering. If work in the flowing portion of the stream is unavoidable, the entire stream flow shall be diverted around or through the work area during the excavation and/or construction operations. Stream flow shall be diverted using gravity flow through temporary culverts/pipes or pumped around the work site with the use of hoses. When a temporary dam or other artificial obstruction is being constructed, maintained, or placed in operation, sufficient water shall at all times be allowed to pass downstream to maintain aquatic life below the dam pursuant to FGC section 5937. Any temporary dam or other artificial obstruction constructed shall only be built from clean materials such as sandbags, gravel bags, water dams, or clean/washed gravel which will cause little or no siltation. Stream diversions shall be removed prior to the winter period.

Contractor

2.12 Coffer Dams. Prior to the start of construction, Permittee shall submit plans for diverting the stream around or through the work area and the work area shall be isolated from the flowing stream. Coffer dams shall be constructed of a non-erodible material which does not contain soil or fine sediment. Coffer dams and the stream diversion system shall remain in place and functional throughout the

construction period. Coffer dams or stream diversions that fail for any reason shall be repaired immediately.

BCAG

2.13 Stranded Aquatic Life. The Permittee shall check daily for stranded aquatic life as the water level in the dewatering area drops. All reasonable efforts shall be made to capture and move all stranded aquatic life observed in the dewatered areas. Capture methods may include fish landing nets, dip nets, buckets and by hand. Captured aquatic life shall be released immediately in the closest body of water adjacent to the work site. This condition does not allow for the take or disturbance of any State or federally listed species, or State listed species of special concern.

Contractor

2.14 Vegetation Removal. Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations. No native trees with a trunk diameter at breast height (DBH) in excess of four (4) inches shall be removed or damaged during construction. Using hand tools (clippers, chain saw, etc.), trees may be trimmed to the extent necessary to gain access to the work sites. All cleared material/vegetation shall be removed out of the riparian zone and stream channel.

Contractor

2.15 Bird Nests. It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird except as otherwise provided by the FGC. No trees that contain active nests of birds shall be disturbed until all eggs have hatched and young birds have fledged without prior consultation and approval of a Department representative. If construction is scheduled during the breeding season (approximately February 15th thru August 31st) then a breeding bird survey will be conducted no more than 15 days prior to the start of construction by a the Department approved biologist. All active bird nests will be marked following the survey to avoid destruction by equipment. If nesting raptors or migratory birds are identified within the area, a non-disturbance buffer will be established around the nest site. The size of the non-disturbance buffer and any other restrictions will be determined, before project activities commence, through consultation with the Department following completion of the survey.

Contractor

2.16 Rock Slope Protection. Un-grouted rock slope protection (RSP) and energy dissipater materials shall consist of clean rock, competent for the application, sized and properly installed to resist washout. RSP slopes shall be supported with competent boulders keyed into a footing trench with a depth sufficient to properly seat the footing course boulders and prevent instability (typically at least 1/3 diameter of footing course boulders). Voids between rocks shall be planted with riparian species native to the area.

Contractor

2.17 Stabilize Exposed Areas. Permittee shall take precautions to minimize turbidity/siltation during construction and post-construction periods. Precautions shall include, but are not limited to: best management erosion control practices to stabilize all exposed/disturbed areas within the project site to the greatest extent possible.

Contractor

2.18 Sediment Control. Precautions to minimize turbidity/siltation shall be taken into account during project planning and implementation. This may require the placement of silt fencing, coir logs, coir rolls, straw bale dikes, or other siltation barriers so that silt and/or other deleterious materials are not allowed to pass to downstream reaches. **Products with plastic monofilament or cross joints in the netting that are bound/stitched (such as found in straw wattles/fiber rolls and some erosion control blankets) which may cause entrapment of wildlife, shall not be allowed.**

Passage of sediment beyond the sediment barrier(s) is prohibited. If any sediment barrier fails to retain sediment, corrective measures shall be taken. The sediment barrier(s) shall be maintained in good operating condition throughout the construction period and the following rainy season. Maintenance includes, but is not limited to, removal of accumulated silt and/or replacement of damaged silt fencing, coir logs, coir rolls, and/or straw bale dikes. Upon the Department's determination that turbidity/siltation levels resulting from project related activities constitute a threat to aquatic life, activities associated with the turbidity/siltation shall be halted until effective Department approved control devices are installed or abatement procedures are initiated.

Contractor

2.19 Removal of Silt Barrier. Permittee is responsible for the removal of non-biodegradable silt barriers (such as plastic silt fencing) after the disturbed areas have been stabilized with erosion control vegetation (usually after the first growing season).

Contractor

2.20 Pollution Control. Utilize Best Management Practices (BMPs) to prevent spills and leaks into channel. Any equipment or vehicles driven and/or operated within or adjacent to the stream shall be checked and maintained daily to prevent leaks of materials that could be deleterious to aquatic and terrestrial life or riparian habitat. If maintenance or refueling of vehicles or equipment must occur on-site, use a designated area and/or a secondary containment, located away from drainage courses to prevent the runoff of storm water and the runoff of spills. Staging and storage areas for equipment, materials, fuels, lubricants and solvents, shall be located more than twenty (20) feet from the stream channel and banks. Place drip pans or absorbent materials under vehicles and equipment when not in use. Ensure that all construction areas have proper spill clean up materials (absorbent pads, sealed containers, booms, etc.) to contain the movement of any spilled substances. Any other substances which could be hazardous to aquatic life, resulting from project related activities, shall be prevented from contaminating the soil and/or entering the waters of the state. Any of these materials, placed within or where they may enter a stream or lake by the Applicant or any party working under contract or with the permission of the Permittee, shall be removed immediately. The Department shall be notified immediately by the Permittee of any spills and shall be consulted regarding clean-up procedures.

Contractor 2.21 Removal of Debris, Materials and Rubbish. Permittee shall remove all Project generated debris, building materials and rubbish from the stream and from areas within one hundred and fifty (150) feet of the high water mark / where such materials could be washed into the stream following completion of Project activities.

Contractor 2.22 Site Restoration. All exposed/disturbed areas and access points within the stream left barren of vegetation as a result of the construction activities, such as staging areas, shall be restored using locally native grass and/or forb seeds, locally native grass plugs and/or a mix of quick growing sterile non-native grass with locally native grass/forb seeds. Seeded areas shall be covered with broadcast straw and/or seeded erosion control blankets.

3. Reporting Measures

Permittee shall meet each reporting requirement described below.

BCAG 3.1 Permittee shall notify the Department within two working days of beginning work within the channel. Notification shall be submitted as instructed in Contact Information section below. Email notification is preferred.

BCAG 3.2 Upon completion of the project activities described in this Agreement, the work area within the stream shall be digitally photographed. Photographs and notification of project completion shall be submitted to the Department within two days of completion as instructed in Contact Information section below. Email submittal is preferred.

BCAG 3.3 Permittee shall submit a monitoring report to the Department by January 1 of the year after completion of the construction project. The report shall discuss the mitigation performance as it relates to the success criteria. The report shall include the success of natural revegetation establishment, survival, and percent cover. The number by species of plants replaced (if applicable), an overview of the revegetation effort, and the method used to assess these parameters shall also be included. Photo documentation shall be included.

CONTACT INFORMATION

Any communication that Permittee or the Department submits to the other shall be in writing and any communication or documentation shall be delivered to the address below by U.S. mail, fax, or email, or to such other address as Permittee or the Department specifies by written notice to the other.

To Permittee:

Andy Newsum
Butte County Association of Governments
2580 Sierra Sunrise Terrace, Suite 100
Chico, CA 95928
Phone: (530) 879-2468
Email: anewsum@bcag.org

To Contact:

~~Elena Gregg~~ Kamie Loeser
NorthStar Engineering
111 Mission Ranch Blvd., Suite 100
Chico, CA 95926
Phone: (530) ~~343-8327~~ 893-1600
Email: ~~egregg@northstareng.com~~ kloeser@northstareng.com

To the Department:

Department of Fish and Wildlife
North Central Region
1701 Nimbus Road
Rancho Cordova, CA 95670
Attn: Lake and Streambed Alteration Program
Notification #1600-2013-0167-R2
Phone: (916) 358-2900 or 916-358-2885
Fax: (916) 358-2912
Email: R2LSA@wildlife.ca.gov

LIABILITY

Permittee shall be solely liable for any violations of the Agreement, whether committed by Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents or contractors and subcontractors, to complete the project or any activity related to it that the Agreement authorizes.

This Agreement does not constitute the Department's endorsement of, or require Permittee to proceed with the project. The decision to proceed with the project is Permittee's alone.

SUSPENSION AND REVOCATION

The Department may suspend or revoke in its entirety the Agreement if it determines that Permittee or any person acting on behalf of Permittee, including its officers,

employees, representatives, agents, or contractors and subcontractors, is not in compliance with the Agreement.

Before the Department suspends or revokes the Agreement, it shall provide Permittee written notice by certified or registered mail that it intends to suspend or revoke. The notice shall state the reason(s) for the proposed suspension or revocation, provide Permittee an opportunity to correct any deficiency before the Department suspends or revokes the Agreement, and include instructions to Permittee, if necessary, including but not limited to a directive to immediately cease the specific activity or activities that caused the Department to issue the notice.

ENFORCEMENT

Nothing in the Agreement precludes the Department from pursuing an enforcement action against Permittee instead of, or in addition to, suspending or revoking the Agreement.

Nothing in the Agreement limits or otherwise affects the Department's enforcement authority or that of its enforcement personnel.

OTHER LEGAL OBLIGATIONS

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from obtaining any other permits or authorizations that might be required under other federal, state, or local laws or regulations before beginning the project or an activity related to it.

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with other applicable statutes in the FGC including, but not limited to, FGC sections 2050 *et seq.* (threatened and endangered species), 3503 (bird nests and eggs), 3503.5 (birds of prey), 5650 (water pollution), 5652 (refuse disposal into water), 5901 (fish passage), 5937 (sufficient water for fish), and 5948 (obstruction of stream).

Nothing in the Agreement authorizes Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, to trespass.

AMENDMENT

The Department may amend the Agreement at any time during its term if the Department determines the amendment is necessary to protect an existing fish or wildlife resource.

Permittee may amend the Agreement at any time during its term, provided the amendment is mutually agreed to in writing by the Department and Permittee. To request an amendment, Permittee shall submit to the Department a completed Department "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the corresponding amendment fee identified in the Department's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

TRANSFER AND ASSIGNMENT

This Agreement may not be transferred or assigned to another entity, and any purported transfer or assignment of the Agreement to another entity shall not be valid or effective, unless the transfer or assignment is requested by Permittee in writing, as specified below, and thereafter the Department approves the transfer or assignment in writing.

The transfer or assignment of the Agreement to another entity shall constitute a minor amendment, and therefore to request a transfer or assignment, Permittee shall submit to the Department a completed Department "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in the Department's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

EXTENSIONS

In accordance with FGC section 1605(b), Permittee may request one extension of the Agreement, provided the request is made prior to the expiration of the Agreement's term. To request an extension, Permittee shall submit to the Department a completed Department "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in the Department's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5). The Department shall process the extension request in accordance with FGC 1605(b) through (e).

If Permittee fails to submit a request to extend the Agreement prior to its expiration, Permittee must submit a new notification and notification fee before beginning or continuing the project the Agreement covers (Fish & G. Code, § 1605, subd. (f)).

EFFECTIVE DATE

The Agreement becomes effective on the date of the Department's signature, which shall be: 1) after Permittee's signature; 2) after the Department complies with all applicable requirements under the California Environmental Quality Act (CEQA); and 3) after payment of the applicable FGC section 711.4 filing fee listed at http://www.wildlife.ca.gov/habcon/ceqa/ceqa_changes.html.

TERM

This Agreement shall expire three years from the date signed by the Department, unless it is terminated or extended before then. All provisions in the Agreement shall remain in force throughout its term. Permittee shall remain responsible for implementing any provisions specified herein to protect fish and wildlife resources after the Agreement expires or is terminated, as FGC section 1605(a)(2) requires.

EXHIBITS

The documents listed below are included as exhibits to the Agreement and incorporated herein by reference.

A. Exhibit A. Map of Project Location

AUTHORITY

If the person signing the Agreement (signatory) is doing so as a representative of Permittee, the signatory hereby acknowledges that he or she is doing so on Permittee's behalf and represents and warrants that he or she has the authority to legally bind Permittee to the provisions herein.

AUTHORIZATION

This Agreement authorizes only the project described herein. If Permittee begins or completes a project different from the project the Agreement authorizes, Permittee may be subject to civil or criminal prosecution for failing to notify the Department in accordance with FGC section 1602.

CONCURRENCE

The undersigned accepts and agrees to comply with all provisions contained herein.

FOR BUTTE COUNTY ASSOCIATION OF GOVERNMENTS

Andy Newsum — Date: 8-20-13

Andy Newsum

FOR DEPARTMENT OF FISH AND WILDLIFE

Tina Bartlett — Date: 8/24/13

Tina Bartlett
Regional Manager

Prepared by: Tanya Sheya
Environmental Scientist

Exhibit A. Map of Project Location

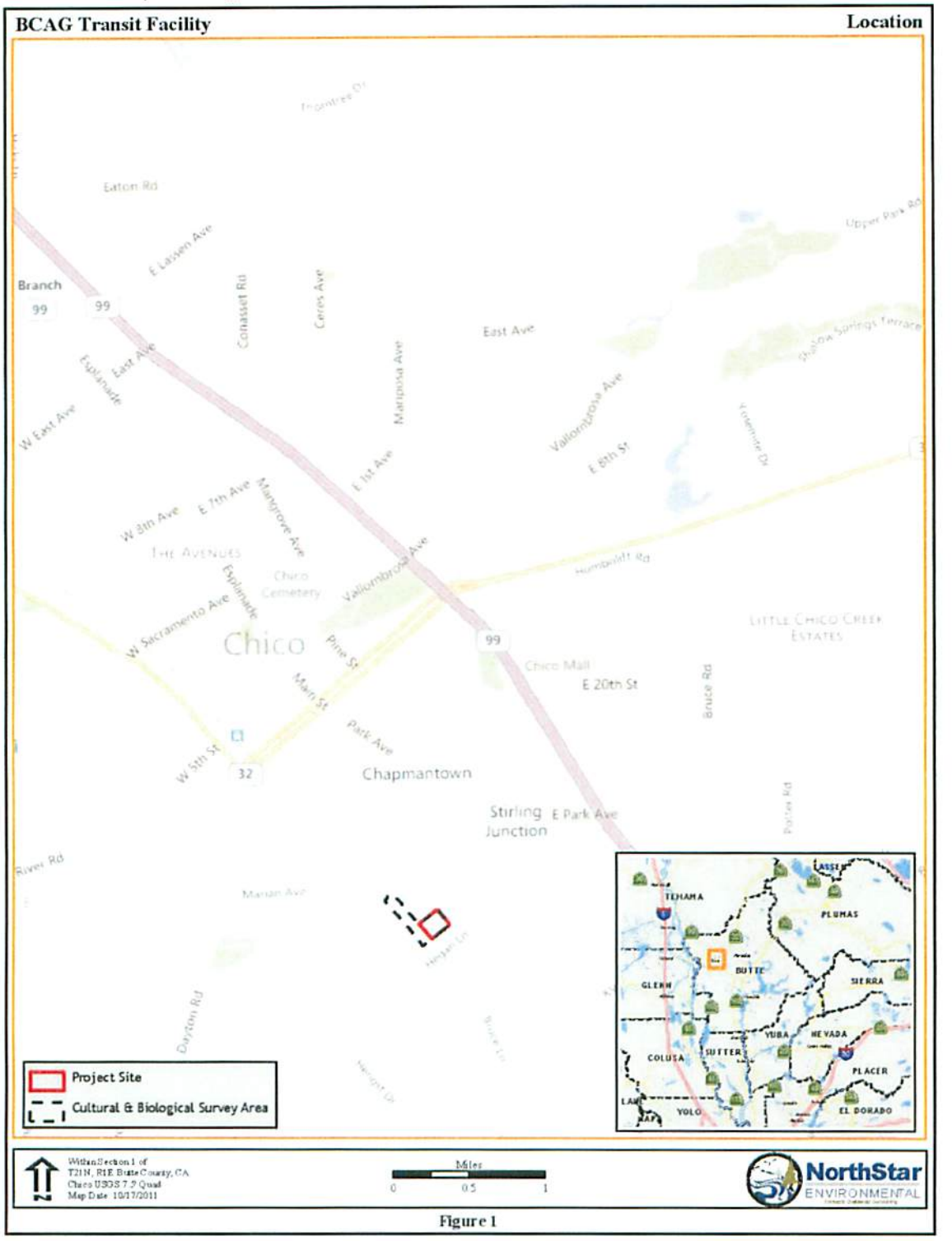
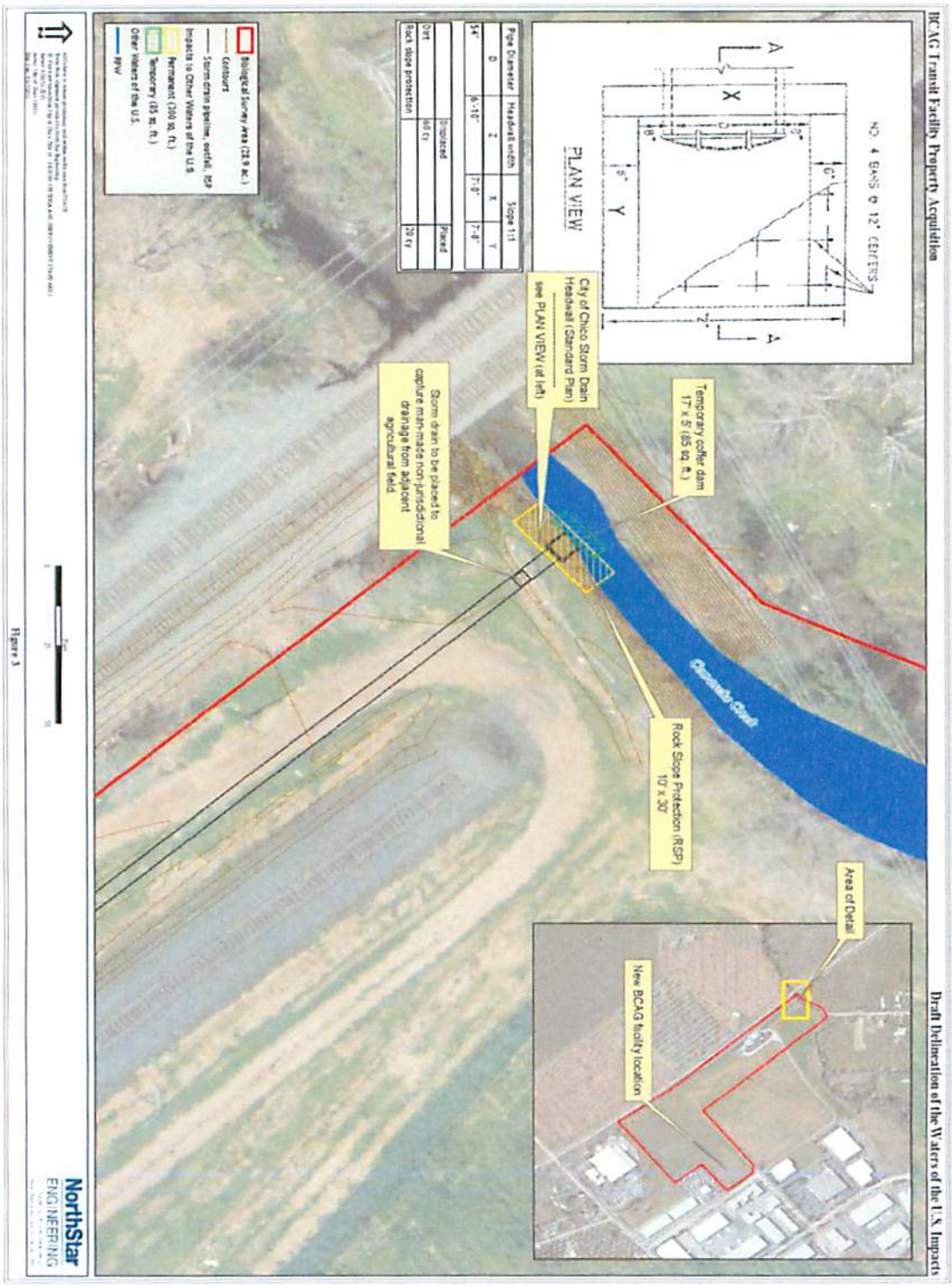


Figure 1

Exhibit B. Map of Project Area



APPENDIX G

PERMIT TO ENTER & CONSTRUCT

Date: 5-30-14
Project: Butte Regional Transit Operations Center
APN: 039-060-125 (portion)

Hegan Lane Partners (OWNER) hereby grants permission to the Butte County Association of Governments (BCAG) and its officers, employees, agents and contractors to enter our property for the purpose of constructing a public roadway extension, stockpiling excavations and accommodating the construction of a storm drain and associated outfall (PROJECT) shown on the attached Exhibit "A" and located at the north end of the Huss Lane and Aztec Drive intersection in Chico, CA.

This permission is granted in consideration of the benefits accruing to OWNER and/or in the interest of the public health, safety, and welfare.

BCAG will give OWNER 5 days notice prior to commencement of the PROJECT. Once the work on the property has commenced, all work will be completed within 120 Working Days unless delayed by reason of inclement weather.

This permit to enter will commence on June 1, 2014 and terminate upon the earlier of the following: (i) completion of the work; (ii) June 1, 2015 or (iii) completion of Mid Valley Title Escrow Number 00401-3846963. After termination, BCAG will have no further rights arising out of this Agreement with respect to the contemplated construction on the Property, excepting therefrom the rights associated with the real state acquisition being contemplated between BCAG and OWNER as defined by Mid Valley Title Escrow Number 00401-3846963.

BCAG will coordinate all of its proposed activities with OWNER to ensure that its work on the property is conducted at times and in a manner that will not unreasonably interfere with the use of the property.

BCAG agrees that at the conclusion of the PROJECT, it will remove all construction equipment, tools and building materials associated with the PROJECT, and any trash and other debris deposited during the work on the property, and will repair, replace or compensate for any existing improvement that may have been unexpectedly or accidentally damaged during the course of work.

All work will be performed at BCAG's sole cost and expense (excepting OWNER's commitment of $333,500 for their share of the storm drain cost) including the cost and expense of obtaining any necessary governmental permits, licenses or other authorizations that may be required.

All work done under this agreement shall conform to all applicable building, fire and sanitary laws, ordinances, and regulations relating to such work, and shall be done in a good and workmanlike manner.

BCAG will protect, indemnify, and hold harmless the OWNER and its officers, employees and agents from and against all liability, loss, cost or expense, including reasonable attorneys' fees and court costs arising out of a negligent act, error or omission, willful misconduct, or violation of law of or by BCAG or its officers, employees, agents and contractors. However, BCAG shall have no obligation to indemnify the OWNER for any loss, liability, or damage caused by the negligence of OWNER, or any of OWNER's employees, agents, or authorized users, including, but not limited to, tenants, invitees or permittees.

BCAG will defend, hold harmless, and indemnify OWNER from any and all third party encumbrances and/or liens against the property arising out of the PROJECT, including any claim or liability in any way connected with the failure of BCAG to pay any of its contractors or subcontractors, or the failure of any contractor or subcontractor of BCAG to pay any person(s) referred to in Section 3181 of the California Civil Code.

Please list any special conditions we should observe while on your property:

OWNER will allow for the deposition of approximately 1500 CY of excavation up to 6 inches in depth contained within a 300' x 300' footprint as shown in the attached Exhibit "A".

OWNER:

By: _____

Print Name: STEVEN SEIDENGLANZ

Title: MANAGING PARTNER

Date: 6-3-2014

Owner Contact and Telephone Number

STEVEN SEIDENGLANZ	530.518-8842	
Name	Telephone #1	Telephone #2

BCAG
Approved BY:

By: _____ Date: 6/3/14

Title: Executive Director

PERMIT TO ENTER & CONSTRUCT

Date: 6-3-14
Project: Butte Regional Transit Operations Center
APN: 039-060-114 (portion)

Littlefoot Property Company, LLC (OWNER) and Sierra Nevada Brewing Co hereby grants permission to the Butte County Association of Governments (BCAG) and its officers, employees, agents and contractors to enter our property, 2702 Aztec Drive, Chico Ca. for the purpose of constructing a storm drain and associated outfall (PROJECT) shown on the attached drawing and located at the north end of the Huss Lane and Aztec Drive intersection in Chico, CA.

This permission is granted in consideration of the benefits accruing to OWNER and/or in the interest of the public health, safety, and welfare.

BCAG will give OWNER 5 days notice prior to commencement of the PROJECT. Once the work on the property has commenced, all work will be completed within 120 Working Days unless delayed by reason of inclement weather.

This permit to enter will commence on May 1, 2014 and terminate upon the earlier of the following: (i) completion of the work; or (ii) December 31, 2014. After termination, BCAG will have no further rights arising out of this Agreement with respect to the contemplated construction on the Property and excepting that yearly monitoring in accordance with Mitigation Monitoring Program (MMP) will be required for 3 years after contemplated construction has been completed. Monitoring would consist of a short duration visit with photographs to include 1 person and a vehicle. Biological monitoring visits will be coordinated with OWNER. This agreement will be amended in writing to address the duration of time needed to complete the MMP.

BCAG will coordinate all of its proposed activities with OWNER to ensure that its work on the property is conducted at times and in a manner that will not unreasonably interfere with the use of the property.

BCAG agrees that at the conclusion of the PROJECT, it will remove all construction equipment, tools and building materials associated with the PROJECT, and any trash and other debris deposited during the work on the property, and will repair, replace or compensate for any existing improvement that may have been unexpectedly or accidentally damaged during the course of work.

All work will be performed at BCAG's sole cost and expense (excepting OWNER's commitment to one-third of the cost to construct, inspect, and material test (including UPPR personnel) the storm drain from the westerly BCAG property line to outfall in Comanche Creek, not to exceed $333,500) including the cost and expense of obtaining any necessary governmental permits, licenses or other authorizations that may be required.

All construction work shall be performed by licensed contractors. Before starting any work, BCAG shall: (i) obtain all required licenses and permits; (ii) deliver to Owner a statement of the names of all contractors and subcontractors and a description of all labor and material to be furnished by them; (iii) cause BCAG's contractors to carry worker's compensation insurance covering all the contractors' and subcontractors' employees, and public liability insurance with limits of $2,000,000 and property damage insurance with limits of $500,000, both general and vehicular (all insurance to be written by companies licensed to do business in the State of California, and insuring Owner and BCAG as well as the contractors) and (iv) deliver to Lessor certificates of all insurance.".

BCAG will protect, indemnify, and hold harmless the OWNER and its officers, employees and agents from and against all liability, loss, cost or expense, including reasonable attorneys' fees and court costs arising out of a negligent act, error or omission, willful misconduct, or violation of law of or by BCAG or its officers, employees, agents and contractors. However, BCAG shall have no obligation to indemnify the OWNER for any loss, liability, or damage caused by the negligence of OWNER, or any of OWNER's employees, agents, or authorized users,

including, but not limited to, tenants, invitees or permittees.

BCAG will defend, hold harmless, and indemnify OWNER from any and all third party encumbrances and/or liens against the property arising out of the PROJECT, including any claim or liability in any way connected with the failure of BCAG to pay any of its contractors or subcontractors, or the failure of any contractor or subcontractor of BCAG to pay any person(s) referred to in Section 3181 of the California Civil Code.

Please list any special conditions we should observe while on your property:

OWNER desires to retain up to 2500 yards of clean excavation (as available from project spoils) from PROJECT at locations shown on the attached plan. Spoils may not be deposited within 200' of the bank of Comanche Creek.

OWNER will allow the construction of a Temporary Rail Spur crossing to facilitate the construction of PROJECT. Upon removal of the Temporary Crossing, BCAG will assure the location is returned to its original condition as approved by the OWNER.

Following completion of the PROJECT, BCAG will scarify 6", place a 2" Aggregate Base section and re-compact the existing roadway surface extending from the Aztec Drive/Huss Lane intersection North and West to the location of the PROJECT outfall as approved by the OWNER.

At any time during construction of the PROJECT, there arises an impact to OWNER'S movement of grain truck(s) and/or rail car(s), work shall be immediately stopped until impacts are resolved to the satisfaction of the OWNER.

OWNER:

By: _____

Print Name: Stanley R. Cooper

Title: Director of Logistics

Date: 6/11/2014

Owner Contact and Telephone Number

Sierra Nevada Brewing Co 530-895-3520

Name Telephone #1 Telephone #2

BCAG
Approved BY:

By: _____

Print Name: JEN A. CLARK

Title: Executive Director

Date: 6-11-14

BUILDING AND DEVELOPMENT
SERVICES DEPARTMENT

411 Main Street – 2nd Floor
P.O. Box 3420
Chico, CA 95927
http://www.ci.chico.ca.us

BUILDING
(530) 879-6700
Fax (530) 895-4726

ENGINEERING
(530) 879-6900
Fax (530) 895-4899

PROCEDURE TO COMMENCE CONSTRUCTION

Step 1: Congratulations, the submitted **1** set of plans has been approved, the required plan check and inspection fees will continue to be paid utilizing the "Real-Time" billing account..

Step 2: Provide Development Engineering two (2) sets of the approved plans for Construction Inspection.

Step 3: If required, provide one (1) copy of the S.W.P.P.P. to Development Engineering for filing in the Building/Subdivision File.

Step 4: Call the Construction Inspection Services HOT LINE @ 530-879-6999, prior to commencing construction.

Step 5: City approved plans shall be available to the City Inspector on the job site at all times.

PROCEDURE TO OBTAIN AN OFFSITE ENCROACHMENT PERMIT

Step 1: Contractors wishing to obtain an encroachment permit, must have the following:

A. Pre-approved Excavation Bond form (provided by the City of Chico) in the amount of $10,000 *OR* an Excavation Bond form provided by an insurance company which has been approved by the City Attorney.
B. Certificate of GENERAL LIABILITY, in the amount of $1,000,000, which has been approved by the City of Chico Risk Manager (530) 879-7900.
C. State contractor's pocket license which shows the following information:
   a) License number; b) Classification(s); and c) Expiration date
D. Letter from corporation/company/sole proprietorship authorizing specific employees/agents to sign Encroachment Permits on behalf of said entity.
E. City of Chico Business License - Contact the Finance Dept. @ (530) 879-7300.
F. Correct and current name of owner/lessee/agent/business, with mailing address(es).

Step 2: Provide this sheet, which is part of the Application process, at the time the Encroachment Permit is requested.

Plan Approval Date:	**6/9/14** MW	Proj. Acct: **72173**
Subdivision Name:	**BCAG Transit Center**	
Parcel Map No. (Name):		
APN(s):	**Portions 039-060-125 and 126**	
Address(es):	**Huss Lane**	

Step 3: Encroachment Permits are obtained at the Building Permit counter, on the 2nd floor of City Hall.

Step 4: Please allow 1 - 2 days for processing.

Step 5: The City will contact you when the encroachment permit is ready to be signed and picked up.

S:\Devlmt Engr\BCAG Transit Center\Imp Plans Congrts.Ltr.doc

APPENDIX H

General Decision Number: CA140009 06/06/2014 CA9

Superseded General Decision Number: CA20130009

State: California

Construction Types: Building, Heavy (Heavy and Dredging) and Highway

Counties: Alpine, Amador, Butte, Colusa, El Dorado, Glenn, Lassen, Marin, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Siskiyou, Solano, Sonoma, Sutter, Tehama, Trinity, Yolo and Yuba Counties in California.

BUILDING CONSTRUCTION PROJECTS (excluding Amador County only); DREDGING CONSTRUCTION PROJECTS (does not include hopper dredge work); HEAVY CONSTRUCTION PROJECTS (does not include water well drilling); AND HIGHWAY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	01/03/2014
1	01/10/2014
2	01/24/2014
3	03/07/2014
4	04/11/2014
5	05/23/2014
6	05/30/2014
7	06/06/2014

ASBE0016-001 01/01/2014

AREA 1: ALAMEDA, CONTRA COSTA, LAKE, MARIN, MENDOCINO, MONTEREY, NAPA, SAN BENITO, SAN FRANCISCO, SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, & SONOMA COUNTIES

AREA 2: ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, DEL NORTE, EL DORADO, FRESNO, GLENN, HUMBOLDT, KINGS, LASSEN, MADERA, MARIPOSA, MERCED, MODOC, MONO, NEVADA, PLACER, PLUMAS, SACRAMENTO, SAN JOAQUIN, SHASTA, SIERRA, SISKIYOU, STANISLAU, SUTTER, TEHEMA, TRINITY, TULARE, TUOLUMNE, YOLO, & YUBA COUNTIES

	Rates	Fringes
Asbestos Workers/Insulator (Includes the application of all insulating materials, Protective Coverings, Coatings, and Finishes to all types of mechanical systems)		
Area 1	$ 57.15	18.72
Area 2	$ 44.05	18.62

ASBE0016-007 01/01/2013

	Rates	Fringes

Asbestos Removal
worker/hazardous material
handler (Includes
preparation, wetting,
stripping, removal,
scrapping, vacuuming, bagging
and disposing of all
insulation materials from
mechanical systems, whether
they contain asbestos or not)....$ 31.13 6.95

BOIL0549-002 01/01/2013

	Rates	Fringes
BOILERMAKER		
(1) Marin & Solano Counties.	$ 42.06	33.43
(2) Remaining Counties.....	$ 38.37	31.32

BRCA0003-001 06/01/2011

	Rates	Fringes
MARBLE FINISHER.....	$ 28.02	12.22

BRCA0003-004 05/01/2011

AREA 1: ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SUTTER, TEHAMA, YOLO AND YUBA COUNTIES

AREA 2: MARIN, NAPA, SISKIYOU, SOLANO, SONOMA AND TRINITY COUNTIES

	Rates	Fringes
BRICKLAYER		
AREA 1.....	$ 35.11	18.99
AREA 2.....	$ 39.85	22.00

SPECIALTY PAY:
(A) Underground work such as tunnel work, sewer work, manholes, catch basins, sewer pipes and telephone conduit shall be paid $1.25 per hour above the regular rate. Work in direct contact with raw sewage shall receive $1.25 per hour in addition to the above.
(B) Operating a saw or grinder shall receive $1.25 per hour above the regular rate.
(C) Gunite nozzle person shall receive $1.25 per hour above the regular rate.

BRCA0003-008 07/01/2013

	Rates	Fringes
TERRAZZO FINISHER.....	$ 33.15	13.93
TERRAZZO WORKER/SETTER.....	$ 39.95	24.39

BRCA0003-010 04/01/2013

	Rates	Fringes
TILE FINISHER		
Area 1	$ 21.21	10.01
Area 2	$ 21.26	12.44
Area 3	$ 22.01	12.35
Area 4	$ 20.93	11.79
Tile Layer		
Area 1	$ 36.08	11.95
Area 2	$ 34.41	13.68
Area 3	$ 39.42	13.77
Area 4	$ 35.45	13.68

AREA 1: Butte, Colusa, El Dorado, Glenn, Lassen, Modoc, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Sutter, Tehema, Yolo, Yuba
AREA 2: Alpine, Amador
AREA 3: Marin, Napa, Solano, Siskiyou
AREA 4: Sonoma

BRCA0003-014 06/01/2011

	Rates	Fringes
MARBLE MASON	$ 39.22	18.68

CARP0034-001 07/01/2013

	Rates	Fringes
Diver		
Assistant Tender, ROV Tender/Technician	$ 38.60	29.78
Diver standby	$ 43.38	29.78
Diver Tender	$ 42.38	29.78
Diver wet	$ 85.91	29.78
Manifold Operator (mixed gas)	$ 47.38	29.78
Manifold Operator (Standby)	$ 42.38	29.78

DEPTH PAY (Surface Diving):
050 to 100 ft $2.00 per foot
101 to 150 ft $3.00 per foot
151 to 220 ft $4.00 per foot

SATURATION DIVING:
The standby rate shall apply until saturation starts. The saturation diving rate applies when divers are under pressure continuously until work task and decompression are complete. The diver rate shall be paid for all saturation hours.

DIVING IN ENCLOSURES:
Where it is necessary for Divers to enter pipes or tunnels, or other enclosures where there is no vertical ascent, the following premium shall be paid: Distance traveled from

entrance 26 feet to 300 feet: $1.00 per foot. When it is necessary for a diver to enter any pipe, tunnel or other enclosure less than 48" in height, the premium will be $1.00 per foot.

WORK IN COMBINATION OF CLASSIFICATIONS:
Employees working in any combination of classifications within the diving crew (except dive supervisor) in a shift are paid in the classification with the highest rate for that shift.

CARP0034-003 07/01/2013

	Rates	Fringes
Piledriver	$ 38.60	29.78

CARP0035-001 08/01/2013

AREA 1: MARIN, NAPA, SOLANO & SONOMA

AREA 3: SACRAMENTO, WESTERN EL DORADO (Territory west of an including highway 49 and the territory inside the city limits of Placerville), WESTERN PLACER (Territory west of and including highway 49), & YOLO

AREA 4: ALPINE, BUTTE, COLUSA, EASTERN EL DORADO, GLENN, LASSEN, MODOC, NEVADA, EASTERN PLACER, PLUMAS, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY, & YUBA

	Rates	Fringes
Drywall Installers/Lathers:		
Area 1	$ 39.35	27.02
Area 3	$ 33.97	27.02
Area 4	$ 32.62	27.02
Drywall Stocker/Scrapper		
Area 1	$ 19.68	15.65
Area 3	$ 16.99	15.65
Area 4	$ 16.31	15.65

CARP0035-009 07/01/2013

Marin County

	Rates	Fringes
CARPENTER		
Bridge Builder/Highway Carpenter	$ 39.35	26.58
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer	$ 39.50	26.58
Journeyman Carpenter	$ 39.35	26.58
Millwright	$ 39.45	28.17

CARP0035-010 07/01/2013

AREA 1: Marin, Napa, Solano & Sonoma Counties

AREA 2: Alpine, San Benito and Santa Cruz

AREA 3: Alpine, Butte, Colusa, El Dorado, Glenn, Lassen, Modoc, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Siskiyou, Sutter, Tehama, Trinity, Yolo & Yuba counties

	Rates	Fringes
Modular Furniture Installer		
Area 1		
Installer I	$ 22.96	17.52
Installer II	$ 19.53	17.52
Lead Installer	$ 26.41	18.02
Master Installer	$ 30.63	18.02
Area 2		
Installer I	$ 20.31	17.52
Installer II	$ 17.36	17.52
Lead Installer	$ 23.28	18.02
Master Installer	$ 26.91	18.02
Area 3		
Installer I	$ 19.36	17.52
Installer II	$ 16.59	17.52
Lead Installer	$ 22.16	18.02
Master Installer	$ 25.58	18.02

CARP0046-001 07/01/2013

El Dorado (West), Placer (West), Sacramento and Yolo Counties

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter	$ 39.35	26.58
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer	$ 33.62	26.58
Journeyman Carpenter	$ 33.47	26.58
Millwright	$ 35.97	28.17

Footnote: Placer County (West) includes territory West of and including Highway 49 and El Dorado County (West) includes territory West of and including Highway 49 and territory inside the city limits of Placerville.

CARP0046-002 07/01/2013

Alpine, Colusa, El Dorado (East), Nevada, Placer (East), Sierra, Sutter and Yuba Counties

	Rates	Fringes

Carpenters
Bridge Builder/Highway
Carpenter.....$ 39.35 26.58
Hardwood Floorlayer,
Shingler, Power Saw
Operator, Steel Scaffold &
Steel Shoring Erector, Saw
Filer.....$ 32.27 26.58
Journeyman Carpenter.....$ 32.12 26.58
Millwright.....$ 34.62 28.17

CARP0152-003 07/01/2013

Amador County

	Rates	Fringes
Carpenters		
Bridge Builder/Highway		
Carpenter	$ 39.35	26.58
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw		
Filer	$ 32.27	26.58
Journeyman Carpenter	$ 32.12	26.58
Millwright	$ 34.62	28.17

CARP0180-001 07/01/2013

Solano County

	Rates	Fringes
Carpenters		
Bridge Builder/Highway		
Carpenter	$ 39.35	26.58
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw		
Filer	$ 39.50	26.58
Journeyman Carpenter	$ 39.35	26.58
Millwright	$ 39.45	28.17

CARP0751-001 07/01/2013

Napa and Sonoma Counties

	Rates	Fringes
Carpenters		
Bridge Builder/Highway		
Carpenter	$ 39.35	26.58
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw		
Filer	$ 39.50	26.58

Journeyman Carpenter	$ 39.35	26.58
Millwright	$ 39.45	28.17

CARP1599-001 07/01/2013

Butte, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama and Trinity Counties

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter	$ 39.35	26.58
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer	$ 32.27	26.58
Journeyman Carpenter	$ 32.12	26.58
Millwright	$ 34.62	28.17

ELEC0180-001 06/01/2013

NAPA AND SOLANO COUNTIES

	Rates	Fringes
CABLE SPLICER	$ 49.29	21.609
ELECTRICIAN	$ 43.81	21.444

ELEC0180-003 12/01/2013

NAPA AND SOLANO COUNTIES

	Rates	Fringes
Sound & Communications		
Installer	$ 31.32	3%+15.30
Technician	$ 35.66	3%+15.30

SCOPE OF WORK INCLUDES-
SOUND & VOICE TRANSMISSION (Music, Intercom, Nurse Call, Telephone); FIRE ALARM SYSTEMS [excluding fire alarm work when installed in raceways (including wire and cable pulling) and when performed on new or major remodel building projects or jobs], TELEVISION & VIDEO SYSTEMS, SECURITY SYSTEMS, COMMUNICATIONS SYSTEMS that transmit or receive information and/or control systems that are intrinsic to the above.

EXCLUDES-
Excludes all other data systems or multiple systems which include control function or power supply; excludes installation of raceway systems, line voltage work, industrial work, life-safety systems (all buildings having floors located more than 75' above the lowest floor level having building access); excludes energy management systems.

ELEC0340-002 12/01/2013

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, NEVADA, PLACER, PLUMAS, SACRAMENTO, TRINITY, YOLO, YUBA COUNTIES

	Rates	Fringes
Communications System		
Sound & Communications Installer	$ 24.68	3%+12.85
Sound & Communications Technician	$ 28.38	3%+12.85

SCOPE OF WORK

Includes the installation testing, service and maintenance, of the following systems which utilize the transmission and/or transference of voice, sound, vision and digital for commercial, education, security and entertainment purposes for the following TV monitoring and surveillance, background-foreground music, intercom and telephone interconnect, inventory control systems, microwave transmission, multi-media, multiplex, nurse call system, radio page, school intercom and sound, burglar alarms, and low voltage master clock systems.

A. SOUND AND VOICE TRANSMISSION/TRANSFERENCE SYSTEMS
Background foreground music Intercom and telephone interconnect systems, Telephone systems, Nurse call systems, Radio page systems, School intercom and sound systems, Burglar alarm systems, Low voltage master clock systems, Multi-media/multiplex systems, Sound and musical entertainment systems, RF systems, Antennas and Wave Guide.

B. FIRE ALARM SYSTEMS
Installation, wire pulling and testing

C. TELEVISION AND VIDEO SYSTEMS Television monitoring and surveillance systems, Video security systems, Video entertainment systems, Video educational systems, Microwave transmission systems, CATV and CCTV

D. SECURITY SYSTEMS Perimeter security systems Vibration sensor systems Card access systems Access control systems Sonar/infrared monitoring equipment

E. COMMUNICATIONS SYSTEMS THAT TRANSMIT OR RECEIVE INFORMATION AND/OR CONTROL SYSTEMS THAT ARE INTRINSIC TO THE ABOVE LISTED SYSTEMS SCADA (Supervisory Control and Data Acquisition) PCM (Pulse Code Modulation) Inventory Control Systems Digital Data Systems Broadband and Baseband and Carriers Point of Sale Systems VSAT Data Systems Data Communication Systems RF and Remote Control Systems Fiber Optic Data Systems WORK EXCLUDED Raceway systems are not covered (excluding Ladder-Rack for the purpose of the above listed systems). Chases and/or nipples (not to exceed 10 feet) may be installed on open wiring systems. Energy management

systems. SCADA (Supervisory Control and Data Acquisition) when not intrinsic to the above listed systems (in the scope). Fire alarm systems when installed in raceways (including wire and cable pulling) shall be performed at the electrician wage rate, when either of the following two (2) conditions apply:
1. The project involves new or major remodel building trades construction.
2. The conductors for the fire alarm system are installed in conduit.

ELEC0340-003 12/01/2013

ALPINE (West of Sierra Mt. Watershed), AMADOR, BUTTE, COLUSA, EL DORADO (West of Sierra Mt. Watershed), GLENN, LASSEN, NEVADA (West of Sierra Mt. Watershed), PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA (West of Sierra Mt. Watershed), SUTTER, TEHAMA, TRINITY, YOLO & YUBA COUNTIES

	Rates	Fringes
ELECTRICIAN		
Remaining area	$ 39.06	18.54
Sierra Army Depot, Herlong..	$ 48.83	18.54
Tunnel work	$ 41.01	18.54

CABLE SPLICER: Receives 110% of the Electrician basic hourly rate.

ELEC0401-005 07/01/2013

ALPINE (east of the main watershed divide), EL DORADO (east of the main watershed divide), NEVADA (east of the main watershed), PLACER (east of the main watershed divide) and SIERRA (east of the main watershed divide) COUNTIES:

	Rates	Fringes
ELECTRICIAN	$ 37.00	14.62

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* ELEC0551-004 06/01/2014

MARIN AND SONOMA COUNTIES

	Rates	Fringes
ELECTRICIAN	$ 47.20	16.76

ELEC0551-005 12/01/2013

MARIN & SONOMA COUNTIES

	Rates	Fringes
Sound & Communications		
Installer	$ 31.32	16.23

Technician.....$ 35.66 16.36

SCOPE OF WORK INCLUDES-
SOUND & VOICE TRANSMISSION (Music, Intercom, Nurse Call, Telephone); FIRE ALARM SYSTEMS [excluding fire alarm work when installed in raceways (including wire and cable pulling) and when performed on new or major remodel building projects or jobs], TELEVISION & VIDEO SYSTEMS, SECURITY SYSTEMS, COMMUNICATIONS SYSTEMS that transmit or receive information and/or control systems that are intrinsic to the above.

EXCLUDES-
Excludes all other data systems or multiple systems which include control function or power supply; excludes installation of raceway systems, line voltage work, industrial work, life-safety systems (all buildings having floors located more than 75' above the lowest floor level having building access); excludes energy management systems.

ELEC0659-006 01/01/2013

DEL NORTE, MODOC and SISKIYOU COUNTIES

	Rates	Fringes
ELECTRICIAN	$ 30.27	14.81

ELEC0659-008 02/01/2013

DEL NORTE, MODOC & SISKIYOU COUNTIES

	Rates	Fringes
Line Construction		
(1) Cable Splicer	$ 51.09	4%+13.30
(2) Lineman, Pole Sprayer, Heavy Line Equipment Man	$ 45.62	4%+13.30
(3) Tree Trimmer	$ 32.07	4%+9.80
(4) Line Equipment Man	$ 45.62	4%+9.80
(5) Powdermen, Jackhammermen	$ 34.22	4%+9.80
(6) Groundman	$ 31.31	4%+9.80

ELEC1245-004 06/01/2013

ALL COUNTIES EXCEPT DEL NORTE, MODOC & SISKIYOU

	Rates	Fringes
LINE CONSTRUCTION		
(1) Lineman; Cable splicer	$ 50.30	15
(2) Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), overhead &		

underground distribution line equipment).....$ 40.17 14.56
(3) Groundman.....$ 30.73 13.48
(4) Powderman.....$ 44.91 13.48

HOLIDAYS: New Year's Day, M.L. King Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day and day after Thanksgiving, Christmas Day

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ELEV0008-001 01/01/2014

	Rates	Fringes
ELEVATOR MECHANIC	$ 59.19	26.785

FOOTNOTE:
PAID VACATION: Employer contributes 8% of regular hourly rate as vacation pay credit for employees with more than 5 years of service, and 6% for 6 months to 5 years of service.
PAID HOLIDAYS: New Years Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Friday after Thanksgiving, and Christmas Day.

ENGI0003-008 07/01/2013

	Rates	Fringes
Dredging: (DREDGING: CLAMSHELL & DIPPER DREDGING; HYDRAULIC SUCTION DREDGING:)		
AREA 1:		
(1) Leverman	$ 40.53	27.81
(2) Dredge Dozer; Heavy duty repairman	$ 35.57	27.81
(3) Booster Pump Operator; Deck Engineer; Deck mate; Dredge Tender; Winch Operator	$ 34.45	27.81
(4) Bargeman; Deckhand; Fireman; Leveehand; Oiler	$ 31.15	27.81
AREA 2:		
(1) Leverman	$ 42.53	27.81
(2) Dredge Dozer; Heavy duty repairman	$ 37.57	27.81
(3) Booster Pump Operator; Deck Engineer; Deck mate; Dredge Tender; Winch Operator	$ 36.45	27.81
(4) Bargeman; Deckhand; Fireman; Leveehand; Oiler	$ 33.15	27.81

AREA DESCRIPTIONS

AREA 1: ALAMEDA,BUTTE, CONTRA COSTA, KINGS, MARIN, MERCED, NAPA, SACRAMENTO, SAN BENITO, SAN FRANCISCO, SAN JOAQUIN, SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, STANISLAUS,

SUTTER, YOLO, AND YUBA COUNTIES

AREA 2: MODOC COUNTY

THE REMAINGING COUNTIES ARE SPLIT BETWEEN AREA 1 AND AREA 2 AS NOTED BELOW:

ALPINE COUNTY:
Area 1: Northernmost part
Area 2: Remainder

CALAVERAS COUNTY:
Area 1: Remainder
Area 2: Eastern part

COLUSA COUNTY:
Area 1: Eastern part
Area 2: Remainder

ELDORADO COUNTY:
Area 1: North Central part
Area 2: Remainder

FRESNO COUNTY:
Area 1: Remainder
Area 2: Eastern part

GLENN COUNTY:
Area 1: Eastern part
Area 2: Remainder

LASSEN COUNTY:
Area 1: Western part along the Southern portion of border with Shasta County
Area 2: Remainder

MADERA COUNTY:
Area 1: Except Eastern part
Area 2: Eastern part

MARIPOSA COUNTY
Area 1: Except Eastern part
Area 2: Eastern part

MONTERREY COUNTY
Area 1: Except Southwestern part
Area 2: Southwestern part

NEVADA COUNTY:
Area 1: All but the Northern portion along the border of Sierra County
Area 2: Remainder

PLACER COUNTY:
Area 1: Al but the Central portion
Area 2: Remainder

PLUMAS COUNTY:
Area 1: Western portion
Area 2: Remainder

SHASTA COUNTY:
Area 1: All but the Northeastern corner
Area 2: Remainder

SIERRA COUNTY:
Area 1: Western part
Area 2: Remainder

SISKIYOU COUNTY:
Area 1: Central part
Area 2: Remainder

SONOMA COUNTY:
Area 1: All but the Northwestern corner
Area 2: Remainder

TEHAMA COUNTY:
Area 1: All but the Western border with Mendocino & Trinity Counties
Area 2: Remainder

TRINITY COUNTY:
Area 1: East Central part and the Northeastern border with Shasta County
Area 2: Remainder

TUOLUMNE COUNTY:
Area 1: Except Eastern part
Area 2: Eastern part

ENGI0003-018 07/01/2013

"AREA 1" WAGE RATES ARE LISTED BELOW

"AREA 2" RECEIVES AN ADDITIONAL $2.00 PER HOUR ABOVE AREA 1 RATES.

SEE AREA DEFINITIONS BELOW

	Rates	Fringes
OPERATOR: Power Equipment (AREA 1:)		
GROUP 1	$ 39.02	26.27
GROUP 2	$ 37.49	26.27
GROUP 3	$ 36.01	26.27
GROUP 4	$ 34.63	26.27
GROUP 5	$ 33.36	26.27
GROUP 6	$ 32.04	26.27
GROUP 7	$ 30.90	26.27
GROUP 8	$ 29.76	26.27
GROUP 8-A	$ 27.55	26.27
OPERATOR: Power Equipment (Cranes and Attachments - AREA 1:)		
GROUP 1		
Cranes	$ 39.90	26.27

Oiler.....$ 32.93 26.27
Truck crane oiler.....$ 36.50 26.27
GROUP 2
Cranes.....$ 32.67 26.27
Oiler.....$ 32.67 26.27
Truck crane oiler.....$ 36.21 26.27
GROUP 3
Cranes.....$ 36.40 26.27
Hydraulic.....$ 32.04 26.27
Oiler.....$ 32.43 26.27
Truck Crane Oiler.....$ 35.94 26.27
OPERATOR: Power Equipment
(Piledriving - AREA 1:)
GROUP 1
Lifting devices.....$ 40.24 26.27
Oiler.....$ 30.98 26.27
Truck crane oiler.....$ 33.26 26.27
GROUP 2
Lifting devices.....$ 38.42 26.27
Oiler.....$ 30.71 26.27
Truck Crane Oiler.....$ 33.01 26.27
GROUP 3
Lifting devices.....$ 36.74 26.27
Oiler.....$ 30.49 26.27
Truck Crane Oiler.....$ 32.72 26.27
GROUP 4
Lifting devices.....$ 34.97 26.27
GROUP 5
Lifting devices.....$ 33.67 26.27
GROUP 6
Lifting devices.....$ 32.33 26.27
OPERATOR: Power Equipment
(Steel Erection - AREA 1:)
GROUP 1
Cranes.....$ 40.87 26.27
Oiler.....$ 31.32 26.27
Truck Crane Oiler.....$ 33.55 26.27
GROUP 2
Cranes.....$ 39.10 26.27
Oiler.....$ 31.05 26.27
Truck Crane Oiler.....$ 33.33 26.27
GROUP 3
Cranes.....$ 37.62 26.27
Hydraulic.....$ 32.67 26.27
Oiler.....$ 30.83 26.27
Truck Crane Oiler.....$ 33.06 26.27
GROUP 4
Cranes.....$ 35.60 26.27
GROUP 5
Cranes.....$ 34.30 26.27
OPERATOR: Power Equipment
(Tunnel and Underground Work
- AREA 1:)
SHAFTS, STOPES, RAISES:
GROUP 1.....$ 35.12 26.27
GROUP 1-A.....$ 37.59 26.27
GROUP 2.....$ 33.86 26.27
GROUP 3.....$ 32.53 26.27
GROUP 4.....$ 31.39 26.27
GROUP 5.....$ 30.25 26.27

UNDERGROUND:		
GROUP 1	$ 35.02	26.27
GROUP 1-A	$ 37.49	26.27
GROUP 2	$ 33.76	26.27
GROUP 3	$ 32.43	26.27
GROUP 4	$ 31.29	26.27
GROUP 5	$ 30.15	26.27

FOOTNOTE: Work suspended by ropes or cables, or work on a Yo-Yo Cat: $.60 per hour additional.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Operator of helicopter (when used in erection work); Hydraulic excavator, 7 cu. yds. and over; Power shovels, over 7 cu. yds.

GROUP 2: Highline cableway; Hydraulic excavator, 3-1/2 cu. yds. up to 7 cu. yds.; Licensed construction work boat operator, on site; Power blade operator (finish); Power shovels, over 1 cu. yd. up to and including 7 cu. yds. m.r.c.

GROUP 3: Asphalt milling machine; Cable backhoe; Combination backhoe and loader over 3/4 cu. yds.; Continuous flight tie back machine assistant to engineer or mechanic; Crane mounted continuous flight tie back machine, tonnage to apply; Crane mounted drill attachment, tonnage to apply; Dozer, slope brd; Gradall; Hydraulic excavator, up to 3 1/2 cu. yds.; Loader 4 cu. yds. and over; Long reach excavator; Multiple engine scraper (when used as push pull); Power shovels, up to and including 1 cu. yd.; Pre-stress wire wrapping machine; Side boom cat, 572 or larger; Track loader 4 cu. yds. and over; Wheel excavator (up to and including 750 cu. yds. per hour)

GROUP 4: Asphalt plant engineer/box person; Chicago boom; Combination backhoe and loader up to and including 3/4 cu. yd.; Concrete batch plant (wet or dry); Dozer and/or push cat; Pull- type elevating loader; Gradesetter, grade checker (GPS, mechanical or otherwise); Grooving and grinding machine; Heading shield operator; Heavy-duty drilling equipment, Hughes, LDH, Watson 3000 or similar; Heavy-duty repairperson and/or welder; Lime spreader; Loader under 4 cu. yds.; Lubrication and service engineer (mobile and grease rack); Mechanical finishers or spreader machine (asphalt, Barber-Greene and similar); Miller Formless M-9000 slope paver or similar; Portable crushing and screening plants; Power blade support; Roller operator, asphalt; Rubber-tired scraper, self-loading (paddle-wheels, etc.); Rubber- tired earthmoving equipment (scrapers); Slip form paver (concrete); Small tractor with drag; Soil stabilizer (P & H or equal); Spider plow and spider puller; Tubex pile rig; Unlicensed constuction work boat operator, on site; Timber skidder; Track loader up to 4 yds.; Tractor-drawn scraper; Tractor, compressor drill combination; Welder; Woods-Mixer (and other similar Pugmill equipment)

GROUP 5: Cast-in-place pipe laying machine; Combination slusher and motor operator; Concrete conveyor or concrete pump, truck or equipment mounted; Concrete conveyor, building site; Concrete pump or pumpcrete gun; Drilling equipment, Watson 2000, Texoma 700 or similar; Drilling and boring machinery, horizontal (not to apply to waterliners, wagon drills or jackhammers); Concrete mixer/all; Person and/or material hoist; Mechanical finishers (concrete) (Clary, Johnson, Bidwell Bridge Deck or similar types); Mechanical burm, curb and/or curb and gutter machine, concrete or asphalt); Mine or shaft hoist; Portable crusher; Power jumbo operator (setting slip-forms, etc., in tunnels); Screed (automatic or manual); Self-propelled compactor with dozer; Tractor with boom D6 or smaller; Trenching machine, maximum digging capacity over 5 ft. depth; Vermeer T-600B rock cutter or similar

GROUP 6: Armor-Coater (or similar); Ballast jack tamper; Boom- type backfilling machine; Assistant plant engineer; Bridge and/or gantry crane; Chemical grouting machine, truck-mounted; Chip spreading machine operator; Concrete saw (self-propelled unit on streets, highways, airports and canals); Deck engineer; Drilling equipment Texoma 600, Hughes 200 Series or similar up to and including 30 ft. m.r.c.; Drill doctor; Helicopter radio operator; Hydro-hammer or similar; Line master; Skidsteer loader, Bobcat larger than 743 series or similar (with attachments); Locomotive; Lull hi-lift or similar; Oiler, truck mounted equipment; Pavement breaker, truck-mounted, with compressor combination; Paving fabric installation and/or laying machine; Pipe bending machine (pipelines only); Pipe wrapping machine (tractor propelled and supported); Screed (except asphaltic concrete paving); Self- propelled pipeline wrapping machine; Tractor; Self-loading chipper; Concrete barrier moving machine

GROUP 7: Ballast regulator; Boom truck or dual-purpose A-frame truck, non-rotating - under 15 tons; Truck-mounted rotating telescopic boom type lifting device, Manitex or similar (boom truck) - under 15 tons; Cary lift or similar; Combination slurry mixer and/or cleaner; Drilling equipment, 20 ft. and under m.r.c.; Firetender (hot plant); Grouting machine operator; Highline cableway signalperson; Stationary belt loader (Kolman or similar); Lift slab machine (Vagtborg and similar types); Maginnes internal full slab vibrator; Material hoist (1 drum); Mechanical trench shield; Pavement breaker with or without compressor combination); Pipe cleaning machine (tractor propelled and supported); Post driver; Roller (except asphalt); Chip Seal; Self-propelled automatically applied concrete curing mahcine (on streets, highways, airports and canals); Self-propelled compactor (without dozer); Signalperson; Slip-form pumps (lifting device for concrete forms); Tie spacer; Tower mobile; Trenching machine, maximum digging capacity up to and including 5 ft. depth; Truck- type loader

GROUP 8: Bit sharpener; Boiler tender; Box operator; Brakeperson; Combination mixer and compressor (shotcrete/gunite); Compressor operator; Deckhand; Fire tender; Forklift (under 20 ft.); Generator;

Gunite/shotcrete equipment operator; Hydraulic monitor; Ken seal machine (or similar); Mixermobile; Oiler; Pump operator; Refrigeration plant; Reservoir-debris tug (self-propelled floating); Ross Carrier (construction site); Rotomist operator; Self-propelled tape machine; Shuttlecar; Self-propelled power sweeper operator (includes vacuum sweeper); Slusher operator; Surface heater; Switchperson; Tar pot firetender; Tugger hoist, single drum; Vacuum cooling plant; Welding machine (powered other than by electricity)

GROUP 8-A: Elevator operator; Skidsteer loader-Bobcat 743 series or smaller, and similar (without attachments); Mini excavator under 25 H.P. (backhoe-trencher); Tub grinder wood chipper

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ALL CRANES AND ATTACHMENTS

GROUP 1: Clamshell and dragline over 7 cu. yds.; Crane, over 100 tons; Derrick, over 100 tons; Derrick barge pedestal-mounted, over 100 tons; Self-propelled boom-type lifting device, over 100 tons

GROUP 2: Clamshell and dragline over 1 cu. yd. up to and including 7 cu. yds.; Crane, over 45 tons up to and including 100 tons; Derrick barge, 100 tons and under; Self-propelled boom-type lifting device, over 45 tons; Tower crane

GROUP 3: Clamshell and dragline up to and including 1 cu. yd.; Cranes 45 tons and under; Self-propelled boom-type lifting device 45 tons and under; Boom Truck or dual purpose A-frame truck, non-rotating over 15 tons; Truck-mounted rotating telescopic boom type lifting device, Manitex or similar (boom truck) over 15 tons;

PILEDRIVERS

GROUP 1: Derrick barge pedestal mounted over 100 tons; Clamshell over 7 cu. yds.; Self-propelled boom-type lifting device over 100 tons; Truck crane or crawler, land or barge mounted over 100 tons

GROUP 2: Derrick barge pedestal mounted 45 tons to and including 100 tons; Clamshell up to and including 7 cu. yds.; Self-propelled boom-type lifting device over 45 tons; Truck crane or crawler, land or barge mounted, over 45 tons up to and including 100 tons; Fundex F-12 hydraulic pile rig

GROUP 3: Derrick barge pedestal mounted under 45 tons; Self-propelled boom-type lifting device 45 tons and under; Skid/scow piledriver, any tonnage; Truck crane or crawler, land or barge mounted 45 tons and under

GROUP 4: Assistant operator in lieu of assistant to engineer; Forklift, 10 tons and over; Heavy-duty repairperson/welder

GROUP 5: Deck engineer

GROUP 6: Deckhand; Fire tender

STEEL ERECTORS

GROUP 1: Crane over 100 tons; Derrick over 100 tons; Self-propelled boom-type lifting device over 100 tons

GROUP 2: Crane over 45 tons to 100 tons; Derrick under 100 tons; Self-propelled boom-type lifting device over 45 tons to 100 tons; Tower crane

GROUP 3: Crane, 45 tons and under; Self-propelled boom-type lifting device, 45 tons and under

GROUP 4: Chicago boom; Forklift, 10 tons and over; Heavy-duty repair person/welder

GROUP 5: Boom cat

TUNNEL AND UNDERGROUND WORK

GROUP 1-A: Tunnel bore machine operator, 20' diameter or more

GROUP 1: Heading shield operator; Heavy-duty repairperson; Mucking machine (rubber tired, rail or track type); Raised bore operator (tunnels); Tunnel mole bore operator

GROUP 2: Combination slusher and motor operator; Concrete pump or pumpcrete gun; Power jumbo operator

GROUP 3: Drill doctor; Mine or shaft hoist

GROUP 4: Combination slurry mixer cleaner; Grouting Machine operator; Motorman

GROUP 5: Bit Sharpener; Brakeman; Combination mixer and compressor (gunite); Compressor operator; Oiler; Pump operator; Slusher operator

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AREA DESCRIPTIONS:

POWER EQUIPMENT OPERATORS, CRANES AND ATTACHMENTS,TUNNEL AND UNDERGROUND [These areas do not apply to Piledrivers and Steel Erectors]

AREA 1: ALAMEDA, BUTTE, CONTRA COSTA, KINGS, MARIN, MERCED, NAPA, SACRAMENTO, SAN BENITO, SAN FRANCISCO, SAN JOAQUIN, SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, STANISLAUS, SUTTER, YOLO, AND YUBA COUNTIES

AREA 2 - MODOC COUNTY

THE REMAINING COUNTIES ARE SPLIT BETWEEN AREA 1 AND AREA 2 AS NOTED BELOW:

ALPINE COUNTY:
Area 1: Northernmost part
Area 2: Remainder

CALAVERAS COUNTY:
Area 1: Except Eastern part
Area 2: Eastern part

COLUSA COUNTY:
Area 1: Eastern part
Area 2: Remainder

DEL NORTE COUNTY:
Area 1: Extreme Southwestern corner
Area 2: Remainder

ELDORADO COUNTY:
Area 1: North Central part
Area 2: Remainder

FRESNO COUNTY
Area 1: Except Eastern part
Area 2: Eastern part

GLENN COUNTY:
Area 1: Eastern part
Area 2: Remainder

HUMBOLDT COUNTY:
Area 1: Except Eastern and Southwestern parts
Area 2: Remainder

LAKE COUNTY:
Area 1: Southern part
Area 2: Remainder

LASSEN COUNTY:
Area 1: Western part along the Southern portion of border with Shasta County
Area 2: Remainder

MADERA COUNTY
Area 1: Remainder
Area 2: Eastern part

MARIPOSA COUNTY
Area 1: Remainder
Area 2: Eastern part

MENDOCINO COUNTY:
Area 1: Central and Southeastern parts
Area 2: Remainder

MONTEREY COUNTY
Area 1: Remainder

Area 2: Southwestern part

NEVADA COUNTY:
  Area 1: All but the Northern portion along the border of
  Sierra County
Area 2: Remainder

PLACER COUNTY:
Area 1: All but the Central portion
Area 2: Remainder

PLUMAS COUNTY:
Area 1: Western portion
Area 2: Remainder

SHASTA COUNTY:
Area 1: All but the Northeastern corner
Area 2: Remainder

SIERRA COUNTY:
Area 1: Western part
Area 2: Remainder

SISKIYOU COUNTY:
Area 1: Central part
Area 2: Remainder

SONOMA COUNTY:
Area 1: All but the Northwestern corner
Area 2: Reaminder

TEHAMA COUNTY:
  Area 1: All but the Western border with mendocino & Trinity
  Counties
Area 2: Remainder

TRINITY COUNTY:
  Area 1: East Central part and the Northeaster border with
  Shasta County
Area 2: Remainder

TULARE COUNTY;
Area 1: Remainder
Area 2: Eastern part

TUOLUMNE COUNTY:
Area 1: Remainder
Area 2: Eastern Part

ENGI0003-019 07/01/2013

SEE AREA DESCRIPTIONS BELOW

	Rates	Fringes
OPERATOR: Power Equipment (LANDSCAPE WORK ONLY)		
GROUP 1		
AREA 1.....	$ 29.64	25.71

AREA 2	$ 31.64	25.71
GROUP 2		
AREA 1	$ 26.04	25.71
AREA 2	$ 28.04	25.71
GROUP 3		
AREA 1	$ 21.43	25.71
AREA 2	$ 23.43	25.71

GROUP DESCRIPTIONS:

GROUP 1: Landscape Finish Grade Operator: All finish grade work regardless of equipment used, and all equipment with a rating more than 65 HP.

GROUP 2: Landscape Operator up to 65 HP: All equipment with a manufacturer's rating of 65 HP or less except equipment covered by Group 1 or Group 3. The following equipment shall be included except when used for finish work as long as manufacturer's rating is 65 HP or less: A-Frame and Winch Truck, Backhoe, Forklift, Hydragraphic Seeder Machine, Roller, Rubber-Tired and Track Earthmoving Equipment, Skiploader, Straw Blowers, and Trencher 31 HP up to 65 HP.

GROUP 3: Landscae Utility Operator: Small Rubber-Tired Tractor, Trencher Under 31 HP.

AREA DESCRIPTIONS:

AREA 1: ALAMEDA, BUTTE, CONTRA COSTA, KINGS, MARIN, MERCED, NAPA, SACRAMENTO, SAN BENITO, SAN FRANCISCO, SAN JOAQUIN, SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, STANISLAUS, SUTTER, YOLO, AND YUBA COUNTIES

AREA 2 - MODOC COUNTY

THE REMAINING COUNTIES ARE SPLIT BETWEEN AREA 1 AND AREA 2 AS NOTED BELOW:

ALPINE COUNTY:
Area 1: Northernmost part
Area 2: Remainder

CALAVERAS COUNTY:
Area 1: Except Eastern part
Area 2: Eastern part

COLUSA COUNTY:
Area 1: Eastern part
Area 2: Remainder

DEL NORTE COUNTY:
Area 1: Extreme Southwestern corner
Area 2: Remainder

ELDORADO COUNTY:
Area 1: North Central part
Area 2: Remainder

FRESNO COUNTY

Area 1: Except Eastern part
Area 2: Eastern part

GLENN COUNTY:
Area 1: Eastern part
Area 2: Remainder

HUMBOLDT COUNTY:
Area 1: Except Eastern and Southwestern parts
Area 2: Remainder

LAKE COUNTY:
Area 1: Southern part
Area 2: Remainder

LASSEN COUNTY:
  Area 1: Western part along the Southern portion of border
  with Shasta County
Area 2: Remainder

MADERA COUNTY
Area 1: Remainder
Area 2: Eastern part

MARIPOSA COUNTY
Area 1: Remainder
Area 2: Eastern part

MENDOCINO COUNTY:
Area 1: Central and Southeastern parts
Area 2: Remainder

MONTEREY COUNTY
Area 1: Remainder
Area 2: Southwestern part

NEVADA COUNTY:
  Area 1: All but the Northern portion along the border of
  Sierra County
Area 2: Remainder

PLACER COUNTY:
Area 1: All but the Central portion
Area 2: Remainder

PLUMAS COUNTY:
Area 1: Western portion
Area 2: Remainder

SHASTA COUNTY:
Area 1: All but the Northeastern corner
Area 2: Remainder

SIERRA COUNTY:
Area 1: Western part
Area 2: Remainder

SISKIYOU COUNTY:
Area 1: Central part
Area 2: Remainder

SONOMA COUNTY:
Area 1: All but the Northwestern corner
Area 2: Reaminder

TEHAMA COUNTY:
  Area 1: All but the Western border with mendocino & Trinity
  Counties
Area 2: Remainder

TRINITY COUNTY:
  Area 1: East Central part and the Northeaster border with
  Shasta County
Area 2: Remainder

TULARE COUNTY;
Area 1: Remainder
Area 2: Eastern part

TUOLUMNE COUNTY:
Area 1: Remainder
Area 2: Eastern Part

IRON0377-002 07/01/2013

	Rates	Fringes
Ironworkers:		
Fence Erector	$ 26.58	17.74
Ornamental, Reinforcing and Structural	$ 33.00	26.30

PREMIUM PAY:

$6.00 additional per hour at the following locations:

China Lake Naval Test Station, Chocolate Mountains Naval Reserve-Niland,
Edwards AFB, Fort Irwin Military Station, Fort Irwin Training Center-Goldstone, San Clemente Island, San Nicholas Island, Susanville Federal Prison, 29 Palms - Marine Corps, U.S. Marine Base - Barstow, U.S. Naval Air Facility - Sealey, Vandenberg AFB

$4.00 additional per hour at the following locations:

Army Defense Language Institute - Monterey, Fallon Air Base, Naval Post Graduate School - Monterey, Yermo Marine Corps Logistics Center

$2.00 additional per hour at the following locations:

Port Hueneme, Port Mugu, U.S. Coast Guard Station - Two Rock

LABO0067-002 12/01/2013

AREA "A" - ALAMEDA, CONTRA COSTA, MARIN, SAN FRANCISCO, SAN MATEO AND SANTA CLARA COUNTIES

AREA "B" - ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, DEL NORTE, EL DORADO, FRESNO, GLENN, HUMBOLDT, KINGS, LAKE, LASSEN, MADERA, MARIPOSA, MENDOCINO, MERCED, MODOC, MONTEREY, NAPA, NEVADA, PLACER, PLUMAS, SACRAMENTO, SAN BENITO, SAN JOAQUIN, SANTA CRUZ, SHASTA, SIERRA, SISKIYOU, SOLANO, SONOMA, STANISLAUS, SUTTER, TEHAMA, TRINITY, TULARE, TUOLUMNE, YOLO AND YUBA COUNTIES

	Rates	Fringes
Asbestos Removal Laborer		
Areas A & B	$ 19.66	9.02
LABORER (Lead Removal)		
Area A	$ 27.89	19.20
Area B	$ 26.89	19.20

ASBESTOS REMOVAL-SCOPE OF WORK: Site mobilization; initial site clean-up; site preparation; removal of asbestos-containing materials from walls and ceilings; or from pipes, boilers and mechanical systems only if they are being scrapped; encapsulation, enclosure and disposal of asbestos-containing materials by hand or with equipment or machinery; scaffolding; fabrication of temporary wooden barriers; and assembly of decontamination stations.

LABO0067-006 06/28/2010

AREA "A" - ALAMEDA, CONTRA COSTA, MARIN, SAN FRANCISCO, SAN MATEO AND SANTA CLARA COUNTIES

AREA "B" - ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, EL DORADO, FRESNO, GLENN, KINGS, LASSEN, MADERA, MARIPOSA, MERCED, MODOC, MONTEREY, NAPA, NEVADA, PLACER, PLUMAS, SACRAMENTO, SAN BENITO, SAN JOAQUIN, SANTA CRUZ, SHASTA, SIERRA, SISKIYOU, SOLANO, SONOMA, STANISLAUS, SUTTER, TEHAMA, TRINITY, TULARE, TUOLUMNE, YOLO AND YUBA COUNTIES

	Rates	Fringes
Laborers: (CONSTRUCTION CRAFT LABORERS - AREA A:)		
Construction Specialist Group	$ 27.84	15.82
GROUP 1	$ 27.14	15.82
GROUP 1-a	$ 27.36	15.82
GROUP 1-c	$ 27.19	15.82
GROUP 1-e	$ 27.69	15.82
GROUP 1-f	$ 27.72	15.82
GROUP 1-g (Contra Costa County)	$ 27.34	15.82
GROUP 2	$ 26.99	15.82
GROUP 3	$ 26.89	15.82
GROUP 4	$ 20.58	15.82

See groups 1-b and 1-d under laborer classifications.

Laborers: (CONSTRUCTION CRAFT LABORERS - AREA B:)

Construction Specialist Group	$ 26.84	15.82
GROUP 1	$ 26.14	15.82
GROUP 1-a	$ 26.36	15.82
GROUP 1-c	$ 26.19	15.82
GROUP 1-e	$ 26.69	15.82
GROUP 1-f	$ 26.72	15.82
GROUP 2	$ 25.99	15.82
GROUP 3	$ 25.89	15.82
GROUP 4	$ 19.58	15.82

See groups 1-b and 1-d under laborer classifications.

Laborers: (GUNITE - AREA A:)		
GROUP 1	$ 28.10	15.82
GROUP 2	$ 27.60	15.82
GROUP 3	$ 27.60	15.82
GROUP 4	$ 27.60	15.82
Laborers: (GUNITE - AREA B:)		
GROUP 1	$ 27.10	15.82
GROUP 2	$ 26.60	15.82
GROUP 3	$ 26.01	15.82
GROUP 4	$ 25.89	15.82
Laborers: (WRECKING - AREA A:)		
GROUP 1	$ 27.14	15.82
GROUP 2	$ 26.99	15.82
Laborers: (WRECKING - AREA B:)		
GROUP 1	$ 26.14	15.82
GROUP 2	$ 25.99	15.82
Landscape Laborer (GARDENERS, HORTICULTURAL & LANDSCAPE LABORERS - AREA A:)		
(1) New Construction	$ 26.89	15.82
(2) Establishment Warranty Period	$ 20.58	15.82
Landscape Laborer (GARDENERS, HORTICULURAL & LANDSCAPE LABORERS - AREA B:)		
(1) New Construction	$ 25.89	15.82
(2) Establishment Warranty Period	$ 19.58	15.82

FOOTNOTES:

Laborers working off or with or from bos'n chairs, swinging scaffolds, belts shall receive $0.25 per hour above the applicable wage rate. This shall not apply to workers entitled to receive the wage rate set forth in Group 1-a below.

LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker; Chainsaw; Laser beam in connection with laborers' work; Cast-in- place manhole form setter; Pressure pipelayer; Davis trencher - 300 or similar type (and all small trenchers); Blaster; Diamond driller; Multiple unit drill; Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko, Wacker

and similar type tampers; Buggymobile; Caulker, bander, pipewrapper, conduit layer, plastic pipelayer; Certified hazardous waste worker including Leade Abatement; Compactors of all types; Concrete and magnesite mixer, 1/2 yd. and under; Concrete pan work; Concrete sander; Concrete saw; Cribber and/or shoring; Cut granite curb setter; Dri-pak-it machine; Faller, logloader and bucker; Form raiser, slip forms; Green cutter; Headerboard, Hubsetter, aligner, by any method; High pressure blow pipe (1-1/2" or over, 100 lbs. pressure/over); Hydro seeder and similar type; Jackhammer operator; Jacking of pipe over 12 inches; Jackson and similar type compactor; Kettle tender, pot and worker applying asphalt, lay-kold, creosote, lime, caustic and similar type materials (applying means applying, dipping or handling of such materials); Lagging, sheeting, whaling, bracing, trenchjacking, lagging hammer; Magnesite, epoxyresin, fiberglass, mastic worker (wet or dry); No joint pipe and stripping of same, including repair of voids; Pavement breaker and spader, including tool grinder; Perma curb; Pipelayer (including grade checking in connection with pipelaying); Precast-manhole setter; Pressure pipe tester; Post hole digger, air, gas and electric; Power broom sweeper; Power tampers of all types (except as shown in Group 2); Ram set gun and stud gun; Riprap stonepaver and rock-slinger, including placing of sacked concrete and/or sand (wet or dry) and gabions and similar type; Rotary scarifier or multiple head concrete chipping scarifier; Roto and Ditch Witch; Rototiller; Sandblaster, pot, gun, nozzle operators; Signalling and rigging; Tank cleaner; Tree climber; Turbo blaster; Vibrascreed, bull float in connection with laborers' work; Vibrator; Hazardous waste worker (lead removal); Asbestos and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model DH143 and similar type drills; Track driller; Jack leg driller; Wagon driller; Mechanical drillers, all types regardless of type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder; All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalers (including drilling of same); Tree topper; Bit grinder

GROUP 1-b: Sewer cleaners shall receive $4.00 per day above Group 1 wage rates. "Sewer cleaner" means any worker who handles or comes in contact with raw sewage in small diameter sewers. Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shal receive $5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers' work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds. All employees performing work covered herein shall receive $ .25 per hour above their regular rate for all work performed on underground structures not specifically covered herein. This paragraph shall not be construed to

apply to work below ground level in open cut. It shall apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts thereof, and work on and in deep footings. (A deep footing is a hole 15 feet or more in depth.) In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep footing wage rate would apply to all employees for each and every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting or shot crete

GROUP 1-g, CONTRA COSTA COUNTY: Pipelayer (including grade checking in connection with pipelaying); Caulker; Bander; Pipewrapper; Conduit layer; Plastic pipe layer; Pressure pipe tester; No joint pipe and stripping of same, including repair of voids; Precast manhole setters, cast in place manhole form setters

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work); Concrete bucket dumper and chute; Concrete chipping and grinding; Concrete laborer (wet or dry); Driller tender, chuck tender, nipper; Guinea chaser (stake), grout crew; High pressure nozzle, adductor; Hydraulic monitor (over 100 lbs. pressure); Loading and unloading, carrying and hauling of all rods and materials for use in reinforcing concrete construction; Pittsburgh chipper and similar type brush shredders; Sloper; Single foot, hand-held, pneumatic tamper; All pneumatic, air, gas and electric tools not listed in Groups 1 through 1-f; Jacking of pipe - under 12 inches

GROUP 3: Construction laborers, including bridge and general laborer; Dump, load spotter; Flag person; Fire watcher; Fence erector; Guardrail erector; Gardener, horticultural and landscape laborer; Jetting; Limber, brush loader and piler; Pavement marker (button setter); Maintenance, repair track and road beds; Streetcar and railroad construction track laborer; Temporary air and water lines, Victaulic or similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and building including but not limited to: street cleaner; cleaning and washing windows; brick cleaner (jobsite only); material cleaner (jobsite only). The classification "material cleaner" is to be utilized under the following conditions:
A: at demolition site for the salvage of the material.
B: at the conclusion of a job where the material is to be salvaged and stocked to be reused on another job.
C: for the cleaning of salvage material at the jobsite or temporary jobsite yard.

The material cleaner classification should not be used in the performance of "form stripping, cleaning and oiling and moving to the next point of erection".

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Structural Nozzleman

GROUP 2: Nozzleman, Gunman, Potman, Groundman

GROUP 3: Reboundman

GROUP 4: Gunite laborer

WRECKING WORK LABORER CLASSIFICATIONS

GROUP 1: Skilled wrecker (removing and salvaging of sash, windows and materials)

GROUP 2: Semi-skilled wrecker (salvaging of other building materials)

LABO0185-002 07/01/2013

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY, YOLO AND YUBA COUNTIES

	Rates	Fringes
LABORER		
Mason Tender-Brick	$ 31.52	16.53

LABO0185-005 07/01/2013

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY, YOLO AND YUBA COUNTIES

	Rates	Fringes
Tunnel and Shaft Laborers:		
GROUP 1	$ 34.10	16.53
GROUP 2	$ 33.87	16.53
GROUP 3	$ 33.62	16.53
GROUP 4	$ 33.17	16.53
GROUP 5	$ 32.63	16.53
Shotcrete Specialist	$ 36.12	16.53

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Gunite and shotcrete nozzlemen

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading; Cherry pickermen - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Gunite & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer, Segment Erector, Tunnel Muck Hauler, Steel Form raiser and setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

LABO0261-002 07/01/2013

MARIN COUNTY

	Rates	Fringes
LABORER (TRAFFIC CONTROL/LANE CLOSURE)		
Escort Driver, Flag Person	$ 27.64	18.74
Traffic Control Person I	$ 27.94	18.74
Traffic Control Person II	$ 25.44	18.74

TRAFFIC CONTROL PERSON I: Layout of traffic control, crash cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of temporary/permanent signs, markers, delineators and crash cushions.

LABO0261-004 07/01/2013

MARIN COUNTY

	Rates	Fringes
Tunnel and Shaft Laborers:		
GROUP 1	$ 34.10	16.53
GROUP 2	$ 33.87	16.53
GROUP 3	$ 33.62	16.53
GROUP 4	$ 33.17	16.53
GROUP 5	$ 32.63	16.53
Shotcrete Specialist	$ 36.12	16.53

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Gunite and shotcrete nozzlemen

GROUP 2: Rodmen; Shaft work & raise (below actual or

excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading; Cherry pickermen - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Gunite & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer, Segment Erector, Tunnel Muck Hauler, Steel Form raiser and setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

LABO0261-007 07/01/2013

MARIN COUNTY

	Rates	Fringes
LABORER		
Mason Tender-Brick	$ 32.77	16.53

LABO0324-004 07/01/2013

NAPA, SOLANO, AND SONOMA, COUNTIES

	Rates	Fringes
LABORER (TRAFFIC CONTROL/LANE CLOSURE)		
Escort Driver, Flag Person	$ 26.64	18.74
Traffic Control Person I	$ 26.94	18.74
Traffic Control Person II	$ 24.44	18.74

TRAFFIC CONTROL PERSON I: Layout of traffic control, crash cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of temporary/permanent signs, markers, delineators and crash cushions.

LABO0324-008 07/01/2013

NAPA, SOLANO, AND SONOMA COUNTIES

	Rates	Fringes
Tunnel and Shaft Laborers:		
GROUP 1	$ 34.10	16.53
GROUP 2	$ 33.87	16.53
GROUP 3	$ 33.62	16.53

GROUP 4.....$ 33.17 16.53
GROUP 5.....$ 32.63 16.53
Shotcrete Specialist.....$ 36.12 16.53

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Gunite and shotcrete nozzlemen

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading; Cherry pickermen - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Gunite & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer, Segment Erector, Tunnel Muck Hauler, Steel Form raiser and setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

LABO0324-010 07/01/2013

NAPA, SOLANO AND SONOMA COUNTIES

	Rates	Fringes
LABORER (Brick)		
Mason Tender-Brick	$ 31.95	16.53

LABO1414-005 08/07/2013

	Rates	Fringes
Plasterer tender	$ 30.00	16.36

Work on a swing stage scaffold: $1.00 per hour additional.

PAIN0016-004 01/01/2013

MARIN, NAPA, SOLANO & SONOMA COUNTIES

	Rates	Fringes
Painters:	$ 33.86	20.26

PREMIUMS:
EXOTIC MATERIALS - $0.75 additional per hour.
SPRAY WORK: - $0.50 additional per hour.
INDUSTRIAL PAINTING - $0.25 additional per hour

[Work on industrial buildings used for the manufacture and processing of goods for sale or service; steel construction (bridges), stacks, towers, tanks, and similar structures]

HIGH WORK:
over 50 feet - $2.00 per hour additional
100 to 180 feet - $4.00 per hour additional
Over 180 feet - $6.00 per houir additional

PAIN0016-005 01/01/2013

ALPINE, BUTTE, COLUSA, EL DORADO (west of the Sierra Nevada Mountains), GLENN, LASSEN (west of Hwy. 395, excluding Honey Lake); MARIN, MODOC, NAPA, NEVADA (west of the Sierra Nevada Mountains), PLACER (west of the Sierra Nevada Mountains), PLUMAS, SACRAMENTO, SHASTA, SIERRA (west of the Sierra Nevada Mountains), SISKIYOU, SOLANO, SONOMA, SUTTER, TEHAMA, TRINITY, YOLO AND YUBA COUNTIES

	Rates	Fringes
DRYWALL FINISHER/TAPER	$ 36.24	18.67

PAIN0016-007 01/01/2013

ALPINE, AMADOR, BUTTE, COLUSA. EL DORADO (west of the Sierra Nevada Mountains), GLENN, LASSEN (west of Highway 395, excluding Honey Lake), MODOC, NEVADA (west of the Sierra Nevada Mountains), PLACER (west of the Sierra Nevada Mountains), PLUMAS, SACRAMENTO, SHASTA, SIERRA (west of the Sierra Nevada Mountains), SISKIYOU, SUTTER, TEHAMA, TRINITY, YOLO & YUBA COUNTIES

	Rates	Fringes
Painters:	$ 29.06	15.98

SPRAY/SANDBLAST: $0.50 additional per hour.
EXOTIC MATERIALS: $1.00 additional per hour.
HIGH TIME: Over 50 ft above ground or water level $2.00 additional per hour. 100 to 180 ft above ground or water level $4.00 additional per hour. Over 180 ft above ground or water level $6.00 additional per hour.

PAIN0016-008 01/01/2013

MARIN, NAPA, SOLANO AND SONOMA COUNTIES

	Rates	Fringes
SOFT FLOOR LAYER	$ 44.87	17.98

PAIN0169-004 01/01/2013

MARIN , NAPA & SONOMA COUNTIES; SOLANO COUNTY (west of a line defined as follows: Hwy. 80 corridor beginning at the City of

Fairfield, including Travis Air Force Base and Suisun City; going north of Manakas Corner Rd., continue north on Suisun Valley Rd. to the Napa County line; Hwy. 80 corridor south on Grizzly Island Rd. to the Grizzly Island Management area)

	Rates	Fringes
GLAZIER	$ 41.88	21.59

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* PAIN0567-001 07/01/2013

EL DORADO COUNTY (east of the Sierra Nevada Mountains); LASSEN COUNTY (east of Highway 395, beginning at Stacey and including Honey Lake); NEVADA COUNTY (east of the Sierra Nevada Mountains); PLACER COUNTY (east of the Sierra Nevada Mountains); AND SIERRA COUNTY (east of the Sierra Nevada Mountains)

	Rates	Fringes
Painters:		
Brush and Roller	$ 23.30	10.19
Spray Painter & Paperhanger	$ 24.15	10.19

PREMIUMS:
Special Coatings (Brush), and Sandblasting = $0.50/hr
Special Coatings (Spray), and Steeplejack = $1.00/hr
Special Coating Spray Steel = $1.25/hr
Swing Stage = $2.00/hr

*A special coating is a coating that requires the mixing of 2 or more products.

PAIN0567-007 07/01/2013

EL DORADO COUNTY (east of the Sierra Nevada Mountains); LASSEN COUNTY (east of Highway 395, beginning at Stacey and including Honey Lake); NEVADA COUNTY (east of the Sierra Nevada Mountains); PLACER COUNTY (east of the Sierra Nevada Mountains) AND SIERRA COUNTY (east of the Sierra Nevada Mountains)

	Rates	Fringes
SOFT FLOOR LAYER	$ 25.40	11.49

PAIN0567-010 07/01/2013

EL DORADO COUNTY (east of the Sierra Nevada Mountains); LASSEN COUNTY (east of Highway 395, beginning at Stacey and including Honey Lake); NEVADA COUNTY (east of the Sierra Nevada Mountains); PLACER COUNTY (east of the Sierra Nevada Mountains); AND SIERRA COUNTY (east of the Sierra Nevada Mountains)

	Rates	Fringes

Drywall
(1) Taper.....$ 27.07 11.14
(2) Steeplejack - Taper, over 40 ft with open space below.....$ 28.57 11.14

PAIN0767-004 01/01/2013

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SOLANO (Remainder), SUTTER, TEHAMA, TRINITY, YOLO, YUBA

	Rates	Fringes
GLAZIER	$ 32.24	19.88

PAID HOLIDAYS: New Year's Day, Martin Luther King, Jr. Day, President's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day.

Employee rquired to wear a body harness shall receive $1.50 per hour above the basic hourly rate at any elevation.

PAIN1176-001 07/01/2013

HIGHWAY IMPR0VEMENT

	Rates	Fringes
Parking Lot Striping/Highway Marking:		
GROUP 1	$ 28.27	11.65
GROUP 2	$ 28.60	11.65
GROUP 3	$ 26.96	11.65

CLASSIFICATIONS

GROUP 1: Striper: Layout and application of painted traffic stripes and marking; hot thermo plastic; tape, traffic stripes and markings

GROUP 2: Gamecourt & Playground Installer

GROUP 3: Protective Coating, Pavement Sealing

PAIN1237-001 01/01/2013

ALPINE; COLUSA; EL DORADO (west of the Sierra Nevada Mountains); GLENN; LASSEN (west of Highway 395, beginning at Stacey and including Honey Lake); MODOC; NEVADA (west of the Sierra Nevada Mountains); PLACER (west of the Sierra Nevada Mountains); PLUMAS; SACRAMENTO; SHASTA; SIERRA (west of the Sierra Nevada Mountains); SISKIYOU; SUTTER; TEHAMA; TRINITY; YOLO AND YUBA COUNTIES

	Rates	Fringes
SOFT FLOOR LAYER	$ 28.25	16.73

PLAS0300-003 07/01/2009

	Rates	Fringes
PLASTERER		
AREA 295: Alpine, Amador, Butte, Colusa, El Dorado, Glenn, Lassen, Modoc, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Siskiyou, Solano, Sutter, Tehema, Trinity, Yolo & Yuba Counties	$ 32.82	15.10
AREA 355: Marin, Napa & Sonoma Counties	$ 32.82	15.30

PLAS0300-005 06/28/2010

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 28.65	18.56

PLUM0038-002 07/01/2013

MARIN AND SONOMA COUNTIES

	Rates	Fringes
PLUMBER (Plumber, Steamfitter, Refrigeration Fitter)		
(1) Work on wooden frame structures 5 stories or less excluding hgih-rise buildings and commercial work such as hospitals, prisons, hotels, schools, casinos, wastewater treatment plants, and resarch facilities as well as refrigeration pipefitting, service and repair work - MARKET RECOVERY RATE	$ 62.00	42.39
(2) All other work - NEW CONSTRUCTION RATE	$ 62.00	42.39

PLUM0038-006 07/01/2013

MARIN & SONOMA COUNTIES

	Rates	Fringes
Landscape/Irrigation Fitter (Underground/Utility Fitter)	$ 52.70	31.45

PLUM0228-001 01/01/2014

BUTTE, COLUSA, GLENN, LASSEN, MODOC, PLUMAS, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY & YUBA COUNTIES

	Rates	Fringes
PLUMBER	$ 34.50	25.24

PLUM0343-001 07/01/2013

NAPA AND SOLANO COUNTIES

	Rates	Fringes
PLUMBER/PIPEFITTER		
Light Commercial	$ 30.60	19.40
All Other Work	$ 47.50	28.20

DEFINITION OF LIGHT COMMERICIAL:
Work shall include strip shopping centers, office buildings, schools and other commercial structures which the total plumbing bid does not exceed Two Hundred and Fifty Thousand ($250,000) and the total heating and cooling does not exceed Two Hundred Fifty Thousand ($250,000); or Any projects bid in phases shall not qualify unless the total project is less than Two Hundred Fifty Thousand ($250,000) for the plumbing bid; and Two Hundred Fifty Thousand ($250,000) for the heating and cooling bid. Excluded are hospitals, jails, institutions and industrial projects, regardless size of the project

FOOTNOTES: While fitting galvanized material: $.75 per hour additional. Work from trusses, temporary staging, unguarded structures 35' from the ground or water: $.75 per hour additional. Work from swinging scaffolds, boatswains chairs or similar devices: $.75 per hour additional.

PLUM0350-001 01/01/2011

EL DORADO COUNTY (Lake Tahoe area only); NEVADA COUNTY (Lake Tahoe area only); AND PLACER COUNTY (Lake Tahoe area only)

	Rates	Fringes
PLUMBER/PIPEFITTER	$ 34.60	10.50

PLUM0355-001 07/01/2013

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NAPA, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SOLANO, SUTTER, TEHAMA, TRINITY, YOLO, AND YUBA COUNTIES

	Rates	Fringes

Underground Utility Worker
/Landscape Fitter.....$ 28.55 8.30

PLUM0442-003 01/01/2014

AMADOR (South of San Joaquin River) and ALPINE COUNTIES

	Rates	Fringes
PLUMBER	$ 35.00	24.99

PLUM0447-001 07/01/2013

AMADOR (north of San Joaquin River), EL DORADO (excluding Lake Tahoe area), NEVADA (excluding Lake Tahoe area); PLACER (excluding Lake Tahoe area), SACRAMENTO AND YOLO COUNTIES

	Rates	Fringes
PLUMBER/PIPEFITTER		
Journeyman	$ 41.77	22.35
Light Commercial Work	$ 32.23	17.22

ROOF0081-006 08/01/2011

MARIN, NAPA, SOLANO AND SONOMA COUNTIES

	Rates	Fringes
Roofer	$ 33.16	10.90

ROOF0081-007 08/01/2012

ALPINE, BUTTE, COLUSA, EL DORADO, GLENN,LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY, YOLO, AND YUBA COUNTIES

	Rates	Fringes
Roofer	$ 32.33	11.97

SFCA0483-003 01/01/2014

MARIN, NAPA, SOLANO AND SONOMA COUNTIES

	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers)	$ 52.42	25.62

SFCA0669-003 07/01/2013

ALPINE, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY, YOLO AND YUBA COUNTIES

	Rates	Fringes

SPRINKLER FITTER.....$ 34.19 19.37

SHEE0104-006 07/01/2013

MARIN, NAPA, SOLANO SONOMA & TRINITY COUNTIES

	Rates	Fringes
Sheet Metal Worker		
Mechanical Contracts		
$200,000 or less.....	$ 51.30	35.96
All other work.....	$ 52.80	34.46

SHEE0104-009 07/01/2013

AMADOR, COLUSA, EL DORADO, NEVADA, PLACER, SACRAMENTO, SUTTER, YOLO AND YUBA COUNTIES

	Rates	Fringes
SHEET METAL WORKER.....	$ 38.43	29.31

SHEE0104-010 07/01/2013

AlPINE COUNTY

	Rates	Fringes
SHEET METAL WORKER.....	$ 35.87	26.88

SHEE0104-011 07/01/2013

BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, YOLO AND YUBA COUNTIES

	Rates	Fringes
Sheet Metal Worker (Metal decking and siding only).....	$ 38.43	29.31

SHEE0104-014 07/01/2013

MARIN, NAPA, SOLANO, SONOMA AND TRINITY COUNTIES

	Rates	Fringes
SHEET METAL WORKER (Metal Decking and Siding only).....	$ 52.80	34.46

SHEE0104-019 07/01/2013

BUTTE, GLENN, LASSEN, MODOC, PLUMAS, SHASTA, SIERRA, SISKIYOU AND TEHAMA COUNTIES

	Rates	Fringes

SHEET METAL WORKER

Mechanical Jobs $200,000 & under	$ 29.54	27.16
Mechanical Jobs over $200,000	$ 38.43	29.31

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* TEAM0094-001 06/01/2014

	Rates	Fringes
Truck drivers:		
GROUP 1	$ 27.44	24.03
GROUP 2	$ 27.74	24.03
GROUP 3	$ 28.04	24.03
GROUP 4	$ 28.39	24.03
GROUP 5	$ 28.74	24.03

FOOTNOTES:

Articulated dump truck; Bulk cement spreader (with or without auger); Dumpcrete truck; Skid truck (debris box); Dry pre-batch concrete mix trucks; Dumpster or similar type; Slurry truck: Use dump truck yardage rate.

Heater planer; Asphalt burner; Scarifier burner; Industrial lift truck (mechanical tailgate); Utility and clean-up truck: Use appropriate rate for the power unit or the equipment utilized.

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Dump trucks, under 6 yds.; Single unit flat rack (2-axle unit); Nipper truck (when flat rack truck is used appropriate flat rack shall apply); Concrete pump truck (when flat rack truck is used appropriate flat rack shall apply); Concrete pump machine; Fork lift and lift jitneys; Fuel and/or grease truck driver or fuel person; Snow buggy; Steam cleaning; Bus or personhaul driver; Escort or pilot car driver; Pickup truck; Teamster oiler/greaser and/or serviceperson; Hook tender (including loading and unloading); Team driver; Tool room attendant (refineries)

GROUP 2: Dump trucks, 6 yds. and under 8 yds.; Transit mixers, through 10 yds.; Water trucks, under 7,000 gals.; Jetting trucks, under 7,000 gals.; Single-unit flat rack (3-axle unit); Highbed heavy duty transport; Scissor truck; Rubber-tired muck car (not self-loaded); Rubber-tired truck jumbo; Winch truck and "A" frame drivers; Combination winch truck with hoist; Road oil truck or bootperson; Buggymobile; Ross, Hyster and similar straddle carriers; Small rubber-tired tractor

GROUP 3: Dump trucks, 8 yds. and including 24 yds.; Transit mixers, over 10 yds.; Water trucks, 7,000 gals. and over; Jetting trucks, 7,000 gals. and over; Vacuum trucks under 7500 gals. Trucks towing tilt bed or flat bed pull trailers; Lowbed heavy duty transport; Heavy duty transport tiller person; Self- propelled street sweeper with self-contained refuse bin; Boom truck - hydro-lift or Swedish type extension or retracting crane; P.B. or similar

type self-loading truck; Tire repairperson; Combination bootperson and road oiler; Dry distribution truck (A bootperson when employed on such equipment, shall receive the rate specified for the classification of road oil trucks or bootperson); Ammonia nitrate distributor, driver and mixer; Snow Go and/or plow

GROUP 4: Dump trucks, over 25 yds. and under 65 yds.; Water pulls - DW 10's, 20's, 21's and other similar equipment when pulling Aqua/pak or water tank trailers; Helicopter pilots (when transporting men and materials); Lowbedk Heavy Duty Transport up to including 7 axles; DW10's, 20's, 21's and other similar Cat type, Terra Cobra, LeTourneau Pulls, Tournorocker, Euclid and similar type equipment when pulling fuel and/or grease tank trailers or other miscellaneous trailers; Vacuum Trucks 7500 gals and over and truck repairman

GROUP 5: Dump trucks, 65 yds. and over; Holland hauler; Low bed Heavy Duty Transport over 7 axles

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters , PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable , i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above

example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an

interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION