FOR CONTRACT NO.: 08-368504

INFORMATION HANDOUT

WATER QUALITY

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION
Dated April 20, 2011

BOARD ORDER NO. R6T-2003-0004
WDID NO. 6B361011002

PERMITS

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
Dated July 25, 2011

SYSTEM NO. 3610130

CALIFORNIA DEPARTMENT OF FISH AND GAME
CALIFORNIA ENDANGERED SPECIES ACT
Incidental Take

PERMIT NO. 2081-2010-030-06

AGREEMENTS

CALIFORNIA DEPARTMENT OF FISH AND GAME
STREAMBED ALTERATION AGREEMENT

NOTIFICATION NO. 1600-2010-0166-R6

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE (Biological Opinion)
Dated October 1, 2010

MATERIALS INFORMATION

FOUNDATION RECOMMENDATIONS
COMERCIAL VEHICLE ENFORCEMENT FACILITY
Dated June 26, 2002

REVISED FOUNDATION REPORT
IVANPAH DITCH (AIF TRUCK)
Bridge No. 54-1215J
Dated May 6, 2008

REVISED FOUNDATION REPORT
IVANPAH DITCH (AIF TRUCK)
Bridge No. 54-1215J
Dated May 6, 2008

BRIDGE FOUNDATION REVIEW
for Bridge No. 54-1215K and
Bridge No. 54-1216J
Dated December 22, 2008

FINAL MATERIALS REPORT
Dated July 28, 2008

GEOTECHNICAL DESIGN REPORT
for Overhead Sign Structure
Dated March 7, 2008

STATE FIRE MARSHAL EXTENSION
Dated November 6, 2012

STATE FIRE MARSHAL EXTENSION
Dated January 30, 2013

FIRE ALARM TESTING FORM

WEIGH STATION BYPASS
File Format

ROUTE: 08-SBd-15-177.3/181.1

California Regional Water Quality Control Board
Lahontan Region

Linda S. Adams
Acting Secretary for Environmental Protection

Victorville Office
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(760) 241-6583 • Fax (760) 241-7308
http://www.waterboards.ca.gov/lahontan

Edmund G. Brown Jr.
Governor

MEMORANDUM

TO: Craig Wentworth
California Department of Transportation
464 West 4th Street, 6th Floor, MS 822
San Bernardino, CA 92401-1400
Email: Craig_Wentworth@dot.ca.gov

FROM: HAROLD J. SINGER, EXECUTIVE OFFICER
LAHONTAN REGIONAL WATER QUALITY CONTROL BOARD

DATE: April 20, 2011

SUBJECT: **NOTICE OF APPLICABILITY FOR GENERAL WASTE DISCHARGE REQUIREMENTS FOR SMALL CONSTRUCTION, INCLUDING UTILITY, PUBLIC WORKS, AND MINOR STREAMBED/LAKEBED ALTERATION PROJECTS, BOARD ORDER NO. R6T-2003-0004, JOINT POINT OF ENTRY, SAN BERNARDINO COUNTY, WDID NO. 6B361011002**

California Regional Water Quality Control Board, Lahontan Region (Water Board) staff received an application for Waste Discharge Requirements (WDRs) for dredge and fill of waters of the State for the Joint Point of Entry (JPOE) Project on November 16, 2010. Water Board staff has determined that the proposed Project is in accordance with the required conditions to be regulated under General Waste Discharge Requirements for Small Construction, Including Utility, Public Works, and Minor Streambed/Lakebed Alteration Projects (General Permit), Board Order No. R6T-2003-0004. You are hereby assigned General Permit Order No. R6T-2003-0004-164 and Waste Discharge Identification (WDID) No. 6B361011002 for your Project. By this Notice of Applicability (NOA), the fill and excavation related discharges to waters of the State associated with the Project are authorized and subject to compliance with the General Permit. A copy of the General Permit is attached. Please use the above-referenced WDID number in future correspondence regarding this Project.

PROJECT DESCRIPTION

This NOA is based upon the information you provided. Specific Project details, as presented in your application and subsequent correspondence, are summarized in the following table.

Table of Project Information:

WDID Number	6B361011002
Applicant	California Department of Transportation 464 West 4th Street, 6th floor, MS 822 San Bernardino, CA 92401-1400 Contact: Craig Wentworth
Project Name	JPOE Project
Project Purpose and Description	The California Department of Transportation proposes to construct a multi-purpose inspection station on Interstate 15 between Nipton Road and Yates Well Road near the California and Nevada state lines. The Project consists of two separate inspection facilities, an Agricultural Inspection Facility and a Commercial Vehicle Enforcement Facility. There are two existing drainages that pass storm flows beneath Interstate 15, Ivanpah Channel and Dry Lake Ditch. The site is traversed by Ivanpah Channel and numerous smaller unnamed ephemeral streams. Dry Lake Ditch parallels the northern boundary of the site. Project construction will result in both permanent and temporary impacts to surface water resources. Upstream flows will be collected in a soft-bottomed drainage channel and directed to either Ivanpah Channel or Dry Lake Ditch. Energy dissipaters will be placed within the drainage channel to slow flow velocities and promote percolation. Onsite stormwater will be directed to one of three detention basins to be located within the central portion of the site. The basins will be allowed to vegetate with native plant species to enhance water quality benefits.
Location (closest City and County)	Nipton, San Bernardino County
Hydrologic Unit(s)	Ivanpah Hydrologic Unit 612.00
Project Area	17.86 acres
Receiving Water(s) Name	Ivanpah Channel, Dry Lake Ditch, and multiple unnamed ephemeral washes
Water Body Type(s)	Ephemeral
Wetlands within the Project area	No
Area of Waters of the State (WOS) within the Project Area	18.72 acres
Area, Linear Foot, and Volume of Permanent Impact of WOS	17.86 acre; 42,879 linear feet; 43,600 cubic yards (fill)
Area, Linear Foot, and Volume of Temporary Impact of WOS	0.42 acre; 45 linear feet; 400 cubic yards (fill)
Non-Compensatory Mitigation	During the Project, the applicant will follow best management practices (BMPs) including construction stormwater controls designed to minimize the short-term degradation of water quality.

Table of Project Information:

	The Applicant shall retain the native topsoil and place that topsoil as a final cover over the temporary impact areas. Following construction, the Applicant shall ensure streambanks in temporary disturbance areas are recontoured and stabilized prior to the rainy season.
Compensatory Mitigation	To compensate for the 17.86 acres of permanent impact to WOS, the Applicant has proposed to purchase a parcel (or parcels) of land that includes, at minimum, 18.31 acres of waters of the State. The mitigation land shall 1) be within the same watershed as the Project site, and 2) be characterized by similar soil permeability and hydrological and biological functions as the Project site, as defined in the application. The Applicant has agreed to acquire the mitigation land prior to Project completion, but no later than October 31, 2012. Once acquired, the Applicant shall obtain a conservation easement to preserve the mitigation land in perpetuity. A copy of the easement title will be sent to the Water Board upon recording.
Applicable Fees	$ 40,000 ($640 base fee + ([4,589 linear feet of permanent and temporary impact] x $6.40 per linear foot] x 2))[1]
Fees Received	$40,000

[1] Dredge and fill fee operations shall not exceed $40,000, pursuant to California Code of Regulations, title 23, section 2200.

CEQA COMPLIANCE

The California Department of Transportation (Caltrans) prepared an Initial Study and Negative Declaration (IS/ND) for the JPOE Project. The IS/ND was prepared pursuant to the California Environmental Quality Act (CEQA) and circulated under State Clearinghouse (SCH) Number 2006021033. The IS/ND was certified on March 31, 2006, following public review. Subsequently, Caltrans prepared a Supplemental Mitigated Negative Declaration (MND) to address biological resources, specifically burrowing owl and desert tortoise. The Supplemental MND was circulated under SCH Number 2006021033, and was certified on November 9, 2010, following public review.

The Water Board, acting as a CEQA Responsible Agency in compliance with the California Code of Regulations (CCR), title 14, section 15096, has considered the IS/ND and Supplemental MND prepared by Caltrans with respect to water quality. Based on that review, I find that potential water quality impacts resulting from Project construction would be less than significant.

GENERAL INFORMATION

1. Coverage under the General Permit shall continue until revoked in writing by the Executive Officer of the Lahontan Regional Water Quality Control Board. Revocation procedures are found in the Administrative Provisions, Section IV.C of the attached permit.

2. The Project must be constructed and operated in accordance with the Project description in the application and subsequent information provided to the Water Board. Deviation from the Project description constitutes a violation of the conditions upon which this Notice of Applicability was granted.

3. Failure to abide by the conditions of the General Permit, including the information contained in the application and subsequent information, could result in an enforcement action as authorized by provisions of the California Porter-Cologne Water Quality Control Act.

4. Neither Project construction activities nor operation of the Project may cause a violation of the Water Quality Control Plan for the Lahontan Region, may cause a condition or threatened condition of pollution or nuisance, or cause any other violation of the California Water Code.

Thank you for your efforts to protect water quality. If you have any questions regarding this letter, please contact Jan Zimmerman, Engineering Geologist, at (760) 241-7376 (jzimmerman@waterboards.ca.gov) or Patrice Copeland, Senior Engineering Geologist, at (760) 241-7404 (pcopeland@waterboards.ca.gov).

Enc: General WDR Permit Order No. R6T-2003-004 and Monitoring and Reporting Program No. R6T-2003-004

cc: Becky Jones, California Department of Fish and Game (Fresno)
Bill Orme, SWRCB, Division of Water Quality
(via email; stateboard401@waterboards.ca.gov)
Paul Amato, Wetlands Regulatory Office, USEPA, Region 9

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

BOARD ORDER NO. R6T-2003-0004

GENERAL WASTE DISCHARGE REQUIREMENTS
FOR

SMALL CONSTRUCTION PROJECTS, INCLUDING UTILITY, PUBLIC WORKS, AND MINOR STREAMBED/LAKEBED ALTERATION PROJECTS IN THE LAHONTAN REGION EXCLUDING THE LAKE TAHOE HYDROLOGIC UNIT

The California Regional Water Quality Control Board, Lahontan Region (Regional Board) finds:

1. In accordance with Section 13260 of the California Water Code, the discharge of storm water runoff and products of erosion from small construction projects, including utility, public works, within certain sensitive watersheds in the Lahontan Region, and discharges associated with minor streambed/lakebed alteration projects in the Lahontan Region is considered to be a discharge of waste that could affect the quality of waters of the State.

2. The Regional Board may prescribe requirements for any proposed discharge, in accordance with Section 13263 of the California Water Code.

3. Implementation of temporary best management practices (BMPs) is an effective and economical means of preventing or minimizing the discharge of the products of erosion, sediment-laden storm water, and minor waste material spills from small construction projects.

4. Implementation of permanent best management practices (BMPs) after construction is an effective means of treating storm water runoff from impervious surfaces and of preventing erosion following construction of small sites.

5. This General Permit regulates: 1) discharges associated with minor streambed/lakebed alteration projects in the Lahontan Region; and 2) storm water discharges from small construction activity that enter surface waters either directly or indirectly through drainage conveyances or municipal separate storm sewer facilities within the following Hydrologic Units/Areas in the Lahontan Region (see Attachments "A", "B", and "C"):

    a. Little Truckee River Hydrologic Unit (HU No. 636.00)
    b. Truckee River Hydrologic Area (HU No. 635.20)
    c. West Fork Carson River Hydrologic Unit (HU No. 633.00)
    d. East Fork Carson River Hydrologic Unit (HU No. 632.00)
    e. Mono Hydrologic Unit (HU No. 601.00)
    f. Long Hydrologic Area (HU No. 603.10)

6. Small construction projects located within the jurisdiction of local agencies that have entered into a Memorandum of Understanding (MOU) with the Regional Board to implement a storm water construction pollution control program in accordance with the *Water Quality Control Plan for the Lahontan Region* (Basin Plan) are not subject to this General Permit. The Town of Mammoth Lakes has entered into such an MOU with the Regional Board and upon adoption of this Permit the Regional Board waives requirements for submitting Reports of Waste Discharge for small construction activity, as defined in Finding 9, within the Mammoth Lakes jurisdiction. Subsequent to the adoption of this Order, other jurisdictions may enter into MOUs with the Regional Board and qualify for a similar waiver.

7. Discharges of storm water runoff and products of erosion from certain construction projects in the Lake Tahoe Hydrologic Unit are regulated under separate General Waste Discharge Requirements and are not covered under this permit.

8. This General Permit does not preempt or supersede the authority of local storm water management agencies to prohibit, restrict, or control storm water discharges to separate storm sewer systems or other watercourses within their jurisdiction, as allowed by State and Federal law.

9. For purposes of this Order, a "small construction project" includes construction activity that results in land disturbance of 10,000 square feet or more and is not covered under the State Water Resources Control Board (SWRCB) Water Quality Order 99-08-DWQ (Statewide Construction General Permit). Land disturbance is clearing, grading, or disturbances to the ground, including excavation and stockpiling, within the footprint of the structure to be constructed, and any staging and access areas that disturb native soil conditions. Only the actual area of land disturbance is considered when determining whether a project must be covered under this Permit. For example, if a 1-acre parcel (43,560 square feet) is to be developed, but only 9,000 square feet of soil will be disturbed within the project site, coverage under this Permit is not required. Small construction projects also include utility projects proposed by a public or private utility and public works projects proposed by a public entity that involve 10,000 square feet or more of land disturbance.

   The Statewide Construction General Permit currently covers projects involving one acre or more of land disturbance. Small construction activity that results in land disturbances of less than 10,000 square feet is subject to this General Permit if the construction activity is part of a larger common plan of development that, as a whole, encompasses 10,000 square feet, but less than 1 acre of soil disturbance. For example, a single development that is completed in two separate phases, with each phase disturbing 8,000 square feet, would require coverage under this Permit because the total land disturbance associated with the project as a whole is 16,000 square feet. For purposes of this Order, Construction activity does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility, nor does it include emergency construction activities required to protect public health and safety.

10. For purposes of this order, a "minor streambed/lakebed alteration project" is one that includes soil disturbing work, including maintenance dredging, within the high water mark of any water body in the Lahontan Region or the 100-year floodplain in the Truckee and Little Truckee River Hydrologic Units, and is not regulated by the Army Corps of Engineers under Clean Water Act (CWA) Section 404.

11. This General Permit does not authorize discharges of fill or dredged material regulated by the U.S. Army Corps of Engineers under CWA Section 404 and does not constitute a state water quality certification under CWA Section 401.

12. To obtain authorization for proposed storm water discharges associated with land disturbing activities to ground and/or surface waters pursuant to this General Permit, the Discharger must submit a Notice of Intent (NOI – Attachment "D") to comply with the General Permit and a filing fee to the Regional Board prior to commencement of construction activities. The NOI must include a description of specific temporary and permanent Best Management Practices (BMPs) to be implemented to prevent or minimize the discharge of waste from the project site during and after construction (see Attachment "E"). For proposed construction activity on easements or on nearby property by agreement or permission, the entity responsible for the construction activity must submit the NOI and filing fee and shall be responsible for development and implementation of the BMPs. Coverage under the General Permit shall begin upon written notification from the Regional Board or 30 days following Regional Board receipt of an NOI if the applicant receives no response from the Regional Board.

13. If an individual National Pollutant Discharge Elimination System (NPDES) Permit is issued to a discharger for activities otherwise subject to this General Permit, or if an alternative general or individual permit is subsequently adopted which covers storm water discharges regulated by this General Permit, the applicability of this General Permit to such discharges is automatically terminated on the effective date of the individual permit or the date of approval for coverage under the subsequent General Permit.

14. Potential pollutant discharges from projects covered under this General Permit consist of products of erosion, construction waste materials, dewatering waste, turbid water and waste earthen materials from work within surface waters, and small amounts of petroleum products from construction equipment.

15. The Regional Board adopted and the State Water Resources Control Board (SWRCB) approved the *Water Quality Control Plan for the Lahontan Region* (Basin Plan). This General Permit implements the Basin Plan. Dischargers regulated by this General Permit must comply with the water quality standards, guidelines, and prohibitions in the Basin Plan, and subsequent amendments thereto.

16. Runoff from the project sites will potentially enter either ground or surface waters of the Hydrologic Units/Areas listed in Finding 5.

17. The beneficial uses of ground and surface waters within the Hydrologic Units/Areas listed in Finding 5 are provided in Chapter 2 of the Basin Plan. There are a variety of designated beneficial uses for individual water bodies that are too numerous to list in this General Permit. The pertinent information is available from the Basin Plan at the Regional Board offices and may be found at the following website - http://www.swrcb.ca.gov/rwqcb6/files.htm

18. A Negative Declaration for the adoption of this General Permit was certified by the Regional Board on January 8, 2003 (Resolution No. R6T-2003-0004) in accordance with the California Environmental Quality Act (Public Resources Code Section 21000 et seq.).

19. The projects regulated by this General Permit are typically nonrecurring and short-term construction projects that will normally be completed within two construction seasons. The applicability of these requirements to the specific project may be revoked pursuant to Administrative Provisions – Section IV.D.

20. The Regional Board has notified the interested agencies and persons of its intent to adopt general waste discharge requirements for small construction projects and has provided them with an opportunity to submit their written views and recommendations.

21. The Regional Board in a public meeting heard and considered all comments pertaining to the requirements.

IT IS HEREBY ORDERED that all dischargers submitting an NOI, applicable fee, and BMP plan in accordance with this permit shall comply with the following:

I. DISCHARGE PROHIBITIONS

A. The discharge of waste[1], including but not limited to, waste earthen materials (such as soil, silt, sand, clay, rock, or other organic or mineral material) that causes violation of any narrative water quality objective contained in the Basin Plan, including the Nondegradation Objective, is prohibited.

B. The discharge of waste that causes violation of any numeric water quality objective contained in the Basin Plan is prohibited.

C. Where any numeric or narrative water quality objective contained in the Basin Plan is already being violated, the discharge of waste that causes further degradation or pollution is prohibited.

D. The discharge, attributable to human activities, of solid or liquid waste materials, including but not limited to soil, silt, clay, sand, or other organic or earthen material, to surface waters of the Truckee River and Little Truckee River Hydrologic Units, is prohibited.

E. The discharge or threatened discharge, attributable to human activities, of solid or liquid waste materials, including but not limited to soil, silt, clay, sand, or other organic or earthen material, to lands within the 100-year floodplain of the Little Truckee River and Truckee River, or any tributary to the Little Truckee and Truckee Rivers, is prohibited. A summary of the waste discharge prohibitions and exception criteria is presented in Attachment "F."

F. Unless specifically granted, authorization pursuant to this General Permit does not constitute an exemption to applicable discharge prohibitions prescribed in the Basin Plan.

G. Unless otherwise authorized by a separate waste discharge permit, discharges of material other than storm water, including dewatering waste, to a separate storm sewer system or waters of the state are prohibited. Discharge of dewatering waste to land is covered under this General Permit providing that there are no pollutants present that could degrade groundwater quality. If no land disposal alternatives exist for dewatering waste, the Discharger may seek coverage to discharge dewatering waste to surface waters under a separate NPDES permit by submitting a separate Report of Waste Discharge.

H. Discharges of non-storm water are allowed only when necessary for performance and completion of construction projects and where they do not cause or contribute to a violation of any water quality standard. Such discharges must be described in the BMP plan (see Provision III – Best Management Practices). Wherever feasible, alternatives that do not result in the discharge of non-storm water, or that discharge any non-storm water to land, shall be implemented.

[1] CWC Section 13050(d): "Waste" includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal.

I. Storm water discharges regulated by this General Permit shall not contain a hazardous substance equal to or in excess of a reportable quantity listed in 40 CFR Part 117 and/or 40 CFR Part 302.

J. Except under emergency conditions, land disturbance between October 15 of any year and May 1 of the following year is prohibited in the Little Truckee River and Truckee River Hydrologic Units. Where it can be shown that granting a variance would not cause or contribute to the degradation of water quality, an exception to the dates stated above may be granted in writing by the Executive Officer.

K. The discharge of fresh concrete or grout to surface waters is prohibited, unless the discharge is confined to the work area and isolated from flowing streams or water bodies.

L. The discharge of oil, gasoline, diesel fuel, any petroleum derivative, any toxic chemical, or hazardous waste is prohibited.

M. The discharge of waste, including wastes contained in storm water, shall not cause a pollution, threatened pollution, or nuisance as defined in Section 13050 of the California Water Code.

II. RECEIVING WATER LIMITATIONS

A. Storm water discharges and authorized nonstorm water discharges to any ground water or surface water shall not adversely impact human health or the environment.

B. The discharge of storm water from the project area to surface waters shall not cause or contribute to a violation of any narrative or numeric water quality objective contained in the Basin Plan. Where any numeric or narrative water quality objective contained in the Basin Plan is already being violated, the discharge of waste that causes further degradation or pollution is prohibited. A complete listing of water quality objectives is presented in the Basin Plan, Chapter 3 and can be found at the following website - http://www.swrcb.ca.gov/rwqcb6/files.htm

Water quality objectives that apply to all surface waters within the Lahontan Region include, but are not limited to, the following construction-related pollutants.

Oil and Grease
Waters shall not contain oils, greases, waxes or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect the water for beneficial uses.

For natural high quality waters, the concentration of oils, greases, or other film or coat generating substances shall not be altered.

pH
In fresh waters with designated beneficial uses of COLD or WARM, changes in normal ambient pH levels shall not exceed 0.5 pH units. For all other waters of the Region, the pH shall not be depressed below 6.5 nor raised above 8.5.

The Regional Board recognizes that some waters of the Region may have natural pH levels outside of the 6.5 to 8.5 range. Compliance with the pH objective for these waters will be determined on a case-by-case basis.

Sediment
The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water for beneficial uses.

Settleable Materials
Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or that adversely affects the water for beneficial uses. For natural high quality waters, the concentration of settleable materials shall not be raised by more that 0.1 milliliter per liter.

Turbidity
Waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses. For all waters, increases in turbidity shall not exceed natural levels by more than 10 percent. Additionally for the Little Truckee Hydrologic Unit and Truckee River Hydrologic Area, turbidity shall not be raised above 3 Nephelometric Turbidity Units (NTU) mean of monthly means. Additionally for the West Fork Carson River Hydrologic Unit, the turbidity shall not be raised above a mean of monthly means value of 2 NTU.

Toxicity
All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life.

C. Should it be determined by the Discharger or Regional Board staff that storm water discharges and/or authorized nonstorm water discharges are causing or contributing to a violation of an applicable water quality standard, the Discharger shall:

1. Implement corrective measures immediately following discovery that water quality standards were violated, followed by notification to the Regional Board by telephone as soon as possible but no later than 48 hours after the discharge has been discovered. This notification shall be followed by a report within 14 calendar days to the Regional Board, unless otherwise directed by the Regional Board, describing (1) the nature and cause of the water quality standard violation; (2) the BMPs currently being implemented; (3) any additional BMPs which will be implemented to prevent or reduce pollutants that are causing or contributing to the violation of water quality standards; and (4) any maintenance or repair of BMPs. This report shall include an implementation schedule for corrective actions and shall describe the actions taken to reduce the pollutants causing or contributing to the violation.

2. The Discharger shall revise storm water pollution control measures and monitoring procedures to incorporate: 1) the additional BMPs that have been, and will be implemented; 2) the implementation schedule; and 3) any additional monitoring needed.

3. Nothing in this section shall prevent the Regional Board from enforcing any provisions of this General Permit while the Discharger prepares and implements the above report.

III. BEST MANAGEMENT PRACTICES (BMPs)

A. Prior to the initiation of any construction related activities, the Discharger shall develop a BMP implementation plan and install temporary erosion control facilities to prevent transport of earthen materials and other wastes off the property. Guidance for developing the BMP plan is provided in Attachment "E."

B. All land disturbing activities shall be conducted in accordance with the Lahontan Region Project Guidelines for Erosion Control (Attachment "G").

C. If the Regional Board determines that the proposed BMPs will not achieve the applicable standards and receiving water objectives, the Discharger may be required to implement additional or alternative BMPs.

IV. ADMINISTRATIVE PROVISIONS

A. Applicability and Timing

1. Upon receipt of the applicable filing fee, an NOI to comply with the provisions of this General Permit, and an adequate BMP plan, the Discharger will be issued a written Notice of Applicability (NOA). The Regional Board reserves the right to request additional information if the NOI and/or BMP plan is deemed inadequate.

2. The Discharger shall submit a NOI, a BMP plan, and the appropriate fee at least 30 days prior to the proposed date of construction. Additional time (up to 120 days) will be required for projects that propose disturbance to flood plains or waters of the state. Construction may not begin until a written NOA is received from the Regional Board or 30 days have elapsed from the date the NOI was received by the Regional Board. If the Discharger is notified in writing that the NOI and/or BMP plan is incomplete, the Discharger must provide the additional information requested in the notice and the Regional Board may take up to 30 days to respond with an NOA or request for additional information.

3. All Dischargers must implement the BMP plan and the Monitoring and Reporting Program upon commencement of construction.

4. Projects may be brought to the Regional Board for consideration of adoption of an individual WDR when the Executive Officer deems it necessary to achieve water quality protection.

5. The conditions of this General Permit do not exempt the Discharger from compliance with any other laws, regulations, or ordinances which may be applicable, do not legalize land treatment and disposal facilities, and leave unaffected any further restraints on those facilities which may be contained in other statutes or required by other regulatory agencies.

B. Provisions

1. All Dischargers must comply with the lawful requirements of municipalities, counties, drainage districts, and other local agencies regarding discharges of storm water to drainage systems or other water courses under their jurisdiction.

2. The Discharger shall at all times fully comply with the engineering plans, specifications, and technical reports developed for the project and/or submitted with the NOI. The Discharger shall at all times fully comply with the BMP Plan.

3. The Discharger must comply with the Standard Provisions for Waste Discharge Requirements contained in Attachment "H", which is made part of this General Permit.

4. Pursuant to California Water Code Section 13267, the Discharger shall comply with Monitoring and Reporting Program No. **R6T-2003-0004** hereby made a part of this General Permit.

5. The owners of property subject to this General Permit shall have a continuing responsibility for ensuring compliance with the General Permit. The Discharger identified in the NOA shall remain liable for General Permit violations until an NOI is received from the new owner/operator. Notification of applicable General Permit requirements shall be furnished to the new owners and/or operators and a copy of such notification shall be sent to the Regional Board. This General Permit is transferable to the new owner. Any change in the ownership and/or operation of property subject to this General Permit shall be reported to the Regional Board. The new owner must comply with the General Permit, including the Monitoring and Reporting Program.

C. Revocation Procedures

Coverage under the General Permit shall continue until revoked in writing by the Regional Board staff. The Discharger is responsible for notifying the Regional Board in writing that the project is complete, certifying that the required conditions are met, and requesting revocation of coverage under the General Permit. The General Permit for the specific project will be revoked provided the following conditions are met: 1) the construction project is complete and soil stabilization measures are in place and functioning; 2) permanent BMPs have been installed and are functional; 3) information required by the attached Monitoring and Reporting Program has been submitted; and 4) Regional Board staff have inspected the site, if deemed necessary.

I, Harold J. Singer, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, Lahontan Region, on January 8, 2003.

Harold J. Singer

HAROLD J. SINGER
EXECUTIVE OFFICER

Attachment A: Map of Little Truckee River Hydrologic Unit and Truckee River Hydrologic Area

Attachment B: Map of West and East Forks Carson River Hydrologic Units

Attachment C: Map of Mono Hydrologic Unit and Long Hydrologic Area

Attachment D: Notice of Intent Form

Attachment E: Best Management Practices Plan

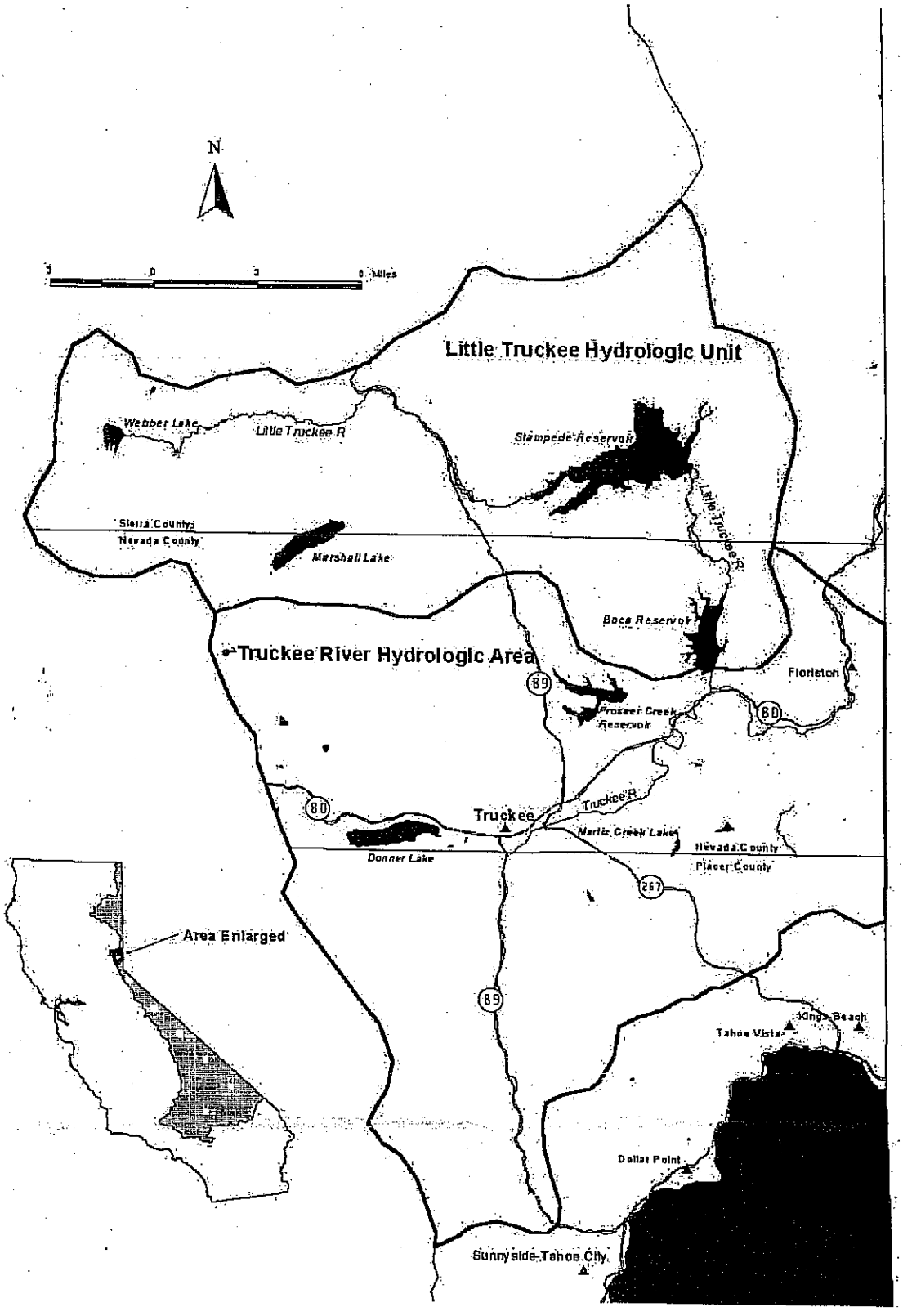
Attachment F: Waste Discharge Prohibitions and Exception Criteria for Projects within the Truckee River Hydrologic Unit

Attachment G: Lahontan Region Project Guidelines for Erosion Control

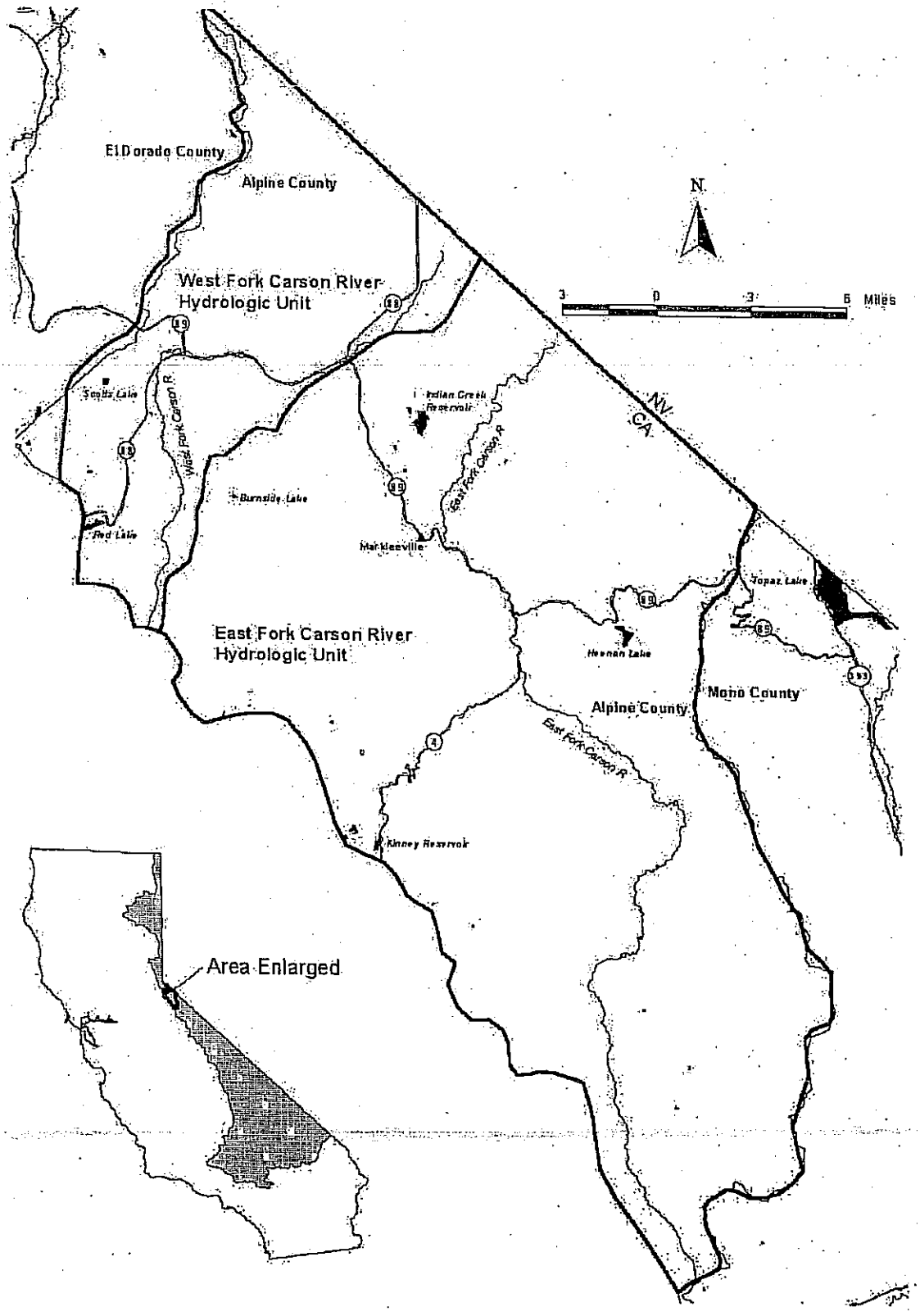
Attachment H: Standard Provision for Waste Discharge Requirements

BA/cgT: Small Construction General Permit WDR

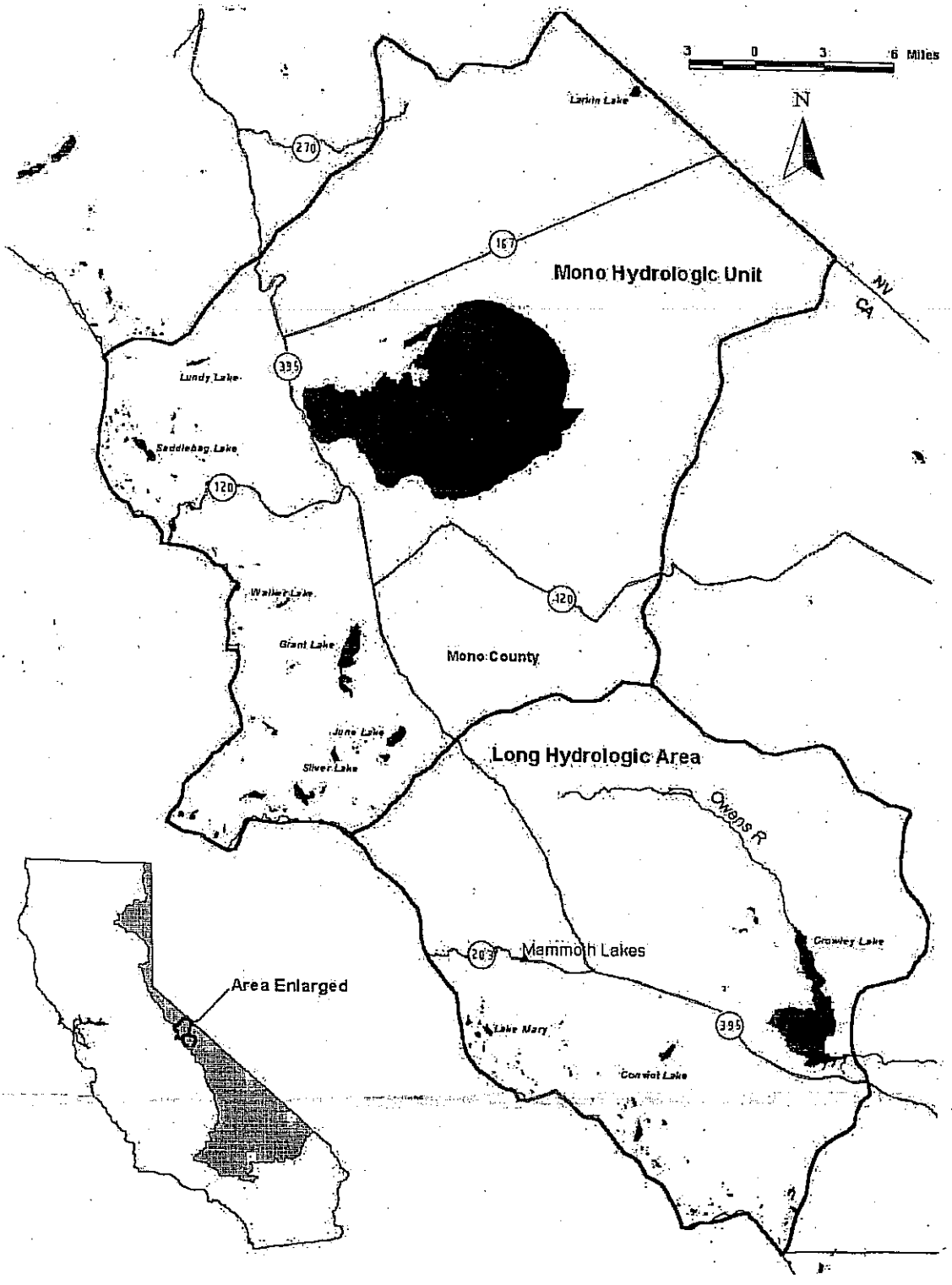
Attachment "A"
Little Truckee River Hydrologic Unit
And
Truckee River Hydrologic Area



Attachment "B"
West and East Fork Carson River
Hydrologic Units



Attachment "C"
Mono Hydrologic Unit
And
Long Hydrologic Area



ATTACHMENT "D"

California Regional Water Quality Control Board – Lahontan Region

NOTICE OF INTENT

TO COMPLY WITH THE TERMS OF THE
GENERAL WASTE DISCHARGE REQUIREMENTS
FOR
SMALL CONSTRUCTION PROJECTS, INCLUDING UTILITY, PUBLIC WORKS, AND MINOR STREAMBED/LAKEBED ALTERATION PROJECTS
IN THE LAHONTAN REGION
EXCLUDING THE LAKE TAHOE HYDROLOGIC UNIT
(WQ ORDER No. R6T-2003-0004)

I. NOI STATUS (SEE INSTRUCTIONS)

MARK ONLY ONE ITEM 1. ☐ New Construction 2. ☐ Change of Information for WDID# _____

II. PROPERTY OWNER

Name	Contact Person		
Mailing Address	Title		
City	State	Zip	Phone ( ) –

III. DEVELOPER/CONTRACTOR INFORMATION

Developer/Contractor	Contact Person		
Mailing Address	Title		
City	State	Zip	Phone ( ) –

IV. CONSTRUCTION PROJECT INFORMATION

Site/Project Name	Site Contact Person		
Physical Address/Location	Latitude ____°	Longitude ____°	County
City (or nearest City)	Zip	Site Phone Number ( ) –	Emergency Phone Number ( ) –

A. Total size of construction site area: _____ Acres

B. Total area to be disturbed: _____ Acres (% of total _____)

C. Percent of site imperviousness (including rooftops):
Before Construction: _____%
After Construction: _____%

D. Tract Number(s): _____, _____

E. Mile Post Marker: _____

F. Is the construction site part of a larger common plan of development or sale?
☐ YES ☐ NO

G. Name of plan or development:

H. Construction commencement date: ___/___/___

I. % of site to be mass graded: _____

J. Projected construction dates:
Complete grading: ___/___/___ Complete project: ___/___/___

K. Type of Construction (Check all that apply):

1. ☐ Residential 2. ☐ Commercial 3. ☐ Industrial 4. ☐ Reconstruction 5. ☐ Transportation
6. ☐ Utility Description: _____ 7. ☐ Other (Please List): _____

V. BILLING INFORMATION

SEND BILL TO:	Name	Contact Person	
☐ OWNER (as in II. above)			
☐ DEVELOPER (as in III. above)	Mailing Address	Phone/Fax	
☐ OTHER (enter information at right)	City	State	Zip

VI. REGULATORY STATUS

A. Has a local agency approved a required erosion/sediment control plan? ☐ YES ☐ NO

Does the erosion/sediment control plan address construction activities such as infrastructure and structures? ☐ YES ☐ NO

Name of local agency: _____ Phone: ( ) –

B. Is this project or any part thereof, subject to conditions imposed under a CWA Section 404 permit or 401 Water Quality Certification? ☐ YES ☐ NO

If yes, provide details: _____

VII. RECEIVING WATER INFORMATION

A. Does the storm water runoff from the construction site discharge to (Check all that apply):

1. ☐ **Indirectly to waters of the State**
2. ☐ **Storm drain system - Enter owner's name:** _____
3. ☐ **Directly to waters of State (e.g. , river, lake, creek, stream, wetlands)**

B. Name of receiving water: (river, lake, creek, stream, wetlands): _____

VIII. BEST MANAGEMENT PRACTICES (BMP) PLAN AND FEE

Have you included a BMP Plan with this submittal? ☐ YES ☐ NO

Have you included payment of the annual fee with this submittal? ☐ YES ☐ NO

X. CERTIFICATIONS

"I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment. In addition, I certify that the provisions of the permit, including the development and implementation of a Storm Water Pollution Prevention Plan and a Monitoring Program Plan will be complied with."

Printed Name: _____

Signature: _____ **Date:** _____

Title: _____

ATTACHMENT "E"

BEST MANAGEMENT PRACTICES PLAN

The purpose of the Best Management Practices (BMP) plan is to evaluate potential sources of sediment and other pollutants at the construction site and put controls in place that will effectively prevent pollutant discharges to surface and ground waters. The following general pollution control elements should be addressed in the BMP Plan:

1. retain soil and sediment on the construction site;
2. prevent non-storm water discharges that would discharge pollutants off site;
3. prevent the discharge of other pollutants associated with construction activities to land or surface waters;
4. permanently stabilize disturbed soils; and
5. minimize the effects of increased storm water runoff from impervious surfaces.

For detailed information on construction related BMPs, the EPA document Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices may be found at the following website:
http://cfpub.epa.gov/npdes/pkeyword.cfm?keywords=BMPs&program_id=0

Additional information may be also be obtained by contacting the Lahontan Regional Water Quality Control Board.

Specific guidance for completing the Best Management Practices (BMP) Plan is provided below. The BMP Plan must be submitted with the Notice of Intent (NOI) to obtain coverage under the General Permit. Use the attached form for preparing the BMP plan.

Temporary Erosion Control

This element of the BMP Plan addresses temporary erosion control or soil stabilization measures to be implemented during the time while active construction and land disturbing work is active. The most efficient way to address erosion control is to preserve existing vegetation where feasible, limit disturbance, and stabilize and revegetate disturbed areas as soon as possible after grading or construction. Use of temporary erosion control measures is especially important on large graded sites where soil exposure to rainfall and wind can cause significant soil loss if left unprotected during the time active construction activities are conducted. Some of these measures may overlap with the permanent soil stabilization measures discussed later in the section. Until permanent vegetation is established, temporarily covering the soil is the most cost-effective and expeditious method to prevent and minimize erosion.

Indicate on the BMP Plan what methods will be used to prevent erosion from cut and fill slopes and other disturbed areas after grading activities are completed, but before permanent soil stabilization measures can be implemented. Options may include, but are not limited to:

- **Covering with mulch**
- **Temporary seeding or planting**
- **Applying soil stabilizers or binders (tackifier)**

- **Placing fiber rolls/logs on bare slopes**
- **Covering surfaces with erosion control blankets**
- **Diverting run off around disturbed areas using stabilized conveyances**

Sediment Control

Sediment control BMPs are required at appropriate locations along the site perimeter and at all internal inlets to the storm drain system. Sediment controls used in combination with the erosion controls described above can effectively prevent the discharge of pollutants off site. Effective filtration devices, barriers, and settling devices shall be selected, installed and maintained properly. The sediment control plan must also include provisions to temporarily stabilize construction access points such that soil, sediment, and other construction related materials are not tracked out beyond the site perimeter.

Indicate on the BMP Plan what sediment controls will be used at the site. Options may include, but are not limited to:

Filter barriers -
- **fiber rolls/logs**
- **silt fence**
- **straw bale barriers**
- **gravel inlet filters**

Retention structures -
- **sediment traps**
- **settling basins**

Stabilized access points/good housekeeping –
- **crushed rock**
- **mulch**
- **landing mats**
- **frequent sweeping**

Stabilization

All disturbed areas of the construction site must be stabilized once construction is complete. Disturbed areas include drainage ditches or channels. Stabilization means implementing permanent rather than temporary erosion controls. It is recommended to stabilize disturbed areas in inactive (no further land disturbance planned) portions of the site as soon as feasible. Final stabilization for the purposes of submitting a Notice of Termination (NOT) is satisfied when all soil disturbing activities are completed AND EITHER OF THE TWO FOLLOWING CRITERIA ARE MET:

1. A uniform vegetative cover with 70 percent coverage has been established OR:

2. equivalent stabilization measures have been employed. These measures include the use of such BMPs as mulch, erosion blankets, rip rap, fiber treatments, or other erosion resistant soil coverings or treatments.

Where background native vegetation covers less than 100 percent of the surface, such as in arid areas, the 70 percent coverage criteria is adjusted as follows: if the native vegetation on adjacent undisturbed areas covers 50 percent of the ground surface, 70 percent of 50 percent (.70 X .50=.35) would require 35 percent total uniform surface coverage.

Indicate on the BMP Plan what stabilization measures will be used at the site. Options may include, but are not limited to:

- **Seeding and/or planting (including hydro mulching/seeding)**
- **Mulching (wood chips, gravel, other) in combination with seeding/planting**
- **Installing erosion blankets (typically used on steeper disturbed slopes or unlined drainage ditches in combination with permanent seeding/planting)**
- **Placing rip rap**

Non-Storm Water Management

Non-storm water discharges should be eliminated or reduced to the extent feasible. Certain non-storm water discharges (e.g. irrigation of vegetative erosion control measures, pipe flushing and testing) may be necessary for the completion of some construction projects and are authorized by this General Permit. Other non-storm water discharges such as concrete washout, and driveway and street washing that would flush sediment or other pollutants to storm drains or surface waters are not allowed and would be a violation of this General Permit. De-watering waste should be discharged to land and infiltrated. A separate permit may be necessary if de-watering waste must be discharged to surface waters due to site constraints.

Indicate on the BMP Plan how unauthorized non-storm water discharges will be controlled. Options include, but are not limited to:

- **Approved off-site wash-out and wash-down areas**
- **Lined wash-out containment basins/traps**
- **De-watering waste infiltration or containment**

Spill Prevention and Control

The BMP Plan must describe measures to prevent and control potential leaks/spills of petroleum products such as fuels and lubricating materials, and other potentially hazardous materials. Secured storage areas for fuels and chemicals should be established and sufficient spill cleanup materials should be at the site to respond to accidental spills.

Indicate on the BMP Plan what spill prevention and control measures will be used. Options include, but are not limited to:

- **Covered material storage**
- **Material storage containment (berms, lined surfaces, secondary containment devices etc.)**
- **Regular equipment leak inspections**
- **Drip pans**
- **Absorbents**

Post-Construction Storm Water Management

Post-construction storm water controls are needed to reduce the impacts of adding impervious surfaces to the landscape and adding potential pollutant sources within storm water drainage areas. Additional impervious surfaces reduce storm water infiltration and storage and increase the volume and velocity of run off down stream from developed sites. Whenever possible, use of infiltration and treatment devices is encouraged. Specific requirements for infiltration or treatment of storm water runoff volume from a 20-year, 1-hour storm from all impervious surfaces in the Truckee River, Little Truckee River, and Mammoth Lakes watersheds must be met (see Attachment "G") Design approaches that limit overall land disturbance and reduce the amount of impervious surfaces are encouraged. Additional post-construction BMPs should also be incorporated into projects as appropriate and be properly maintained.

Indicate on the BMP Plan what post-construction BMPs will be implemented. Options include, but are not limited to:

- **Infiltration structures**
- **Detention/retention basins**
- **Storm water treatment vaults**
- **Biofilter BMPs (typically vegetated swales, strips, and buffers)**
- **Energy dissipation devices (structures designed to prevent erosion and slow water velocity associated with conveyance systems**
- **Efficient irrigation systems**
- **Proper drain plumbing (e.g. ensuring that interior drains are not connected to a storm sewer system)**

Maintenance, Inspection, and Repair

BMPs implemented at the site must be properly maintained to be effective. The BMP plan shall include provisions to inspect and maintain all BMPs identified in the plan throughout the duration of the project. Sites that are inactive and winterized through the wet season should be checked periodically to ensure the site remains stable. For sites where construction activity is conducted through the wet season, the Discharger must ensure that BMPs remain effective.

Indicate on the BMP Plan how BMPs will be inspected and repaired in accordance with the following minimum program:

For inactive construction sites during wet season -

- **Cease construction through wet season and winterize (see Attachment "G")**

For active construction sites during wet season -

- **Inspect BMPs before and after storm events**
- **Inspect BMPs once each 24-hour period during extended storm events**
- **Implement repairs or design changes as soon as feasible depending upon worker safety and field conditions**
- **Have provisions to respond to failures and emergencies**

BEST MANAGEMENT PRACTICES PLAN

Discharger Name: _____

Site Name: _____

Street Address: _____

City: _____

County: _____

Use the template provided below to identify BMPs to be implemented at the construction site. Check the boxes next to the BMPs that will be used. If other BMPs will be used, describe them in the space provided for "Other BMP." Attach additional sheets if needed.

TEMPORARY EROSION CONTROL

Erosion from graded or disturbed areas, including cut and fill slopes, will be temporarily protected once soil disturbing activities are completed by the following method(s):

- ❑ **Covering with mulch**
- ❑ **Temporary seeding or planting**
- ❑ **Applying soil stabilizers or binders (tackifier)**
- ❑ **Placing fiber rolls/logs on bare slopes**
- ❑ **Covering surfaces with erosion control blankets**
- ❑ **Diverting run off around disturbed areas using stabilized conveyances**
- ❑ **Other (describe below)**

BEST MANAGEMENT PRACTICES PLAN

SEDIMENT CONTROL

Excess sediment will be prevented from running off the site or to storm drain inlets by the following method(s):

Filter barriers -

- ❑ **fiber rolls**
- ❑ **silt fence**
- ❑ **straw bale barriers**
- ❑ **gravel inlet filters**

Retention structures -

- ❑ **sediment traps**
- ❑ **settling basins**

Stabilized access points/good housekeeping –

- ❑ **crushed rock**
- ❑ **mulch**
- ❑ **landing mats**
- ❑ **frequent sweeping**

❑ **Other (describe below)**

BEST MANAGEMENT PRACTICES PLAN

STABILIZATION

Disturbed soil areas not covered with impervious surfaces will be permanently stabilized by the following method(s):

- ❑ **Seeding and/or planting (including hydro mulching/seeding)**
- ❑ **Mulching (wood chips, gravel, other) in combination with seeding/planting**
- ❑ **Installing erosion blankets (typically used on steeper disturbed slopes or unlined drainage ditches in combination with permanent seeding/planting)**
- ❑ **Placing rip rap (describe location)**
- ❑ **Other (describe below)**

NON-STORM WATER MANAGEMENT

Unauthorized non-storm water discharges will be controlled using the following method(s):

- ❑ **Approved off-site wash-out and wash-down areas (describe location)**
- ❑ **Lined wash-out containment basins/traps (describe location)**
- ❑ **De-watering waste infiltration or containment (describe location)**
- ❑ **Other (describe below)**

BEST MANAGEMENT PRACTICES PLAN

POST-CONSTRUCTION STORM WATER MANAGEMENT

The following post-construction BMPs will be implemented to reduce impacts from additional impervious surfaces and pollutant sources (include design calculations used to size BMPs):

- ❑ **Infiltration structures**
- ❑ **Detention/retention basins**
- ❑ **Storm water treatment vaults**
- ❑ **Biofilter BMPs (typically vegetated swales, strips, and buffers)**
- ❑ **Energy dissipation devices (structures designed to prevent erosion and slow water velocity associated with conveyance systems**
- ❑ **Efficient irrigation systems**
- ❑ **Proper plumbing design (e.g. ensuring that interior drains are not connected to a storm sewer system)**
- ❑ **Other (describe below)**

MAINTENANCE, INSPECTION, AND REPAIR

BMPs will be inspected and repaired in accordance with the following minimum program:

For inactive construction sites during wet season (October 15 – May 1) –

- ❑ **Cease construction through wet season and winterize (see Attachment "G")**

For active construction sites during wet season (October 15 – May 1) –

- ❑ **Inspect BMPs, and repair if needed, before and after storm events**
- ❑ **Inspect BMPs once each 24-hour period during extended storm events**
- ❑ **Implement repairs or design changes as soon as feasible depending upon worker safety and field conditions**
- ❑ **Have provisions to respond to failures and emergencies**
- ❑ **Other (describe below)**

ATTACHMENT "F"

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

WASTE DISCHARGE PROHIBITIONS
AND
EXCEPTION CRITERIA
FOR PROJECTS WITHIN THE TRUCKEE RIVER HYDROLOGIC UNIT

The *Water Quality Control Plan for the Lahontan Region* (Basin Plan) prohibits the discharge or threatened discharge, attributable to human activities, of solid or liquid waste[1] materials (including, but not limited to, soil, silt, clay, sand and other organic and earthen materials) to lands within the 100-year floodplain of the Truckee River or within the 100-year floodplain of any tributary[2] to the Truckee River. The Regional Board may grant exceptions to the prohibition for repair or replacement of existing structures provided that a loss of additional floodplain area or volume does not occur, and Best Management Practices and mitigation measures are used to minimize any potential soil erosion and/or surface runoff problems.

The Regional Board may also grant exceptions to the prohibition for the following types of new projects:

(1) Projects solely intended to reduce or mitigate existing sources of erosion or water pollution, or to restore the functional value to previously disturbed floodplain areas.

(2) Bridge abutments, approaches, or other essential transportation facilities identified in an approved county general plan.

(3) Projects necessary to protect public health or safety, or to provide essential public services.

(4) Projects necessary for public recreation.

(5) Projects that will provide outdoor public recreation within portions of the 100-year flood plain that have been substantially altered by grading and/or filling activities which occurred prior to June 26, 1975.

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1 Waste includes earthen material placed in a water body or carried to waters by erosive forces. Construction activity involving ground disturbance within 100-year floodplain areas is generally considered to constitute a threat of discharge.

2 Tributaries include: perennial surface waters (rivers, streams, lakes, wetlands) and ephemeral (seasonal) watercourses exhibiting evidence of the occurrence of flowing water, and having the potential to transport water and/or sediment to another water body, including, but not limited to, named and unnamed streams, wetlands, and lakes.

The Basin Plan allows an exception to the prohibitions for new projects only when the Regional Board makes all of the following findings:

- The project is included in one or more of the five categories listed above.
- There is no reasonable alternative to locating the project or portions of the project within the 100-year flood plain.
- The project, by its very nature, must be located within the 100-year flood plain. (The determination of whether a project, by its very nature, must be located in a 100-year flood plain shall not apply to projects in category (5), above, and shall be based on the type of project proposed, not the particular site proposed.)
- The project incorporates measures which will ensure that any erosion and surface runoff problems caused by the project are mitigated to levels of insignificance.
- The project will not individually or cumulatively with other projects, directly or indirectly, degrade water quality or impair beneficial uses of water.
- The project will not reduce the flood flow attenuation capacity, the surface flow treatment capacity, or the ground water flow treatment capacity from existing conditions. All 100-year flood plain areas and volumes lost as a result of the project must be completely mitigated by restoration of previously-disturbed floodplain within or as close as practical to the project site.[3] The restored, new, or enlarged floodplain shall be of sufficient area and volume to more than compensate for the flood flow attenuation capacity, surface flow treatment capacity and ground water flow treatment capacity which are lost as a result of the project.

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[3] This finding will not be required for new projects necessary to protect public health and safety. For new projects necessary to provide essential public services, this finding will not be required when the Regional Board finds mitigation measures to be infeasible because the financial resources of the project proponent are severely limited.

ATTACHMENT "G"

LAHONTAN REGION
PROJECT GUIDELINES FOR EROSION CONTROL

In the interest of protecting surface water quality from unnatural or accelerated erosion caused by land development, the following guidelines shall be followed:

Guidelines Applicable To: **Little Truckee River Hydrologic Unit (HU No. 636.00)**
Truckee River Hydrologic Area (HU No. 635.20)
West Fork Carson River Hydrologic Unit (HU No. 633.00)
East Fork Carson River Hydrologic Unit (HU No. 632.00)
Mono Hydrologic Unit (HU No. 601.00)
Long Hydrologic Area (HU No. 603.10)

Temporary Construction BMPs

1. Surplus or waste materials shall not be placed in drainage ways or within the 100-year flood plain of surface waters.

2. All loose piles of soil, silt, clay, sand, debris, or earthen materials shall be protected in a reasonable manner to prevent discharge of pollutants to waters of the State. Material stockpiles should be placed on the upgradient side of excavation whenever possible. Stockpiles may also be protected by covering to prevent contact with precipitation and by placing sediment barriers around the stockpiles.

3. Dewatering shall be done in a manner so as to prevent the discharge of pollutants, including earthen materials, from the site. The first option is to discharge dewatering waste to land. A separate permit may be required if, due to site constraints, dewatering waste must be discharged to surface waters. Contact the Regional Board for information on discharging to surface waters.

4. All disturbed areas shall be stabilized by appropriate erosion and/or sediment control measures by October 15 of each year.

5. All work performed between October 15th and May 1st of each year shall be conducted in such a manner that the project can be winterized within 48 hours. Winterized means implementing erosion and/or sediment controls that will prevent the discharge of earthen materials from the site and the controls will remain effective throughout the rainy/snow season without requiring maintenance. In general, this requires stabilizing bare disturbed soils with mulch, erosion protection blankets, or other suitable materials, and installing perimeter sediment controls such as fiber logs or other similar materials that will remain effective during significant rain and snow events.

6. After completion of a construction project, all surplus or waste earthen material shall be removed from the site and deposited at a legal point of disposal.

7. All non-construction areas (areas outside of the construction zone that will remain undisturbed) shall be protected by fencing or other means to prevent unnecessary encroachment outside the active construction zone.

8. During construction, temporary erosion control facilities (e.g., impermeable dikes, filter fences, weed-free straw bales, etc.) shall be used as necessary to prevent discharge of earthen materials from the site during periods of precipitation or runoff.

9. Control of run-on water from offsite areas shall be managed (protected, diverted, treated, etc.) to prevent such water from degrading before it discharges from the site.

10. Where construction activities involve the crossing and/or alteration of a stream channel, such activities require a prior written agreement with the California Department of Fish and Game and shall be timed whenever possible to occur during the period in which streamflow is expected to be lowest for the year. Other control measures may be used as necessary to prevent adverse effects from work in surface waters.

Permanent Construction BMPs

1. Impervious surfaces should be constructed with infiltration trenches or comparable infiltration structures along downgradient sides to infiltrate the increase in runoff resulting from the new impervious surfaces. Infiltration structures should also be constructed to accept runoff from structural (roof top) drip lines. Other control measures may be considered if design and/or site constraints are such that construction of infiltration devices is infeasible. Additional specific design specifications are required for the Truckee, Little Truckee and Long Hydrologic Units/Areas (see specific requirements below).

2. Where possible, existing drainage patterns shall not be significantly modified.

3. Drainage swales disturbed by construction activities shall be stabilized by the addition of crushed rock or riprap, as necessary, or other appropriate stabilization methods.

4. Revegetated areas shall be regularly and continually maintained in order to assure adequate growth and root development. Physical erosion control measures (controls other than live vegetation) shall be placed on a routine maintenance and inspection program to provide continued erosion control integrity.

Additional Requirements for Specific Watersheds

Truckee River Hydrologic Area and Little Truckee Hydrologic Unit

1. Runoff from impervious surfaces shall be treated or contained onsite. For purposes of this requirement, the volume of water to be contained or treated is the 20-year, one-hour storm, which is equal to 0.7 inches of rain.

2. Except in the event of emergencies, land disturbance associated with project construction is prohibited between October 15th and May 1st of the following year. Exemptions may be granted by the Executive Officer on a case by case basis.

Long Hydrologic Area

Policy: (Contact the Regional Water Quality Control Board for information on permitting requirements delegated to the Town of Mammoth Lakes under a Memorandum of Understanding)

1. For Mammoth Lakes watershed at an elevation above 7,000 feet, drainage collection, retention, and infiltration facilities shall be constructed and maintained to prevent transport of the runoff from a 20-year, 1-hour design storm from the project site. A 20-year, 1-hour design storm for the Mammoth Lakes area is equal to 1.0 inch of rainfall.

ATTACHMENT "H"

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

STANDARD PROVISIONS
FOR WASTE DISCHARGE REQUIREMENTS

1. Inspection and Entry

The discharger shall permit Regional Board staff:

a. to enter upon premises in which an effluent source is located or in which any required records are kept;

b. to copy any records relating to the discharge or relating to compliance with the waste discharge requirements;

c. to inspect monitoring equipment or records; and

d. to sample any discharge.

2. Reporting Requirements

a. Pursuant to California Water Code 13267(b), the discharger shall immediately notify the Regional Board by telephone whenever an adverse condition occurred as a result of this discharge; written confirmation shall follow within two weeks. An adverse condition includes, but is not limited to, spills of petroleum products or toxic chemicals, or damage to control facilities that could affect compliance.

b. Pursuant to California Water Code Section 13260 (c), any proposed material change in the character of the waste, manner or method of treatment or disposal, increase of discharge, or location of discharge, shall be reported to the Regional Board at least 120 days in advance of implementation of any such proposal. This shall include, but not be limited to, all significant soil disturbances.

c. The owner(s) of, and discharger upon, property subject to waste discharge requirements shall be considered to have a continuing responsibility for ensuring compliance with applicable waste discharge requirements in the operations or use of the owned property. Pursuant to California Water Code Section 13260(c), any change in the ownership and/or operation of property subject to the waste discharge requirements shall be reported to the Regional Board. Notification of applicable waste discharge requirements shall be furnished in writing to the new owners and/or operators and a copy of such notification shall be sent to the Regional Board.

d. If a discharger becomes aware that any information submitted to the Regional Board is incorrect, the discharger shall immediately notify the Regional Board, in writing, and correct that information.

e. Reports required by the waste discharge requirements, and other information requested by the Regional Board, must be signed by a duly authorized representative of the discharger. Under Section 13268 of the California Water Code, any person failing or refusing to furnish technical or monitoring reports, or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars ($1000) for each day of violation.

f. If the discharger becomes aware that their waste discharge requirements are no longer needed (because the project will not be built or the discharge will cease) the discharger shall notify the Regional Board in writing and request that their waste discharge requirements be rescinded.

3. Right to Revise Waste Discharge Requirements

The Board reserves the privilege of changing all or any portion of the waste discharge requirements upon legal notice to and after opportunity to be heard is given to all concerned parties.

4. Duty to Comply

Failure to comply with the waste discharge requirements may constitute a violation of the California Water Code and is grounds for enforcement action or for permit termination, revocation and reissuance, or modification.

5. Duty to Mitigate

The discharger shall take all reasonable steps to minimize or prevent any discharge in violation of the waste discharge requirements which has a reasonable likelihood of adversely affecting human health or the environment.

6. Proper Operation and Maintenance

The discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the discharger to achieve compliance with the waste discharge requirements. Proper operation and maintenance includes adequate laboratory control, where appropriate, and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by the discharger, when necessary to achieve compliance with the conditions of the waste discharge requirements.

7. Waste Discharge Requirement Actions

The waste discharge requirements may be modified, revoked and reissued, or terminated for cause. The filing of a request by the discharger for waste discharge requirement

modification, revocation and reissuance, termination, or a notification of planned changes or anticipated noncompliance, does not stay any of the waste discharge requirements conditions.

8. Property Rights

The waste discharge requirements do not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

9. Enforcement

The California Water Code provides for civil liability and criminal penalties for violations or threatened violations of the waste discharge requirements including imposition of civil liability or referral to the Attorney General.

10. Availability

A copy of the waste discharge requirements shall kept and maintained by the discharger and be available at all times to operating personnel.

11. Severability

Provisions of the waste discharge requirements are severable. If any provision of the requirements is found invalid, the remainder of the requirements shall not be affected.

12. Public Access

General public access shall be effectively excluded from treatment and disposal facilities.

13. Transfers

Providing there is no material change in the operation of the facility, this Order may be transferred to a new owner or operation. The owner/operator must request the transfer in writing and receive written approval from the Regional Board Executive Officer.

14. Definitions

a. "Surface waters" as used in this Order, include, but are not limited to, live streams, either perennial or ephemeral, which flow in natural or artificial water courses and natural lakes and artificial impoundments of waters. "Surface waters" does not include artificial water courses or impoundments used exclusively for wastewater disposal.

b. "Ground waters" as used in this Order, include, but are not limited to, all subsurface waters being above atmospheric pressure and the capillary fringe of these waters.

15. Storm Protection

All facilities used for collection, transport, treatment, storage, or disposal of waste shall be adequately protected against overflow, washout, inundation, structural damage or a significant reduction in efficiency resulting from a storm or flood having a recurrence interval of once in 100 years.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

MONITORING AND REPORTING PROGRAM NO. R6T-2003-0004
GENERAL WASTE DISCHARGE REQUIREMENTS

FOR

SMALL CONSTRUCTION PROJECTS, INCLUDING UTILITY, PUBLIC WORKS, AND MINOR STREAMBED/LAKEBED ALTERATION PROJECTS
LAHONTAN REGION
EXCLUDING THE LAKE TAHOE HYDROLOGIC UNIT

A. An inspection of the construction site shall be made daily during active construction and monthly during long periods of inactivity (e.g. winter), by the Discharger, resident engineer, superintendent, general contractor, or equivalent. The purpose of the inspection is to discover potential water quality problems at the construction site so that the Discharger can implement corrective measures. The following items should be inspected at the site, as applicable:

1. Damaged containment dikes or erosion fencing
2. Unauthorized access by vehicles and/or sediment tracking off the site
3. Boundary fence damage or removal
4. Disturbed areas with no erosion control protection
5. Evidence of any sediment leakage through erosion control fencing or containment dikes
6. Soil piles unprotected or located in drainage ways
7. Spilled chemicals, paints, fuels, oils, sealants, etc.
8. Upstream runoff diversion structures in place and operational
9. Any signs of downstream erosion from runoff discharges
10. Sediment accumulation within onsite storm water drainage facilities

B. Following completion of project construction, the Discharger shall submit a notice of completion and request for revocation of coverage under the permit. The notice of completion should include the following information:

1. Details on any modification from the construction plans to the proposed stormwater collection, treatment, or disposal facilities.

2. Details on any changes to the amount of impervious coverage for this project.

3. Any significant problems which occurred during project construction and remedial measures taken.

4. Statement that onsite stabilization/revegetation measures have been completed.

5. Certification that project is in compliance with the requirements of the General Permit.

The final report shall contain the name of the project and shall be signed and dated by the property owner or his legal representative. The report shall be submitted to the Regional Board office in South Lake Tahoe.

Ordered by Harold J. Singer Date: Jan 8, 2003
HAROLD J. SINGER
EXECUTIVE OFFICER

BA/cgT: Small Construction M&R

State of California—Health and Human Services Agency
California Department of Public Health

HOWARD BACKER, MD, MPH
Interim Director

EDMUND G. BROWN JR.
Governor

July 25, 2011

Ms. Laurie Vasquez
Sanitary Engineer
Department of Transportation, MS 9-3/11H
Division of Engineering Services
1801 30th St.
Sacramento, CA 95816

Subject: CALTRANS MOUNTAIN PASS JOINT POINT OF ENTRY PERMIT APPLICATION AND TMF EVALUATION (System No. 3610130)

Dear Ms. Vasquez

The Department received your TMF (Technical, Managerial, and Financial Assessment) application and permit application for the new water system of California Department of Transportation Mountain Joint Pass of Entry (No. 3610130). Our preliminary review of the TMF documents submitted revealed the following issues that will need to be addressed to the Department before a permit can be issued:

1. Source Capacity
    a. Provide a water conservation plan to address potential water shortages
2. Operations Plan
    a. Provide an operations plan that describes the tasks that would enable another qualified operator to assume the operation of the system in an emergency. Include tasks that will be completed: Daily, Weekly, Monthly, Yearly. Include non-routine activities relating to: Positive analytical results, Complaints, Emergency operational practices, Record keeping, and other duties.
3. Ownership
    a. Provide the lease document from Bureau of Land Management (BLM)
4. Water Rights
    a. Provide description that establish legal basis and authority to divert or extract water.
        a. Copies of the deeds for the parcels of each un-adjudicated groundwater source used by the system.

5. Organization
    a. In order to establish the lines of authority and communication between employees and management including the governing board, managers, certified operators, and clerical staff, provide a:
        i. Structural organizational chart for positions associated with the water system that indicates the lines of authority.
        ii. Separate chart that lists the names and phone numbers of the specific people who fill those positions. Update this information as needed.
        iii. List on the organization charts information on any contract certified operators the system may utilize.
        iv. Indicate the level of certification and the number of hours for which the services of a certified operator are contracted
        v. Copies of contracts or agreements with the state agencies involved which identify party(s) responsible for operations, maintenance, and improvements of the water system
6. Emergency Response Plan
    a. Ensure that the emergency response plan for the water system includes:
    b. A list of all disasters and emergencies that is likely to occur in the water system's service area. Include earthquakes, fires, and disinfection failure at minimum as well as flooding, water outages, water contamination, power outages, and other potential local emergencies.
    c. The names and contact information of water system personnel including the decision makers. Identify responsibilities, and provide a clear chain of command.
    d. An inventory of system resources used for normal operations and available for emergencies including maps and schematic diagrams, lists of emergency equipment and suppliers, emergency contract agreements, and emergency water interconnections or sources.
    e. A communication network that describes a designated location for an emergency operations center, emergency contact information for equipment suppliers, emergency phone and radio communication capabilities, coordination procedures with governmental agencies for health and safety protection, technical and financial assistance, and public notification procedures.
    f. Emergency procedures to quickly assess damage to water system facilities including logistics for emergency source activation and repairs, procedures for monitoring progress of repairs and restoration, and procedures for documenting damage and repairs.
    g. Describe steps that will be taken to resume normal operations and to submit reports to appropriate agencies.
7. Budget Projection / Capital Improvement Plan
    a. Use the sample 5-year budget projection/capital improvement plan (CIP) template, or an equivalent alternative, that is located on the CDPH website at

i. http://www.cdph.ca.gov/certlic/drinkingwater/Documents/TMFplanningandreports/swsbudgetcalculator-CIPandMinRateGen.xls
ii. This file consists of guidelines for completing this spreadsheet on the first Excel tab, the 5-year budget projection on the second tab, and the CIP on the third tab.

b. Submit the following:
   i. 5-Year budget projection/CIP template
   ii. Documentation that reserve funds have been created for the CIP, operations and maintenance expenses, potential emergency needs, and any other reserve accounts necessary for the management of the system.
   iii. Documentation that budget amounts cover expenses including the CIP reserve, or describe the plan to increase revenues to cover these expenditures?

Regarding the plans, the Department noticed that no pump-to-waste lines were included in the design of water wells. Therefore, a provision must be added that allows the pump to go to waste per Title 22, CCR, Section 64560. In addition, the plans state that some emergency eyewash stations will be used for total coliform rule sampling points, however these emergency eyewash stations are poor sites for bacteriological sampling as water maybe stagnant at these points due to lack of regular usage, therefore the water system should revise the bacteriological site sampling plan.

These additional TMF items need not be submitted prior to construction of the facility. However a complete permit application will need to be submitted for review and issuance of a permit prior to operation of the water system. The Department will need to conduct a permit inspection of the constructed water system facilities in order to issue a permit for the water system.

The Department approves of the plans for the water supply system for construction, and requests Department of Transportation (Caltrans) to keep the Department updated on the progress of the construction.

If you have any questions please contact Faraz Asad at (909) 383-4312.

Sincerely,

Sean F. McCarthy

Sean F. McCarthy, P.E.
Senior Sanitary Engineer
San Bernardino District

California Department of Fish and Game
Inland Deserts Region
3602 INLAND EMPIRE BOULEVARD, SUITE C-220
ONTARIO, CA 91764

California Endangered Species Act
Incidental Take Permit No. 2081-2010-030-06

CALIFORNIA DEPARTMENT OF TRANSPORTATION
JOINT PORT OF ENTRY

Authority: This California Endangered Species Act (CESA) Incidental Take Permit (ITP) is issued by the Department of Fish and Game (DFG) pursuant to Fish and Game Code section 2081, subdivisions (b) and (c), and California Code of Regulations, title 14, section 783.0 et seq. CESA prohibits the take[1] of any species of wildlife designated by the California Fish and Game Commission as an endangered, threatened, or candidate species.[2] DFG, however, may authorize the take of any such species by permit if the conditions set forth in Fish and Game Code section 2081, subdivisions (b) and (c) are met. (See also Cal. Code Regs., tit. 14, § 783.4.)

Permittee:	**Department of Transportation**
Name and title of principal officer:	**Craig Wentworth, Principal Officer**
Contact person:	**Craig Wentworth, (909) 383-6936**
Mailing address:	**464 West 4th Street, 6th Floor** **San Bernardino, CA 92401-1400**

Effective Date and Expiration Date of the ITP:

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[1]Pursuant to Fish and Game Code section 86, "'Take' means hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill."

[2]"Candidate species" are species of wildlife that have not yet been placed on the list of endangered species or the list of threatened species, but which are under formal consideration for listing pursuant to Fish and Game Code section 2074.2.

This ITP shall be executed in duplicate original form and shall become effective once a duplicate original is acknowledged by signature of the Permittee on the last page of the ITP and returned to DFG's Habitat Conservation Planning Branch at the address listed in the Notices section of this ITP. Unless renewed by DFG, this ITP's authorization to take the Covered Species shall expire on **12/30/2015.**

Notwithstanding the expiration date on the take authorization provided by this ITP, Permittee's obligations pursuant to this ITP do not end until DFG accepts as complete the Permittee's Final Mitigation Report required by Condition 7.6 of this ITP.

Project Location:

The Joint Port of Entry (Project) is located between Nipton Road Interchange and Yates Well Road interchange on the southbound side of I-15 in the County of San Bernardino (See Figure 1). The Project is located approximately 4.9 to 8.6 miles southwest of the Nevada/California State Line, Mineral Hill USGS 7.5 minute topographic map at Township 16N, Range 14E and Sections 12,13,14 and 23.

Project Description:

The California Department of Transportation (Caltrans) in conjunction with the California Department of Food and Agriculture CDFA), the California Department of General Services, and the California Highway Patrol (CHP), propose to construct a Joint Port of Entry (JPOE) inspection facility, which includes a Commercial Vehicle Enforcement Facility (CVEF) and an Agricultural Inspection Facility (AIF). The proposed JPOE would provide for CDFA agricultural inspections and CHP commercial vehicle enforcement, to provide a strategically located multi-purpose JPOE to address increased mobility of people and products into the state; provide a facility for the inspection of agricultural goods used for a preventative program that provides critical protection not only for the infrastructure of agriculture, but also for the well being of California's environment; and provide a commercial vehicle enforcement facility to inspect for safety violations and overweight trucks, and registration and fee

compliance. The proposed Project includes the construction of: 1,312 feet of auxiliary lanes for trucks; an independent truck by-pass lane; two passenger vehicle entry lanes; truck on/off ramps at the beginning and end of the proposed project; two bridges spanning Ivanpah Ditch; a Portland Cement Concrete rehabilitation on the northbound I-15 mainline and inside shoulder improvement work; a new flood channel to just beyond the proposed CVEF; 3 detention basins to collect onsite flows; pipe culverts underneath the auto lane and truck lane; one water well, water tank, and fire well to supply water for each facility; and a sewer system for each facility that consist of a septic tank and leach field. In addition, it will include the demolition and removal of the existing Yermo AIF supplemental to the construction of the new facilities and correction of I-15 substandard vertical sight disturbance at Yermo AIF location.

The proposed Project includes the development of 133 acres of undeveloped land for the proposed JPOE. Project activities include grubbing and grading of the entire Project site, trench digging, pile driving, road construction, tree removal, and other activities.

Covered Species Subject to Take Authorization Provided by this ITP:

This ITP covers the following species:

Name	**CESA Status**[3]
Reptiles	
1. Desert Tortoise (*Gopherus agassizii*)	Threatened (Cal. Code Regs. tit. 14 § 670.5, subd. (b)(4)(A).)

[3]Refers to status under CESA. Under CESA, a species may be on the list of endangered species, the list of threatened species, or the list of candidate species. All other species are "unlisted."

This species and only this species is hereinafter referred to as "Covered Species."

Impacts to Covered Species:

The Project activities described above and their resulting impacts are expected to result in the incidental take of individuals of the Covered Species. Incidental take of individuals of the Covered Species may occur as a result of mortality due to development activities, construction of fencing, Project-related traffic on and off the Project site, and Project-caused habitat losses, crushing an occupied burrow of individual Covered Species, moving Covered Species off site to a new location, or the permanent removal of habitat that is currently occupied by the Covered Species. In particular, the Project will result in permanent loss of 133 acres of habitat for the Covered Species. Impacts of the proposed taking also include adverse impacts to the Covered Species related to temporal losses, increased habitat fragmentation, and edge effects, and the Project's incremental contribution to cumulative impacts (indirect impacts). These impacts include: possible increase in predation to Cover Species from ravens and coyotes, dust accumulation on surrounding vegetation could lead to disruption of natural foraging patters and/or destroy foraging habitat, relocation of animals and possible increase of noxious and invasive weed which have the potential for crowding out the grasses and annual plants consumed by the Covered Species resulting in reduced forage and habitat quality.

Incidental Take Authorization of Covered Species:

This ITP authorizes incidental take of the Covered Species and only the Covered Species. With respect to incidental take of the Covered Species, DFG authorizes the Permittee, its employees, contractors, and agents to take Covered Species incidentally in carrying out the Project, subject to the limitations described in this section and the Conditions of Approval identified below. This ITP does not authorize take of Covered Species from activities outside the scope of the Project as described above, take of Covered Species resulting from violation of this ITP, or intentional take of Covered Species (except for capture and relocation of Covered Species as authorized by this ITP).

Conditions of Approval:

Unless specified otherwise, the following measures shall pertain to all ground- or vegetation-disturbing activities within the Project construction boundaries, including areas used for ingress and egress routes during construction, and staging and parking areas. DFG's issuance of this ITP and Permittee's authorization to take the Covered Species are subject to Permittee's compliance with and implementation of the following Conditions of Approval:

1. Legal Compliance. Permittee shall comply with all applicable state, federal, and local laws in existence on the effective date of this ITP or adopted thereafter.

2. CEQA Compliance. Permittee shall implement and adhere to the mitigation measures related to the Covered Species in the Biological Resources section of the Mitigated Negative Declaration (SCH Number: 2006021033) adopted by the lead agency, California Department of Transportation, for the Project under the California Environmental Quality Act (CEQA) on November 8, 2010.

3. LSA Agreement Compliance. Permittee shall implement and adhere to the mitigation measures and conditions related to the Covered Species in the Lake and Streambed Alteration (LSA) agreement (notification number 1600-2010-0166-R6) for the Project pursuant to Fish and Game Code section 1602 et seq.

4. ESA Compliance. Permittee shall implement and adhere to the terms and conditions related to the Covered Species in the Joint Point of Entry Facility, San Bernardino County, California (HAD-CA, File #08-SBd-15, PM 177.3/181.1, I-15 Joint Point of Entry Facility Document # P542020) (1-8-06-F-20) for the Project pursuant to the Federal Endangered Species Act (ESA), unless those terms and conditions are less protective of the Covered Species or conflict with the conditions of this ITP.

5. ITP Time Frame Compliance. Permittee shall fully implement and adhere to the conditions of this ITP within the time frames set forth below and as set forth in the Mitigation Monitoring and Reporting Program (MMRP), which is included as Attachment 1 to this ITP.

6. General Provisions:

6.1. Designated Representative. Before starting Covered Activities, Permittee shall designate a representative (Designated Representative) responsible for communications with DFG and overseeing compliance with this ITP. Permittee shall notify DFG in writing before starting Covered Activities of the Designated Representative's name, business address, and contact information, and shall notify DFG in writing if a substitute Designated Representative is selected or identified at any time during the term of this ITP.

6.2. Designated Biologist. Permittee shall submit to DFG in writing the name, qualifications, business address, and contact information of a biological monitor (Designated Biologist) at least 30 days before starting Covered Activities. Permittee shall ensure that the Designated Biologist is knowledgeable and experienced in the biology and natural history of the Covered Species. The Designated Biologist shall be responsible for monitoring Covered Activities to help minimize and fully mitigate or avoid the incidental take of individual Covered Species and to minimize disturbance of Covered Species' habitat. Permittee shall obtain DFG approval of the Designated Biologist in writing before starting Covered Activities, and shall also obtain approval in advance in writing if the Designated Biologist must be changed.

6.3. Designated Biologist Authority. To ensure compliance with the Conditions of Approval of this ITP, the Designated Biologist shall have authority to immediately stop any activity that is not in compliance with this ITP, and/or to order any reasonable

measure to avoid the unauthorized take of an individual of the Covered Species, or a species not covered by this ITP.

6.4. Education Program. Permittee shall conduct an education program for all persons employed or otherwise working in the Project Area before performing any work. The program shall consist of a presentation from the Designated Biologist that includes a discussion of the biology and general behavior of the Covered Species, information about the distribution and habitat needs of the Covered Species, sensitivity of the Covered Species to human activities, its status pursuant to CESA including legal protection, recovery efforts, penalties for violations and Project-specific protective measures described in this ITP. Permittee shall provide interpretation for non-English speaking workers, and the same instruction shall be provided for any new workers before their performing work in the Project Area. Permittee shall prepare and distribute wallet-sized cards or a fact sheet handout containing this information for workers to carry in the Project Area. Upon completion of the program, employees shall sign a form stating they attended the program and understand all protection measures.

6.5. Construction Monitoring Notebook. The Designated Biologist shall maintain a construction-monitoring notebook on-site throughout the construction period which shall include a copy of this ITP with attachments and a list of signatures of all personnel who have successfully completed the education program. Permittee shall ensure a copy of the construction-monitoring notebook is available for review at the Project site upon request by DFG.

6.6. Trash Abatement. Permittee shall initiate a trash abatement program before starting Covered Activities and shall continue the program for the duration of the Project. Permittee shall ensure that trash and food items are contained in closed (animal-proof) containers and removed regularly (at least once a week) to avoid

attracting opportunistic predators such as ravens, coyotes, and feral dogs.

6.7. Dust Control. Permittee shall implement dust control measures during Covered Activities to facilitate visibility for monitoring of the Covered Species by the Designated Biologist. Permittee shall keep the amount of water used to the minimum amount needed, and shall not allow water to form puddles.

6.8. Erosion Control Materials. Permittee shall prohibit use of erosion control materials potentially harmful to Covered Species and other species, such as mono-filament netting (erosion control matting) or similar material, in potential Covered Species' habitat.

6.9. Firearms and Dogs. Permittee shall prohibit firearms and domestic dogs from the Project Area and site access routes during Covered Activities, except those in the possession of authorized security personnel or local, State, or federal law enforcement officials.

6.10. Delineation of Property Boundaries. Before starting Covered Activities along each part of the route in active construction, Permittee shall clearly delineate the boundaries of the Project Area with fencing, stakes or flags. Permittee shall restrict all Covered Activities to within the fenced, staked or flagged areas. Permittee shall maintain all fencing, stakes and flags until the completion of Covered Activities in that area.

6.11. Delineation of Habitat. Permittee shall clearly delineate habitat of the Covered Species within the Project Area with posted signs, posting stakes, flags, and/or rope or cord, and place fencing as necessary to minimize the disturbance of Covered Species' habitat.

6.12. Project Access. Project-related personnel shall access the Project Area using existing routes, or routes identified in the Project Description and shall not cross Covered Species' habitat outside of or en route to the Project Area. Permittee shall restrict Project-related vehicle traffic to established roads, staging, and parking areas. Permittee shall ensure that vehicle speeds do not exceed 20 miles per hour to avoid Covered Species on or traversing the roads. If Permittee determines construction of routes for travel are necessary outside of the Project Area, the Designated Representative shall contact DFG for written approval before carrying out such an activity. DFG may require an amendment to this ITP if additional take of Covered Species may result from Project modification.

6.13. Staging Areas. Permittee shall confine all Project-related parking, storage areas, laydown sites, equipment storage, and any other surface-disturbing activities to the Project Area using, to the extent possible, previously disturbed areas. Additionally, Permittee shall not use or cross Covered Species' habitat outside of the marked Project Area unless specifically provided for in Condition 6.11 of this ITP.

6.14. Hazardous Waste. Permittee shall immediately stop and following pertinent State and federal statutes and regulations arrange for repair and clean up by qualified individuals of any fuel or hazardous waste leaks or spills at the time of occurrence, or as soon as it is safe to do so. Permittee shall exclude the storage and handling of hazardous materials from the Project Area and shall properly contain and dispose of any unused or leftover hazardous products off-site.

6.15. DFG Access. Permittee shall provide DFG staff with reasonable access to the Project, and shall otherwise fully cooperate with DFG efforts to verify compliance with or effectiveness of mitigation measures set forth in this ITP.

6.16. Refuse Removal. Upon completion of Covered Activities, Permittee shall remove

from the Project Area and properly dispose of all construction refuse, including, but not limited to, broken equipment parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, and boxes

7. Monitoring, Notification and Reporting Provisions:

7.1. Notification Before Commencement. The Designated Representative shall notify DFG 14 calendar days before starting Covered Activities and shall document compliance with all pre-Project Conditions of Approval before starting Covered Activities.

7.2. Notification of Non-compliance. The Designated Representative shall immediately notify DFG in writing if it determines that the Permittee is not in compliance with any Condition of Approval of this ITP, including but not limited to any actual or anticipated failure to implement measures within the time periods indicated in this ITP and/or the MMRP. The Designated Representative shall report any non-compliance with this ITP to DFG within 24 hours.

7.3. Compliance Monitoring. The Designated Biologist shall be on-site daily when Covered Activities occur. The Designated Biologist shall conduct compliance inspections to (1) minimize incidental take of the Covered Species; (2) check for compliance with all measures of this ITP; (3) check all exclusion zones; and (4) ensure that signs, stakes, and fencing are intact, and that Covered Activities are only occurring in the Project Area. The Designated Representative or Designated Biologist shall prepare daily written observation and inspection records summarizing: oversight activities and compliance inspections, observations of Covered Species and their sign, survey results, and monitoring activities required by this ITP. The Designated Biologist shall conduct compliance inspections a minimum of once a month during periods of inactivity and after clearing, grubbing, and grading are completed.

7.4. Monthly Compliance Report. The Designated Representative or Designated Biologist shall compile the observation and inspection records identified in Condition 7.3 into a Monthly Compliance Report and submit it to DFG along with a copy of the MMRP table with notes showing the current implementation status of each mitigation measure. Monthly Compliance Reports shall be submitted to DFG's Regional Office at the office listed in the Notices section of this ITP and via e-mail to DFG's Regional Representative. At the time of this ITP's approval, the DFG Regional Representative is Rebecca Jones (rjones@dfg.ca.gov). DFG may at any time increase the timing and number of compliance inspections and reports required under this provision depending upon the results of previous compliance inspections. If DFG determines the reporting schedule must be changed, DFG will notify Permittee in writing of the new reporting schedule.

7.5. Annual Status Report. Permittee shall provide DFG with an Annual Status Report (ASR) no later than January 31 of every year beginning with issuance of this ITP and continuing until DFG accepts the Final Mitigation Report identified below. Each ASR shall include, at a minimum: (1) a summary of all Monthly Compliance Reports for that year identified in Condition 6.4; (2) a general description of the status of the Project Area and Covered Activities, including actual or projected completion dates, if known; (3) a copy of the table in the MMRP with notes showing the current implementation status of each mitigation measure; (4) an assessment of the effectiveness of each completed or partially completed mitigation measure in avoiding, minimizing and mitigating Project impacts; (5) all available information about Project-related incidental take of the Covered Species; and (6) information about other Project impacts on the Covered Species.

7.6. CNDDB Observations. The Designated Biologist shall submit all observations of

Covered Species to DFG's California Natural Diversity Database (CNDDB) and the Designated Biologist shall include copies of the submitted forms with the next Monthly Compliance Report or ASR, whichever is submitted first relative to the observation.

7.7. Final Mitigation Report. No later than 45 days after completion of all mitigation measures, Permittee shall provide DFG with a Final Mitigation Report. The Designated Biologist shall prepare the Final Mitigation Report which shall include, at a minimum: (1) a summary of all Monthly Compliance Reports and all ASRs; (2) a copy of the table in the MMRP with notes showing when each of the mitigation measures was implemented; (3) all available information about Project-related incidental take of the Covered Species; (4) information about other Project impacts on the Covered Species; (5) beginning and ending dates of Covered Activities; (6) an assessment of the effectiveness of this ITP's Conditions of Approval in minimizing and fully mitigating Project impacts of the taking on Covered Species; (7) recommendations on how mitigation measures might be changed to more effectively minimize take and mitigate the impacts of future projects on the Covered Species; and (8) any other pertinent information.

7.8. Notification of Take. Permittee shall immediately notify the Designated Biologist if a Covered Species is killed or taken by a Project-related activity, or if a Covered Species is otherwise found dead or injured within the vicinity of the Project. The Designated Biologist or Designated Representative shall provide initial notification to DFG by calling the Regional Office at (661)285-5867. The initial notification to DFG shall include information regarding the location, species, number of animals taken and the ITP Number. Following initial notification, Permittee shall send DFG a written report within 2 calendar days. The report shall include the date and time of the finding or incident, location of the animal or carcass, and if possible provide a photograph, explanation as to cause of take, and any other pertinent information.

8. Take Minimization Measures:

Avoidance of Covered Species is the first priority of this ITP. The second priority is the minimization of incidental take of Covered Species that are discovered within the work area, both prior to ground- or vegetation-disturbing activities and also throughout the Project construction period. Permittee shall implement and adhere to the following conditions described to avoid or minimize take of Covered Species:

8.1. No more than 14 days prior to initiating ground- or vegetation-disturbing Project activities, the Project area shall be surveyed for Covered Species by the Designated/Authorized Biologists using protocols approved in advance by DFG. If a Covered Species or sign of a Covered Species is found, a follow-up survey shall be conducted no more than 48 hours in advance of initiating ground- or vegetation-disturbing Project activities. During the surveys, all burrows, pallets, and dens of Covered Species that may be affected by Project activities shall be prominently flagged by the Designated/Authorized Biologists and avoided to the maximum possible extent during Project activities. Permittee shall include the survey results in the ASR.

8.2. Only the Authorized Biologist(s) may excavate burrows and handle the Covered Species.

8.3. The Authorized Biologist(s) shall handle Covered Species using the handling protocol outlined in *Guidelines for Handling Desert Tortoises during Construction Projects* (Handling Guidelines) (Desert Tortoise Council 1994, revised 1999).

8.4. During preconstruction clearance surveys the Authorized Biologist(s) shall excavate all burrows by hand that cannot be avoided within the area to be impacted as a result of the Project, including burrows not recently used that are considered by the Authorized Biologist(s)s to be potentially suitable for the Covered Species. Potentially

suitable burrows shall be excavated and collapsed by the Authorized Biologist(s) at the time of survey to prevent re-entry by the Covered Species. The Authorized Biologist(s) shall excavate potentially suitable burrows in accordance with the Handling Guidelines. If the Covered Species is active above-ground, a final survey for the Covered Species shall occur no more than 48 hours before the onset of surface-disturbing activities. Burrow excavation shall follow procedures established in the Handling Guidelines.

8.5. The Authorized Biologist(s) shall identify all relocation sites and provide their locations to DFG prior to initiation of Project activities. The Authorized Biologist(s) shall relocate Covered Species to suitable habitat outside of the Project site and place the animal(s) in natural or artificial burrows or under a large marked shrub, depending on the time of day and year, in accordance with the Handling Guidelines. If deemed necessary by the Authorized Biologist(s), the Covered Species may be enclosed in a fence to temporarily restrain its movement. At the direction of the Authorized Biologist(s), the Permittee shall remove the fence after completing Project work activities in the vicinity. If an active Covered Species nest is detected during clearance surveys, the Authorized Biologist(s) shall immediately notify DFG to facilitate approval of an egg relocation site prior to relocation.

8.6. During all handling procedures, the Authorized Biologist(s) shall treat the Covered Species in a manner to ensure that they do not overheat, exhibit signs of overheating (e.g., gaping, foaming at the mouth, hyperactivity, etc.), or are placed in a situation where they cannot maintain surface and core temperatures necessary to their well-being. The Authorized Biologist(s) shall keep the Covered Species shaded at all times until it is safe to release the individual(s). The Authorized Biologist(s) shall measure ambient air temperature in the shade, protected from wind, and at a height of 2 inches above the ground surface.

8.7. The Authorized Biologist(s) shall ensure that the Covered Species is not captured, moved, transported, released, or purposefully caused to leave its burrow for any reason when the ambient air temperature is above 95 degrees Fahrenheit (35 degrees Celsius). The Authorized Biologist(s) shall ensure that no Covered Species is captured if the ambient air temperature is anticipated to exceed 95 degrees Fahrenheit before handling or processing can be completed. If the ambient air temperature exceeds 95 degrees Fahrenheit during handling or processing, the Authorized Biologist(s) shall ensure the Covered Species is kept in a shaded environment with a temperature that does not exceed 95 degrees Fahrenheit, and that the animal is not released until ambient air temperature declines to below 95 degrees Fahrenheit. During translocation, the Authorized Biologist(s) may hold captured Covered Species overnight and move them the following morning within these temperature constraints.

8.8. If a Covered Species voids its bladder as a result of being handled, the Authorized Biologist(s) shall rehydrate the animal(s). The Authorized Biologist(s) shall rehydrate the Covered Species at the location where the animal(s) was or were captured, or the location where the animal(s) is or will be released for translocation. The Authorized Biologist(s) shall rehydrate the Covered Species by placing it in a tub with a clean plastic disposable liner. The Authorized Biologist(s) shall add water to the lined tub while ensuring that the water level is not higher then the lower jaw of the Covered Species. The Authorized Biologist(s) shall rehydrate each Covered Species individually for a minimum of 10 to 20 minutes. The Authorized Biologist(s) shall place the lined tub in a quiet protected area during rehydration.

8.9. Construction personnel shall look for Covered Species on the ground around and under vehicles and in and around other equipment and building materials being stored on the Project site prior to moving them.

8.10. All personnel on the Project site shall immediately report all encounters with the Covered Species to a Designated/Authorized Biologist. If a Covered Species is identified by construction personnel, a Designated/Authorized Biologist, or other personnel at any time during Project activities, the Permittee shall immediately stop all work in the area and a Designated/Authorized Biologist shall allow it to escape unimpeded or an Authorized Biologist(s) may relocate the Covered Species as described in this ITP and the Handling Guidelines. Permittee shall not resume work until the Authorized Biologist(s) has relocated the animal or allowed it to move outside the Project area on its own. A Designated/Authorized Biologist or the Designated Representative shall immediately notify the DFG Regional Office of the incident via telephone followed by a written incident report submitted within 2 days. Notification shall include the ITP number, date, time, location and circumstances of the finding or incident, general condition and health of the Covered Species, any apparent injuries and state of healing, any diagnostic markings (such as identification numbers or marked lateral scutes), the name of the Authorized Biologist that physically relocated the Covered Species, and a description with GPS coordinates of the location where the animal was moved. The Authorized Biologist(s) shall maintain records of all Covered Species encountered during Project activities.

8.11. Designated/Authorized Biologists shall inspect open pipeline trenches, auger holes, or other excavations that may act as pit-fall traps a minimum of twice a day and just prior to back-filling. Any Covered Species found shall be safely removed and relocated out of harm's way by the Authorized Biologist(s). Permittee shall maintain earthen escape ramps for all open trenches at intervals of no greater than 0.25 mile. Permittee shall cover or ramp all other excavations that remain open overnight to prevent them from becoming pit-fall traps.

8.12. Permittee shall cap or tape closed all pipe segments that are stored on the ground overnight. Prior to sealing, the Designated/Authorized Biologist(s) shall regularly

inspect pipe segments for the presence of Covered Species. If a pipe segment becomes occupied by the Covered Species, a Designated/Authorized Biologist shall allow the animal(s) to escape unimpeded, or an Authorized Biologist may remove it from the pipe segment and release the animal(s) in a safe area.

8.13. If a Covered Species is injured as a result of Project-related activities or if a Covered Species is otherwise found injured within or in the vicinity of the Project site during Project activities, an Authorized Biologist shall immediately take it to a DFG-approved wildlife rehabilitation or veterinary facility. Permittee shall identify a DFG-approved wildlife rehabilitation or veterinary facility capable of treating the Covered Species prior to the start of ground- or vegetation-disturbing activities. Permittee shall bear all costs associated with the care or treatment of injured Covered Species within or in the vicinity of the Project site during Project activities. A Designated/Authorized Biologist or the Designated Representative shall notify DFG of the injury to the Covered Species immediately as described in Condition 7.8.

8.14. A permanent desert tortoise exclusionary fence will be installed around the proposed JPOE facility. The fence shall be inspected at the end of each working day to ensure the Covered Species is prohibited from entering the site. If the fence is compromised, repairs will be completed at that time. Once construction is finished the fence will be inspected monthly and during and immediately after heavy rainfalls.

9. Mitigation Measures/Compensation for Take:

DFG has determined that permanent protection and perpetual management of compensatory habitat is necessary and required pursuant to CESA to fully mitigate Project-related impacts of the taking on the Covered Species that will result with implementation of the Covered Activities. This determination is based on factors including an assessment of

the importance of the habitat in the Project Area, the extent to which the Covered Activities will impact the habitat, and DFG's estimate of the acreage required to provide for adequate compensation.

To meet this requirement, the Permittee shall either purchase 399 acres of Covered Species credits from a DFG-approved mitigation or conservation bank OR shall provide for the permanent protection and management of 399 acres of Habitat Management (HM) lands by completing the transfer of fee title to a DFG-approved public agency or the recordation of a conservation easement pursuant to Government Code 65965, and calculation and deposit of the management funds (Conditions 9.2 and 9.3). Permanent protection and perpetual management of compensatory habitat must be complete before starting Covered Activities, or within 18 months of the effective date of this ITP if Security is provided pursuant to Condition 10 below.

9.1. Cost Estimates. DFG has estimated the cost of acquisition, protection, and perpetual management of the HM lands as follows:

9.1.1. Land acquisition costs for HM lands identified in Condition 9.3 below, estimated at $1000.00/acre for 399 acres: **$399,000.00**. Land acquisition costs are estimated using local fair market current value for lands with habitat values meeting mitigation requirements;

9.1.2. Start-up costs for HM lands, including initial site protection and enhancement costs as described in Condition 9.2.5 below, estimated at **$99,750.00**;

9.1.3. Interim management period funding as described in Condition 9.2.6 below, estimated at **$3,900.00**;

9.1.4. Long-term management funding as described in Condition 9.3 below, estimated at $1,300.00/acre for 399 acres: **$518,700.00** plus the ten percent contingency fee as described in Condition 9.3.2.2.1 ($51,870.00) for a total of $**570,570.00**. The

long-term management endowment fund is estimated initially for the purpose of providing Security to ensure implementation of HM land management.

9.1.5. Related transaction fees including but not limited to account set-up fees, administrative fees, title and documentation review and related title transactions, expenses incurred from other state agency reviews, and overhead related to transfer of HM Lands to DFG as described in Condition 9.4, estimated at **$3,000.00**.

9.2. Habitat Acquisition and Protection. To provide for the acquisition and protection of the HM lands, the Permittee shall:

9.2.1. Fee Title/Conservation Easement. Transfer fee title to the HM lands to DFG pursuant to terms approved by DFG. Alternatively, a DFG-approved non-profit organization qualified pursuant to California Government Code section 65965 or DFG-approved public agency (collectively "approved entity") may hold fee title or act as grantee for a conservation easement over the HM lands. If an approved entity holds fee title, Permittee shall record a conservation easement in favor of DFG or a DFG-approved entity as grantee. If an approved entity holds a conservation easement, DFG shall be named third-party beneficiary. The Permittee shall obtain DFG approval of any conservation easement before its recordation;

9.2.2. HM Lands Approval. Obtain DFG approval of the HM lands before acquisition and/or transfer of the land by submitting, at least three months before acquisition and/or transfer of the HM lands, a formal Proposed Lands for Acquisition Form (see Attachment 2B) identifying the land to be purchased or property interest conveyed to an approved entity as mitigation for the Project's impacts on Covered Species;

9.2.3. HM Lands Documentation. Provide a recent preliminary title report, initial hazardous materials survey report, and other necessary documents (see Attachment 2A). All documents conveying the HM lands and all conditions of title

are subject to the approval of DFG, and if applicable, the Wildlife Conservation Board and the Department of General Services;

9.2.4. Land Manager. Designate an interim and long-term land manager. Permittee may select the conservation easement grantee, land owner, or other party as the land manager. Documents related to land management shall identify the land manager. Permittee shall notify DFG of any subsequent changes in the land manager within 30 days of the change. If DFG will hold fee title to the mitigation land, DFG will also act as long-term land manager unless otherwise specified.

9.2.5. Start-up Activities. Provide for the implementation of start-up activities, including the initial site protection and enhancement of HM lands, once the HM lands have been approved by DFG. Start-up activities include, at a minimum: (1) preparing a final management plan for DFG approval (see http://www.dfg.ca.gov/habcon/conplan/mitbank/); (2) conducting a baseline biological assessment and land survey report within 4 months of recording or transfer; (3) developing and transferring Geographic Information Systems (GIS) data if applicable; (4) establishing initial fencing; (5) conducting litter removal; (6) conducting initial habitat restoration or enhancement, if applicable; and (7) installing signage;

9.2.6. Interim Management (Initial and Capital). Provide for the interim management of the HM lands. The interim management period shall be a minimum of 3 years from the date of HM land acquisition and protection and full funding of the Endowment and includes expected annual management (described in the final management plan) following start-up activities. Interim management period activities include fence repair, continuing trash removal, site monitoring, and vegetation management. Permittee shall either (1) provide a security for the 3 year interim management amount that the land owner, Permittee, or land manager agrees to manage at their own expense, (2) establish an escrow account with instructions to pay the land manager annually in advance, (3) establish a short-term enhancement sub-account with the National Fish and Wildlife Foundation (NFWF) for annual payment to the land manager, or (4) establish a short-term enhancement account with DFG for annual payment to the land manager.

9.3. Endowment Fund. After obtaining DFG approval of the HM lands, Permittee shall provide long-term management funding for the in-perpetuity management of the HM lands by establishing a long-term management fund (Endowment Fund). The Endowment Fund is a sum of money, held in a DFG-authorized trust fund that provides funds for the perpetual management, maintenance, monitoring, and other activities on the HM lands consistent with the management plan(s) required by Condition 9.3.3. Endowment Fund as used in this ITP shall refer to the endowment deposit and all interest, dividends, other earnings, additions and appreciation thereon.

9.3.1. Identify an Endowment Fund Manager. The Endowment Fund shall be held by NFWF or DFG;

9.3.2. Calculate the Endowment Funds Deposit. After obtaining DFG approval of the HM lands, long-term management plan, and Endowment Fund Manager, Permittee shall prepare a Property Analysis Record (PAR) or PAR-equivalent analysis (hereinafter "PAR") to calculate the amount of funding necessary to ensure the long-term management of the HM lands (Endowment Deposit Amount). The Permittee shall submit to DFG for review and approval the results of the PAR before transferring funds to the Endowment Fund Manager.

9.3.2.1. Capitalization Rate and Fees. Permittee shall obtain the capitalization rate from the selected Endowment Fund Manager for use in calculating the PAR and adjust for any additional administrative, periodic, or annual fees.

9.3.2.2. Endowment Buffers/Assumptions. Permittee shall include in PAR assumptions the following buffers for endowment establishment and use that will substantially ensure long-term viability and security of the Endowment Fund:

9.3.2.2.1. 10 Percent Contingency. A 10 percent contingency shall be added to each endowment calculation to hedge against underestimation of the fund, unanticipated expenditures, inflation, or catastrophic events.

9.3.2.2.2. Three Years Delayed Spending. The endowment shall be established assuming spending will not occur for the first three years after full funding.

9.3.2.2.3. Non-annualized Expenses. For all large capital expenses to occur periodically but not annually such as fence replacement or well replacement, payments shall be withheld from the annual disbursement until the year of anticipated need or upon request to Endowment Fund Manager and DFG.

9.3.3. Transfer Long-term Endowment Funds. Permittee shall transfer the long-term endowment funds to the Endowment Fund Manager upon DFG approval of the Endowment Deposit Amount identified above. The approved Endowment Fund Manager may pool the Endowment Fund with other endowments for the operation, management, and protection of HM lands for local populations of the Covered Species but shall maintain separate accounting for each Endowment Fund.

9.4. Reimburse DFG. Permittee shall reimburse DFG for all reasonable expenses incurred by DFG such as transaction fees, account set-up fees, administrative fees, title and documentation review and related title transactions, expenses incurred from other state agency reviews, and overhead related to transfer of HM Lands to DFG.

10. Performance Security:

The Permittee may proceed with Covered Activities only after the Permittee has ensured funding (Security) to complete any activity required by Condition 9 that has not been completed before Covered Activities begin. Permittee shall provide Security as follows:

10.1. Security Amount. The Security shall be in the amount of **$1,076,220.00**. This amount is based on the cost estimates identified in Condition 9.1 above;

10.2. Security Form. The Security shall be in the form of an irrevocable letter of credit (see Attachment 3) or another form of Security approved in advance in writing by DFG's Office of the General Counsel;

10.3. Security Timeline. The Security shall be provided to DFG before Covered Activities

begin or within 30 days after the effective date of this ITP, whichever occurs first;

10.4. Security Holder. The Security shall be held by DFG or in a manner approved in advance in writing by DFG;

10.5. Security Transmittal. If DFG holds the Security, Permittee shall transmit it to DFG with a completed Mitigation Payment Transmittal Form (see Attachment 4) or by way of an approved instrument such as escrow, irrevocable letter of credit, or other.

10.6. Security Drawing. The Security shall allow DFG to draw on the principal sum if DFG, in its sole discretion, determines that the Permittee has failed to comply with the Conditions of Approval of this ITP;

10.7. Security Release. The Security (or any portion of the Security then remaining) shall be released to the Permittee after all secured requirements have been met as evidenced by:

- Timely submission of all required reports;
- An on-site inspection by DFG; and
- Written approval from DFG.

Even if Security is provided, the Permittee must complete the required acquisition, protection and transfer of all HM lands and record any required conservation easements no later than 18 months from the effective date of this ITP. DFG may require the Permittee to provide additional HM lands and/or additional funding to ensure the impacts of the taking are minimized and fully mitigated, as required by law, if the Permittee does not complete these requirements within the specified timeframe.

Even if the Security is provided, the Permittee must complete the required acquisition, protection and transfer of all HM Lands and record the required conservation easements in favor of DFG no later than 18 months after the start of the ground- or vegetation-disturbing activities.

Amendment:

This ITP may be amended as provided by California Code of Regulations, Title 14, section 783.6, subdivision (c), and other applicable regulations and law. This ITP may also be amended without the concurrence of the Permittee as required by law, including if DFG determines that continued implementation of the Project under existing ITP conditions would jeopardize the continued existence of the Covered Species or that Project changes or changed biological conditions necessitate an ITP amendment to ensure that impacts to the Covered Species are minimized and fully mitigated.

Stop-Work Order:

DFG may issue Permittee a written stop-work order to suspend any activity covered by this ITP for an initial period of up to 25 days to prevent or remedy a violation of any ITP condition(s) (including but not limited to failure to comply with reporting, monitoring, or habitat acquisition obligations) or to prevent the illegal take of an endangered, threatened, or candidate species. Permittee shall comply with the stop-work order immediately upon receipt thereof. DFG may extend a stop-work order under this provision for a period not to exceed 25 additional days, upon written notice to the Permittee. DFG may commence the formal suspension process pursuant to California Code of Regulations, Title 14, Section 783.7 within five working days of issuing a stop-work order. Neither the Designated Biologist nor DFG shall be liable for any costs incurred in complying with stop-work orders.

Compliance with Other Laws:

This ITP contains DFG's requirements for the Project pursuant to CESA. This ITP does not necessarily create an entitlement to proceed with the Project. Permittee is responsible for complying with all other applicable state, federal, and local laws.

Notices:

The Permittee shall deliver the fully executed duplicate original ITP by first class mail or

overnight delivery to the following address:

Habitat Conservation Planning Branch
California Department of Fish and Game
Attention: CESA Permitting Program
1416 Ninth Street, Suite 1260
Sacramento, CA 95814

Written notices, reports and other communications relating to this ITP shall be delivered to DFG by first class mail at the following addresses, or at addresses DFG may subsequently provide the Permittee. Notices, reports, and other communications shall reference the Project name, Permittee, and ITP Number (2081-2010-030-06) in a cover letter and on any other associated documents.

Original cover with attachment(s) to:

Kimberly Nicol, Regional Manager
4665 Lampson Avenue, Suite J
Los Alamitos, CA 90720
Telephone (562) 569-4212
Fax (562)799-8427

Copy of cover without attachment(s) to:

Office of the General Counsel
California Department of Fish and Game
1416 Ninth Street, 12th Floor
Sacramento, CA 95814

And:

Habitat Conservation Planning Branch
California Department of Fish and Game

1416 Ninth Street, Suite 1260
Sacramento, CA 95814

Unless Permittee is notified otherwise, DFG's Regional Representative for purposes of addressing issues that arise during implementation of the ITP is:

Rebecca Jones
36431 41st Street East
Palmdale, CA 93552
Telephone (661) 285-5867
Fax (661) 285-5867

Compliance with CEQA:

DFG's issuance of the ITP is subject to CEQA. DFG is a responsible agency under CEQA with respect to the ITP because of prior environmental review of the Project by the lead agency, California Department of Transportation. (See generally Pub. Resources Code, §§ 21067, 21069.) The lead agency's prior environmental review of the Project is set forth in the Mitigated Negative Declaration and Initial Study, State Clearinghouse #2006021033 dated March 2006 that the California Department of Transportation adopted for the Interstate 15 Joint Port of Entry on November 8, 2010. At the time the lead agency adopted the Mitigated Negative Declaration and approved the Project it also adopted all mitigation measures described in the Mitigated Negative Declaration as conditions of Project approval.

In fulfilling its obligations as a responsible agency, DFG's obligations under CEQA are more limited than the lead agency. DFG, in particular, is responsible for considering only the effects of those activities involved in the Project which it is required by law to carry out or approve and mitigating or avoiding only the direct or indirect environmental effects of those parts of the Project which it decides to carry out, finance, or approve. (Pub. Resources Code,

§ 21002.1, subd. (d); CEQA Guidelines, §§ 15041, subd. (b), 15096, subds. (f)-(g).)[4] Accordingly, because DFG's exercise of discretion is limited to issuance of the ITP, DFG is responsible for considering only the environmental effects that fall within its permitting authority under CESA.

This ITP, along with DFG's CEQA findings for the ITP and Project, which are available as separate documents, provides evidence of DFG's consideration of the lead agency's Mitigated Negative Declaration for the Project and the environmental effects related to issuance of the ITP. (CEQA Guidelines, § 15096, subd. (f).) DFG finds that issuance of the ITP will not result in any previously undisclosed potentially significant effects on the environment or a substantial increase in the severity of any potentially significant environmental effects previously disclosed by the lead agency. Furthermore, to the extent the potential for such effects exists, DFG finds adherence to and implementation of the Conditions of Project Approval adopted by the lead agency, as well as adherence to and implementation of the Conditions of Approval imposed by DFG through the issuance of this ITP, will avoid or reduce to below a level of significance any such potential effects. DFG consequently finds that issuance of the ITP will not result in any significant, adverse impacts on the environment.

Findings under CESA:

These findings are intended to document DFG's compliance with the specific findings requirements set forth in CESA and related regulations. (Fish & G. Code § 2081, subs. (b)-(c); Cal. Code Regs., tit. 14, §§ 783.4, subds, (a)-(b), 783.5, subd. (c)(2).)

DFG finds that issuance of this ITP complies and is consistent with the criteria governing the issuance of ITPs under CESA:

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[4] The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

(1) Take of Covered Species as defined in the ITP will be incidental to the otherwise lawful activities covered under the ITP;

(2) Impacts of the taking of the Covered Species will be minimized and fully mitigated through the implementation of measures required by this ITP and as described in the Mitigation Monitoring and Reporting Program (MMRP). Measures include: 1) permanent habitat protection; 2) establishment of avoidance zones; 3) worker education; and 4) Monthly Compliance Reports. DFG evaluated the quality of the habitat on the Project site, the scope and extent of direct impacts, the scope and extent of indirect impacts, and other relevant information available to DFG or provided by the Permittee. Based on this evaluation, DFG determined that the protection and management in perpetuity of 399 acres of compensatory habitat that is contiguous with other protected Covered Species habitat and/or is of higher quality than the habitat being destroyed by the Project, along with the minimization, monitoring, reporting, and funding requirements of this ITP fully mitigates the impacts of the taking caused by the Project;

(3) The take avoidance and mitigation measures required pursuant to the conditions of this ITP and its attachments are roughly proportional in extent to the impacts of the taking authorized by this ITP;

(4) The measures required by this ITP maintain Permittee's objectives to the greatest extent possible;

(5) All required measures are capable of successful implementation;

(6) The ITP is consistent with any regulations adopted pursuant to Fish and Game Code sections 2112 and 2114;

(7) Permittee has ensured adequate funding to implement the measures required by the ITP as well as for monitoring compliance with, and the effectiveness of, those measures for the Project; and

(8) Issuance of the ITP will not jeopardize the continued existence of the Covered Species based on the best scientific and other information reasonably available, and this finding includes consideration of the species' capability to survive and reproduce, and any adverse impacts of the taking on those abilities in light of (a) known population trends; (b) known threats to the species; and (c) reasonably foreseeable impacts on the species from other related projects and activities. Moreover, DFG's finding is based, in part, on DFG's express authority to amend the terms and conditions of the ITP without concurrence of the Permittee as necessary to avoid jeopardy and as required by law.

Attachments:

FIGURE 1	Map of Project
ATTACHMENT 1	Mitigation Monitoring and Reporting Program
ATTACHMENT 2A,2B	Habitat Management Lands Checklist; PLFAF Form
ATTACHMENT 3	Mitigation Payment Transmittal Form
ATTACHMENT 4	Letter of Credit Form

ISSUED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME

on 6/15/2011.

Kimberly Nicol

Kimberly Nicol, Regional Manager
INLAND DESERTS REGION

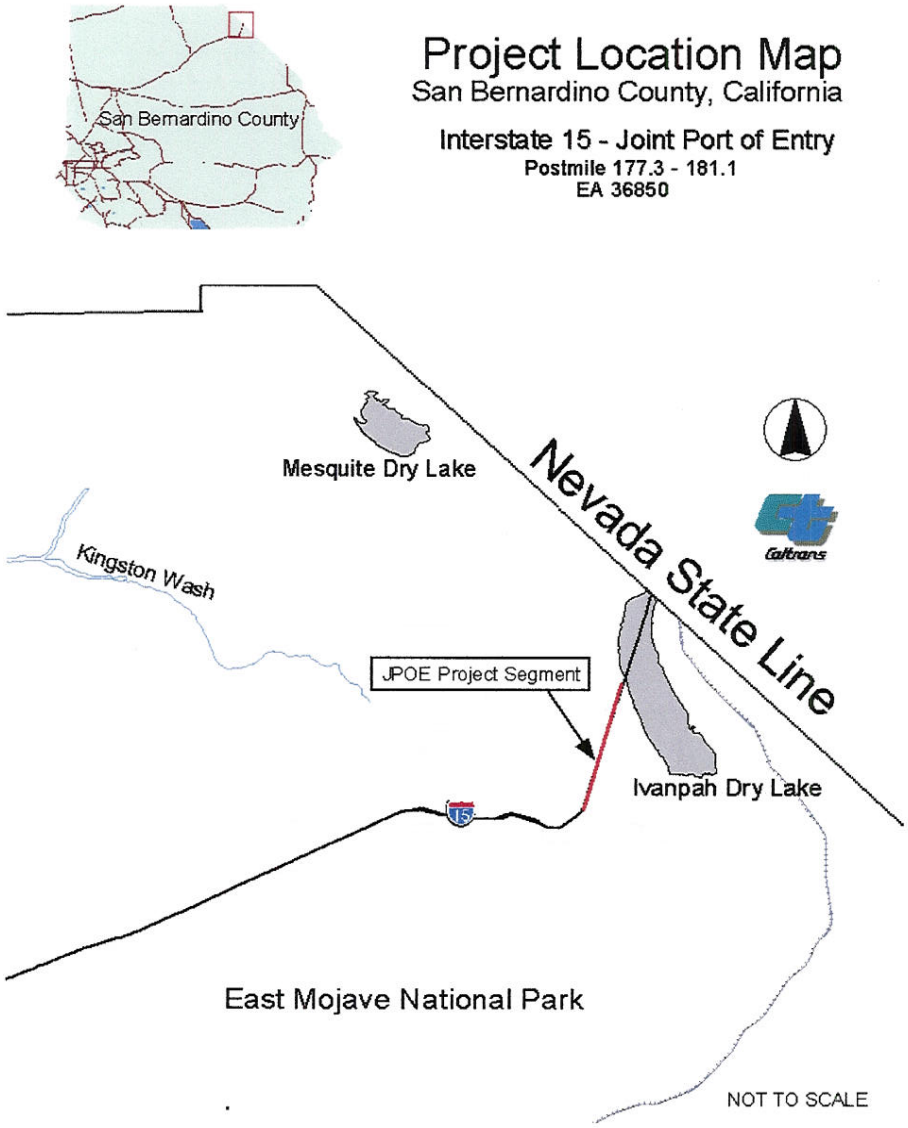
ACKNOWLEDGMENT

The undersigned: 1) warrants that he or she is acting as a duly authorized representative of the Permittee, 2) acknowledges receipt of this ITP, and 3) agrees on behalf of the Permittee to comply with all terms and conditions of the ITP.

By: Craig Wentworth Date: 6/16/2011

Printed Name: Craig Wentworth Title: Senior Environmental Planner

FIGURE 1: Map of Project



CALIFORNIA DEPARTMENT OF FISH AND GAME
INLAND DESERT REGION
407 W. LINE STREET
BISHOP, CA 93514

STREAMBED ALTERATION AGREEMENT
NOTIFICATION NO. 1600-2010-0166-R6
Ivanpah Channel and unnamed tributaries

CALIFORNIA DEPARTMENT OF TRANSPORTATION
JOINT PORT OF ENTRY

This Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Game (DFG) and the California Department of Transportation (Permittee); as represented by Mr. Craig Wentworth.

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) section 1602, Permittee notified DFG on December 15, 2010 that Permittee intends to complete the project described herein.

WHEREAS, pursuant to FGC section 1603, DFG 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 Ivanpah Channel and unnamed tributaries to Ivanpah Dry Lake, in the County of San Bernardino, State of California; Latitude 35/30/50.34, Longitude 115/25/26.71.

PROJECT DESCRIPTION

The California Department of Transportation (Caltrans) in conjunction with the California Department of Food and Agriculture (CDFA), the California Department of General Services, and the California Highway Patrol (CHP), propose to construct a Joint Port of Entry (JPOE) inspection facility, which includes a Commercial Vehicle Enforcement Facility (CVEF) and an Agricultural Inspection Facility (AIF). A new flood channel would be constructed along the western border of the facilities from Dry Lake Ditch Bridge south to just beyond the proposed CVEF facility. The proposed flood channel would be approximately 15,8778 feet in length, 5 feet deep, and 20 feet wide with side slopes of 1:4 and 1:2. A 12 foot wide and 6 foot high earthen berm would be constructed between the flood channel and the JPOE facilities for protection form storm water flows. Rock slope protection would be provided along the berm at various locations.

Three infiltration basins would be constructed to collect onsite flows and allow for percolation. Culverts would be constructed underneath the auto and truck lanes to direct onsite flows into the infiltration basins. Two bridges would be constructed over the Ivanpah Ditch each would have 3 piers within the wash with 5 to 8 columns per pier.

PROJECT IMPACTS

Existing fish or wildlife resources the project could substantially adversely affect include: desert tortoise, side-blotched lizard, Mojave yucca, and short-jointed beavertail.

The adverse effects the project could have on the fish or wildlife resources identified above include: the permanent loss of 18.31 acres of ephemeral desert wash.

MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

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 DFG 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 DFG 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, DFG shall contact Permittee to resolve any conflict.

1.4 Project Site Entry. Permittee agrees that DFG personnel may enter the project site at any time to verify compliance with the Agreement.

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.

2.1 The Applicant shall not remove vegetation from the project site from March 15 to September 15 to avoid impacts to nesting birds. If the Applicant intends to commence project construction during the period commencing March 15 through September 15, the Applicant shall have a qualified biologist survey all potential nesting vegetation within the project site for nesting birds, prior to project activities (including construction and/or site preparation). Surveys shall be conducted for at the appropriate time of day during the breeding season, and surveys shall end no more than three days prior to clearing. The Department shall be notified in writing prior to the start of the surveys. Documentation of surveys and findings shall be submitted to the Department within ten (10) days of the last survey. If no nesting birds were observed project activities may begin. If threatened or endangered species are observed in the area, no work shall occur during the breeding season (March 15 through September 15) to avoid direct or indirect (noise) take of listed species.

2.2 Sections 3503, 3503.5, and 3513 of the California Fish and Game Code prohibit take of all birds and their active nests, including raptors and other migratory nongame birds (As listed under the Migratory Bird Treaty Act).

2.3 A qualified biologist shall be on-site to monitor all activities that result in the clearing or grading of sensitive habitat as well as grading, excavation, and/or other ground-disturbing activities in jurisdictional areas. The Applicant shall flag the limits of grading and the jurisdictional areas, perform necessary surveys, and take photographs during the construction process, as required by this permit. The

monitor is required to halt construction activities if threatened or endangered species are identified and notify the appropriate agencies immediately.

2.4 The Applicant shall not allow water containing mud, silt or other pollutants from grading, aggregate washing, or other activities to enter a lake or flowing stream or be placed in locations that may be subjected to high storm flows.

2.5 The Applicant shall comply with all litter and pollution laws. All contractors, subcontractors and employees shall also obey these laws and it shall be the responsibility of the Applicant to ensure compliance.

2.6 Spoil sites shall not be located within a stream/lake or locations that may be subjected to high storm flows, where spoil shall be washed back into a stream, or where it will impact streambed habitat, aquatic or riparian vegetation.

2.7 Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances which could be hazardous to fish and wildlife resources, resulting from project related activities shall be prevented from contaminating the soil and/or entering the waters of the state. These materials, placed within or where they may enter a stream/lake, by Applicant or any party working under contract, or with the permission of the Applicant shall be removed immediately.

2.8 No broken concrete, debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, oil or petroleum products or other organic or earthen material from any construction, or associated activity of whatever nature shall be allowed to enter into or placed where it may be washed by rainfall or runoff into, waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream or lake.

2.9 No equipment maintenance shall be done within or near any stream channel where petroleum products or other pollutants from the equipment may enter these areas under any flow.

3. Compensatory Measures

To compensate for adverse impacts to fish and wildlife resources identified above that cannot be avoided or minimized, Permittee shall implement each measure listed below.

3.1 Impacts to wash habitat will be mitigated for at a 2:1 ratio. Mitigation lands acquired for the 2081 may be used if they have sufficient wash habitat to cover this condition.

4. Reporting Measures

Permittee shall meet each reporting requirement described below.

4.1 The Applicant shall notify the Department, in writing, at least five (5) days prior to initiation of project activities in jurisdictional areas and at least five (5) days prior to completion of project activities in jurisdictional areas. Notification shall be sent to the Department at 4665 Lampson Avenue, Suite J, Los Alamitos, CA 90720, Attn: Lake and Streambed Alteration Team. Please reference **SAA # 1600-2010-0166-R6**.

CONTACT INFORMATION

Any communication that Permittee or DFG 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 DFG specifies by written notice to the other.

To Permittee:

Mr. Craig Wentworth
California Department of Transportation
464 West 4th Street, 6th Floor
San Bernardino, CA 92401-1400
(909) 383-6936
craig.wentworth@dot.ca.gov

To DFG:

Department of Fish and Game
Inland Deserts Region
12550 Jacaranda Ave

Victorville, CA 92395
Attn: Lake and Streambed Alteration Program – Rebecca Jones
Notification #1600-2010-0166-R6
(661) 285-5867
rjones@dfg.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 DFG'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

DFG 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 DFG 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 DFG 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 DFG to issue the notice.

ENFORCEMENT

Nothing in the Agreement precludes DFG 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 DFG'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

DFG may amend the Agreement at any time during its term if DFG 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 DFG and Permittee. To request an amendment, Permittee shall submit to DFG a completed DFG "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the corresponding amendment fee identified in DFG'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 DFG 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 DFG a completed DFG "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in DFG'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 DFG a completed DFG

"Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5). DFG 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 DFG's signature, which shall be: 1) after Permittee's signature; 2) after DFG 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.dfg.ca.gov/habcon/ceqa/ceqa_changes.html.

TERM

This Agreement shall expire on March 3, 2016, 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.

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 DFG in accordance with FGC section 1602.

CONCURRENCE

The undersigned accepts and agrees to comply with all provisions contained herein.

FOR CALIFORNIA DEPARTMENT OF TRANSPORTATION

Craig Wentworth — 3/8/2011

Craig Wentworth
Office Chief, Biological Studies and Permits

Date

FOR DEPARTMENT OF FISH AND GAME

Bruce Kinney, DRM — 04/02/11

Bruce Kinney
Deputy Regional Manager

Date

Prepared by: Rebecca Jones
Environmental Scientist

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
81440-2010-F-0096
8-8-10-F-24

October 1, 2010

Memorandum

To: District Manager, California Desert District, Bureau of Land Management, Moreno Valley, California

From: Field Supervisor, Ventura Fish and Wildlife Office, Ventura, California

Subject: Biological Opinion on BrightSource Energy's Ivanpah Solar Electric Generating System Project, San Bernardino County, California [CACA-48668, 49502, 49503, 49504] (8-8-10-F-24)

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the Bureau of Land Management's (Bureau) proposed issuance of a right-of-way grant to Solar Partners I, LLC, Solar Partners II, LLC, and Solar Partners VIII, LLC for the Ivanpah Solar Electric Generating System (ISEGS) and its effects on the federally threatened desert tortoise (*Gopherus agassizii*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Because BrightSource Energy is a parent company for all Solar Partner Companies, this biological opinion refers to the project proponents collectively as BrightSource. The proposed project involves construction, operation, maintenance, and decommissioning of a 370-megawatt solar thermal power plant and associated infrastructure and facilities on 3,582 acres of public land managed by the Bureau. Your December 7, 2009 request for formal consultation was received on December 8, 2009.

This biological opinion is based on information that accompanied your December 7, 2009 request for consultation and additional information regarding changes in the project description and translocation strategy obtained from Bureau staff during the formal consultation process. This information includes the biological assessment (CH2MHill 2009a), revised biological assessment (CH2MHill 2010a), draft environmental impact statement and final staff assessment (Bureau and California Energy Commission 2009), supplemental draft environmental impact statement (Bureau 2010), desert tortoise survey report for the project site (CH2MHill 2008a), biological survey report for the proposed desert tortoise translocation areas (SNEI 2009), desert tortoise translocation plan (CH2MHill 2009b), the management plan for common ravens (CH2MHill 2008b), project site reclamation plan (CH2MHill 2009c), the site plan for management of weeds (CH2MHill 2008c), and additional correspondences regarding modifications to the desert tortoise translocation strategy and mitigation framework (Fesnock

2010a and 2010b, CH2MHill 2010b). A complete record of this consultation is on file in the Ventura Fish and Wildlife Office.

Construction, operation, maintenance, and decommissioning of the ISEGS facility and translocation of desert tortoises do not require activities that would adversely affect the primary constituent elements of critical habitat for the desert tortoise because the actions will not take place within critical habitat or affect the primary constituent elements. Therefore, we do not address critical habitat in this biological opinion.

Consultation History

On December 7, 2009, the Bureau initiated consultation for construction, operation, maintenance, and decommissioning of the ISEGS facility. Following public comment on the Bureau's draft environmental impact statement and the California Energy Commission's final staff assessment, BrightSource modified its project to reduce adverse effects to desert tortoises and rare plant species. On April 26, 2010, we issued a draft biological opinion to the Bureau (Service 2010c). We revised the draft biological opinion based on comments from the Bureau and BrightSource. On July 21, 2010, the Bureau provided us with a revised translocation strategy that required significant revisions to the draft biological opinion (Fesnock 2010c). On September 21, 2010, the Bureau provided additional changes to the translocation strategy, requiring further revisions of the draft biological opinion (Fesnock 2010a). This biological opinion analyzes the effects associated with the reduced project footprint, the revised translocation strategy, and the comments received from the Bureau and BrightSource.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Introduction

BrightSource Energy is proposing to construct and operate a solar energy plant approximately 4.5 miles southwest of Primm, Nevada and 1.6 miles west of Ivanpah Dry Lake. The proposed site is 0.5 mile west of the Primm Valley Golf Club. The facility would consist of 3 solar electric generating plants, constructed over a 4-year period as follows: (1) Ivanpah 1 – construction of the Ivanpah 1 plant (southernmost site; 914 acres), construction of shared facilities (i.e., power substation, administrative facilities, water line, power lines, and construction logistics area), and improvement of Colosseum Road ; (2) Ivanpah 2 – construction of the Ivanpah 2 plant (middle site; 1,097 acres); and (3) Ivanpah 3 – construction of the Ivanpah 3 plant (northern site; 1,227 acres). BrightSource Energy would also install a 5.7-mile natural gas distribution line, install a 9.5-mile fiber optic line, and re-route several dirt roads/trails that currently cross the proposed ISEGS site. We summarized the description of the proposed action from your request for consultation, the revised biological assessment (CH2MHill 2010a), and the supplemental environmental impact statement (Bureau 2010).

Construction

Construction of the ISEGS facility would require an average workforce of 474 and a peak workforce of 959. Below, we have provided a detailed description of each stage of project development for the three project sites, the construction logistics area, and other associated infrastructure (i.e., access roads, water wells, water line, gas line and tie-in facility, fiber optic line, etc.). We have described the measures that BrightSource will implement to avoid or minimize adverse effects to the desert tortoise in a later section.

Construction Logistics Area

BrightSource would develop a construction logistics area (CLA) between the Ivanpah 1 and 2 project sites to accommodate construction support facilities (e.g., temporary construction trailers, construction tool sheds, construction lay down areas, and construction parking), the electrical tie-in substation, water wells, permanent facility parking areas, permanent administrative and warehouse facilities, and wheel wash areas. In addition, the CLA would accommodate a segment of Colosseum Road that BrightSource would re-route through the CLA to avoid the Ivanpah 2 project site.

CLA development would begin with surveying and staking the CLA boundaries and grading of a 10-foot-wide perimeter road along the boundary of the CLA to facilitate fence installation. BrightSource would then install an 8-foot high chain-link security fence with desert tortoise exclusion fencing attached to the bottom around the perimeter of the CLA. Alternatively, BrightSource may install desert tortoise exclusion and security fencing separately. Regardless of the method for fence installation, all site development and construction activities described for the CLA would occur within this fenced boundary. This includes grading of selected locations and construction or installation of all construction support facilities and permanent operational facilities.

Ivanpah 1, Ivanpah 2, and Ivanpah 3 Project Sites

Each project site would consist of one heliostat (mirror) array constructed around a 459-foot-tall centralized solar power tower. Ivanpah 1 would contain approximately 53,500 heliostats and Ivanpah 2 and 3 would contain approximately 60,000 heliostats each. Each heliostat consists of two 75.8-square-foot mirrors. All three units (Ivanpah 1, 2, and 3) would have their own individual power block; the biological assessment describes the components of the power blocks.

Prior to site development and construction activities for each phase, BrightSource would install a desert tortoise exclusion fence or a combined exclusion fence and security fence around the entire perimeter of the phase. BrightSource would use the same methods described above for the CLA in installation of this fence. Following fence installation, BrightSource would mow all vegetation on the project sites to within 12 to 18 inches of the ground surface, grade a site for the power block, and grade additional areas within the project site for parking areas, construction lay down areas, building pads, and internal roads. During the construction stage, BrightSource

would improve internal project-site roads, construct the power block, install the heliostat field, install underground piping and wiring, install the generation tie-line, and erect fabrication shops and other construction and administrative buildings. In addition, BrightSource would re-route existing dirt roads/trails around the perimeter of the project site.

Gas Line

In addition to the CLA and the three project sites, BrightSource would construct a 5.7-mile natural gas distribution pipeline. The pipeline would connect to the Kern River Gas Transmission line that traverses Ivanpah Valley 0.5 mile north of the Ivanpah 3 project site. At the point of connection with the Kern River Gas Transmission line, BrightSource would construct a permanent gas metering station (100 feet by 150 feet), requiring a 200-foot by 200-foot temporary construction area. From this metering station, the natural gas line and an 8- to 12-foot-wide access road would head south along the eastern edge of Ivanpah 3 to a metering station (10 feet by 40 feet) near the middle of its western side. From the metering station at Ivanpah 3, the gas line and access road would continue along the eastern edge of Ivanpah 2 to another metering station (20 feet by 40 feet) on the east side of Ivanpah 2. From the Ivanpah 2 metering station, the gas line would continue along the west side of Ivanpah 2 following the asphalt access road to Ivanpah 1. Gas line installation would require a 50-foot-wide construction corridor for access, storage of excavated soil, and pipefitting. In addition, construction of the Ivanpah 3 metering station would require a temporary lay down area within the Ivanpah 3 project site. The Ivanpah 1 and 2 metering stations would use a portion of the Ivanpah 2 solar field for construction lay down.

To allow for gas company access, BrightSource would construct the gas line, access road, and metering stations outside of the fenced project sites for Ivanpah 1, 2, and 3. A portion of the gas line to the Ivanpah 1 project site would be located within the fenced CLA. BrightSource would construct additional spur lines within the fenced project sites to carry gas from the edge of the respective project site to the main power block.

Construction activities related to the metering stations would include grading a pad and installing aboveground and underground gas piping, metering equipment, gas conditioning, pressure regulation, and pigging facilities. The construction contractor would determine which method to use to install the natural gas pipeline. The most common method of pipeline construction includes installation of the pipeline into an open trench approximately 36 inches wide and 3 to 10 feet deep.

Fiber Optic Line

To allow for remote monitoring of the new electrical substation, Southern California Edison (SCE) would construct an 8-mile fiber optic line from the Ivanpah substation to an interface point designated by the local telecommunication carrier in Mountain Pass. SCE would use existing distribution line poles for installation. Installation would require use of a bucket truck, four people, and two pick-up trucks. SCE would string out fiber optic cable between the existing

poles. Every 10,000 to 20,000 feet, SCE would establish a 40-foot by 60-foot line stringing set. Crews would work within this area to raise the cable and string it tight over the existing poles. SCE estimates that approximately 20 poles are not accessible from the existing dirt service roads. Workers on foot would install the fiber optic line on these poles.

Operation

The ISEGS facility would have an operating life of up to 45 years and would operate 7 days a week for up to 14 hours a day. During operation, approximately 90 full-time employees would work at the site. ISEGS would use a maximum of 100 acre-feet of water per year for operational purposes. Heliostat washing is the only identified activity that we have described in this section because it is the only operational activity with the potential to have some effects on desert tortoise.

To keep heliostats clean, BrightSource would wash some portion of the heliostat field on a nightly basis, so that every heliostat within the 3 project sites is washed once every 2 weeks. The application rate per heliostat would be about 2.5 gallons per washing for a total use of 10.97 acre-feet per year for Ivanpah 1 and about 12 acre-feet per year for Ivanpah 2 and 3. However, the application rate on Ivanpah 1 may double during construction of Ivanpah 3 due to increased amounts of construction- related dust. During each washing, approximately 0.17 gallon per linear foot of mirror would run off onto the ground beneath the mirror.

Maintenance

In addition to regular, day-to-day operation of the ISEGS facility, BrightSource would need to perform a variety of maintenance actions. BrightSource has grouped these anticipated maintenance activities into three classes. Any maintenance activities that are outside the approved right-of-way boundary (i.e., the fenced boundary of the project site and the associated perimeter road) for the project will require additional authorizations from the Bureau and additional section 7 consultation.

Class I activities are those maintenance actions that do not result in new surface disturbance. BrightSource would perform these activities by hand or with the use of tools, equipment, and/or vehicles. Class I activities would take place on existing structures or would be staged from existing roads or other disturbed areas. These activities would not include off-road travel. Vehicles used during these activities might include low-boy tractor and trailer, flat bed, utility trucks, forklifts, scissor lifts, cherry pickers, and mechanical hoists. Labor may involve several workers confined to the area in need of maintenance. BrightSource may need to perform these activities on a daily basis.

Class II activities would result in minimal surface disturbance, but would likely require heavy earth-moving equipment including motor graders, bulldozers, front-end loaders, backhoes, water trucks, asphalt pavers, and dump trucks. Typical Class II activities would include: 1) underground utility (e.g., water, gas, sewage, electrical, communication, etc.) repairs, upgrades

and tie-ins to structures; 2) motor grading and repairs of existing dirt roads, shoulders, and berms; 3) cut or fill of soil surface to re-establish appropriate cover due to soil erosion after rainfall events; 4) maintenance of drainages, fords and culverts for proper flow of water runoff; 5) maintenance of asphalt roads, shoulders and parking lots; 6) security and desert tortoise exclusion fence repairs; and 7) minor natural gas pipeline repairs that require excavation.

Class III includes maintenance activities that result in major surface disturbance. Typical Class III activities would include: 1) installation of a new underground pipeline a distance of 1,000 feet or more and 2) disturbance of an acre or more for construction of new storm water drainage features.

Decommissioning and Restoration

BrightSource would perform restoration work on all sites disturbed during construction, operation, maintenance, and decommissioning of the ISEGS facilities. For short-term disturbances, BrightSource would begin restoration following completion of ground disturbance and would implement the following general steps: 1) decompaction of soils, 2) spreading of topsoil salvaged prior to construction, and 3) seeding of the disturbed area with native plant species. BrightSource would time seeding to avoid drought periods to the extent possible.

Decommissioning of the facility would occur sequentially in the order of construction (i.e., Ivanpah 1, followed by Ivanpah 2, Ivanpah 3, and the shared facilities). Following decommissioning of the ISEGS facility, BrightSource would remove all structures from the project area and begin restoration of all long-term disturbances. Decommissioning and restoration/reclamation would involve the following general activities: 1) rehabilitate access roads by removing asphalt, decompacting soil, and revegetating, 2) remove all structures and foundations less than 6-feet deep from the project area, 3) remove all physical components of the generation facility except for the SCE substation, the diversion structure, and asphalt access road, 4) re-contour and decompact soils associated with disturbed areas, 5) implement revegetation procedures using native species, 6) remove all exclusion and security fencing, and 7) monitor revegetated areas for success and control non-native weeds.

Minimization Measures

General Protective Measures

To minimize adverse effects to the desert tortoise, BrightSource will implement the following protective measures during construction, operation, maintenance, and decommissioning activities. The wording of some measures differs from those proposed by the Bureau and BrightSource. We have changed the wording of some measures to improve clarity, but we have not changed the substance of the measures that BrightSource and the Bureau have proposed.

1. BrightSource will employ authorized biologists, approved by the Service, and desert tortoise monitors to ensure compliance with protective measures for the desert tortoise.

Use of authorized biologists and desert tortoise monitors will be in accordance with the most up-to-date Service guidance and will be required for monitoring of any construction, operation, or maintenance activities that may result in take of the desert tortoise. The current guidance is entitled *Desert Tortoise – Authorized Biologist and Monitor Responsibilities and Qualifications* (Service 2008a).

2. BrightSource will provide the credentials of all individuals seeking approval as authorized biologists to the Bureau. The Bureau will review these and provide the credentials of appropriate individuals to the Service for approval at least 30 days prior to the time they must be in the field.

3. BrightSource will designate a field contact representative who will oversee compliance with protective measures during construction, operation, maintenance, and decommissioning activities that may result in injury or mortality of desert tortoises. If the field contact representative, authorized biologist, or desert tortoise monitor identifies a violation of the desert tortoise protective measures, they will halt work until the violation is corrected.

4. Individuals approved to handle desert tortoises (i.e., authorized biologists and supervised desert tortoise monitors) will do so in compliance with the most up-to-date guidance from the Service. The Service is currently using the *Desert Tortoise Field Manual* (Service 2009a).

5. BrightSource will develop and implement an environmental awareness program for all workers (construction, operation, maintenance, and decommissioning) that will address the following: a) types of construction activities that may affect the desert tortoise, b) the required desert tortoise protective measures, c) desert tortoise life history and threats, d) legal protections and penalties, and e) reporting requirements.

6. Bright Source will fence the boundaries of the Ivanpah 1, 2, and 3 project sites, the CLA, and Colosseum Road and clear these areas of all desert tortoises prior to construction. We have provided a description of the procedures for clearance, translocation, and monitoring of these animals below.

7. Authorized biologists will perform clearance surveys of unfenced work areas outside of the main project sites and CLA (e.g., gas distribution line, utility right-of way, etc.) immediately prior to the onset of construction, operation, or maintenance activities.

8. BrightSource will employ an appropriate number of authorized biologists and desert tortoise monitors to monitor construction, operation, maintenance, and decommissioning activities that occur in any unfenced work areas. Authorized biologists or desert tortoise monitors will flag all desert tortoise burrows for avoidance in areas adjacent to construction work areas.

9. BrightSource will confine all construction activities, project vehicles, and equipment within the delineated boundaries of construction areas that authorized biologists or designated desert tortoise monitors have identified and cleared of desert tortoises. BrightSource will confine all work areas to the smallest practical area, considering topography, placement of facilities, location of burrows, public health and safety, and other limiting factors. BrightSource will use previously disturbed areas to the extent feasible.

10. Any non-emergency expansion of activities into areas outside of the areas considered in this biological opinion will require Bureau approval and desert tortoise clearance surveys. These expanded activities may require re-initiation of consultation with the Service.

11. BrightSource will prohibit project personnel from driving off road or performing ground-disturbing activities outside of designated areas during construction, operation, maintenance, or decommissioning except to deal with emergencies.

12. During operation and maintenance activities at the completed project site, BrightSource will confine all vehicle parking, material stockpiles, and construction-related materials to the permanently fenced project sites and CLA.

13. BrightSource will confine project access to Colosseum Road for construction, operation, maintenance, and decommissioning of the facility. BrightSource will permanently fence this road with desert tortoise exclusion fencing prior to the onset of construction. To reduce the potential for vehicle strikes of desert tortoise on unfenced access roads (i.e., gas line road, fiber optic right-of-way road, etc.), BrightSource will enforce a 20-mile-per-hour speed limit for project related travel (i.e., construction, operation, maintenance, and decommissioning) in these areas. BrightSource will post speed limit signs along all access routes.

14. With the exception of security personnel, BrightSource will prohibit firearms on the project site.

15. Project personnel who are working outside fenced areas will check under vehicles or equipment before moving them. If project personnel encounter a desert tortoise, they will contact an authorized biologist. The desert tortoise will be allowed to move a safe distance away prior to moving the vehicle. Alternatively, an authorized biologist or desert tortoise monitor may move the desert tortoise to a safe location to allow for movement of the vehicle.

16. An authorized biologist or desert tortoise monitor will inspect all excavations that are not within desert tortoise exclusion fencing on a regular basis (several times per day) and immediately prior to filling of the excavation. If project personnel discover a desert tortoise in an open trench, an authorized biologist or desert tortoise monitor will move it to a safe location. BrightSource will cover or temporarily fence excavations that are

outside of the permanently fenced project areas at the end of each day to prevent entrapment of desert tortoises during non-work hours.

17. When outside of the fenced project areas, project personnel will not move construction pipes greater than 3 inches in diameter if they are stored less than 8 inches above the ground until they have inspected the pipes to determine the presence of desert tortoises. As an alternative, BrightSource may cap all such structures before storing them outside of fenced area.

Management of Common Ravens

BrightSource will implement the following project design features and protective measures to reduce the adverse effects associated with predation of desert tortoises by common ravens (*Corvus corax*). The draft management plan for common ravens (CH2MHill 2008b) contains more detailed information on the following actions:

1. BrightSource will contain all trash associated with the project that could provide subsidies to predators in secure, self-closing receptacles to prevent the introduction of subsidized food resources for common ravens.

2. BrightSource will promptly remove and dispose of all road-killed animals on the project site or its access roads.

3. BrightSource will use water for construction, operation, maintenance, and decommissioning (e.g., truck washing, dust suppression, heliostat washing, landscaping, etc.) in a manner that does not result in puddling.

4. BrightSource will use closed tanks to store water for all project site water needs to eliminate an open water source for common ravens.

5. BrightSource will use closed tanks to store water associated with boiler commissioning and emergency outfalls. BrightSource will not use storm-water detention basins in its project design.

6. BrightSource will install generation tie-lines on utility poles designed to be incompatible with nesting of common ravens in accordance with Avian Power Line Interaction Committee guidelines (2006) and will monitor the effectiveness of these deterrence measures. BrightSource will implement alternative measures if the current effort is unsuccessful.

7. All transmission lines associated with the ISEGS facility will be designed in a manner that will reduce the likelihood of nesting by common ravens. BrightSource will monitor all utility lines and other potential nesting structures and remove common raven nests that it identifies following authorization by the Bureau and the Service.

8. BrightSource will monitor the ISEGS facilities to identify frequently used perching locations for common ravens. If it identifies such locations, BrightSource will install bird barrier spikes or other functional equivalent following specific discussion with the Bureau and the Service.

9. BrightSource will coordinate with the Bureau and the Service to implement or fund hazing or lethal removal of problem common ravens. Problem common ravens are individuals that have been shown to prey on desert tortoises through monitoring.

10. BrightSource will monitor the effectiveness of its management plan for common ravens during all 3 phases of construction and for 2 years following completion of the final phase. BrightSource will implement adaptive management measures if monitoring shows that the management plan is not effective in controlling common raven use of the project site. BrightSource will consult with the Bureau and the Service prior to implementing adaptive management changes.

Weed Management

BrightSource will implement the following weed management measures to reduce adverse effects to desert tortoises and their habitat during construction operation and maintenance of the ISEGS facilities:

1. BrightSource will designate an environmental compliance manager to provide oversight of construction practices and ensure compliance with weed management provisions.

2. BrightSource will provide training to all personnel charged with environmental management responsibilities that will include the following: a) weed plant identification, b) impacts of noxious weeds on native vegetation, wildlife, and fire activity, and c) required measures to prevent the spread of noxious weeds on the site.

3. During construction, BrightSource will perform weekly inspections during the growing season of all construction areas, access routes, and equipment cleaning facilities for the presence of noxious weeds and weed seed. Following the completion of construction activities, from March through August, BrightSource will continue monitoring according to the following schedule: 1) once a month during the first 2 years of the revegetation, 2) quarterly for the third and fourth years, and 3) semi-annually for year 5 through 10.

4. During operation of completed facilities, BrightSource will perform general site monitoring according to the schedule described above (Measure 3) and perform weed control at least every other week during the growing season (March through August) and once a month during the remainder of the year. Weed control will consist of physical control methods (e.g., hand pulling, hoeing, etc.) or herbicide application.

5. BrightSource will apply all herbicides used in weed treatments according to a plan approved by the Bureau and in accordance with the herbicide labels. BrightSource will only use qualified individuals for herbicide application and will suspend herbicide use when any of the following conditions are met: a) wind velocity exceeds 6 miles per hour during application of liquids or 15 miles per hour during application of granular herbicides, b) snow or ice covers the foliage of noxious weeds, c) precipitation is occurring or is imminent, or d) air temperatures exceed 90 degrees Fahrenheit.

6. BrightSource will monitor all locations of weed treatment to ensure that treatments are effective.

7. BrightSource will limit disturbance areas during construction to the minimal required to perform work and will only use defined routes when accessing work areas.

8. BrightSource will use vehicle wash and inspection stations and closely monitor all material brought onto the site to minimize the potential for weed introductions.

9. BrightSource will identify and flag all areas of noxious weed infestation and minimize use of these areas by project personnel until weed treatment of the area has occurred.

10. BrightSource will preferentially perform native seed collection for restoration work from areas adjacent to the project site. When it is necessary to use native seeds from commercial vendors, BrightSource will only accept seed that is free of non-native weed seeds.

Desert Tortoise Translocation

The following description of the desert tortoise translocation strategy for the ISEGS project is taken from BrightSource's translocation plan (CH2MHill 2009b) and from modifications made by the Bureau during the formal consultation process (Fesnock 2010a).

Fencing and Clearance Surveys

To minimize adverse effects to the desert tortoise, BrightSource will fence the boundary of the Ivanpah 1, 2, and 3 project sites, the portions of the CLA where ground disturbance would occur, and Colosseum Road from the Primm Golf Club to the CLA with desert tortoise exclusion fencing. BrightSource will install desert tortoise guards, as described in attachment B of the biological assessment (CH2MHill 2009a), at gated entries to prevent desert tortoises from gaining entry to the project sites or CLA. BrightSource will also fence the construction area for the utility right-of-way (e.g., gas distribution line) with temporary desert tortoise fencing prior to clearance surveys and ground disturbance. BrightSource may choose to fence all phases of the ISEGS project and the CLA at one time, or it may fence each phase at the time of construction on a given phase.

Within 24 hours prior to the initiation of construction of the desert tortoise-exclusion fence, BrightSource will conduct 2 complete desert tortoise clearance surveys of the fence line segment and associated disturbance right-of-way that will be fenced that day. During these surveys, an authorized biologist will inspect all burrows to determine occupancy and collapse all unoccupied burrows. To the extent feasible, BrightSource will make modifications in fence line alignment to fence occupied burrows out of the ISEGS project areas. If the fence line cannot avoid a given burrow, an authorized biologist will remove the desert tortoise and place it in a sheltered location outside of the ISEGS project area being fenced. If BrightSource fences a given project phase and does not plan on immediate clearing of that phase, it will leave gaps in the fence in locations where desert tortoise burrows are found in the path of the fence line right-of-way. These gaps will buffer the burrow by a distance of 54.6 yards (i.e., 27.3 yards on each side) and will remain open until the time that BrightSource is ready to commence with clearance surveys. BrightSource will not excavate and clear these burrows until it is ready to perform clearance surveys.

Following construction of the desert tortoise exclusion fence around a given portion of the ISEGS projects site (i.e., Ivanpah 1, 2, and 3 project sites, the CLA, or Colosseum Road), BrightSource will perform a full clearance survey of the fenced area during the spring (i.e., April 1 to May 31) or fall (i.e., September 1 to October 15). For fall clearance surveys, BrightSource may extend this survey window until October 31 for phases in which all desert tortoises will be placed into a quarantine facility (e.g., Ivanpah1 and the CLA) rather than translocated. Regardless of the method used to fence project site boundaries (i.e., at one time versus phased), clearance surveys would proceed according to the schedule described below.

In the fall of 2010, BrightSource intends to clear all desert tortoises from the CLA and Ivanpah 1. In fall 2010, BrightSource also intends to construct temporary desert tortoise exclusion fencing around the Ivanpah 2 power block and the power block access road and clear desert tortoises from these areas. BrightSource would place desert tortoises moved from the Ivanpah 2 power block and power block access route into adjacent habitat on the remainder of Ivanpah 2. BrightSource would not clear desert tortoises from the remainder of Ivanpah 2 or from Ivanpah 3 until construction is ready to commence on those phases.

When performing clearance surveys, authorized biologists and supervised desert tortoise monitors will conduct at least 3 complete clearance sweeps over a given phase with transects no wider than 30 feet. Surveyors will conduct transects for each sweep in different directions to allow for opposing angles of observation. BrightSource will consider the site clear after two complete passes have discovered no new desert tortoises. Authorized biologists will excavate all potential desert tortoise burrows by hand to confirm occupancy status. BrightSource will collect data on all desert tortoises handled and examine all individuals for clinical signs of disease. A detailed list of data that BrightSource will collect on each desert tortoise is provided in its translocation plan.

Disease Testing, Quarantine, and Translocation

CLA and Ivanpah 1

Desert tortoises that BrightSource locates during clearance surveys will undergo varying levels of disease testing and quarantine, depending on their location within the project site. In fall 2010, BrightSource intends to clear all desert tortoises from Ivanpah 1 and the CLA and quarantine them within a portion of the CLA that would not be disturbed by construction activities. BrightSource will collect blood, perform ELISA testing, and do visual health assessments on all project site desert tortoises quarantined at this facility.

The quarantine facility within the CLA will consist of a series of 65.6-foot by 65.6-foot) pens to allow separate quarantine of each individual cleared from the CLA and Ivanpah 1. BrightSource will construct each pen with permanent desert tortoise exclusion fencing or other materials that will prevent individuals from digging out or coming into direct contact with other quarantined or wild individuals. Each pen will contain at least two natural or artificially constructed burrows and should contain shrub cover that is similar to that found within the project site phases. In addition to the individual pens, BrightSource will construct a security fence around the entire quarantine facility and install netting over the facility or over the individual pens that contain juvenile desert tortoises to prevent access by desert tortoise predators. BrightSource will use a portable irrigation system and water all desert tortoise pens at a sufficient frequency, duration, intensity, and timing to mimic the rainfall patterns of a good rainfall year for this portion of the Mojave Desert. In addition, BrightSource will maintain a sufficient stock of supplemental feed to allow for additional feeding of quarantined animals, if necessary. BrightSource will develop an animal husbandry plan for the quarantine facility that the Service will review and authorize prior to placement of individuals in the quarantine facility.

Prior to release of the CLA and Ivanpah 1 desert tortoises from the quarantine facility, BrightSource will perform surveys of translocation areas west and north of the ISEGS project to determine density and disease prevalence within the resident population. Surveys would include full coverage surveys of a 500-meter buffer along the western and northern boundaries of the project site and full coverage surveys of the 4 translocation sites identified in the BrightSource's translocation plan (i.e., N1, N2, N3, and N4; CH2MHill 2009b). BrightSource will collect blood for ELISA testing and perform visual health assessments on all desert tortoises identified within these areas. In addition, BrightSource will perform sampling transects of a 3.7-mile buffer of contiguous desert tortoise habitat around these areas. All desert tortoises located during this sampling will be tested for disease using visual health assessments and ELISA testing. BrightSource will transmitter a subset (i.e., at least equal to the estimated project-site population) of the individuals located during these surveys to facilitate post-translocation monitoring of the resident population. Surveys of the 3.7-mile buffer will determine population density and disease prevalence. BrightSource will locate and test a sufficient number of individuals to predict, with a confidence interval of 95 percent, that 5 percent or less of the desert tortoises in this buffer are infected with upper respiratory tract disease. If BrightSource determines that this area has an upper respiratory tract disease prevalence of more than 5 percent among the resident

animals, it will not release individuals into the area west or north of the project site. If BrightSource determines through pre-translocation surveys that the post-translocation density in the translocation area would be more than 21 subadult and/or adult desert tortoises per square mile, it will not release individuals into the area west or north of the project site. If either of these scenarios occurs, BrightSource will contact the Service to address necessary changes in its translocation strategy prior to clearance surveys of additional phases.

Following receipt of ELISA testing results and completion of visual health assessments for the resident and quarantined population, BrightSource will contact the Service regarding the proposed release of each quarantined desert tortoise. The Service will work with BrightSource to identify an appropriate facility to house any quarantined desert tortoises that test ELISA-positive. In addition, the Service may require BrightSource to perform additional testing to confirm disease status of any ELISA-positive desert tortoises before final disposition. Prior to release of individuals into the translocation area, BrightSource will fence Interstate 15 between Nipton Road and Yates Well Road with desert tortoise exclusion fencing to prevent translocated desert tortoises from entering the roadway during long-distance, post-translocation movements.

BrightSource intends to translocate all ELISA-negative desert tortoises from quarantine to the translocation area in spring 2011, but timing of disease testing may push the translocation to the fall 2011. For Ivanpah 1 and the CLA, BrightSource will release all desert tortoises, originally located within 500 meters of the western fence, in areas adjacent to the western fence line. This release will be done in a manner that does not place a translocated individual more than 500 meters from its original capture location. In addition, BrightSource will not translocate a desert tortoise in this category within 1500 meters of a resident individual that has tested positive for disease through ELISA testing or visual health assessments. If BrightSource cannot comply with this buffer without moving the individual more than 500 meters from its original capture location, it will translocate the individual to the translocation area it has identified for Ivanpah 1 and CLA (i.e., N4; CH2MHill 2009b).

BrightSource will release all other desert tortoises into the translocation area that it identified for Ivanpah 1 and the CLA in its translocation plan (i.e., N4; CH2MHill 2009b). BrightSource will attach transmitters to all translocated desert tortoises to facilitate post-translocation monitoring. BrightSource will not translocate a desert tortoise in this category within 3.7 miles of a resident individual that has tested positive for disease through ELISA testing or visual health assessments.

Ivanpah 2

In fall 2010, BrightSource intends to construct a temporary desert tortoise exclusion fence around the Ivanpah 2 power block and the power block access. It will then move all desert tortoises that occupy this enclosure into adjacent habitat on the remainder of Ivanpah 2. BrightSource will ensure that it does not move these desert tortoises more than 500 meters during this clearance.

In spring 2010, BrightSource intends to clear all desert tortoises from Ivanpah 2 that are more than 500 meters from the western fence line and quarantine them within the facility described above for Ivanpah 1 and the CLA. If necessary, BrightSource will construct additional pens to facilitate the quarantine of these animals. BrightSource will collect blood, perform ELISA testing, and do visual health assessments on all project site desert tortoises quarantined at this facility.

Following visual health assessments, BrightSource will translocate all desert tortoises located within 500 meters of the western boundary fence of Ivanpah 2 to areas immediately outside the fence. BrightSource will not translocate a desert tortoise in this category within 1500 meters of a resident individual that has tested positive for disease through ELISA testing or visual health assessments. If BrightSource cannot comply with this buffer without moving the individual more than 500 meters from its original capture location, it will quarantine this individual. Following receipt of ELISA testing results and completion of visual health assessments for the quarantined population, BrightSource will contact the Service regarding the proposed release of each quarantined desert tortoise. The Service will work with BrightSource to identify an appropriate facility to house any quarantined desert tortoises that tests ELISA-positive. In addition, the Service may require BrightSource to perform additional testing to confirm disease status of any ELISA-positive desert tortoises before final disposition.

BrightSource will translocate all ELISA-negative, healthy desert tortoises from quarantine to the translocation area in spring or fall 2011 depending on the timing of ELISA test results. For Ivanpah 2, BrightSource will release all quarantined individuals in the translocation area it has identified for that phase of the project (i.e., N2 or N3; CH2MHill 2009b). BrightSource will attach transmitters to all translocated desert tortoises to facilitate post-translocation monitoring. BrightSource will not translocate a desert tortoise in this category within 3.7 miles of a resident individual that has tested positive for disease through ELISA testing or visual health assessments.

Ivanpah 3

Following or concurrent with clearance of desert tortoises from Ivanpah 2, BrightSource will perform a clearance level survey of Ivanpah 3 and attach transmitters to all desert tortoises that it locates to facilitate post-translocation monitoring and to allow easy location of individuals prior to translocation. In addition, BrightSource will perform visual health assessments of all desert tortoises on Ivanpah 3. During this survey, BrightSource will translocate all healthy desert tortoises located within 500 meters of the western or northern boundary fences of Ivanpah 3 to areas immediately outside of these fence lines. It will collect blood from all desert tortoises that are more than 500 meters from the western or northern fence line for ELISA testing. BrightSource will quarantine desert tortoises that are more than 500 meters from the western or northern fence line at the CLA quarantine facility. Alternatively, BrightSource may choose to perform *in* situ quarantine with these individuals. If *in situ* quarantine is chosen, BrightSource would attach transmitters to the quarantined animals and leave them at the location of their initial capture to await ELISA test results.

Following receipt of ELISA testing results for the quarantined desert tortoises on Ivanpah 3, BrightSource will contact the Service regarding the proposed disposition of each desert tortoise. If BrightSource chooses to quarantine the individuals in the CLA quarantine facility, it would translocate all ELISA-negative individuals into the translocation area it has identified for this phase of the project (i.e., N1; CH2MHill 2009b) or into the solar exclusion zone north of the Ivanpah 3 project site according to the procedures discussed with the Service. If BrightSource chooses *in situ* quarantine, all desert tortoises that test ELISA negative and are not within 500 meters of an ELISA-positive individual at the time of final clearance will be released into the translocation area it has identified (i.e., N1; CH2MHill 2009b) or into the solar exclusion zone (i.e, portion of the right-of-way excluded from future solar development for rare plant concerns) north of the Ivanpah 3 project site. The Service will work with BrightSource to identify an appropriate facility to house any desert tortoises that test ELISA positive. The Service may require BrightSource to perform or fund additional testing to confirm disease status of any ELISA- positive desert tortoises before final disposition. In addition, BrightSource will quarantine any individual that is located within 500 meters of an ELISA-positive desert tortoise on the Ivanpah 3 project site. This quarantine would occur at the CLA quarantine facility. While in quarantine, BrightSource will conduct an additional ELISA test to confirm disease status prior to translocation. If these individuals test negative on the second ELISA test, BrightSource will release these animals into one of the translocation areas described above.

Monitoring

BrightSource will provide for the monitoring of desert tortoises cleared from a given phase of the IESGS project site for a period of 3 years following its initial clearance. As discussed above, BrightSource will attach transmitters to all desert tortoises translocated from the project site and to an equal number of resident desert tortoises to facilitate monitoring. Following the completion of the first 3 years of monitoring, BrightSource will perform an additional 2 years of monitoring if directed by the Service.

BrightSource will also attach transmitters to and monitor desert tortoises in a population that will serve as a control group for translocation monitoring. BrightSource would establish the control group prior to release of translocated individuals. When establishing this control group, BrightSource will collect blood samples from all desert tortoises desert tortoises that it transmitters in the control population for ELISA testing. The number of desert tortoises monitored in this population will be equal to the number of desert tortoises translocated from the project site. The location of the control population will be within the Bureau's Ivanpah Desert Wildlife Management Area. The final boundaries of the control population monitoring area will depend on the number of desert tortoises that BrightSource has to transmitter to match the translocated population. BrightSource will ensure that only qualified biologists, authorized by the Service, perform monitoring of these populations.

During monitoring, BrightSource will collect information on survivorship, mortality rates, health status, body condition, movement of individuals, and predation in all three populations (i.e.,

resident, translocated, and control) to inform adaptive management of the translocation effort on future phases. If monitoring shows a mortality rate of 10 percent or higher among the desert tortoises moved from the project site, BrightSource will review all data collected to develop a remedial action plan in coordination with the Bureau and the Service prior to further phased translocation activities.

To minimize adverse effects to the desert tortoise, BrightSource will implement the following protective measures when implementing clearance surveys and desert tortoise translocation:

1. BrightSource will design all permanent desert tortoise exclusion fencing in accordance with the most up-to-date Service guidance. The Service is currently using guidance provided in the *Desert Tortoise Field Manual* (Service 2009a).

2. BrightSource will comply with the most up-to-date guidance for performing clearance surveys and handling desert tortoises. The Service is currently using the *Desert Tortoise Field Manual* (Service 2009a).

3. BrightSource will use authorized biologists for the performance of clearance surveys and for any other activities that require the handling of desert tortoises. If BrightSource uses desert tortoise monitors during clearance surveys or for other activities that require identification of sign or handling of desert tortoises, they will do so under the direct supervision of an authorized biologist.

4. BrightSource will ensure that health assessments and blood collection for disease testing of desert tortoises are conducted by individuals authorized by the Service to perform these tasks.

5. Following clearance of desert tortoises from the fenced project sites, CLA, and utility right-of-way, an authorized biologist will be onsite during initial clearing and grading to move any desert tortoises missed during the initial clearance surveys. If a desert tortoise is identified and found to have clinical signs of disease, BrightSource will contact the Service to determine appropriate disposition of the animal.

6. BrightSource will not perform any clearance surveys or translocation activities when the ambient air temperature is above 95 degrees Fahrenheit or is anticipated to exceed 95 degrees Fahrenheit before handling or processing can be completed. BrightSource will not perform any clearance surveys or translocation activities when ambient air temperature are below 65 degrees Fahrenheit or are anticipated to go below 50 degrees Fahrenheit during the week after release. BrightSource will not release any desert tortoises at translocation sites if the ambient air temperature is above or are expected to reach 90 degrees Fahrenheit within 3 hours of release. Ambient air temperature will be measured in the shade, protected from wind, at a height of 2 inches above the ground surface.

7. An authorized biologist will hydrate all desert tortoises scheduled for translocation within 12 hours prior to release.

8. An authorized biologist will assess all desert tortoises on the project site for clinical signs of disease prior to translocation regardless of whether these animals will receive additional ELISA testing. The authorized biologist will remove and temporarily quarantine any desert tortoises with clinical signs of disease that are encountered on the ISEGS project sites. Authorized biologists will use the descriptions of clinical signs of disease described in the available scientific literature (Berry and Cristopher 2001, Origgi et al. 2004, Ritchie 2006; all in CH2MHill 2009a), unless the Service provides more appropriate guidance. BrightSource will contact the Ventura Fish and Wildlife Office within 24 hours of collection of an animal to determine the appropriate disposition of animals showing clinical signs of disease. These animals may require more extensive disease testing (e.g., ELISA, Western Blot) prior to determination of their final disposition.

9. BrightSource will only perform clearance surveys during the spring (April 1 to May 31) and fall (September 1 to October 15). If all desert tortoises from a given phase would be placed in a quarantine facility, BrightSource may extend its fall clearance window until October 31 if conditions (i.e., air temperatures) allow. BrightSource will only perform release of cleared desert tortoises into a translocation area during the spring (April 1 to May 31) or early-fall (September 1 and October 1).

10. BrightSource will consider ELISA testing results valid for a period of 1 year on any individual desert tortoise. BrightSource will coordinate with the Service to determine the necessity for re-testing of individuals based on the circumstances of their quarantine and their proposed plan for disposition of the individual. BrightSource will only draw blood for ELISA testing between May 15 and October 31 to ensure accurate ELISA testing results.

11. BrightSource will maintain a record of all desert tortoises encountered and translocated during project surveys and monitoring. The record will include the following information for each desert tortoise: the location (narrative, vegetation type, and maps) and dates of observations, burrow data, general conditions and health, measurements, any apparent injuries and state of healing, the location from which it was captured and the location in which it was released, whether animals voided their bladders, diagnostic markings (i.e., identification numbers), results of health assessments, and ELISA-test results.

12. During temporary quarantine (i.e., desert tortoises held for less than one week), an authorized biologist will provide adequate food and water and a temperature-controlled holding area away from other desert tortoises.

13. BrightSource will only use Service-authorized individuals that have experience identifying the clinical signs of upper respiratory tract disease, herpes virus, and cutaneous dyskeratosis for the performance of health assessments. BrightSource will provide the Service with the qualifications of any authorized biologists that it will use to perform health assessments or blood collection on desert tortoises during clearance and translocation activities. The Service should receive these qualifications at least 30 days prior to the need for the health assessment and blood collection.

14. BrightSource will send all samples for ELISA to a laboratory qualified to perform these tests.

15. For monitoring activities, an authorized biologist will attach radio transmitters to adult desert tortoises using methods described in Boarman et al. (1998).

16. BrightSource will develop an animal husbandry plan for management of the CLA quarantine facility for the Service's review and approval prior to release of individuals into this facility.

17. BrightSource will not release project-site desert tortoises into the translocation area if it determines that post-translocation density will exceed 21 subadult or adult desert tortoises per square mile.

18. BrightSource will not release desert tortoises moved more than 500 meters from their point of capture within 3.7 miles of a resident desert tortoise that has tested ELISA-positive or has shown clinical signs of disease.

19. BrightSource will not release desert tortoises moved less than 500 meters from their point of capture within 1500 meters of a resident desert tortoise that has tested ELISA-positive or has shown clinical signs of disease.

Compensation

The following information was briefly discussed in the revised biological assessment (CH2MHill 2010a) and clarified with more detail in follow up communications with the Bureau (Fesnock 2010a and 2010b). The Bureau will require BrightSource to compensate for loss of desert tortoise habitat in accordance with the Northern and Eastern Mojave amendment to the California Desert Conservation Area (CDCA) Plan (Bureau 2002). The Bureau will apply a compensation ratio of 1:1, as described in this plan. This compensation will provide for acquisition of up to 3,582 acres of land in the Northeastern Mojave Recovery Unit, or desert tortoise habitat enhancement or rehabilitation activities on existing public land, or some combination of the two. The following is a list of potential habitat enhancement and rehabilitation actions, identified by the Bureau, that could be implemented solely or in combination with land acquisition to fulfill the Bureau's compensation requirements:

1. Install at least 50 miles of desert tortoise exclusion fencing along the following road segments: a) Interstate 15 between Nipton Road and Ivanpah Dry Lake, b) U.S. Highway 95 through Piute Valley from the California-Nevada state line to Goffs Road, c) Nipton Road, between the California-Nevada border and Interstate 15, and d) Ivanpah Road, from Nipton Road through portions of the Mojave National Preserve.
2. Restore habitat, including vertical mulching, of at least 50 routes that the Bureau has designated as closed in the Shadow Valley, Piute Valley, and Ivanpah Valley Desert Wildlife Management Areas.
3. Install three-strand fencing or other suitable fencing around the boundary of the towns of Nipton and Goffs.
4. Remove exotic plant species from areas important to desert tortoises.
5. Identify and clean up destroyed or damaged habitat areas, such as illegal dumpsites and illegal routes, in Shadow Valley, Piute Valley, Ivanpah Valley, and the critical habitat portions of Mojave National Preserve.
6. Fund desert tortoise head start research, if approved by the Service's Desert Tortoise Recovery Office.

The California Energy Commission has already approved the proposed action. In addition to the required compensation described above, the California Energy Commission will require compensation for loss of desert tortoise habitat at a ratio of 2:1. Lands acquired to meet the California Energy Commissions requirements would meet the following criteria:

1. must be as close as possible to the project site,
2. provide good quality habitat for desert tortoises with capacity to regenerate naturally when disturbances are removed,
3. be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation,
4. be connected to lands currently occupied by desert tortoise, ideally with populations that are stable, recovering, or likely to recover,
5. not have a history of intensive recreational use or other disturbance that might make habitat recovery and restoration infeasible,
6. not be characterized by high densities of invasive species, whether on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration, and
7. not contain hazardous wastes.

To meet land acquisition requirements, BrightSource will either directly purchase lands, or it will deposit funds with the National Fish and Wildlife Foundation (NFWF). If BrightSource chooses to deposit funds with NFWF, a compensation fee will be assessed based on current fair market appraised value for the specific geographic area in which the acquisition occurs. If BrightSource chooses to provide funds to NFWF, the following conditions will be met: 1) funds will be provided prior to project construction, 2) lands will be acquired prior to completion of project

construction, and 3) lands will be conserved in perpetuity by a legal mechanism agreed to by the Bureau and California Department of Fish and Game. If BrightSource directly acquires the lands rather than providing funds to NFWF, it will acquire the lands prior to completion of project construction and will conserve these lands in perpetuity through a legal mechanism approved by the Bureau and California Department of Fish and Game.

Regardless of the acquisition method (i.e., directly or through NFWF), BrightSource will establish a management fund for the acquired lands to comply with requirements of the California Endangered Species Act. The management fund will consist of an interest-bearing account (as described in the memorandum of agreement between the Renewable Energy Action Team Agencies and NFWF) with the amount of capital commensurate to generate sufficient interest to fund all monitoring, management, and protection of the acquired lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and other actions designed to protect or improve the habitat values of the acquired lands. A Property Analysis Record (PAR) analysis, or comparable method, will be conducted by BrightSource, the Bureau, and the California Department of Fish and Game to determine the management needs and costs described above, which then will be used to calculate the amount of capital needed for the management fund. The management fund will be held and managed by NFWF or another entity approved by the Bureau, Service, and California Department of Fish and Game.

To mitigate this project's portion of the cumulative effect of increasing the number of common ravens in the desert region, the California Energy Commission will also require BrightSource to contribute $105.00 per acre for the 3,582 acres associated with the project site. These funds will contribute to an account established by the NFWF to carry out a regional management for the common raven. This account was established under a memorandum of agreement between Renewable Energy Action Team agencies (i.e., the Bureau, Service, the California Energy Commission, and the California Department of Fish and Game) and NFWF to manage funds to implement regional common raven management. Activities that would be carried out to reduce common raven predation on desert tortoises include reduction of human-provided subsidies (e.g., food, water, sheltering and nesting sites), education and outreach, removal ofcommon ravens and their nests, and evaluation of effectiveness and adaptive management. The total fee for this project of $376,110 will fund the project's portion of the regional raven management. BrightSource will make the payment within six months of final project approval.

Implementing control of common ravens and habitat enhancement and rehabilitation to fulfill some of the Bureau's compensation requirements may result in adverse effects to desert tortoises. These actions will require future site-specific Bureau authorizations and future project-specific consultation. Consequently, we will analyze the adverse effects of these actions in a general way, but cannot provide any site-specific analysis for these future actions in this biological opinion.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

The jeopardy analysis in this biological opinion relies on four components: (1) the status of the species, which describes the range-wide condition of the desert tortoise, the factors responsible for that condition, and its survival and recovery needs; (2) the environmental baseline, which analyzes the condition of the desert tortoise in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the desert tortoise; (3) the effects of the action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the desert tortoise; and (4) the cumulative effects, which evaluates the effects of future, non-Federal activities in the action area on the desert tortoise.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed federal action in the context of the current status of the desert tortoise, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the desert tortoise in the wild.

The jeopardy analysis in this biological opinion places an emphasis on consideration of the range-wide survival and recovery needs of the desert tortoise and the role of the action area in the survival and recovery of the desert tortoise as the context for evaluation of the significance of the effects of the proposed federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

STATUS OF THE SPECIES

Basic Ecology of the Desert Tortoise

The desert tortoise is a large, herbivorous reptile found in portions of the California, Arizona, Nevada, and Utah deserts. It also occurs in Sonora and Sinaloa, Mexico. In California, the desert tortoise occurs primarily within the Creosote, Shadscale, and Joshua Tree Series of Mojave Desert Scrub, and the Lower Colorado River Valley subdivision of Sonoran Desert Scrub. Optimal habitat has been characterized as creosote bush scrub in areas where precipitation ranges from 2 to 8 inches, diversity of perennial plants is relatively high, and production of ephemerals is high (Luckenbach 1982, Turner and Brown 1982, Schamberger and Turner 1986). Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse. In California, desert tortoises are typically associated with gravelly flats or sandy soils with some clay, but are occasionally occur in windblown sand or in rocky terrain (Luckenbach 1982). Desert tortoises occur in the California desert from below sea level to an elevation of 7,300 feet, but the most favorable habitat occurs at elevations of approximately 1,000 to 3,000 feet (Luckenbach 1982, Schamberger and Turner 1986). Recent range-wide monitoring efforts have consistently documented desert tortoises above 3,000 feet (Service 2006).

Desert tortoises may spend more time in washes than in flat areas outside of washes; Jennings (1997) notes that, between March 1 and April 30, desert tortoises "spent a disproportionately longer time within hill and washlet strata" and, from May 1 through May 31, hills, washlets, and washes "continued to be important." Jennings' paper does not differentiate between the time desert tortoises spent in hilly areas versus washes and washlets; however, he notes that, although washes and washlets comprised only 10.3 percent of the study area, more than 25 percent of the plant species on which desert tortoises fed were located in these areas. Luckenbach (1982) states that the "banks and berms of washes are preferred places for burrows;" he also recounts an incident in which 15 desert tortoises along 0.12 mile of wash were killed by a flash flood. Desert tortoises are most active in California during the spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and occasionally after summer rain storms. Desert tortoises spend most of their time during the remainder of the year in burrows, escaping the extreme conditions of the desert; however, recent work has demonstrated that they can be active at any time of the year. Further information on the range, biology, and ecology of the desert tortoise can be found in Burge (1978), Burge and Bradley (1976), Hovik and Hardenbrook (1989), Luckenbach (1982), Weinstein et al. (1987), and Service (1994a).

Food resources for desert tortoises are dependent on the availability and nutritional quality of annual and perennial vegetation, which is greatly influenced by climatic factors, such as the timing and amount of rainfall, temperatures, and wind (Beatley 1969, 1974, Congdon 1989, Karasov 1989, Polis 1991; all in Avery 1998). In the Mojave Desert, these climatic factors are typically highly variable; this variability can limit the desert tortoise's food resources.

Desert tortoises will eat many species of plants. However, at any time, most of their diet consists of a few species (Nagy and Medica 1986 and Jennings 1993 in Avery 1998). Additionally, their preferences can change during the course of a season (Avery 1998) and over several seasons (Esque 1994 in Avery 1998). Possible reasons for desert tortoises to alter their preferences may include changes in nutrient concentrations in plant species, the availability of plants, and the nutrient requirements of individual animals (Avery 1998). In Avery's (1998) study in the Ivanpah Valley, desert tortoises consumed primarily green annual plants in spring; they ate cacti and herbaceous perennials once the winter annuals began to disappear. Medica et al. (1982 in Avery 1998) found that desert tortoises ate increased amounts of green perennial grass when winter annuals were sparse or unavailable; Avery (1998) found that desert tortoises rarely ate perennial grasses.

Desert tortoise females typically produce one to two clutches of 1 to 7 eggs per year (Turner et al. 1986). On rare occasions, clutches can contain up to 15 eggs; most clutches contain 3 to 7 eggs. Multi-decade studies of the Blanding's turtle (*Emydoidea blandingii*), which, like the desert tortoise, is long lived and matures late, indicate that approximately 70 percent of the young animals survive each year until they reach adult size; after this time, annual survivorship exceeds 90 percent (Congdon et al. 1993). Research has indicated that 50 to 60 percent of young desert tortoises typically survive from year to year, even in the first and most vulnerable year of life. We do not have sufficient information on the demography of the desert tortoise to

determine whether this rate is sufficient to maintain viable populations; however, it does indicate that maintaining favorable habitat conditions for small desert tortoises is crucial for the continued viability of the species.

Desert tortoises typically hatch from late August through early October. At the time of hatching, the desert tortoise has a substantial yolk sac; the yolk can sustain them through the fall and winter months until forage is available in the late winter or early spring. However, neonates will eat if food is available to them at the time of hatching; when food is available, they can reduce their reliance on the yolk sac to conserve this source of nutrition. Neonate desert tortoises use abandoned rodent burrows for daily and winter shelter; these burrows are often shallowly excavated and run parallel to the surface of the ground.

Neonate desert tortoises emerge from their winter burrows as early as late January to take advantage of freshly germinating annual plants; if appropriate temperatures and rainfall are present, at least some plants will continue to germinate later in the spring. Freshly germinating plants and plant species that remain small throughout their phenological development are important to neonate desert tortoises because their size prohibits access to taller plants. As plants grow taller during the spring, some species become inaccessible to small desert tortoises.

Neonate and juvenile desert tortoises require approximately 12 to 16 percent protein content in their diet for proper growth. Desert tortoises, both juveniles and adults, seem to selectively forage for particular species of plants with favorable ratios of water, nitrogen (protein), and potassium. The potassium excretion potential model (Oftedal 2001) predicts that, at favorable ratios, the water and nitrogen allow desert tortoises to excrete high concentrations of potentially toxic potassium, which is abundant in many desert plants. Oftedal (2001) also reports that variation in rainfall and temperatures cause the potassium excretion potential index to change annually and during the course of a plant's growing season. Therefore, the changing nutritive quality of plants, combined with their increase in size, further limits the forage available to small desert tortoises to sustain their survival and growth.

In summary, the ecological requirements and behavior of neonate and juvenile desert tortoises are substantially different from those of subadults and adults. Smaller desert tortoises use abandoned rodent burrows, which are typically more fragile than the larger ones constructed by adults. They are active earlier in the season. Finally, small desert tortoises rely on smaller annual plants with greater protein content; the smaller plant size allows them to gain access to food and the higher protein content promotes growth.

Status of the Desert Tortoise

The Mojave population of the desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, southwestern Utah, and in the Colorado Desert in California. On August 4, 1989, the Service published an emergency rule listing the Mojave population of the desert tortoise as endangered (54 *Federal Register* 32326).

In its final rule, dated April 2, 1990, the Service determined the Mojave population of the desert tortoise to be threatened (55 *Federal Register* 12178).

The Service listed the desert tortoise in response to loss and degradation of habitat caused by numerous human activities including urbanization, agricultural development, military training, recreational use, mining, and livestock grazing. The loss of individual desert tortoises to increased predation by common ravens, collection by humans for pets or consumption, collisions with vehicles on paved and unpaved roads, and mortality resulting from diseases also contributed to the Service's listing of this species.

Before entering into a discussion of the status and trends of the desert tortoise in the Northeastern Mojave Recovery Unit where the proposed action is located, a brief discussion of the methods of estimating the numbers of desert tortoises would be useful. Three primary methods have been widely used: permanent study plots, triangular transects, and line distance sampling.

Generally, permanent study plots are defined areas that are visited at roughly 4-year intervals to determine the numbers of desert tortoises present. Desert tortoises found on these plots during the spring surveys were registered; that is, they were marked so they could be identified individually during subsequent surveys. Between 1971 and 1980, 27 plots were established in California to study the desert tortoise; 15 of these plots were used by the Bureau to monitor desert tortoises on a long-term basis (Berry 1999). Range-wide, 49 plots have been used at one time or another to attempt to monitor desert tortoises (Tracy et al. 2004).

Triangular transects are used to detect sign (i.e., scat, burrows, footprints, etc.) of desert tortoises. The number of sign is then correlated with standard reference sites, such as permanent study plots, to allow the determination of density estimates.

Finally, line distance sampling involves walking transects while trying to detect live desert tortoises. Based on the distance of the desert tortoise from the centerline of the transect, the length of the transect, and a calculation of what percentage of the animals in the area were likely to have been above ground and visible to surveyors during the time the transect was walked, an estimation of the density can be made. This density only represents an estimation of the number of desert tortoises that are greater than 180 millimeters in size. Desert tortoises that are larger than this size are typically classified as subadult or adult desert tortoises.

Each of these methods has various strengths and weaknesses. In general, permanent study plots have been used to estimate the status of desert tortoises across large areas over time. Triangular transects were used to assess the density of desert tortoises on specific sites at a point in time; this method was commonly used to determine how many desert tortoises may be affected by a specific proposed action. In 2001, the Service initiated line-distance sampling to estimate the density of desert tortoises in desert wildlife management areas and critical habitat throughout the range.

Note that, when reviewing the information presented in the following sections, determining the number of desert tortoises over large areas is extremely difficult. The report prepared by the Desert Tortoise Recovery Plan Assessment Committee (Tracy et al. 2004) acknowledges as much. Desert tortoises spend much of their lives underground or concealed under shrubs, are not very active in years of low rainfall, and are distributed over a wide area in several different types of habitat. Other factors, such as the inability to sample on private lands and rugged terrain, further complicate sampling efforts. Consequently, the topic of determining the best way to estimate the abundance of desert tortoises has generated many discussions over the years. As a result of this difficulty, we cannot provide concise estimations of the density of desert tortoises in each recovery unit or desert wildlife management area that have been made in a consistent manner.

Given the difficulty in determining the density of desert tortoises over large areas, the reader needs to understand fully that the differences in density estimates in the recovery plan and those derived from subsequent sampling efforts may not accurately reflect on-the-ground conditions. Despite this statement, the reader should also be aware that the absence of live desert tortoises and the presence of carcasses over large areas of some desert wildlife management areas provide at least some evidence that desert tortoise populations seem to be in a downward trend in some regions.

The following paragraphs provide general information on the status and trends of the desert tortoise population in the Northeastern Mojave Recovery Unit, where the proposed action is located. We have not included detailed information on the status of the desert tortoise in the other recovery units throughout the range of the species in this biological opinion. This omission will not compromise the analysis in the biological opinion because our determination regarding whether a proposed action is likely to jeopardize the continued existence of a species must be conducted at the level of the listed taxon. When the range of the listed taxon is divided into recovery units, our level of analysis begins with the recovery unit; if the effects of the proposed action have the potential to compromise the ability of the species to survive and recover within the recovery unit, the next level of analysis considers how the compromised recovery unit would affect the listed taxon throughout its range (Service 2005a). Our analysis can therefore be conducted in a comprehensive manner through an iterative process. The Northeastern Mojave Recovery Unit comprises one of six recovery units for the desert tortoise; consequently, our level of analysis in this biological opinion will begin at this level.

The Northeastern Mojave Recovery Unit is located to the southwest of the Upper Virgin River Recovery Unit and extends through Nevada and into California in Ivanpah Valley. Several critical habitat units and four desert wildlife management areas are located within this recovery unit. Tracy et al. (2004) note that densities of adult desert tortoises for the overall region do not show a statistical trend over time.

The Beaver Dam Slope Desert Wildlife Management Area covers portions of Nevada, Utah, and Arizona. Based on various methods, the recovery plan estimates the density of desert tortoises in this desert wildlife management area as being from 5 to 56 animals per square mile (Service

1994). In 2007, the Desert Tortoise Recovery Office estimated a density for the Beaver Dam Slope Desert Wildlife Management Area of 3.11 desert tortoises per square mile based on line distance sampling transects (Service 2009b).

The Gold Butte-Pakoon Desert Wildlife Management Area covers portions of Nevada and Arizona, generally south of the Beaver Dam Slope Desert Wildlife Management Area. The recovery plan states that densities of desert tortoises in this recovery unit vary from 5 to 56 animals per square mile (Service 1994a). In 2007, the Desert Tortoise Recovery Office estimated a density for the Gold Butte-Pakoon Desert Wildlife Management Area of 3.11 desert tortoises per square mile based on line distance sampling transects (Service 2009b).

The Mormon Mesa Desert Wildlife Management Area is located entirely in Nevada, generally west and northwest of the Beaver Dam Slope and Gold Butte-Pakoon desert wildlife management areas, respectively. The recovery plan states that densities of desert tortoises in this recovery unit vary from 41 to 87 subadult and adult animals per square mile (Service 1994a). In 2007, the Desert Tortoise Recovery Office estimated a density for the Mormon Mesa Desert Wildlife Management Area of 8.55 desert tortoises per square mile based on line distance sampling transects (Service 2009b).

The Coyote Springs Desert Wildlife Management Area is located entirely in Nevada, generally west of the Mormon Mesa Desert Wildlife Management Area and east of the Desert National Wildlife Refuge. The recovery plan states that densities of desert tortoises in this recovery unit vary from 0 to 90 adult animals per square mile (Service 1994a). Kernel analysis for the Coyote Springs Desert Wildlife Management Area showed areas where the distributions of carcasses and living desert tortoises do not overlap (Tracy et al. 2004); this scenario is indicative of a higher than average rate of mortality. The Desert Tortoise Recovery Plan Assessment Committee used a kernel analysis to examine the distribution of live desert tortoises and carcasses over large areas of the range of the species (Tracy et al. 2004). The intent of this analysis is to determine where large areas with numerous carcasses do not overlap large areas with live animals. Regions where the areas of carcasses do not overlap areas of live animals likely represent recent die-offs or declines in desert tortoise populations. Because permanent study plots for this region were discontinued after 1996, recent declines in numbers would not be reflected in the kernel analysis if they had occurred. In 2007, the Desert Tortoise Recovery Office estimated a density for the Coyote Springs Desert Wildlife Management Area of 3.6 desert tortoises per square mile based on line distance sampling transects (Service 2009b).

The Ivanpah Desert Wildlife Management Area lies east of the Mojave National Preserve and covers approximately 36,795 acres. It is contiguous with National Park Service lands; note that the National Park Service did not designate desert wildlife management areas within the Mojave National Preserve because it considers that all of its lands are managed in a manner that is conducive to the recovery of the desert tortoise. The permanent study plot in the Ivanpah Valley is located within the Mojave National Preserve and provides information on the status of desert tortoises in this general region. Data on desert tortoises on this permanent study plot were collected in 1980, 1986, 1990, and 1994; the densities of desert tortoises of all sizes per square

mile were 368, 393, 249, and 164, respectively (Berry 1996). Numerous data sets are collected from the study plots and various statistical analyses conducted to provide information on various aspects of trends. We cannot, in this biological opinion, provide all of this information; therefore, we have selected the density of desert tortoises of all sizes per square mile to attempt to indicate trends. The number of juvenile and immature desert tortoises on the study plot declined, although the number of adult animals remained fairly constant. The notes accompanying this report indicated that the "ill juvenile and dead adult male (desert) tortoises salvaged for necropsy contained contaminants;" it also cited predation by common ravens and the effects of cattle grazing as causative factors in the decline in the number of juvenile and immature desert tortoises on the study plot (Berry 1996). In 2002, workers found 55 desert tortoises on this plot; this number does not represent a density estimate (Berry 2005). In 2007, the Desert Tortoise Recovery Office estimated a density for the Ivanpah Desert Wildlife Management Area of 16.84 desert tortoises per square mile based on line distance sampling transects (Service 2009b). However, the area sampled to determine this estimate includes all portions of the Ivanpah Critical Habitat Unit, which is primarily within the Eastern Mojave Recovery Unit. Only a small portion of the sample area for this estimate is located within the Northeastern Mojave Recovery Unit.

In 2007, the Desert Tortoise Recovery Office estimated an average density of desert tortoises in this recovery unit of 4.4 desert tortoises per square mile, which was a 9 percent decrease from previous estimates in 2005 (Service 2009b). However, this decrease was expected based on a change in sampling design and may not represent a true decline in density for the Northeastern Mojave Recovery Unit.

Recovery Plan for the Desert Tortoise

The recovery plan for the desert tortoise is the basis and key strategy for recovery and delisting of the desert tortoise. The recovery plan divides the range of the desert tortoise into 6 distinct population segments or recovery units and recommends the establishment of 14 desert wildlife management areas throughout the recovery units. Within each desert wildlife management area, the recovery plan recommends implementation of reserve-level protection of desert tortoise populations and habitat, while maintaining and protecting other sensitive species and ecosystem functions. The recovery plan also recommends that desert wildlife management areas be designed to follow the accepted concepts of reserve design and be managed to restrict human activities that negatively affect desert tortoises (Service 1994a). The delisting criteria established by the recovery plan are:

1. The population within a recovery unit must exhibit a statistically significant upward trend or remain stationary for at least 25 years;

2. Enough habitat must be protected within a recovery unit or the habitat and desert tortoises must be managed intensively enough to ensure long-term viability;

3. Populations of desert tortoises within each recovery unit must be managed so discrete population growth rates (lambdas) are maintained at or above 1.0;

4. Regulatory mechanisms or land management commitments that provide for long-term protection of desert tortoises and their habitat must be implemented; and

5. The population of the recovery unit is unlikely to need protection under the Endangered Species Act in the foreseeable future.

The recovery plan based its descriptions of the six recovery units on differences in genetics, morphology, behavior, ecology, and habitat use over the range of the Mojave population of the desert tortoise. The recovery plan contains generalized descriptions of the variations in habitat parameters of the recovery units and the behavior and ecology of the desert tortoises that reside in these areas (pages 20 to 22 in Service 1994a). The recovery plan (pages 24 to 26 from Service 1994) describes the characteristics of desert tortoises and variances in their habitat, foods, burrow sites, and phenotypes across the range of the listed taxon. Consequently, to capture the full range of phenotypes, use of habitat, and range of behavior of the desert tortoise as a species, conservation of the species across its entire range is essential.

The Service has released a revised recovery plan for public review (Service 2008c). The revised recovery plan includes a discussion of reducing the number of recovery units to four, based on information that has been generated since the release of the original document.

Relationship of Recovery Units, Distinct Population Segments, Desert Wildlife Management Areas, and Critical Habitat Units

The recovery plan (Service 1994a) recognized six recovery units or evolutionarily significant units across the range of the listed taxon, based on differences in genetics, morphology, behavior, ecology, and habitat use of the desert tortoises found in these areas. The boundaries between these areas are vaguely defined. In some cases, such as where the Western Mojave Recovery Unit borders the Eastern Mojave Recovery Unit, a long, low-lying, arid valley provides a fairly substantial separation of recovery units. In other areas, such as where the Eastern Mojave Recovery Unit borders the Northern Colorado Recovery Unit, little natural separation exists. Because of the vague boundaries, the acreage of these areas has not been quantified. Over the years, the Service has commonly referred to the areas as "recovery units;" the term "distinct population segment" has not been in common use.

The recovery plan recommended that land management agencies establish one or more desert wildlife management areas within each recovery unit. As mentioned previously in the Recovery Plan for the Desert Tortoise section of this biological opinion, the recovery plan recommended that these areas receive reserve-level management to remove or mitigate the effects of the human activities responsible for declines in the number of desert tortoises. As was the case for the recovery units, the recovery plan did not determine precise boundaries for the desert wildlife management areas; the recovery team intended for land management agencies to establish these

boundaries, based on the site-specific needs of the desert tortoise. At this time, desert wildlife management areas have been established throughout the range of the desert tortoise.

Based on the recommendations contained in the draft recovery plan for the desert tortoise, the Service designated critical habitat units throughout the range of the desert tortoise (59 *Federal Register* 5820). The 14 critical habitat units have defined boundaries and cover specific areas throughout the 6 recovery units.

The Bureau used the boundaries of the critical habitat units and other considerations, such as conflicts in management objectives and more current information, to propose and designate desert wildlife management areas through its land use planning processes. In California, the Bureau also classified these desert wildlife management areas as areas of critical environmental concern, which allows the Bureau to establish management goals for specific resources in defined areas. Through the land use planning process, the Bureau established firm boundaries for the desert wildlife management areas.

Finally, we note that the Department of Defense installations and National Park Service units in the California desert did not establish desert wildlife management areas on their lands. Where the military mission is compatible with management of desert tortoises and their habitat, the Department of Defense has worked with the Service to conserve desert tortoises and their habitat. Examples of such overlap include the bombing ranges on the Navy's Mojave B and the Chocolate Mountains Aerial Gunnery Ranges; although the target areas are heavily disturbed, most of the surrounding land remains undisturbed. Additionally, the Army has established several areas along the boundaries of Fort Irwin where training with vehicles is prohibited; desert tortoises persist in these areas, which are contiguous with lands off-base. The National Park Service did not establish desert wildlife management areas within the Mojave National Preserve, because the entire preserve is managed at a level that is generally consistent with the spirit and intent of the recovery plan for the desert tortoise.

The following table depicts the relationship among recovery units, desert wildlife management areas, and critical habitat units through the range of the desert tortoise.

Critical Habitat Unit	**Desert Wildlife Management Area**	**Recovery Unit**	**State**	**Size of Critical Habitat Unit (acres)**
Chemehuevi	Chemehuevi	Northern Colorado	CA	937,400
Chuckwalla	Chuckwalla	Eastern Colorado	CA	1,020,600
Fremont-Kramer	Fremont-Kramer	Western Mojave	CA	518,000
Ivanpah Valley	Ivanpah Valley	Eastern Mojave/Northeastern Mojave	CA	632,400
Pinto Mountain	Joshua Tree	Western Mojave/	CA	171,700

Critical Habitat Unit	Desert Wildlife Management Area	Recovery Unit	State	Size of Critical Habitat Unit (acres)
		Eastern Colorado		
Ord-Rodman	Ord-Rodman	Western Mojave	CA	253,200
Piute-Eldorado- CA Piute-Eldorado- NV	Fenner Piute-Eldorado	Eastern Mojave Northeastern Mojave/ Eastern Mojave	CA NV	453,800 516,800
Superior-Cronese	Superior-Cronese Lakes	Western Mojave	CA	766,900
Beaver Dam: NV UT AZ	 Beaver Dam Beaver Dam Beaver Dam	Northeastern Mojave (all)	 NV UT AZ	 87,400 74,500 42,700
Gold Butte-Pakoon NV AZ	 Gold Butte-Pakoon Gold Butte-Pakoon	Northeastern Mojave (all)	 NV AZ	 192,300 296,000
Mormon Mesa	Mormon Mesa Coyote Spring	Northeastern Mojave	NV	427,900
Upper Virgin River	Upper Virgin River	Upper Virgin River	UT	54,600

Nussear et al. (2009) modeled desert tortoise habitat across the range of the desert tortoise. This model, which is based on 3,753 desert tortoise locations, uses 16 environmental variables, such as precipitation, geology, vegetation, and slope. In addition, Nussear et al. used 938 additional occurrence locations to test the model's accuracy. Using this model, we estimate that the Northern and Eastern Mojave Recovery Unit contains approximately 4,853,368 acres of potential desert tortoise habitat (Darst 2010). Although this analysis likely omits some marginal desert tortoise habitat, it explains the occurrence of 95 percent of the 938 test points used in the Nussear et al. (2009) model. This modeling and mapping analysis does not consider habitat loss, fragmentation, or degradation associated with human-caused impacts; however, it provides a reference point relative to the amount of desert tortoise habitat within the Northeastern Mojave Recovery Unit.

Fire and Drought

Since December 2004, numerous wildfires have occurred in desert tortoise habitat across its range. Although we know that some desert tortoises were killed by the wildfires, mortality estimates are not available. We estimate that approximately 300,000 acres of potential desert tortoise habitat burned in the Northeastern Mojave Recovery Unit in 2005 (Burroughs 2005). This acreage includes approximately 109,000 acres of critical habitat (Clayton 2005). In total, approximately 136,447 acres of critical habitat in the Northeastern Mojave Recovery Unit burned in the 2005 fires (Clayton 2005). This loss of habitat has adversely affected the status of

the desert tortoise by reducing available habitat and likely reducing the distribution of individuals by eliminating them or greatly reducing their numbers in burned area.

In addition, drought has been implicated as a factor in reduced survival rates on desert tortoises in local areas (Longshore et al. 2003). In this 9-year study, researchers compared 2 "closely situated, but physiographically different, sites" in the Lake Mead National Recreation Area, Nevada. After a period during which survival rates were stable, the survival rate decreased on one of the sites that experienced drought conditions in 3 out of 4 years. The authors postulate that if such local incidents occur on a regular basis, "source-sink population dynamics may be an important factor" in determining the density of desert tortoise populations.

ENVIRONMENTAL BASELINE

Action Area

The implementing regulations for section 7(a)(2) of the Act define the "action area" as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For the purposes of this biological opinion, we consider the action area to include all areas of the proposed project, described in the Description of the Proposed Action, BrightSource's proposed translocation and control areas, and all contiguous desert tortoise habitat north and west of Interstate 15, east of the Clark Mountains, and south of Primm, Nevada (Croft 2010). By including all contiguous desert tortoise habitat west of Interstate 15, we are accounting for all areas that desert tortoises could move to following translocation based on the presence of movement barriers and the post-translocation distances observed in previous studies (Berry 1986, Field et al. 2007, Nussear 2004). The action area defined for this biological opinion is approximately 66,688 acres (Croft 2010).

Within this action area, adverse effects will occur primarily in the following areas:

1) Project Site – this portion of the action area consists of Ivanpah 1 and the CLA (913.5 acres), Ivanpah 2 (1,097 acres), and Ivanpah 3 (1,227 acres) (CH2MHill 2009a).
2) Solar Exclusion Zone Translocation Area (SEZ translocation area) – this portion of the action area consists of the 433-acre solar exclusion zone immediately north of Ivanpah 3 (Croft 2010).
3) Long-distance Translocation Sites (i.e., N1, N2, N3, and N4) – this portion of the action area consists of the four translocation areas identified by BrightSource in their translocation plan (i.e., N1, N2, N3, and N4; CH2MHill 2009b) and will accommodate all desert tortoises translocated more than 500 meters. The combined area of these translocation sites is approximately 495 acres (Croft 2010).
4) Control Area – this portion of the action area comprises all desert tortoises habitat within the Bureau's Ivanpah Desert Wildlife Management Area and is approximately 28,594 acres in size (Croft 2010). We have identified the entire Desert Wildlife Management Area within the action area because we do not know the precise size or location of the control population within this area. However, the final control area is likely to comprise

a small fraction of the total acreage identified here.

5) Short-distance Translocation Area – this portion of the action area consists of a 500-yard buffer strip, immediately west and north of the project site that will accommodate all short-distance translocations (i.e., less than 500 meters from capture site to release location). This portion of the action area is approximately 1,461 acres in size (Croft 2010).

In addition, some adverse effects are likely to occur along Colosseum Road and along the route of the fiber optic line. Of the approximately 66,688-acre action area, 4,741.5 acres would consist of areas that would be directly associated with aspects of the project or translocation release sites. The remaining 61,946.5 acres of the action area is composed of areas that have the potential for effects associated with desert tortoises that make long distance movements following translocation or effects associated with monitoring of the control population.

Past Consultations in the Action Area

The Service has issued numerous biological opinions for actions that have occurred or will occur within the action area for this consultation. In all cases, the Service determined that the proposed action was not likely to jeopardize the continued existence of the desert tortoise.

On December 2, 1992, the Service issued a biological opinion to the Bureau for leasing of oil and gas minerals at three sites in the Ivanpah Valley (1-6-92-F-58, Service 1992a). This biological opinion anticipated that project activities would kill or injure one desert tortoise due to use of access roads. One of the lease areas analyzed in the biological opinion is located within the action area covered in this biological opinion.

On July 13, 1993, the Service issued a biological opinion to the Bureau for cattle grazing on allotments in the Mojave Desert (1-6-92-F-19, Service 1993). This biological opinion anticipated the mortality of 3 desert tortoises and the harassment of 10 desert tortoises each year due to the development of range improvements on 25 cattle grazing allotments in the Mojave Desert. On March 19, 1994, the Service issued a new biological opinion on these allotments, in which it anticipated that 3 desert tortoises would be killed as a result of activities associated with cattle grazing on these allotments; the biological opinion also anticipated that range improvements would harass 10 desert tortoises (1-8-94-F-17, Service 1994b). This biological opinion superseded the 1993 biological opinion. The proposed project is located within the boundaries of the Clark Mountain Allotment, which was included in these consultations.

On February 9, 2001, the Service issued a biological opinion to the Bureau for issuance of a right-of-way for construction of the Level 3 fiber-optic line from Victorville to the California-Nevada state line (1-8-00-F-60, Service 2001). This biological opinion did not anticipate the amount of mortality associated with project activities, but it did require the Bureau to reinitiate consultation if project implementation killed or injured any desert tortoises. A portion of the project passed through the action area considered in this biological opinion.

On January 17, 2002, the Service issued a biological opinion to the Bureau regarding the effects to the desert tortoise of the implementation of the CDCA Plan (1-8-01-F-16, Service 2002). The biological opinion contained an analysis of the general management direction described in the CDCA Plan and deferred more detailed analysis to the future when the Bureau proposed specific projects. The biological opinion also contained an incidental take statement for ongoing actions, such as management of burros, entrapment of desert tortoises in managed waters and guzzlers, and casual use associated with recreation and mining. Although the biological opinion did not anticipate a specific level of injury or mortality that would likely occur due to these activities, it required the Bureau to reinitiate consultation if more than 5 desert tortoises were killed or injured during any 12-month period. Due to a court challenge, the Service issued another biological opinion on the CDCA Plan on March 31, 2005 (1-8-04-F-43R, Service 2005b). The new biological opinion did not change the threshold for reinitiation of consultation identified in the 2002 biological opinion. The entire action area for the ISEGS project is located within the planning area considered in both CDCA consultations.

On December 21, 1990, the Service issued a biological opinion for the Kern River and Mojave Pipeline projects (1-1-87-F-36R, Service 1990 in Service 2002b). The biological opinion anticipated that pipeline installation would kill or injure 45 desert tortoises in several states. A portion of the Kern River pipeline crosses the northern edge of the ISEGS action area. On July 9, 2002, the Service issued a biological opinion for expansion of the Kern River pipeline (1-5-02-F-476, Service 2002b). This biological opinion did not anticipate the number of desert tortoises that project activities would kill or injure, but it directed the Bureau to reinitiate consultation if more than 2 desert tortoises were killed on any 25-mile section of the pipeline. The Kern River expansion project also crossed the northern portion of the ISEGS action area.

On March 31, 2006, the Service issued a biological opinion to the Federal Highway Administration for construction of a joint port of entry along Interstate 15 between Nipton Road and Yates Well Road (1-8-06-F-20, Service 2006c). This biological opinion did not quantify the anticipated level of injury or mortality associated with project implementation, but it indicated that the number was likely to be small. As of this date, construction of this project has not moved forward.

Cumulatively the biological opinions listed above have authorized a very small amount of take within the areas that they cover. In addition, the take associated with all but one of these biological opinions is associated with projects that have action areas many times the size of the ISEGS action area. Therefore, it is unlikely that all take associated with these larger projects would happen to occur entirely within the ISEGS action area. Consequently, we conclude that take associated with these projects has not substantially affected the environmental baseline within the ISEGS action area.

Habitat Characteristics of the Action Area

We used the U.S. Geological Survey's model of desert tortoise habitat potential (Nussear et al. 2009) to define desert tortoise habitat within the action area. Within the action area,

BrightSource provided specific information on vegetation types for the project site, natural gas distribution line, fiber optic line, Colosseum Road, SEZ translocation area, and long-distance translocation sites. We summarized the information in this paragraph from the biological assessment (CH2MHill 2009a). All features for which we have specific vegetation or habitat survey information are located on a large, alluvial fan that slopes eastward from the Clark Mountains to Ivanpah Dry Lake at a 3 to 5 percent grade. Numerous ephemeral washes dissect the ISEGS project site with active channels that range in width from 1 to 15 feet. Elevations within the ISEGS project site range from 2,850 to 3,150 feet above sea level. Elevations along the route of the fiber optic line range from 2,850 feet to 5,320 feet. Creosote bush scrub is the dominant vegetation type on the ISEGS project site, western translocation area, SEZ translocation area, natural gas distribution line, Colosseum Road, and the lower elevation portions of the fiber-optic line. Mojave wash scrub also occurs on the ISEGS project site. Vegetation at higher elevations along the fiber optic line is characterized by blackbrush (*Coleogyne ramosissima*), Joshua trees (*Yucca brevifolia*), Utah juniper (*Juniperus osteosperma*), single-leaf pinyon (*Pinus monophylla*), and Mormon tea (*Ephedra* sp.). We do not have specific vegetation survey information for the remaining portions of the action area. However, all portions of the action area contain habitat features that the U.S. Geological Survey has mapped as conducive to desert tortoise occupancy (Nussear et al. 2009).

The portion of the action area west of Interstate 15 is within a Bureau-managed cattle grazing allotment (Clark Mountain) and a wild burro herd management area (Bureau and CEC 2009, Bureau 2002). In 2007, the Bureau removed most wild burros from the herd management area (Bureau and CEC 2009). However, given the recent nature of this removal and the persistence of some burros within the action area, adverse effects to habitat are likely to persist. The biological opinion for the CDCA Plan amendment for this area discussed the potential effects of cattle grazing on desert tortoises (Service 2005b). The remaining portions of the action area, south and east of Interstate 15, are within a desert wildlife management area managed for conservation of the desert tortoises.

During surveys of the project site, BrightSource identified numerous non-native plant species, such as Sahara mustard (*Brassica tournefortii*), salt cedar (*Tamarix ramosissima*), red brome (*Bromus madritensis*), Mediterranean grass (*Schismus* spp.), London rocket (*Sisymbrium irio*), and red-stemmed filaree (*Erodium cicutarium*) (CH2MHill 2009a, CH2MHill 2008c). Surveyors observed only one Sahara mustard and a few London rockets during assessment of the project site (CH2MHill 2008c). Surveyors located red brome, red-stemmed filaree, and Mediterranean grass throughout the project site with Mediterranean grass having a patchy distribution (CH2MHill 2008c). These species likely occur throughout the remainder of the action area. However, we expect the abundance of these species to be lower in portions of the action area that have not experienced cattle grazing in recent years (i.e., the Ivanpah DWMA).

In addition to cattle grazing, wild burro use, and non-native species, the habitat within the action area has also been affected by indirect effects associated with mining, a 640-acre golf course, various highways, electrical transmission lines, a natural gas transmission line, a fiber optic line, a railroad line, and private development along Nipton Road (CH2MHill 2009a, Bureau 1998,

1999, 2002). The remainder of the action area is crisscrossed by unpaved vehicle routes (Bureau 2002).

Status of the Desert Tortoise in the Action Area

From April 9 to June 5, 2007, CH2MHill conducted desert tortoise surveys over a 3,870-acre area that included the 3 project sites, CLA, natural gas distribution line, and the zone of influence (CH2MHill 2009a, CH2MHill 2008a). Because of a change in the project description, they surveyed an additional 726 acres from May 20 to May 25, 2008. The 2008 surveys also covered the proposed access route for the ISEGS facility. During the 2007 and 2008 surveys, CH2MHill located 25 live desert tortoises, 97 carcasses, and 214 burrows, with the greatest density of sign occurring on the Ivanpah 1 project site. Of the 25 desert tortoises identified, 7 were within Ivanpah1 and the CLA, 3 were within Ivanpah 2, 6 were within Ivanpah 3, 4 were within the SEZ translocation area, and 2 were in the area of the natural gas distribution line. The remaining desert tortoises were found on zone-of-influence transects that were outside of the proposed project footprint. The surveys were 100 percent coverage surveys in accordance with the pre-project survey protocols developed by the Service (1992b). BrightSource did not perform protocol level surveys of the fiber-optic line for desert tortoises, but it confirmed the presence of desert tortoise habitat along the entire route and incidentally found three individuals along the line (CH2MHill 2009a).

Based on the survey results and the Service's revised pre-project survey protocol (Service 2010), we estimate that Ivanpah 1 and the CLA, Ivanpah 2, and Ivanpah 3 contain approximately 14, 6, and 12 subadult and/or adult desert tortoises, respectively. In addition, we estimate that the SEZ translocation area contains approximately 8 adult/subadult desert tortoises. We emphasize that, although our estimate of the number of subadult and adult desert tortoises on the project site is based on the best available information, these numbers represent only an estimate; the overall number of individuals on site may be different. For example, based on the desert tortoise densities estimated through line-distance sampling for other portions of Ivanpah Valley (16.84 per square mile, Service 2009b), the actual number of subadult and/or adult desert tortoises on Ivanpah 1 and the CLA, Ivanpah 2, Ivanpah 3, and the SEZ translocation area could be as high as 24, 29, 33, and 12, respectively. Because the pre-project survey data represents the best available data and because the data collected through line-distance sampling were collected in areas that are currently managed for desert tortoise conservation (i.e., Bureau-designated desert wildlife management areas and the Mojave National Preserve), we do not expect that the actual number of subadult and adult desert tortoises will be as high in these portions of the action area.

In addition to subadult and adult desert tortoises, the ISEGS project site is likely to contain juvenile desert tortoises and desert tortoise eggs. Based on studies performed in Ivanpah Valley and the Goffs study site that identified a sex ratio of 1:1 (Turner et al. 1984, Turner et al. 1987) and the anticipated number of adult desert tortoises on the site, we estimate that Ivanpah 1 and the CLA, Ivanpah 2, Ivanpah 3, and the SEZ translocation area contain approximately 7, 3, 6, and 4 female desert tortoises of reproductive age, respectively. Based on a mean number of clutches of 1.6 per female per year, observed in a 2-year study in Ivanpah Valley (Turner et al.

1984), and a mean clutch size of 5.38 eggs per clutch observed at the Goffs study site (Turner et al. 1986 in Service 1994), we estimate that reproductive females on Ivanpah 1 and the CLA, Ivanpah 2, Ivanpah 3, and the SEZ translocation area produce approximately 61, 26, 52, and 35 eggs per year, respectively. Turner et al. (1987) observed that the proportion of the population composed of juvenile desert tortoises at the Goffs study site ranged as high as 51.2 percent over the course of 4 years. Based on this information and the anticipated population of subadults and adults on the project site, we estimate that Ivanpah 1 and the CLA, Ivanpah 2, Ivanpah 3, and the SEZ translocation area may contain as many as 15, 7, 13, and 9 juvenile desert tortoises, respectively.

We do not have desert tortoise survey information for the remainder of the action area described in this biological opinion. Given the proximity of the short-distance translocation area and the long-distance translocation sites to the surveyed areas, described above, the density of desert tortoises is likely similar (i.e., approximately 7 subadult and/or adult desert tortoises per square mile). This estimate is supported by a survey immediately east of the ISEGS project site that found 27 desert tortoises on a 5.75 square mile survey area (Ironwood 2009). Using these data and the Service's revised pre-project survey protocol (Service 2010b), we estimate a population density of approximately 6 desert tortoises per square mile for that survey area. Applying the higher of these density estimates to BrightSource's translocation sites, we estimate a population size of 15 desert tortoises within the combined area of the proposed translocation sites (i.e., short-distance, long-distance, and SEZ translocation areas). Using the same method described above for estimation of eggs and juveniles, we estimate that the reproductive females in the western translocation area produce approximately 65 desert tortoise eggs per year and the western translocation area population contains approximately 17 juvenile desert tortoises at any given time.

Because the Service has estimated the density of desert tortoises within the Ivanpah Desert Wildlife Management Area through line-distance sampling (i.e., 16.84 per square mile; Service 2009b), we have applied that density estimate to the control population areas. Using this density, we estimate that this 28,594-acre portion of the action area contains 753 subadult and/or adult desert tortoises. Using the same method described previously for estimation of eggs and juveniles, we estimate that the reproductive females in the control population area produce approximately 3,239 desert tortoise eggs per year and the population within this area may contain as many as 816 juvenile desert tortoises at any given time.

For the remaining portions of the action area (i.e., areas west of Interstate 15 that desert tortoises may move to following translocation), we estimate that densities are likely similar to those identified for the three phases of the project site and the translocation areas (i.e., seven desert tortoises per square mile). Consequently, we estimate that this portion of the action area, which include the project site areas and translocation areas discussed above, contain approximately 330 subadult and/or adult desert tortoises. We also estimate that these areas contain approximately 358 juveniles and produce approximately 1,421 eggs per year.

We emphasize that, although our estimates of the number of subadult and adult desert tortoises, eggs, and juveniles on the project site phases, translocation areas, control area, and remainder of the action area are based on the best available information, these numbers represent only an estimate; the overall number of animals and eggs on site may be different. We recognize that the survey data used for these estimates represents a single point in time and the number of individuals in these areas may change by the onset of construction. For example, some desert tortoises may leave or die. Alternatively, the number of desert tortoises present on the site may increase or decrease by the time construction commences. For example, one or more desert tortoises may not have been detected during the initial survey; other desert tortoises may have moved on to the site since the time of the surveys. Desert tortoises may have emerged from a nest on the site; this scenario could increase the overall number of individuals. For example, if a clutch of seven eggs (i.e., the number of eggs in a clutch that would be considered large) hatched, this increase would be much more than we would expect from individuals moving on to the site. In addition, the studies used to estimate juveniles and eggs are based on a single study site that may or may not have similar productivity and juvenile survival rates to that of our action area.

EFFECTS OF THE ACTION

The estimates of the number of desert tortoises and eggs derived from the pre-project survey data constitute the best available information regarding the number of desert tortoises in the action area. For this reason, we have used the estimates from the Environmental Baseline section of this biological opinion, which are based on these surveys, in the following analysis.

Effects of the Translocation Strategy

The primary effects of the proposed action on desert tortoise will result from the capture and translocation of desert tortoises prior to all ground disturbance associated with the proposed construction activities. We anticipate that BrightSource will capture and translocate all subadult and adult desert tortoises from the fenced project areas, and any other portion of the action area that is in harm's way due to project-related activities. Because of the difficulty in locating juvenile desert tortoises, BrightSource is likely to move some but not all juvenile desert tortoises from the project site.

Prior to translocation of individuals, BrightSource will perform surveys of the resident populations in each translocation area (i.e., short-distance, long-distance, and SEZ translocation areas). Within all portions of the translocation areas that are more than 500 meters from the western or northern fence lines of the project site, BrightSource will only perform visual health assessments. It will perform visual health assessments and ELISA testing in all other portions of the translocation areas and disease sampling (i.e, ELISA testing and visual health assessments) in the remaining portions of the action area north and west of Interstate 15 to assess population density and disease prevalence prior to translocation. In addition, BrightSource will perform surveys of the control area to identify and attach transmitters to control desert tortoises and to assess disease prevalence of the population to be monitored. During these surveys, BrightSource

will attach transmitters to an equal number of individuals in the resident and control areas to the estimated number that they will clear from the project site. We have analyzed the effects associated with attaching transmitters to these animals in a later section of this document. We cannot precisely predict how many desert tortoises that BrightSource would draw blood from in these areas, but we know that it would be at least 32 each in the resident, control, and project-site populations. However, BrightSource will need to draw blood from additional resident animals that are located in portions of the action area west and north of Interstate 15 to assess whether this area has disease prevalence above five percent. To determine whether this threshold has been reached, with a sufficient level of confidence (i.e., 95 percent confidence), we estimate that BrightSource may have to draw blood from as many as 98 desert tortoises (Averil-Murray 2010). Some potential exists that a subset of the animals tested could suffer mortality as a result of improper blood collection techniques. Because BrightSource will use experienced biologists, authorized by the Service, we expect that this number will be a small fraction of the total animals tested.

BrightSource has proposed numerous measures to minimize injury or mortality of desert tortoises and ensure success of the translocation effort. Because the project would be built in phases over several years, during which time desert tortoise numbers on the project site will likely change, we cannot predict exactly how many desert tortoises will be removed from the project site and other related work areas. However, based on current surveys that cover the project site, CLA, natural gas line, and Colosseum Road, we estimate that BrightSource will have to capture and translocate approximately 32 subadult and/or adult desert tortoises (14, 6, and 12 from Ivanpah 1 and the CLA, Ivanpah 2, and Ivanpah 3, respectively) from these areas. Although BrightSource would move some desert tortoises a relatively short distance (i.e., less than 500 meters), other desert tortoises are likely to be translocated outside of their existing home ranges. We have estimated that the project site may contain approximately 35 juvenile desert tortoises (15, 7, and 13 from Ivanpah 1 and the CLA, Ivanpah 2, and Ivanpah 3, respectively) and produces as many as 139 desert tortoise eggs (61, 26, and 52 from Ivanpah 1 and the CLA, Ivanpah 2, and Ivanpah 3, respectively) per year. However, because of the difficulty in finding desert tortoise eggs and juvenile desert tortoises, we anticipate that BrightSource will translocate few, if any, eggs or juveniles from the project site. Effects to juvenile desert tortoises and eggs that are missed on the project site are discussed later in this section.

Based on our current estimates of the resident population density in the translocation areas (i.e., 7 subadult and/or adult desert tortoises per square mile), the combined size of the translocation areas (i.e., 2.74 square miles), and the post-translocation density threshold identified in the project description (i.e., 21 subadult and/or adult desert tortoises per square mile), we anticipate that the proposed translocation areas can accommodate approximately 38 additional subadult and/or adult desert tortoises. Consequently, the proposed translocation areas appear to be large enough to accommodate all 32 subadult and/or adult desert tortoises that BrightSource needs to move. However, we will not be able to determine this until surveys of the translocation areas and the project sites are performed. At that point, we will know the precise number of individuals on the project site and have a more precise estimate of the number of individuals

within the translocation areas. If the translocation areas prove to be too small, BrightSource would have to identify a new translocation area for the additional desert tortoises. This action would constitute a significant change in the project description and would likely require re-initiation of consultation.

BrightSource has indicated that the 8-mile line to Mountain Pass will use existing poles and would require a 40-foot by 60-foot area of disturbance for every 10,000 feet of line. Consequently, we estimate that project work areas for installation of the fiber optic line would total 0.28 acre in size. Based on this estimate and the estimated density for this portion of the action area of approximately 7 subadult and/or adult desert tortoises per square mile, we anticipate that few, if any, desert tortoises or eggs are likely to be moved during installation of the fiber optic line. Because of the small size of work areas and the difficulty in locating juvenile desert tortoises and eggs, we do not anticipate the movement of any juvenile desert tortoises or eggs.

To prevent translocated desert tortoises from entering roadways following translocation, BrightSource will fence approximately 7 miles of Interstate 15 between Nipton Road and Yates Wells Road. BrightSource has indicated that it would require a 10-foot-wide area of disturbance to install desert tortoise exclusion fencing around the 3 phases of its project. We anticipate that it would require a similar disturbance right-of-way to install desert tortoise exclusion fencing along Interstate 15. Therefore, we estimate that fence installation will directly affect up to 9.1 acres (0.01 square mile). Boarman and Sazaki (2006) found that desert tortoise populations are depressed next to major roadways out to a distance of at least 400 meters (437.5 yards). Because the fence installation would occur along a major roadway and considering the estimated density of desert tortoises in this portion of the action area (i.e., 7 subadult and/or adult desert tortoises per square mile) and the small area of direct effects, we expect that fence installation will affect few desert tortoises or eggs.

Some potential exists that handling of desert tortoises may cause elevated levels of stress that may render these animals more susceptible to disease or dehydration from loss of fluids. Because BrightSource will use experienced biologists that are approved by the Service and approved handling techniques, collected desert tortoises are unlikely to suffer substantially elevated stress levels during handling.

Following release, we cannot predict the movement patterns that all translocated animals are likely to exhibit. Translocation studies, including a study performed in the Ivanpah Valley, have shown that straight-line movement distances following release can be over 3.73 miles in the first year for some desert tortoises (Berry 1986, Field et al. 2007, Nussear 2004). Mean dispersal distances observed on 3 study plots south of Fort Irwin ranged from 153.1 to 6,168 yards, with maximum dispersal distances of between 13,795 to 25,155.3 yards (Walde et al. 2008). For short distance translocations, data appear to indicate shorter post-translocation dispersal distances (79.8 to 1610.9 yards) (Walde et al. 2008). Translocated populations can also significantly expand the area they occupy in the first year following translocation (e.g., from 3.9 to 6.9 square miles at a Nevada site; from 0.2 to 10.3 square miles at a Utah site). The degree to which these

animals expand the area they use depends on whether the translocated animals are released into typical or atypical habitat; that is, if the translocation area supports habitat that is similar to that of the source area, desert tortoises are likely to move less (Nussear 2004).

Translocated animals appear to reduce movement distances following their first post-translocation hibernation to a level that is not significantly different from resident populations (Field et al. 2007, Nussear 2004). As time increases from the date of translocation, most desert tortoises change their movement patterns from dispersed, random patterns to more constrained patterns, which indicate an adoption of a new home range (Nussear 2004).

We cannot predict the direction that translocated animals are likely to move. In some studies, translocated desert tortoises have exhibited a tendency to orient toward the location of their capture and attempt to move in that direction (Berry 1986), but in other instances, no discernible homing tendency has been observed in translocated animals (Field et al. 2007). Information specific to short-distance translocations indicates that at least some individuals will attempt to return to their former home ranges after release (Stitt et al. 2003, Rakestraw 1997).

Based on this information, at least a portion of the translocated animals are likely to make extensive, long-distance movements during the first year following translocation and the area that the translocated population occupies is likely to increase significantly. Animals translocated more than 500 meters to the long-distance translocation areas or to the SEZ translocation area are most likely to exhibit this pattern. However, desert tortoises moved into the short-distance translocation area are more likely to move distances similar to that observed by Walde et al. (2008) because they will be translocated a relatively short distance. Some of the translocated desert tortoises are likely to attempt to return to the project site, where they would encounter the project site fence and either turn around or walk the fence line. Following the first hibernation period after translocation, individuals are likely to significantly reduce movement distances and establish new home ranges.

In one study, the majority of the dispersal movement away from the release site occurred during the first 2 weeks after translocation (Field et al. 2007). Desert tortoises that make long-distance movements following translocation can travel for 5 to 10 days and average 671.5 yards per day (Berry 1986). During this time and over the period prior to home range establishment, desert tortoises may suffer a higher potential for mortality because they are moving great distances through unfamiliar territory and are less likely to have established cover sites for protection. Studies have documented various sources of mortality for translocated individuals, including predation, exposure, fire, disease, crushing by cattle, and flooding (Nussear 2004, Field et al. 2007, Berry 1986, U.S. Army 2009, 2010). Of these, predation appears to be the primary source of mortality in most translocation studies (Nussear 2004, Field et al. 2007, U.S. Army 2009, 2010).

Based on the description of the action area in the Environmental Baseline section of this biological opinion, the potential exists for all six sources of mortality within the action area. However, fire is likely to be localized and highly dependent on the abundance of non-native

grasses and other weeds. The potential also exists for desert tortoises to die on roads during the period when translocated individuals are seeking new home range locations. However, because BrightSource will fence Interstate 15 prior to translocation, road kills are less likely to occur at this translocation site.

BrightSource has selected translocation areas in desert tortoise habitat that should serve as suitable recipient sites for these animals. It has also identified post-translocation density thresholds to ensure that the final translocation areas are large enough to accommodate all desert tortoises from the site. It has proposed numerous protective measures in its translocation plan that are likely to reduce the potential for mortality of translocated individuals. In addition, because construction and translocation will occur in phases and BrightSource has identified a 10 percent mortality threshold for the translocation effort, some potential exists that it can reduce the level of translocation-related effects through adaptive management. However, adaptive management measures are not available for our evaluation, so we cannot predict their effectiveness in this biological opinion.

Translocating desert tortoises may also adversely affect resident desert tortoises within the action area due to local increases in population density. Increased densities may result in an increased spread of upper respiratory tract disease or other diseases, an increased incidence of aggressive interactions between individuals, and an increased incidence of predation that may not have occurred in the absence of translocation. Saethre et al. (2003) evaluated the effects of density on desert tortoises in nine semi-natural enclosures at the Desert Tortoise Conservation Center in Nevada. The enclosures housed from approximately 289 to 2,890 desert tortoises per square mile. Saethre et al. (2003) observed a greater incidence of fighting during the first year of the experiment but did not detect any trends in body condition index, reproduction, or presence of the symptoms of upper respiratory tract disease among the enclosures. Body condition index and reproduction are important indicators of how translocation may affect resident desert tortoises; generally, stress suppresses body condition index and reproduction in desert tortoises. This study did not draw any conclusions regarding density-dependent effects on predation of desert tortoises. Additionally, as discussed previously in this section, desert tortoises tend to move substantial distances from the release sites; this behavior reduces the likelihood of overcrowding in smaller areas.

We anticipate that density-dependent effects on resident populations are likely to be minor for the following reasons: 1) current densities in the translocation areas are likely to be low based on our population estimates for the action area, 2) translocation will result in a dispersed release of individuals, 3) the translocation areas are not confined spaces, so released individuals would be able to disperse into other areas, and 4) BrightSource has identified a post-translocation density threshold for the translocation areas that is significantly lower than densities at which adverse effects were observed in previous studies.

Translocation has the potential to increase the prevalence of diseases, such as upper respiratory tract disease, in a resident population. Stress associated with handling and movement or due to density dependent effects could exacerbate this threat if translocated individuals with subclinical upper respiratory tract disease or other diseases begin to exhibit clinical signs of disease due to

the stress associated with handling and movement. This potential conversion of translocated desert tortoises from a non-contagious to contagious state may increase the potential for infection in the resident population above pre-translocation levels.

We cannot reasonably predict the increase in disease prevalence within the resident population that may occur due to translocation. However, the following mitigating circumstances are likely to reduce the magnitude of this threat: 1) BrightSource will use experienced biologists and approved handling techniques that are unlikely to result in substantially elevated stress levels in translocated animals, 2) desert tortoises on the project site are currently part of a continuous population with the resident populations of the translocation areas and are likely to share similar pathogens and immunities, 3) BrightSource will move some of the translocated desert tortoises a relatively short distance into the SEZ and western translocation areas, which is likely to reduce post-translocation stress associated with long-distance movements, 4) density dependent stress is unlikely to occur for the reasons discussed above, 5) BrightSource will not translocate any animal that either has clinical signs of disease or tests ELISA-positive, and 6) BrightSource has identified specific translocation buffers to prevent release of individuals within proximity of diseased resident animals.

Because ELISA testing can result in false positive results (i.e., an animal may test positive even though it is not a carrier of the disease) the potential exists for removal of healthy individuals from the translocated population due to concern over disease. These individuals would not be released into the wild and would no longer contribute to the environmental baseline for the action area. Because BrightSource would coordinate with the Service and perform follow-up testing of ELISA-positive individuals, the potential for removing false-positive individuals from the translocated population is low. Consequently, we conclude that few, if any, desert tortoises will be incorrectly removed from the population due to false positive results.

In a study conducted in Ivanpah Valley, 21.4 percent of 28 translocated desert tortoises died (Field et al. 2007). Other studies have documented mortality rates of 0, 15, and 21 percent in other areas (Nussear 2004, Cook et al. 1978 in Nussear 2004). Esque et al. (2010) observed mortality of 89 of 357 translocated desert tortoises (24.9 percent). Esque et al. (2010) and Nussear (2004) found that mortality among translocated animals was not statistically different from mortality observed in resident populations. In addition, Esque et al. (2010) found that mortality rates in resident (29 of 140 desert tortoises; 20.7 percent mortality), control (28 of 149 desert tortoises; 18.8 percent mortality), and translocated populations did not differ statistically and concluded that the translocation was not the cause of the observed mortality. With the exception of the Esque et al. (2010) study, none of the studies cited in this paragraph used controls to compare mortality rates in resident and translocated populations to the mortality rate experienced in populations not affected by translocation.

Based on the information that we have gathered and considering the uncertainty of site-specific applicability, we estimate that translocated, resident, and control desert tortoises are likely to experience mortality rates of approximately 30 percent due to predation, exposure, fire, disease, crushing by cattle and vehicles, and flooding. (We based our estimate of overall mortality in the

three populations on the work of Esque et al. (2010) and then buffered it to 30 percent to accommodate the additional mortality that would be likely to occur if all or most of the monitoring period occurs during years of low rainfall.) Consequently, we estimate that approximately 10, 87, and 226 translocated, resident, and control desert tortoises, respectively, may die during the 3-year post-translocation monitoring period. We conclude that mortality rates in the resident and translocated populations are unlikely to be elevated above levels that these populations would experience in the absence of translocation, based on the information provided in Esque et al. (2010). Therefore, we do not anticipate this mortality will be the result of translocation. The monitoring of a nearby control population will assist us in determining whether this prediction is realized. If monitoring shows this conclusion to be incorrect, this will constitute new information and require the re-initiation of consultation. One shortcoming of the proposed monitoring program is that, while it includes the observation of a control population that will not be affected in any manner by the translocation, it omits a mechanism to prompt the implementation of corrective actions if significant differences in mortality rates among the populations can be attributed to the translocation.

We have estimated that few, if any, desert tortoises are likely to be moved during installation of the fiber optic line. Because disturbance areas on this portion of the project are small, movement of desert tortoises immediately outside of the work area is not likely to remove them from their current home ranges. Consequently, any desert tortoise moved from the fiber optic line will likely continue to occupy familiar territory and use known shelter sites and is unlikely to suffer post-translocation mortality associated with displacement from the work area.

Many translocated juveniles will likely die due to their greater susceptibility to predation. Because we anticipate that BrightSource will move few, if any, juvenile desert tortoises, we do not anticipate a large amount of juvenile mortality associated with translocation because surveyors will miss most juvenile desert tortoises during clearance surveys. Consequently, most juveniles will likely die during construction. We have discussed this effect below.

Effects of Post-translocation Monitoring

Based on the description of the post translocation monitoring program and our estimate of the number of desert tortoises on the project site, we anticipate that BrightSource will attach transmitters to 96 desert tortoises to facilitate monitoring of the translocated, resident, and control populations. As a result, desert tortoises will carry transmitters and be monitored and handled periodically for visual health assessments. Some potential exists that handling of desert tortoises may cause elevated levels of stress that may render these animals more susceptible to disease or dehydration from loss of fluids. Because BrightSource will use experienced biologists, approved by the Service, and approved handling techniques, these desert tortoises are unlikely to suffer substantially elevated stress levels resulting from handling and monitoring activities.

Effects of Construction of the ISEGS Facilities

BrightSource will permanently fence all three project phases, Colosseum Road, and the CLA with desert tortoise exclusion fencing and clear all desert tortoises from the project site prior to ground disturbance. During construction of the permanent perimeter fencing and during other ground-disturbing activities that are outside of the permanently fenced facilities (i.e., fiber optic line, highway fence, natural gas distribution line), Bright Source will perform pre-activity clearance surveys and employ monitors to move desert tortoises out of harm's way if they re-enter work areas. For these reasons, we anticipate that construction, including construction access, is unlikely to kill subadult and adult desert tortoises. Some potential always exists that surveyors may miss an individual during clearance surveys and construction monitoring. We cannot predict how many subadult and adult desert tortoises that clearance surveys and construction monitoring would miss. However, because BrightSource will use qualified biologists, authorized by the Service for clearance surveys, we anticipate that the number is likely to be small.

In addition, juvenile desert tortoises and eggs are difficult to detect during clearance surveys and construction monitoring; therefore, the potential exists that surveyors may miss most of them and they are likely to remain in the work areas during construction. Juvenile desert tortoises and eggs that surveyors miss during clearance surveys or project monitoring are likely to be killed during construction. Based on the estimates in the Environmental Baseline section of this biological opinion, we estimate that as many as 35 juvenile desert tortoises (15, 7, and 13 from Ivanpah 1 and the CLA, Ivanpah 2, and Ivanpah 3, respectively) may be killed during construction. We have estimated that the reproductive females on the project site collectively produce as many as 139 desert tortoise eggs (61, 26, and 52 from Ivanpah 1 and the CLA, Ivanpah 2, and Ivanpah 3, respectively) per year. However, we cannot estimate how many of these eggs that construction activities would destroy because this number covers the entire year's total production, and we do not know what portion of this total will be present on site when construction activities are occurring on a given phase. In the Summary of Effects section (below) we discuss the significance of the loss of these individuals and eggs to the overall status of the species within the Northeastern Mojave Recovery Unit and range wide.

Effects of Operations and Maintenance Activities

Following fencing, operation and maintenance activities within permanently fenced areas are unlikely to directly injure or kill any desert tortoises. However, we have discussed additional indirect effects associated with operation and maintenance of this facility in the Miscellaneous Effects section later in this biological opinion.

Over the 45-year life of this project, BrightSource may conduct some ground-disturbing maintenance activities outside of fenced areas. These activities have the potential to injure or kill desert tortoises primarily as a result of vehicle strikes, as workers travel to and from work sites outside of the fenced areas; a limited possibility exists that desert tortoises could be injured or killed by equipment or workers moving around a work site. Because Class I maintenance

activities would not result in surface disturbance or loss of habitat and BrightSource would implement protective measures to reduce the potential for effects to desert tortoises, Class I maintenance activities would kill few, if any, desert tortoises.

Class II maintenance activities associated with repair of desert tortoise exclusion fencing would likely kill or injure few, if any, desert tortoises for the following reasons: 1) fence repairs are likely to result in minimal ground disturbance in localized areas, 2) at least a portion of the work area would be on disturbed areas within the fenced project site, 3) perimeter roads would exist that would allow access to most repair locations with minimal off-road travel, and 4) BrightSource would implement numerous protective measures to reduce the potential for injury or mortality of desert tortoises.

Because we do not have sufficient detail regarding the other types of maintenance activities discussed in the Description of the Proposed Action, we cannot adequately analyze the potential for injury or mortality of desert tortoises. Consequently, we are not analyzing Class III maintenance activities or any Class II maintenance activities that would occur outside of the fence and not be associated with repair of fencing. The Bureau has indicated that these actions would require future site-specific authorizations. At the time the Bureau considers authorization of these future activities, it will need to determine whether these future activities may affect desert tortoises. Some of these actions may require future site-specific consultation under section 7.

Effects of Restoration/Reclamation Activities

Decommissioning or restoration activities within the permanently fenced project area are unlikely to result in injury or mortality of desert tortoises. BrightSource will also need to perform restoration of long-term and short-term disturbance associated with the natural gas distribution line and fiber optic line. BrightSource would implement pre-activity clearance surveys and employ desert tortoise monitors to ensure that desert tortoises do not enter restoration work areas. Consequently, restoration activities will injure or kill few, if any, desert tortoises. These actions are likely to reduce the amount of time required to return disturbed areas to habitat suitable for desert tortoise occupancy. However, this process is likely to take several decades.

Effects of Accessing Worksites

BrightSource will fence the primary access road for the ISEGS facility (Colosseum Road) with desert tortoise exclusion fencing, so accessing the main fenced facilities is unlikely to result in injury or mortality of desert tortoises. In the event that the fence is damaged, a small number of desert tortoises could enter the roadway and be injured or killed. In addition, access of project work areas outside of the fenced facilities (i.e., natural gas pipeline, fiber optic line, highway fence) has the potential to injure or kill desert tortoises due to elevated use of existing routes. Because all workers will have undergone an education program about desert tortoises, workers may be less likely to strike desert tortoises than a casual user. We cannot predict how many

individuals will be killed or injured because of the variables involved, such as weather conditions, the nature and condition of the road, and activity patterns of desert tortoises at the time the roads are being used. However, we expect the number that would be injured or killed to be small and does not substantially change the number of desert tortoises that we anticipate may be killed or injured by the overall effects of the project.

Effects of Loss of Habitat

The biological assessment has defined permanent, long-term, and short-term disturbance as follows:

- Permanent Disturbance: project disturbance that would remain after the project's lifespan.
- Long-term Disturbance: project disturbance that would remain in place for the lifespan of the project, but would be restored following closure.
- Short-term disturbance: project disturbance restored within 5 years of the time of the disturbance.

Based on these definitions and the project description provided in the biological assessment, construction of the 3 project phases and the CLA, including installation of exclusion fencing, and improvements to Colosseum Road would result in 3,391.9 and 94 acres of permanent/long-term and short-term disturbance, respectively (CH2MHill 2009a). Installation of the natural gas distribution line and associated facilities will result in an additional 1.7 and 6 acres of new permanent/long-term and short-term disturbance. We anticipate that installation of fencing along Interstate 15 would temporarily disturb approximately 9.1 acres of desert tortoise habitat.

The following table, adapted from table 2.1-1 of the revised biological assessment (CH2MHill 2010a), provides details regarding the disturbance associated with each project feature.

Permanent and Long-term Disturbance	**Acres**
Ivanpah 1	913.5
Ivanpah 2	1,097
Ivanpah 3	1,227
CLA and SCE Substation	68.4
Gas Line	1.7
Colosseum Road	14.3
Total	**3,321.9**
Short-term disturbance	
CLA and SCE Substation	115.6
Gas Line	6.0
Construction areas for linear corridors	10.4
Credit for existing roads within project area	-9.9
Total	**122.1**

Based on the definitions above, we estimate that installation of the fiber optic line would result in approximately 0.28 acre of new short-term disturbance. In addition to the disturbances associated with construction of the ISEGS facility, Class II and III maintenance activities are likely to result in additional habitat disturbance over the 45-year life of the project. Based on the information provided, we cannot estimate the amount of disturbance associated with Class II and III maintenance activities over the life of the project. We are not analyzing these activities in the biological opinion because they will require future authorizations from the Bureau.

These disturbances are likely to result in desert tortoise habitat loss that will persist for various periods. Following extensive disturbance and compaction, Mojave Desert soils can take between 92 and 124 years to recover in the absence of active restoration (Webb 2002). In addition, recovery of plant cover and biomass in the Mojave Desert can require 50 to 300 years in the absence of restoration efforts (Lovich and Bainbridge 1999). Although active restoration, including decompaction, seeding, and planting, can reduce the time required to restore desert ecosystems, success is varied and dependent on numerous variables. Based on this information, 3,321.9 acres, currently characterized as permanent/long-term disturbance, are likely to be permanently lost or unsuitable as habitat for several decades following decommissioning of the facilities and commencement of restoration work. Because active restoration will occur, we estimate that BrightSource will restore 132 acres of short-term disturbance to desert tortoise habitat prior to decommissioning of the facility. Based on the information provided, we cannot estimate the amount or duration of habitat loss associated with Class II and III maintenance activities. Consequently, we are not analyzing the effects of these activities in this biological opinion. The Bureau has indicated that these actions will require future Bureau authorizations.

Based on the work by Nussear et al. (2009), we calculated that the Northeastern Mojave Recovery Unit contains approximately 7,583 square miles of modeled desert tortoise habitat. Because the model does not take into account existing human disturbance, we used a more conservative estimate in which we considered half of the modeled habitat was no longer suitable for desert tortoises because of development or degradation resulting from human activities; we also removed the 300,000 acres lost to fire in 2005. Therefore, based on this estimate, approximately 3,323 square miles of modeled desert tortoise habitat remain in the recovery unit. The habitat that would be disturbed on a long-term basis (i.e., approximately 3,322 acres) constitutes approximately 0.07 percent of the modeled habitat in the Northeastern Mojave Recovery Unit and approximately 0.15 percent of the modeled habitat if we use the conservative estimate. Although this percentage does not constitute a numerically substantial portion of the Northeastern Mojave Recovery Unit, we do not have the ability to place a numerical value on edge effects and overall fragmentation that the proposed action may cause or that occurs in the recovery unit as a whole. Given that, this low percentage of the recovery unit that would be lost likely underestimates the biological value of the area. However, the area where the ISEGS project is located is already substantially cut off from the remainder of the Northeastern Mojave Recovery Unit by Interstate 15, Ivanpah Lake, Primm, Nevada, and the Clark Mountains. Although the construction of the ISEGS facility will increase fragmentation and edge effect in

the area bounded by Interstate 15 and the Clark Mountains, it is unlikely to greatly increase fragmentation and edge effect when considered in the larger context of the recovery unit.

Effects of Compensation

The Bureau is proposing to require compensation for loss of habitat associated with this project at a ratio of 1:1 per the provisions of the Northern and Eastern Mojave Plan. Compensation will include acquisition of private lands containing desert tortoise habitat that will be placed under Bureau management and/or implementation of habitat enhancement and rehabilitation projects on public land. All acquisitions and habitat enhancements or rehabilitation actions associated with the Bureau's compensation requirements would be performed within the Northeastern Mojave Recovery Unit.

Potential habitat enhancement and rehabilitation actions that the Bureau has proposed, include highway fencing, fencing the boundary of two desert residential communities, non-native plant control, rehabilitation of closed routes, and identification and clean up of degraded sites (i.e., illegal dumps, illegal routes). All actions would occur within or would benefit Desert Wildlife Management Areas or other areas that are important to desert tortoise conservation in the Northeastern Mojave Recovery Unit or in nearby areas in the Eastern Mojave Recovery Unit. The mitigation that is ultimately implemented for the ISEGS project will involve implementation of some, if not all, of these actions solely or in some combination with land acquisition.

In addition to the Bureau's compensation strategy, the California Energy Commission has required BrightSource to compensate for the loss of desert tortoise habitat at a ratio of 2:1. Although these funds may be spent in locations outside of the Northeastern Mojave Recovery Unit, at least some funds are likely to be expended within the unit; we expect that these funds would be used to implement actions similar to those implemented by the Bureau and would also result in actions that would promote the conservation of the species. The California Energy Commission will also require BrightSource to provide funding for the implementation of regional management programs for the common raven.

Although acquisition of suitable desert tortoise habitat through these compensation requirements will not create new habitat within the Northeastern Mojave Recovery Unit, it will result in a net increase in the amount of desert tortoise habitat managed for the conservation of this species. In addition, the funding of management actions and regional management of common ravens is likely to result in restoration and rehabilitation of degraded habitat, protection of existing habitat from future sources of degradation, and a reduction in the direct mortality of desert tortoises. In general, the actions proposed for compensation are identified in the original and draft revised recovery plans (Service 1994, 2008) as being necessary for the recovery of the desert tortoise. These actions will increase the quantity and/or quality of habitat for the desert tortoise and reduce the number of existing threats and mortality sources in the areas where they occur. We cannot quantify the level of effects that these actions will have, but they are likely to reduce mortality of desert tortoises and improve habitat quality with the Northeastern and Eastern Mojave Recovery Units. Because habitat enhancement actions and land acquisition would occur

in Desert Wildlife Management Areas or other locations that are important to desert tortoise conservation, the proposed compensation requirements would provide a positive recovery benefit to the desert tortoise and offset loss of habitat and other adverse effects associated with the project.

Implementation of some habitat enhancement actions has the potential to result in adverse effects to the desert tortoise. Because we do not have specific information regarding future habitat enhancement and rehabilitation projects, we cannot perform a detailed analysis of these actions. The Bureau has indicated that these actions would require future project-specific authorizations prior to implementation. Consequently, we will address their adverse effects to the desert tortoise in future project-specific section 7 consultations.

Miscellaneous Effects

Indirect effects associated with construction, operation, maintenance, and decommissioning of the ISEGS facility may injure or kill desert tortoises. These effects include increased predation by common ravens that are attracted to the area because of increased human activity and modification of the habitat and diet of desert tortoises due to the spread of non-native plant species. Ivanpah Valley currently supports numerous facilities that subsidize common ravens (e.g., water sources, trash, road-killed animals, nest and roost sites, etc.); these facilities are associated with established communities (i.e., Primm, Nevada and Nipton, California), golf courses, an interstate highway, and utility lines that are likely to elevate the level of predation of desert tortoises by common ravens within the action area. Construction and operation of the ISEGS facility has the potential to attract additional common ravens and increase predation in the action area. BrightSource has proposed numerous measures to address predation by common ravens associated with the project site. These measures include subsidy control, a monitoring program, and contingencies for removal of problem common ravens. In addition, BrightSource will provide funds for implementation of regional management actions for common ravens.

We cannot reasonably predict the amount of predation by common ravens that construction and operation of this project is likely to add to baseline levels within the action area, but we anticipate that the program proposed by BrightSource is likely to be effective in eliminating some, but not all, common raven use of the project site. Depending on the location of specific control actions, funding of regional management of common ravens may also aid in reducing the amount of common raven predation on desert tortoises within the action area.

Non-native plant species currently occur on the proposed project site and are likely to occur in other portions of the action area at varying densities. Within Ivanpah Valley, numerous features serve as vectors for infestation of the action area by non-native plant species (e.g., highways, cattle allotment). However, construction and operation of the ISEGS facility has the potential to increase the distribution and abundance of non-native species within the action area due to ground-disturbing activities that favor the establishment of non-native species. In addition, access to the project site and other project features by construction and operations personnel is likely to increase the volume and distribution of non-native seed carried into the action area. The

increased abundance in non-native species associated with this project may result in an increased fire risk, which may result in future habitat loss.

BrightSource has proposed numerous measures to address control of non-native plant species within the project site. We cannot reasonably predict the increase in non-native species abundance that this project will create within the action area, but we anticipate that the program proposed by BrightSource will be reasonably effective in reducing the increase in some species. However, BrightSource has not proposed any measures to control species, such as red brome, that are ubiquitous in the area. Increases in the abundance of this species elevate the risk of fire, which, in turn, heightens the risk of future habitat loss, which could reduce the number and distribution of desert tortoises within the action area. We anticipate that BrightSource's use of herbicides in control of weeds would have minimal effects because these herbicides would be used within fenced areas that do not contain desert tortoises.

Summary of Effects

Prior to construction of the ISEGS facility, we estimate that BrightSource would capture and translocate approximately 32 subadult and/or adult desert tortoises from project worksites. We anticipate that they will translocate few, if any, juvenile desert tortoises. Because BrightSource will implement a variety of measures to reduce stress to these animals, we do not anticipate that injury or mortality will result from handling of these animals. We anticipate that disease screening associated with the translocation effort will result in the improper removal of few, if any, desert tortoises with false positive ELISA test results. Following release of translocated animals, we anticipate that approximately 30 percent (i.e., 10 subadult and/or adult desert tortoises) will die due to predation, exposure, fire, disease, crushing by cattle, road kills, or flooding. Most of this mortality is likely to occur in the first year after release, during the period that translocated animals are making long-distance movements and attempting to establish new home ranges. In addition, some resident desert tortoises in the translocation areas are likely to die due to the same causes of mortality. We have concluded that mortality rates within the resident and translocated populations are unlikely to be above what they would experience in the absence of translocation, and we do not anticipate that post-translocation mortality will actually be caused by the act of moving desert tortoises. If post-translocation monitoring indicates elevated levels of mortality in resident and translocated populations, re-initiation of consultation may be required to address this unanticipated effect.

We also anticipate that BrightSource may have to quarantine and collect blood from the 32 translocated animals and collect additional blood samples from 32 control animals and up to 98 resident desert tortoises to assess disease. Some potential exists that collection of blood from some of these individuals could result in injury, if done improperly. However, we anticipate that the number of desert tortoises that may be injured would be minimal because BrightSource would use experienced biologists authorized by the Service to perform these activities.

In addition to the 32 translocated desert tortoises that BrightSource would attach transmitters to and monitor following release, we estimate that they will attach transmitters to and monitor an

additional 32 resident and 32 control animals. We do not anticipate that placing transmitters on these animals or periodic handling for the purposes of monitoring will result in substantial adverse effects because BrightSource will use experienced biologists, approved by the Service, and approved handling techniques.

Because BrightSource will surround the majority of its work areas with desert tortoise exclusion fencing, perform clearance surveys on all work areas, and implement numerous measures to prevent injury and mortality of desert tortoises, we anticipate that construction of the ISEGS project site, including use of access routes, is likely to kill or injure few subadult and adult desert tortoises. Because of the difficulty detecting them, we estimate that project implementation may kill or injure up to 35 juvenile desert tortoises. We also anticipate that project construction will destroy any desert tortoise eggs within work areas; some eggs may be detected and moved to a translocation area, but most are unlikely to be found. Given the numerous variables discussed in this section, we cannot predict the precise number of eggs with any certainty.

Following construction, we do not anticipate that operations, maintenance, or restoration and reclamation activities within the permanently fenced portions of the ISEGS facility or regular access to the ISEGS facility along Colosseum Road will injure or kill desert tortoises. Because BrightSource would implement numerous protective measures, restoration activities in unfenced work areas are unlikely to injure or kill desert tortoises. We cannot accurately predict the number of desert tortoises that most Class II maintenance activities would kill or injure outside of the fenced project site because we do not have sufficient information to predict the location, frequency, or magnitude of these actions. However, Class I activities and Class II maintenance activities associated with fence repair would kill or injure few, if any, desert tortoises because of the nature of these activities and the protective measures that BrightSource would implement.

Project development will result in 3,297.03 acres of long-term/permanent disturbance to desert tortoise habitat. Although all of this area, except for the permanent facilities (i.e., SCE substation and gas metering stations), will undergo restoration/reclamation work, it is unlikely to serve as suitable desert tortoise habitat for many years following facility closure. We cannot predict the amount of time required to return areas of long-term disturbance to suitable desert tortoise habitat because of numerous variables associated with restoration success, including the timing and amount of rainfall. We estimate that BrightSource will return an additional 285.4 acres of short-term disturbance to suitable desert tortoise habitat by the end of the 45-year project lifespan.

Construction, operation, maintenance, and decommissioning of the ISEGS facility have the potential to increase common raven predation on desert tortoises within the action area. In addition, this project is likely to result in an increased abundance of non-native plant species and a subsequent increase in fire frequency within the action area. The measures proposed by BrightSource to address these threats will reduce the magnitude of these effects, but some level of adverse effect will likely persist. We cannot reasonable predict the number of desert tortoises that these threats will adversely affect.

The compensation required by the Bureau would, to some degree, offset the adverse effects of the proposed solar power facility. All of the actions that would be undertaken as compensation are consistent with recommendations for recovery of the desert tortoise. However, the lack of specificity with regard to which actions will be implemented, the uncertainty of success of the actions, and the time lag between implementation of the conservation actions and a substantive effect on recovery of the desert tortoise prohibit us from concluding that the compensation measures would completely offset the adverse effects of the solar facility. Because of the long term or permanent loss of approximately 3,297 acres of desert tortoise habitat, the project will likely result in a net decrease in desert tortoise habitat.

To conclude, areas disturbed by the proposed solar facility and its ancillary features would no longer support reproduction of desert tortoises. Most of the desert tortoises that currently reside within these areas will likely continue to reproduce after translocation. Consequently, we anticipate that the proposed action will not appreciably diminish the reproductive capacity of the species.

Implementation of the proposed action would not appreciably reduce the number of desert tortoises in the Northeastern Mojave Recovery Unit. Based on the amount of modeled desert tortoise habitat (7,583.39 square miles) and the average density (4.4 desert tortoises per square mile) that the Service has estimated for this recovery unit, we estimate that approximately 33,367 subadult and/or adult desert tortoises occur in the Northeastern Mojave Recovery Unit. Using the conservative estimate of the amount of remaining modeled habitat (i.e., 3,323 square miles; see the Effects of the Action - Effects of Loss of Habitat section of this biological opinion), we estimate that approximately 15,652 subadult and/or adult desert tortoises reside within the Northeastern Mojave Recovery Unit. Using this estimate and the information and methods described above for estimating the number of juvenile desert tortoises and eggs within the project site, action area, and translocation area, we estimate that the Northeastern Mojave Recovery Unit may contain approximately 16,422 juvenile desert tortoises in at any given time. Reproductive females within the Northeastern Mojave Recovery Unit may produce as many as 134,733 desert tortoise eggs over the course of a year. Consequently, we conclude that the number of desert tortoises and eggs that are likely to be lost as a result of the ISEGS project comprises a relatively small portion of the overall population in the Northeastern Mojave Recovery Unit.

In previous consultations, we estimated the number of desert tortoises found in the desert wildlife management areas and critical habitat by multiplying the average density of animals found in these areas by their total size. For the numbers of desert tortoises outside of those areas, we used a density value of one-tenth of that estimated within desert wildlife management areas and critical habitat, which we multiplied by the estimated area of available desert tortoise habitat. We did not correct for areas that were unsuitable habitat in either case in these past consultation estimates. Because the method of estimating the number of desert tortoises we use in this biological opinion takes into account a conservative estimate of modeled desert tortoise habitat, we used the same average density across all areas of desert tortoise habitat for our estimate.

The distribution of the desert tortoise would be reduced by approximately 5 square miles, based on the amount of long-term and permanent disturbance associated with the proposed action. As we mentioned previously in the biological opinion, this loss comprises approximately 0.07 percent of the modeled habitat in the Northeastern Mojave Recovery Unit and approximately 0.15 percent of the modeled habitat if we use the conservative estimate discussed previously in this section. Although this loss of habitat is likely to increase fragmentation of habitat and decrease the overall sustainability of the portion of the recovery unit that is isolated by Interstate 15, Ivanpah Lake, Primm, Nevada, and the Clark Mountains, it will not appreciably reduce the amount of habitat available to the desert tortoise when considered in the context of the entire Northeastern Mojave Recovery Unit.

Although the effects of this project on desert tortoises are substantial, we do not anticipate that it will result in effects that appreciably reduce the current distribution, numbers, or reproduction of the overall population within the Northeastern Mojave Recovery Unit or range wide. We anticipate that the compensation programs (i.e., one proposed by the Bureau and the other approved by the California Energy Commission) will result in an increase in the amount of habitat that is managed for the conservation of this species and will result in many advances in the implementation of recovery actions. We anticipate that this compensation will offset many adverse effects associated with this project. Taking into consideration the compensation that is proposed, the lack of statistical trends in population size in this recovery unit, and considering the relative scale of the adverse effects in context with our current estimates of the species' status in the Northeastern Mojave Recovery Unit and range wide, we do not anticipate that construction of this project would appreciably reduce our ability to recover the desert tortoise.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. The Bureau manages all of the land in the action area with the exception of two 640-acre sections owned by the State of California. There are no proposed, non-federal actions within these parcels.

CONCLUSION

After reviewing its status, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the desert tortoise. We have reached this conclusion because:

1. Project activities are likely to directly kill few subadult and adult desert tortoises because BrightSource will implement numerous measures to reduce the potential that desert tortoises will occupy project work sites (i.e., clearance surveys, exclusion fencing, translocation, qualified biologists, desert tortoise monitors).

2. The number of desert tortoises injured and killed as a result of translocation will likely be small relative to the number of desert tortoises that occur within the Northeastern Mojave Recovery Unit and across the range of the species.
3. BrightSource will implement numerous measures to reduce the potential for increased predation by common ravens and spread of non-native plant species.
4. Current information from permanent study plots and line distance sampling does not document a statistical trend in adult desert tortoise densities in this recovery unit. Therefore, we have no information to indicate that the loss of a small number of individuals as a result of this project would appreciably reduce our ability to reach population recovery objectives for the desert tortoise in the Northeastern Mojave Recovery Unit.
5. This project would not result in loss of desert tortoise habitat in areas that the Bureau or other agencies have designated for intensive management to achieve conservation of desert tortoises.
6. Compensation requirements through the Bureau and California Energy Commission will result in an increase in the amount of existing habitat that is managed for the conservation of the desert tortoise and will likely lead to restoration of lost or degraded habitat within these areas.
7. Regional management actions are likely to aid in reducing common raven predation in a portion of the desert tortoise's range.

As we noted previously in this biological opinion, the analysis we conduct under section 79a)(2) of the Endangered Species Act must be conducted in relation to the status of the entire listed taxon. We based the analysis in this biological opinion within the context of the Northeastern Mojave Recovery Unit because of the wide range of the desert tortoises. Because we have determined that the effects of this action would not compromise the integrity of the Northeastern Mojave Recovery Unit or impede the survival or recovery of the desert tortoises in a measurable manner in this portion of its range, we have not extended the analysis of the effects of this proposed action to the remainder of the range of the Mojave population of the desert tortoise.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act

provided that such taking is in compliance with the terms and conditions of an incidental take statement.

The measures described in this document are non-discretionary. The Bureau has a continuing duty to regulate the activities covered by the incidental take statement in the biological opinion. If the Bureau fails to include the terms and conditions of this incidental take statement as enforceable conditions of its right-of-way grant, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Bureau must report the progress of its action and its impact on the desert tortoise to the Service as specified in the incidental take statement [50 *Code of Federal Regulations* 402.14(i)(3)].

Translocation of Desert Tortoises

We anticipate that the translocation of approximately 32 subadult /adult desert tortoises from project facilities (i.e., Ivanpah 1, 2, and 3 project sites, the CLA, and natural gas distribution line) would involve take, in the form of capture and harassment, of all of these individuals. We anticipate the translocation of few, if any, desert tortoises from the fiber-optic line or highway fence project sites. We emphasize that these numbers are estimates, based on the best available information. The number of individuals translocated may be somewhat higher or lower. We anticipate that few, if any, of these individuals will be injured or killed due to handling.

We cannot precisely quantify how many juvenile desert tortoises eggs that project activities would take because we do not know how successful surveyors will be in locating them. However, we have estimated that as many as 35 juvenile desert tortoises may be on the project site, based on the number of adults detected during pre-project surveys and information on desert tortoise demographics. We have also estimated that as many as 139 desert tortoise eggs may be produced on the project site each year. Based on our estimate that few, if any, subadult and adult desert tortoises would be in project work sites on the fiber-optic line and highway fence, we anticipate that these portions of the action area will contain few, if any, juveniles or eggs. We emphasize that these numbers are estimates, based on the best available information; the number of individuals may be somewhat higher or lower. Because of the difficulty in locating juvenile desert tortoises and desert tortoise eggs and because of the difficulty in determining what proportion of the total number of eggs might be on site at the time that construction occurs, we anticipate that the total number taken in the form of capture for translocation will be a small fraction of these numbers. Any individuals and eggs that are not captured would likely be killed or injured by construction activities. We have discussed injury and mortality of these individuals later in this section.

We do not anticipate that the post-translocation mortality rates for the resident and translocated population will be statistically greater than that of the control population. Consequently, we do not anticipate take associated with translocation aside from what we have described in this incidental take statement.

Disease Testing

We anticipate that as many as 162 subadult and/or adult desert tortoises (i.e., 98, 32, and 32 in the resident, control, and translocated populations, respectively) will be taken, in the form of capture and harassment, when BrightSource collects blood to assess disease prevalence. Although such an invasive procedure presents some likelihood that individuals could be injured or killed, we do not anticipate that blood collection will result in the mortality of any individuals because BrightSource would use experienced biologists, authorized by the Service.

Post-translocation Monitoring

We anticipate the take, in the form of capture, of approximately 64 desert tortoises each in the resident and control population for monitoring. As discussed above, because the project site population may increase between now and the time of translocation, a somewhat larger number of desert tortoises may require monitoring depending on the final number of desert tortoises translocated. Although these animals and the 32 desert tortoises from the translocated population would be captured multiple times over the course of the post-translocation monitoring effort, we do not anticipate injury or mortality of these individuals as a result of the post-translocation monitoring.

Construction of ISEGS Facilities

We anticipate that construction of the ISEGS project site, including use of access routes, is likely to take, in the form of mortality or injury, few, if any, subadult or adult desert tortoises because BrightSource will fence the majority of its work areas with desert tortoise exclusion fencing, perform clearance surveys on all work areas, and implement numerous measures to prevent adverse effects to desert tortoises

We anticipate that construction of the ISEGS facilities is likely to take, in the form of mortality or injury, many of the juvenile desert tortoises and destroy eggs that occur within this area; because of the difficulty detecting them, these individuals and eggs are likely to be missed during clearance surveys. We have estimated that as many 35 juvenile desert tortoises may be on the project site and that as many as 139 desert tortoise eggs may be produced on the project site each year. Because of the difficulty in locating juvenile desert tortoises and eggs, we cannot determine a precise number because we do not know how successful surveyors will be at locating these individuals.

Compensation

All enhancement actions associated with the Bureau's compensation requirements will require future Bureau authorizations. Consequently, we have not provided incidental take exemptions for these actions in this biological opinion. These actions will require future project-specific consultation if they may affect the desert tortoise or other listed species.

Operation and Maintenance of ISEGS Facilities

We anticipate that operation and maintenance activities, including site access, within permanently fenced areas are likely to take few desert tortoises. A limited potential exists that a very small number of desert tortoises may find their way into a fenced area. Most of these individuals are likely to be taken in the form of capture as they are removed to offsite habitat; a small fraction of these individuals may be taken, in the form of injury or mortality, if they are exposed to adverse weather conditions or crushed by vehicles before they are detected.

We anticipate that Class I maintenance activities that are outside of fenced work areas and Class II maintenance activities associated with fence repair are likely to take, in the form of injury or mortality, few, if any, desert tortoises because Class I activities would not result in ground disturbance, Class II activities would be localized and infrequent, and access to repair sites would require little, if any, off-road travel. In addition, for all maintenance work, BrightSource would implement numerous protective measures to avoid killing or injuring desert tortoises. We anticipate that these maintenance activities may result in the take, in the form of capture, of a small number of desert tortoises if they are encountered during work activities and moved from harm's way.

Because we do not have sufficient information regarding the location or extent of other Class II and Class III maintenance activities that may occur outside of the permanently fenced work areas, we cannot determine the level of take associated with these activities. Consequently, we cannot provide an exemption from the prohibitions against take for these activities. These actions will require further site-specific or programmatic consultation.

Decommissioning and Restoration of ISEGS Facilities

We anticipate that restoration of temporary disturbance within fenced facilities during operation and maintenance or following decommissioning is unlikely to result in take of desert tortoises because BrightSource will clear all fenced areas of desert tortoises prior to construction of facilities. After facility closure, decommissioning activities and restoration of long-term disturbance within fenced areas are unlikely to take desert tortoises for the same reason. We anticipate that restoration of temporary disturbances and long-term disturbances outside of fenced work areas is likely to take, in the form of injury or mortality, few, if any, desert tortoises for the following reasons: 1) desert tortoise habitat will either be absent from restoration sites or will be of a substantially degraded nature that it will not attract desert tortoises; 2) BrightSource will implement clearance surveys of any restoration sites where ground-disturbing activities are likely to occur, 3) BrightSource will implement numerous measures to reduce the potential for take on restoration sites (e.g., worker education, desert tortoise monitors, etc.). We anticipate that a few desert tortoises are likely to be taken, in the form of capture as they are moved out of harm's way, during these activities. Because much of this work would occur many years from now, we cannot quantify the number of animals that are likely to be taken.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of desert tortoises during the implementation of the ISEGS project:

1. The Bureau must ensure that desert tortoises do not enter fenced project facilities.

2. The Bureau must ensure that the level of incidental take anticipated in this biological opinion is commensurate with the analysis contained herein.

3. The Bureau must ensure that translocation of desert tortoises does not result in injury or mortality of translocated or resident desert tortoises that is substantially elevated above natural injury and mortality rates within the action area.

4. The Bureau must ensure that desert tortoises carrying transmitters are routinely monitored to prevent loss of these animals prior to the removal of transmitters.

5. The Bureau must ensure that the ISEGS facility does not serve as a subsidy to common ravens.

6. The Bureau must ensure that desert tortoises that exhibit clinical signs of disease are not translocated.

7. The Bureau must ensure the proper implementation of health assessments and disease testing to ensure the accuracy of results and to minimize the injury of desert tortoises.

8. The Bureau must ensure that translocation does not result in density-dependent effects or disease related effects to the resident or translocated populations.

Our evaluation of the proposed action includes consideration of the protective measures described in the Description of the Proposed Action section of this biological opinion. Consequently, any changes in these protective measures may constitute a modification of the proposed action that causes an effect to the desert tortoise that was not considered in the biological opinion and require re-initiation of consultation, pursuant to the implementing regulations of the section 7(a)(2) of the Act (50 Code of Federal Regulations 402.16).

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Bureau must comply with the following terms and conditions, which implement the reasonable and prudent measures described in the previous section, or make them enforceable conditions of its right-of-way grant, and must comply with the reporting and monitoring requirements. These conditions are non-discretionary.

1. The following term and condition implements reasonable and prudent measure 1:

   The Bureau must ensure that BrightSource monitors the integrity of all desert tortoise exclusion fencing at least once a month and following any rain events that result in surface flow of water in washes within the action area. The Bureau must ensure that BrightSource promptly repairs any damage identified during monitoring.

2. The following terms and conditions implement reasonable and prudent measure 2:

   a. To ensure that the measures proposed by the Bureau and BrightSource are effective and are being properly implemented, the Bureau must contact the Service immediately if it becomes aware that a desert tortoise has been killed or injured by project activities. At that time, the Service and the Bureau must review the circumstances surrounding the incident to determine whether additional protective measures are required. Project activities may continue pending the outcome of the review, provided that the proposed protective measures and any appropriate terms and conditions of this biological opinion have been and continue to be fully implemented.

   b. If more than 38 subadult or adult desert tortoises are identified for translocation during clearance surveys of the project site, the Bureau must re-initiate consultation, pursuant to the implementing regulations for section 7(a)(2) of the Endangered Species Act at 50 Code of Federal Regulations 402.16, on the proposed action. This condition only applies to clearance of the project site for construction and does not apply to the short distance movement of desert tortoises out of harm's way during activities that occur outside of the fenced project site. Because we do not expect that capturing and removing desert tortoises from work areas outside of the project site is likely to result in injury or mortality of desert tortoises, we are not establishing a re-initiation criterion for that activity.

   c. If 9 desert tortoises are killed or injured as a result of any construction, operation, maintenance, decommissioning, or restoration activities covered by this biological opinion over the life of the ISEGS project, the Bureau must re-initiate consultation, pursuant to the implementing regulations for section 7(a)(2) of the Endangered Species Act at 50 Code of Federal Regulations 402.16, on the proposed action. This term and condition also applies to direct mortality and injury of desert tortoises during translocation and post-translocation monitoring on the resident, control, and translocated populations (i.e., due to handling, road kills, or other effects caused by personnel working on the project). However, it does not apply to post-translocation mortality within these populations that is not connected directly to an action required to carry out the translocation and monitoring effort.

   d. If 3 desert tortoises are killed or injured in any 1 year as a result of any construction, operation, maintenance, decommissioning, or restoration activities covered by this biological opinion, the Bureau must re-initiate consultation, pursuant to the implementing

regulations for section 7(a)(2) of the Endangered Species Act at 50 Code of Federal Regulations 402.16, on the proposed action. This term and condition also applies to direct mortality and injury of desert tortoises during translocation and post-translocation monitoring on the resident, control, and translocated populations (i.e., due to handling, road kills caused by personnel working on the project). However, it does not apply to post-translocation mortality within these populations that is not connected directly to an action required to carry out the translocation and monitoring effort.

3. The following term and condition implements reasonable and prudent measure 3:

   If monitoring of translocated and resident desert tortoises indicates a statistically significant elevation in mortality rates above that observed in control populations, the Bureau must re-initiate consultation, pursuant to the implementing regulations for section 7(a)(2) of the Endangered Species Act at 50 Code of Federal Regulations 402.16, on the proposed action.

4. The following terms and conditions implement reasonable and prudent measure 4:

   a. The Bureau must ensure that BrightSource monitors all translocated desert tortoises according to the following schedule: 1) within 24 hours of release, 2) twice weekly for the first 2 weeks after release, 3) starting the third week after release, at least once a week from March 1 to October 31 and once every other week from November 1 to February 28.

   b. The Bureau must ensure that BrightSource monitors all desert tortoises that carry transmitters in the resident and control populations at least once a week from March 1 to October 31 and once every other week from November 1 to February 28.

5. The following term and condition implements reasonable and prudent measure 5:

   The Bureau must meet with the Service to review data and reports associated with BrightSource's monitoring and adaptive management program for common ravens prior to the cessation of these activities. If the agencies determine that further monitoring and adaptive management are warranted, the Bureau must require BrightSource to extend these activities.

6. The following term and condition implements reasonable and prudent measure 6:

   After performance of visual health assessments on project-site desert tortoises, the Bureau must ensure that BrightSource contacts the Service with the results of the health assessments and the proposed disposition of each individual. The Bureau must ensure that BrightSource receives authorization for translocation of these individuals from the Service prior to commencement of translocation.

7. The following term and condition implements reasonable and prudent measure 7:

   The Bureau must ensure that all individuals that will perform visual health assessments and blood collection have been specifically authorized or trained for that activity by the Service. The Service must receive the credentials for all individuals seeking approval at least 30 days prior to the need for visual health assessments and blood collection.

8. The following terms and conditions implement reasonable and prudent measure 8:

   a. If pre-translocation surveys of the translocation area indicate that it cannot accommodate all desert tortoises from the ISEGS project under the threshold established in the description of the proposed action, the Bureau must re-initiate consultation, pursuant to the implementing regulations for section 7(a)(2) of the Endangered Species Act at 50 Code of Federal Regulations 402.16 to address modifications to the translocation plan.

   b. If pre-translocation surveys of the translocation areas indicate a disease prevalence of more than 5 percent or indicates that additional translocation areas will be required to accommodate the disease buffering requirements identified in the description of the proposed action, the Bureau must re-initiate consultation, pursuant to the implementing regulations for section 7(a)(2) of the Endangered Species Act at 50 Code of Federal Regulations 402.16 to address modifications to the translocation plan.

   c. The Bureau must ensure that BrightSource performs disease sampling of all areas that desert tortoises may move to following translocation as described in the Environmental Baseline section of this biological opinion (i.e., area bounded by Interstate 15, the Clark Mountains, Ivanpah Lake, and Primm, Nevada), as opposed to the 6 kilometer buffer identified in the project description.

Because of the complex nature of this incidental take statement, we have attached a summary of the levels of incidental take that would necessitate re-initiation of formal consultation.

REPORTING REQUIREMENTS

Within 60 days of the completion of the proposed action, the Bureau must provide a report to the Service that provides details on the effects of the action on the desert tortoise. The Bureau must also provide an annual report by December 31of each year during construction of each phase and during the subsequent translocation monitoring. Specifically, these reports must include information on the effectiveness and practicality of minimization measures, any instances when desert tortoises were killed, injured, or handled; the circumstances of such incidents and the specific information for each animal; and any actions undertaken to prevent similar instances from re-occurring. In addition, these reports should provide detailed information on the results of translocation monitoring to include the following: 1) location of all desert tortoises carrying transmitters, 2) mortality rate from each population, 3) statistical analysis of mortality rate between all three populations, and 4) health status and body condition of all desert tortoises that

carry transmitters. These reports should also provide an estimate of the actual acreage disturbed by various aspects of the construction and operation up to the time of the report. We recommend that the Bureau provide us with any recommendations that would facilitate the implementation of the protective measures while maintaining protection of the desert tortoise. We also request that the Bureau provide us with the names of any monitors who assisted the authorized biologist and an evaluation of the experience they gained on the project; the qualifications form on our website (http://www.fws.gov/ventura/sppinfo/protocols/deserttortoise_monitor-qualifications-statement.pdf), filled out for this project, along with any appropriate narrative would provide an appropriate level of information. This information would provide us with additional reference material in the event these individuals are submitted as potential authorized biologists for future projects.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that the Bureau work with BrightSource and the Service to determine if the desert tortoises associated with the resident, control, and translocated populations can be used to answer additional research questions related to translocation or desert tortoise biology.

2. We recommend that the Bureau amend the California Desert Conservation Area Plan to prohibit large-scale development (e.g., solar energy facilities, wind development, etc.) within the area bounded by Interstate 15, the State line, and Clark Mountains. We offer this recommendation because this area will have been used as a recipient site for translocated desert tortoises from the ISEGS project. Additionally, three other projects, the Joint Port of Entry, DesertXpress, and a pipeline extension from the Kern River Gas Transmission Company's line may be built in this valley. Given these activities, the potential exists that this portion of the Ivanpah Valley may be disturbed and fragmented to the extent that desert tortoises and other wildlife populations may be severely compromised.

3. We recommend that the Bureau perform additional wild burro gathers in the former Clark Mountain Herd Management Area to remove remaining burros that may adversely affect habitat within translocation areas.

4. Based upon our review, certain aspects of the weed management plan may result in an inefficient use of resources. We recommend that the Bureau and BrightSource work with the Mojave Resource Conservation District to develop a site-specific weed management plan that would be effective and efficient.

5. We recommend that the Bureau consider alternative configurations for this project that would focus ground disturbance on lands next to Interstate 15 that are likely to have very low desert tortoise densities.

The Service requests notification of the implementation of any conservation recommendations so we may be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats.

DISPOSITION OF DEAD OR INJURED DESERT TORTOISES

Within 3 days of locating any dead or injured desert tortoises, you must notify the Ventura Fish and Wildlife Office by telephone (805 644-1766) and by facsimile (805 644-3958) or electronic mail. The report must include the date, time, location of the carcass, a photograph, cause of death, if known, and any other pertinent information.

We will advise you on the appropriate means of disposing of the carcass when you contact us. We may advise you to provide it to a laboratory for analysis. Until we provide information on the disposition of the carcass, you must handle it such that the biological material is preserved in the best possible state for later analysis. If possible, the carcass should be kept on ice or refrigerated (not frozen) until we provide further direction.

Injured desert tortoises must be taken to a qualified veterinarian for treatment. If any injured desert tortoises survive, the Service must be contacted regarding their final disposition.

REINITIATION NOTICE

This concludes formal consultation on the Bureau's proposal to issue a right-of-way grant to BrightSource Energy for construction of the ISEGS facility in San Bernardino County, California. Reinitiation of formal consultation is required where discretionary federal involvement or control over the action has been retained or is authorized by law and: (a) if the amount or extent of taking specified in the incidental take statement is exceeded; (b) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (c) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (d) if a new species is listed or critical habitat designated that may be affected by the identified action (50 Code of Federal Regulations 402.16).

If you have any questions regarding this biological opinion, please contact Brian Croft of my staff at (951) 697-5365.

Attachment

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Summary of Levels of Take that Necessitate Re-initiation of Formal Consultation

The following table summarizes the incidental take that we anticipate for the ISEGS project and identifies re-initiation thresholds for capture, harassment, injury, and mortality as defined in the body of the incidental take statement or in the terms and conditions of this biological opinion.

Source of Take	Age Class	Anticipated Take		Re-initiation Thresholds based on Incidental Take Statement or Terms and Conditions	
		Captured and/or Harassed	Killed or Injured	Captured and/or Harassed[1]	Killed or Injured
Translocation and Disease Testing of Project Site Desert Tortoises	Subadult/Adult	~32	few, if any	38[2]	9 desert tortoises over the life of the project or 3 in any given year[5]
	Juveniles	few, if any	few, if any	35[2]	
	Eggs	few, if any	few, if any	139[2]	
Movement of desert tortoises off of the fiber-optic line and Interstate 15 fence alignment	Subadult/Adult	few, if any	few, if any	None established[3]	
	Juveniles	few, if any	few, if any	None established[3]	
	Eggs	few, if any	few, if any	NA	
Survey and Disease Testing of Control and Resident Population	Subadult/Adult	130[4]	few, if any	130	
	Juveniles	0	0	NA	
	Eggs	0	0	NA	
Construction of ISEGS Facility	Subadult/Adult	few, if any	few, if any[6]	38[2]	
	Juveniles	few, if any	Most[6]	35[2]	
	Eggs	few, if any	Most[6]	13[2]	
Operation and Maintenance	Subadult/Adult	few, if any	few, if any	None established[7]	
	Juveniles	few, if any	few, if any	None established[7]	
	Eggs	few, if any	few, if any	None established[7]	
Post-translocation Monitoring	Subadult/Adult	96[8]	few, if any	None established[3]	
	Juveniles	0	0	NA	
	Eggs	0	0	NA	
Effects of Translocation itself on Residents and Translocated desert tortoises	NA	NA	NA	NA	A statistically significant difference in mortality between the control and resident or translocated populations[10]
	NA	NA	NA	NA	
	NA	NA	NA	NA	
Decommissioning	Subadult/Adult	few, if any	few, if any	None established[2]	9 desert tortoises over the life of the project or 3 in any given year[5]
	Juveniles	few, if any	few, if any	None established[2]	
	Eggs	few, if any	few, if any	NA	

Table Notes:

1. By 'capture,' we mean the act, by authorized biologists (and monitors working under their supervision), of removing desert tortoises from their home ranges to be placed in a quarantine facility, translocated, or moved a short distance from harm's way. By 'harassment,' we mean the act, by authorized biologists, of collecting blood or conducting other invasive health assessments that may result in the likelihood of injury or mortality; see the regulatory definition of harassment in the Incidental Take Statement section of this biological opinion.
2. The re-initiation thresholds identified are the totals for both sources of take and do not represent separate take thresholds for each activity. For example, although we anticipate that 32 subadult and adult desert tortoises are likely to be captured for translocation at the project site, we have established a re-initiation trigger of 38 because we have determined this is the maximum number of subadult and adult desert tortoises that the recipient site is likely to be able to hold. If 38 or more subadult and adult desert tortoises are found onsite, re-initiation of formal consultation would be warranted.
3. No re-initiation trigger is set because this movement not likely to result in injury or mortality, given that these animals will remain within their home ranges. Also, a very small number of desert tortoises may need to be moved more than once to remove them from unfenced work areas and constraining the number of times the animal can be captured and moved would reduce the effectiveness of biological monitoring as a take minimization measure on these actions.
4. The 130 subadults and adults include 98 resident individuals and 32 control individuals.
5. Does not apply to post-translocation mortality that is not directly associated with an action required to carry out the translocation (e.g., handling, disease testing, accessing the translocation areas by vehicle, etc.).
6. We anticipate that any desert tortoises and eggs that are not translocated will be killed or injured by construction. We anticipate that few, if any, subadults and adults will be killed or injured because most will have been translocated. Because of their small size, juveniles and eggs are difficult to detect, so we anticipate that most will be killed or injured.
7. No re-initiation trigger because we only anticipate the capture of desert tortoises during operation and maintenance in instances where desert tortoise exclusion fencing has been washed out. In such rare situation, the biologically preferable option is to move the desert tortoises out of harm's way rather than leave them in place and in danger, while awaiting re-initiation of consultation.
8. Includes all control and translocated individuals identified above for capture and harassment associated with disease testing and translocation and a subset (32 individuals) of the resident population identified above. These individuals would be captured multiple times over the course of the post-translocation monitoring period, but we do not anticipate that these individuals would suffer harassment.
9. No re-initiation threshold set because multiple captures of the same individuals will be required to facilitate post-translocation monitoring.
10. For post-translocation monitoring only.

State of California

Business, Transportation and Housing Agency

Memorandum

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To: MR. JOE ESFANDIARY, Chief
Office of Transportation Architecture
Structure Design Branch 1
Mail Stop # 9-3/7J

Attention: MR. SHERVIN PAHLAVAN

Date: June 26, 2002
File: 08-SBD-15-179.6/KP289.0
08-368501
Mountain Pass JPOE
Agricultural inspection facility

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design - South MS #5

Subject: Foundation Recommendations

The proposed Agricultural inspection facility (AIF) consists of a one-story office building constructed of wood and light-gauge steel, and a drive-thru inspection canopy of structural steel components. There are also minor structures including a small storage building, a carport, a loading dock, and some retaining walls. The construction of this AIF is part of the planned Mountain pass Joint Port of Entry Facilities on west side of southbound Route 15 for the San Bernardino area. A request for the final foundation recommendations (dated November 13, 2000) for the subject facility was submitted to the Office of Geotechnical Design South by Mr. Joe Esfandiary (Branch Chief, Design Branch 1). The General plan (revised March 15, 2002), office Foundation plan (revised December, 10, 2001) and canopy Foundation plan (revised April 5, 2002) were received April 25, 2002.

A field study was completed on February 7, 2002 by Structure Foundations Branch F. The investigation consisted of drilling thirteen. 190mm diameter, hollow stem auger sampled borings. The new Log of Test Borings is being prepared and will be forwarded, which are to be included in the contract plans. A review of the recent soil test borings completed in 2002 provided the foundation evaluation.

All elevations provided in this report and shown on the new Log of Test Borings are based on the 1988 NAVD Vertical Datum.

Project Site Description

The proposed AIF will be built in an environmentally sensitive, flat, barren area between the old Las Vegas Highway (dirt road) and about 45 meters west of southbound Route 15. The site is located in San Bernardino County about 9 km south of California/Nevada State line, between Nipton and Yates Well roads. The site can be accessed from the Yates Well road exit off I-15 via the old Las Vegas Highway. The existing land in the area is primarily used as grazing land owned by the Bureau of Land Management.

Site Geology

Based on a Geological map of the area (Kingman sheet, by C.W.Jennings, 1961), the proposed site is located on west side of the Ivanpah Valley surrounded by the Clark Mountains on the west and south, and playa deposits of Chemehuevis lake on the north and east. Precambrian metamorphic rocks (gneiss, schist, granite) on the west and south, and Paleozoic marine sedimentary and metasedimentary rocks (limestone, dolomite, shale, sandstone) on the northwest, are part of the Clark Mountains deposits that surround the site.

Based on recent boring results, the site is underlain by valley alluviums and fan deposits. These deposits consist of very loose (at surface to a depth of ± 1.0 meter) to very dense (generally below the depth of 1.5 meter). The soil intervals include well graded sand with silt and interbeds of silty sand with caliche; scattered gravel throughout with occasional stringers; sparse small cobbles (≥150 mm diameter); intermittent caliche deposits as weak cementation and stringers. For detailed subsurface conditions and sediment lithology, refer to the Log of Test Borings.

Groundwater

Groundwater was not encountered during the 2002 field investigation. It is not anticipated that groundwater will be encountered during the footing constructions. However, if the footings are constructed during the precipitation periods, water seepage could become a problem. It should be noted that ground water levels could fluctuate with the change of season and other factors.

Corrosion Potential

Composite soil samples were taken from four different borings at two different depth intervals, from ground surface to the bottom of the boring depth. These samples were sent to District 07 laboratory for corrosion testing. The test results indicated a non-corrosive environment at the proposed site. Although two of the test results show low resistivity (due to excessive presence of caliche), further testing revealed the results to be below Caltrans threshold for chloride and sulfate content. Therefore, normal construction material and design are advised. Since the footings will be placed on fill material, the borrow pit material should be inspected and tested prior to bringing the fill material to the site.

However, the gravel grains at the site and vicinity could be reactive if mixed with untreated concrete. If contractor decides to use the local supply of gravel in concrete batches, Mr. Douglas Parks of Corrosion Technology Branch should be contacted at 916-227-7007, regarding specific questions concerning corrosion recommendations. Refer to Table No. 1 below for specific test results.

Table No. 1
Soil-Corrosion Test Summary

Boring Number	Depth Interval (Meter)	Sample Date	PH	Minimum Resistivity (ohm-cm)	Chloride Content* (ppm)	Sulfate Content* (ppm)	Estimated Design Life Based on 18 Gauge CMP
02-2	0.00-1.52	2/4/02	7.77	1703	N/A	N/A	31 years
	1.52-9.90	2/4/02	8.11	1022	N/A	N/A	25 years
02-5	0.00-1.98	2/5/02	8.01	2043	N/A	N/A	33 years
	1.98-9.60	2/5/02	8.28	885	170	390	
02-9	0.00-1.52	2/6/02	8.11	5108	N/A	N/A	49 years
	1.52-9.14	2/6/02	8.13	885	120	710	
02-12	0.00-1.82	2/7/02	7.88	11577	N/A	N/A	68 years
	1.82-9.75	2/7/02	8.14	3609	N/A	N/A	42 years

Note: For corrosion definitions refer to "Memo to Designers" 3-1.
* The Corrosion Technology Branch policy states that if the minimum resistivity is greater than 1000 ohm-cm the area is considered to be non-corrosive and sulfate and chloride contents are not tested.

Liquefaction Potential

Based on lack of ground water and the dense to very dense state of the underlying granular material, the potential for liquefaction may not be of concern during a maximum credible earthquake.

Seismicity

The Pahrump-Stateline fault (M=7.0) is mapped about 9 km (5.5 mi) northwesterly of the site. The estimated peak horizontal bedrock acceleration at the site is 0.4g. Also a trace of Ivanpah fault is mapped about 2.8 km (1.8 mi), south southwesterly of the site, but this fault is not considered the controlling fault.

For seismic design information and site specific criteria, the office of Geotechnical Earthquake Engineering should be contacted for final seismic recommendations.

Foundation Recommendations

The following foundation recommendations are for the proposed AIF buildings as shown on the 1) General Plan revised March 15, 2002, 2) Office Foundation Plan revised December 10, 2001, 3) Canopy Foundation Plan revised April 05, 2002, 4) Carport Foundation and Footing Plan revised March 12, 2001, 5) Office Foundation details 2ST-1.9 revised December 11, 2001, and 2ST-3.1 revised December, 05, 2001, 6) Canopy Foundation details (2ST-2.6) revised February 13, 2002. Also a request letter dated November 13, 2000, and personal communications with Mr. Shervin Pahlavan.

The footings at the proposed site will be placed on new compacted fill material of various thick nesses. The native granular soil is loose at the surface to a shallow depth, and will settle when the

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new fill is emplaced. To avoid post construction differential settlement, the following remedial soil treatment should be made to improve the foundation conditions:

Overexcavate 1.0 meter of the existing soil at the office building, inspection canopy, carport, truck inspection lanes, storage building and loading dock. The excavated areas should be back filled to the bottom of footing grade with new fill or removed native soil when free of organic material and large rocks, and compacted to 95% Relative Compaction.

At all building locations, overexcavate the entire building footprint. At canopies of the inspection area and carport, where the isolated footings are used, overexcavate underneath each individual footing only. The limits of removal and compaction shall comply with Section 19-5.03 of the Standard Specifications for retaining wall footings without the pile foundations within the limits established by inclined planes sloping 1:1.5 (vertical : horizontal) out and down from lines 0.3 m outside the bottom edges of the footing. Recommended soil bearing pressures to be used for design are provided below in Table No. 2.

Table No. 2
Spread Footing Data

Support Location	Isolated Column Minimum Footing (width & length) m (ft)	Bearing Wall Minimum Footing width &thickness m (ft)	Bottom of Footing Elevation m	Fill Thickness m (ft)	Gross Allowable Soil Bearing Pressure (q_{all})
Office-Columns	1.22 x 1.22 (4.0 x 4.0)		843.28	1.73 - 2.49 (5.6 - 8.1)	95 kPa (1.0 tsf)
Canopy-Columns	2.75 x 2.75 (9.0 x 9.0)		843.38	1.81 - 2.59 (5.9 - 8.5)	95 kPa (1.0 tsf)
Canopy-Columns	1.20 x 1.20 (4.0 x 4.0)		843.38	1.81 - 2.59 (5.9 - 8.5)	95 kPa (1.0 tsf)
Carport-Columns	1.83 x 1.83 (6.0 x 6.0)		843.38	1.67 (5.5)	95 kPa (1.0 tsf)
Office-Walls		0.46 x 0.46 (1.5 x 1.5)	843.28	1.73 - 2.49 (5.6 - 8.1)	144 kPa (1.5 tsf)
Storage Building		0.46 x 0.46 (1.5 x 1.5)	843.28	1.83 (6.0)	144 kPa (1.5 tsf)
Loading-Dock		0.46 x 0.46 (1.5 x 1.5)	843.28	1.76 (5.7)	144 kPa (1.5 tsf)

Notes: The Maximum Contact Pressure, (q_{max}), is not to exceed the recommended Gross Allowable Soil Bearing Pressure, (q_{all}). The Ultimate Soil Bearing Capacity, (q_{ult}), will equal or exceed 3 times the recommended Gross Allowable Soil Bearing Pressure, (q_{all}).

General Notes

All support locations are to be plotted on the Log of Test Borings in plan view as stated in "Memo to Designers" 4-2. The plotting of the support locations should be completed prior to requesting a foundation review.

Construction Considerations

1. Quality control should be practiced to ensure that bottom of the footing excavation is level and clear of any loose debris. Should any large rock be found in embankment fill material, at the bottom of the footing elevations, the contractor should be prepared to remove, and replace them with granular material at 95% RC.
2. The fill is to be constructed in accordance with Sections 19-5.03 and 19-6.01 of the Standard Specifications and other requirements as directed by the Design Engineer. End dumping is not to be permitted.
3. Although groundwater was not measured during the field study, if construction is commenced during or shortly after the rainy season, inflow and/or seepage into the footing excavation should be expected.

The recommendations contained in this report are based on specific project information regarding design loads, structure type and support locations that has been provided by the Office of Transportation Architecture. If any conceptual changes are made during final project design, the Office of Geotechnical Design - South should review those changes to determine if these foundation recommendations are still applicable. Any questions or comments regarding the above recommendations should be directed to Faramarz Gerami at (562) 864-8472 or Ted Liu at (562) 864-0805.

Prepared by: Date: 7-3-02 Supervised by: Date: 7-3-02

REGISTERED PROFESSIONAL ENGINEER
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O.Alcantara - Proj Mgmt
J.Cosmez - PCE (MS#9-5/12F)
J.Ehsan - GDS
RGES.30

State of California

Business, Transportation and Housing Agency

Memorandum

Flex your power!
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To: MR. JOE ESFANDIARY, Chief
Office of Transportation Architecture
Structure Design Branch 1
Mail Stop # 9-3/7J

Date: June 26, 2002
File: 08-SBD-15-178.5/KP287.26
08-368501
Mountain Pass JPOE
Commercial Vehicle
Enforcement Facility

Attention: MR. SHERVIN PAHLAVAN

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design - South MS #5

Subject: Foundation Recommendations

The proposed Commercial Vehicle Enforcement Facility (CVEF) consists of a one-story office building and a one-story truck inspection area constructed of masonry and structural steel. There are also two small steel framed canopies. The construction of this CVEF is part of the planned Mountain pass Joint Port of Entry Facilities on west side of southbound Route 15 for the San Bernardino area. A request for the final foundation recommendations (dated November 13, 2000) for the subject facility was submitted to the Office of Geotechnical Design South by Mr. Joe Esfandiary (Branch Chief, Design Branch 1). The General plan (revised February 26, 2002), Office Foundation plan (revised February 28, 2002) and Inspection Area Foundation plan (revised November 21, 2001) were received April 22, 2002.

A field study was completed on February 21, 2002 by Structure Foundations Branch F. The investigation consisted of drilling nine, 190mm diameter, hollow stem auger sampled borings. The new Log of Test Borings is being prepared and will be forwarded, which are to be included in the contract plans. A review of the recent soil test borings completed in 2002 provided the foundation evaluation.

All elevations provided in this report and shown on the new Log of Test Borings are based on the 1988 NAVD Vertical Datum.

Project Site Description

The proposed CVEF will be built in an environmentally sensitive, flat, barren area between the old Las Vegas Highway (dirt road) and about 45 meters west of southbound Route 15. The site is located in San Bernardino County about 12 km south of California/Nevada State line, between Nipton and Yates Well roads. The site can be accessed from the Yates Well road exit off I-15 via the old Las Vegas Highway. The existing land in the area is primarily used as grazing land owned by the Bureau of Land Management.

Site Geology

Based on Geological map of the area (Kingman sheet, by C.W.Jennings, 1961), the proposed site is located on west side of the Ivanpah Valley surrounded by the Clark Mountains on the west and south, and playa deposits of Chemehuevis lake on the north and east. Precambrian metamorphic rocks (gneiss, schist, granite) on the west and south, and Paleozoic marine sedimentary and metasedimentary rocks (limestone, dolomite, shale, sandstone) on the northwest, are part of the Clark Mountains deposits that surround the site.

Based on recent boring results, the site in underlain by valley alluviums and fan deposits. These deposits consist of loose to very dense well graded sand with silt and interbeds of silty sand; scattered gravel throughout with occasional cobbles (≥200 mm diameter); intermittent caliche deposits as weak cementation and stringers. For detailed subsurface conditions and sediment lithology, refer to the Log of Test Borings.

Groundwater was not encountered during the 2002 field investigation. It is not anticipated that groundwater will be encountered during the footing constructions. However, if the footings are constructed during the precipitation periods, water seepage could become a problem. It should be noted that ground water levels could fluctuate with the change of season and other factors.

Corrosion Potential

Composite soil samples were taken from three different borings at two different depth intervals, from ground surface to the bottom of the boring depth. These samples were sent to District 07 laboratory for corrosion testing. The test results indicated a non-corrosive environment at the proposed site. Normal construction material and design are advised. Since the footings will be placed on fill material, the borrow pit material should be inspected and tested prior to bringing the fill material to the site. However, the gravel grains at the site and vicinity could be reactive if mixed with untreated concrete. If contractor decides to use the local supply of gravel in concrete batches, Mr. Douglas Parks of Corrosion Technology Branch should be contacted at 916-227-7007, regarding specific questions concerning corrosion recommendations. Refer to Table No. 1 below for specific test results.

Table No. 1: Soil-Corrosion Test Summary

Boring Number	Depth Interval (Meter)	Sample Date	PH	Minimum Resistivity (ohm-cm)	Chloride Content* (ppm)	Sulfate Content* (ppm)	Estimated Design Life Based on 18 Gauge CMP
02-1	0.00-1.82	2/7/02	7.95	11577	N/A	N/A	68 years
	1.82-9.75	2/7/02	8.65	4358	N/A	N/A	46 years
02-4	0.00-1.52	2/20/02	8.39	6470	N/A	N/A	54 years
	1.52-9.14	2/20/02	8.33	5380	N/A	N/A	50 years
02-9	0.00-1.52	2/21/02	8.06	13620	N/A	N/A	73 years
	1.52-9.14	2/21/02	8.39	6470	N/A	N/A	54 years

Note: For corrosion definitions refer to "Memo to Designers" 3-1.
* The Corrosion Technology Branch policy states that if the minimum resistivity is greater than 1000 ohm-cm the area is considered to be non-corrosive and sulfate and chloride contents are not tested.

Liquefaction Potential

Based on lack of ground water and the dense to very dense state of the underlying granular material, the potential for liquefaction may not be of concern during a maximum credible earthquake.

Seismicity

The Pahrump-Stateline fault (M=7.0) is mapped about 10.5 km (6.5 mi) northwesterly of the site. The estimated peak horizontal bedrock acceleration at the site is 0.4g. Also a trace of Ivanpah fault is mapped about 2.8 km (1.8 mi), south southwesterly of the site, but this fault is not considered the controlling fault.

For seismic design information and site specific criteria, the office of Geotechnical Earthquake Engineering should be contacted for final seismic recommendations.

Foundation Recommendations

The following foundation recommendations are for the proposed CVEF buildings as shown on the 1) General Plan revised February 26, 2002, 2) Office Foundation Plan revised February 28,2002, 3) Inspection Area Foundation Plan revised April 04, 2002, 4) Foundation details 1ST-1.17, 1ST-1.18 revised February 23, 2002, 1ST-1.19 revised November 21, 2001 and 1ST-1.20 revised May 17, 2002, 5) Column and wall details revised April 18, 2002, 6) Request letter dated November 13, 2000, and 7) personal communications with Mr. Shervin Pahlavan.

The bearing walls and column footings at the northern 2/3 of the proposed site will be placed on new compacted fill material of various thicknesses. However, the bearing walls and column footings at the southern 1/3 will be located in a cut and placed on native material. The native granular soil is loose at the surface to a shallow depth, and will settle when the new fill is emplaced. To avoid post construction differential settlement, the following remedial soil treatment should be made to improve the foundation conditions:

Overexcavate 1.0 meter of existing soil where the footings are placed on fill material. Where the footings are placed in cut section of less than 1.0 meter deep, overexcavate to a full depth of 1.0 meter. The excavated areas should be back filled to the bottom of footing grade with new fill or removed native soil when free of organic material and large rocks, and compacted to 95% Relative Compaction.

At all building locations, overexcavate the entire building footprint. At canopies, where the isolated footings are used, overexcavate underneath each individual footing only. The limits of removal and compaction shall comply with Section 19-5.03 of the Standard Specifications for retaining wall footings without the pile foundations within the limits established by inclined planes sloping 1:1.5 (vertical : horizontal) out and down from lines 0.3 meter outside the bottom edges of

the footing. Recommended soil bearing pressures to be used for design are provided below in Table No. 2 & 3.

Table No. 2: Spread Footing Data - Office building

Support Location	Isolated Column Minimum Footing (width & length) m (ft)	Bearing Wall Minimum Footing width & thickness m (ft)	Bottom of Footing Elevation m	Fill/Cut Thickness m (ft)	Gross Allowable Soil Bearing Pressure (q_{all})
OFFICE COLUMNS					
Isolated Columns					
A-①	1.22 x 1.22 (4.0 x 4.0)		885.53	0.30 - cut (1.0)	95 kPa (1.0 tsf)
B-③	1.52 x 1.52 (5.0 x 5.0)			0.30 - cut (1.0)	145 kPa (1.5 tsf)
C-②	2.44 x 2.44 (8.0 x 8.0)			0.30 - cut (1.0)	95 kPa (1.0 tsf)
Combination columns					
①	1.22 x 1.22 (4.0 x 4.0)				95 kPa (1.0 tsf)
②	1.22 x 1.22 (4.0 x 4.0)				145 kPa (1.5 tsf)
③	1.22 x 1.22 (4.0 x 4.0)				190 kPa (2.0 tsf)
④	1.22 x 1.22 (4.0 x 4.0)				190 kPa (2.0 tsf)
OFFICE WALLS		0.45 x 0.45 (1.5 x 1.5)	886.30	Fill on north half 0.78 - 1.81 (2.5 - 6.0) Cut on south half 0.30 (1.0)	144 kPa (1.5 tsf)

Table No. 3: Spread Footing Data - Inspection Bay

Support Location	Isolated Column Minimum Footing (width & length) m (ft)	Bearing Wall Minimum Footing width &thickness m (ft)	Bottom of Footing Elevation m	Fill/Cut Thickness m (ft)	Gross Allowable Soil Bearing Pressure (q_{all})
Steel Columns (Rows F & H)	1.52 x 1.52 (5.0 x 5.0)		885.39	0.60 - fill (2.0)	191 kPa (2.0 tsf)
Concrete Columns (Rows D & K)	3.20 x 3.20 (10.5 x 10.5)			Fill at Row-D 0.60 (2.0) Cut at Row-K 0.48 (1.6)	240 kPa (2.5 tsf) 240 kPa (2.5 tsf)
Bearing Walls		0.45 x 0.45 (1.5 x 1.5)	885.39	0.50 - fill (1.6)	144 kPa (1.5 tsf)

Notes: The Maximum Contact Pressure, (q_{max}), is not to exceed the recommended Gross Allowable Soil Bearing Pressure, (q_{all}). The Ultimate Soil Bearing Capacity, (q_{ult}), will equal or exceed 3 times the recommended Gross Allowable Soil Bearing Pressure. (q_{all}).

① Circled numbers represent column type

A,B,C, Represent footing types

General Notes

All support locations are to be plotted on the Log of Test Borings in plan view as stated in "Memo to Designers" 4-2. The plotting of the support locations should be completed prior to requesting a foundation review.

Construction Considerations

1. Quality control should be practiced to ensure that bottom of the footing excavation is level and clear of any loose debris. Should any large rock be found in embankment fill material, at the bottom of the footing elevations, the contractor should be prepared to remove, and replace them with granular material at 95% RC.

2. The fill is to be constructed in accordance with Sections 19-5.03 and 19-6.01 of the Standard Specifications and other requirements as directed by the Design Engineer. End dumping is not to be permitted.

3. Although ground water was not measured during the field study, if construction is commenced during or shortly after the rainy season, inflow and/or seepage into the footing excavation should be expected.

The recommendations contained in this report are based on specific project information regarding design loads, structure type and support locations that has been provided by the Office of

Transportation Architecture. If any conceptual changes are made during final project design, the Office of Geotechnical Design - South should review those changes to determine if these foundation recommendations are still applicable. Any questions or comments regarding the above recommendations should be directed to Faramarz Gerami at (562) 864-8472 or Ted Liu at (562) 864-0805.

Prepared by: Date: 7-3-02 Supervised by: Date: 7-3-02

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J.Ehsan - GDS
Geology Bridge File - LA (2)
Geology Bridge File - Sac
RGES.30

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Memorandum

Flex your power!
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To: MR. DAN ADAMS
Structures Design
Office of Bridge Design
Bridge Design Branch 10
MS #9

Attention: Mr. Larry Wu

Date: May 6, 2008

File: 08-SBD-15-179.4 PM
08-368501
Ivanpah Ditch (AIF Truck)
Br. #54-1216J

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 2 MS #5
Design Branch B

Subject: Revised Foundation Report

This Revised Foundation Report supercedes the "original" Foundation Report, dated June 12, 2002, for the proposed Ivanpah Ditch (AIF Truck) bridge (Br. #54-1216J). This Revised Foundation Report is in response to changes in pile diameters, pile cut-off elevations, and design loadings at the Abutment 1 and 5 locations, as well as changes in footing widths, bottom of footing elevations, and the changing in design from LFD to LRFD. The sole purpose of this Revised Foundation Report is to provide updated foundation recommendations based on the design changes mentioned above. All elevations provided in this report are based on the NGVD 29 vertical datum.

Project Description

The proposed Ivanpah Ditch (AIF Truck) bridge will be built over the Ivanpah Ditch/channel, located approximately 330 ft west of southbound Route 15. The site is located in San Bernardino County about 6 mi south of the California/Nevada State line, between Nipton and Yates Well roads. The creek channel is dry most of the year but carries occasional flash flood water.

The Ivanpah Ditch (AIF Truck) bridge (Br. #54-1216J), is proposed to be a 4-span, cast-in-place, reinforced concrete slab structure with end diaphragm abutments and five-column bents.

Site Geology

The foundation investigation performed in January 2002 consisted of two mud rotary borings. Based on the 2002 foundation investigation, the site is underlain by alluvial valley and/or alluvial fan deposits. The earth materials encountered at that site can be generally separated into two units. The upper unit consists of medium dense, poorly and well graded sand with silt and gravel. The lower unit consists of dense to very dense, silty sand, poorly graded sand and well graded sand with silt, gravel and cobbles. For specific details regarding subsurface conditions, refer to the Log of Test Borings (LOTBs) sheets.

Scour Potential

The Final Hydraulic Report, dated April 11, 2008, states a potential scour depth of 4.0 ft and scour elevation of 2777.03 ft. The scour elevation is approximately 1.0 ft above the top of the footing elevations at the bent locations. For additional hydrology and hydraulic information, refer to the Final Hydraulic Report, dated April 11, 2008, by Tony Nedwick of the Office of Design & Technical Services.

Groundwater

Groundwater was not encountered during the 2002 field investigation, and is not anticipated to be encountered during the footing constructions. The creek channel is dry most of the year but carries occasional flash flood water. It should be noted that even though the Ivanpah Ditch is dry most of the year, it has the potential to flow and inundate the creek basin during periods of heavy rain. The contractor should select construction methods that take into account these conditions. At the time of construction, the groundwater surface elevations may be significantly higher or lower than those shown in the LOTBs, due to seasonal runoffs.

Corrosion Potential

During the 2002 foundation investigation, soil samples were collected from Boring # 02-1 and were tested for corrosive potential by the District 7 laboratory. All of the soils samples tested are considered non-corrosive by current Caltrans standards. For specific test results, refer to Table 1 below.

Table No. 1 Soil-Corrosion Test Summary

Boring Number	Depth Interval (ft)	Sample Date	PH	Minimum Resistivity (ohm-cm)	Chloride Content*	Sulfate Content*
02-1	0.0-5.0	1/30/02	7.90	5380	N/A	N/A
02-1	5.0-30.0	1/30/02	8.40	3614	N/A	N/A
02-1	30.0-50.0	1/30/02	8.60	3609	N/A	N/A
02-1	50.0-91.0	1/30/02	8.63	3133	N/A	N/A

Note: Caltrans currently defines a site to be corrosive to foundation elements if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: Chloride concentration is more than 500 ppm, sulfate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less. With the exception of MSE walls, soil and water are not tested for chlorides and sulfates if the minimum resistivity is greater than 1,000 ohm-cm.

Fault and Seismic Data

The structure site is potentially subject to strong ground motions from nearby sources during the design life of the new structure. The controlling fault for the site is Pahrump-Stateline fault located approximately 6.0 mi northwesterly of the site. The estimated peak horizontal bedrock acceleration at the site is 0.4g. The fault is capable of generating a Maximum Credible Earthquake moment magnitude (M_w) of 7.0. Mahmoud Khojasteh of the Office of Geotechnical Design-South 2 is in process of providing final seismic design recommendations, which will be forward to your office when completed.

Liquefaction Potential

Based on the dense to very dense state of underlying granular material combined with the fact that groundwater was not encountered, the potential for liquefaction is considered non-existent.

Foundation Recommendations

The revised pile cut-off elevations, design loadings, and specified pile tip elevations for Abutments 1 and 5 are presented in Table 2, below. The ultimate geotechnical pile capacity for the CIDH piles will meet or exceed the required nominal resistance in compression listed below in Table 2.

Table 2: Abutments 1 and 5 - CIDH Pile Data (Br. #54-1216J)

Location	Pile Type	Design Loading	Nominal Resistance		Pile Cut-off Elevation	Design Tip Elevation	Specified Tip Elevation
			Compression	Tension			
Abutment 1	16 in CIDH	90 kips	180 kips	-0-	2788.0 ft	2763.0 ft (1) (2)	2763.0 ft
Abutment 5	16 in CIDH	90 kips	180 kips	-0-	2787.0 ft	2763.0 ft (1) (2)	2763.0 ft

Note: Design tip elevation is controlled by the following demands: (1) Compression (2) Scour to elevation 2777.03 ft

Spread footings may be used for support at the Bents 2, 3 and 4 locations. The revised bottom of footing elevations, bottom of subexcavation elevations, and revised footing dimensions are shown below in Table 3. The controlling vertical loadings, moments, shears and effective footing dimensions are presented below in Table 4. The factored nominal bearing resistances for the controlling strength and extreme limit states are shown below in Table 5.

Table 3: Bent Spread Footing Dimensions (Br. #54-1216J)

Location	Bottom of Footing Elevation	Bottom of Subexcavation Elevation	Footing Dimensions			Depth of Footing[3] (D_f)
			Length (L_L)[1]	Length (L_T)[2]	Thickness (t)	
Bent 2	2774.2 ft	2773.2 ft	6.0 ft	6.0 ft	2.0 ft	3.0 ft
Bent 3	2774.0 ft	2773.0 ft	6.0 ft	6.0 ft	2.0 ft	3.0 ft
Bent 4	2774.0 ft	2773.0 ft	6.0 ft	6.0 ft	2.0 ft	3.0 ft

Notes: 1) (L_L) Longitudinal direction.
2) (L_T) Transverse direction.
3) (D_f) Minimum footing embedment depth used to determine factored nominal bearing resistances.

Table 4: Bent Controlling Loading Conditions (Br. #54-1216J)

Limit State[1]	Moment[2]		Shear[3]		Vertical Loading[4]	Effective Footing Dimensions		Estimated Settlement
	M_T	M_L	S_T	S_L		$(L_L)^5$	$(L_T)^6$	
Service	0 k-ft	0 k-ft	0 kips	0 kips	131 k	6.0 ft	6.0 ft	< 0.5 in
Strength	0 k-ft	0 k-ft	0 kips	0 kips	219 k	6.0 ft	6.0 ft	N/A
Extreme	0 k-ft	0 k-ft	0 kips	0 kips	108 k	6.0 ft	6.0 ft	< 0.5 in

Notes: 1) Only the controlling design Loading conditions for each Limit State are listed
2) (M_T) Moment in transverse direction at top of footing. (M_L) Moment in longitudinal direction at top of footing.
3) (S_T) Shear in transverse direction at top of footing. (S_L) Shear in longitudinal direction at top of footing.
Per accepted design practice and Seismic Design Criteria 7.7.1.1, designer did not use shear in moment calculation.
4) Vertical loading is the total vertical load , which includes the weight of the spread footing and soil cover on the footing.
5) (L_L) Longitudinal direction.
6) (L_T) Transverse direction.

Table 5: Bent Spread Footing Data (Br. #54-1216J)

Support Location	LRFD		
	Service	Strength $\varphi_b = 0.45$	Extreme Event $\varphi_b = 1.00$
	Permissible Net Contact Stress	Factored Nominal Bearing Resistance	Factored Nominal Bearing Resistance
Bent 2	N/A*	6.5 ksf	14.4 ksf
Bent 3	N/A*	6.5 ksf	14.4 ksf
Bent 4	N/A*	6.5 ksf	14.4 ksf

Note: *N/A due to bottom of footing on very dense alluvium.

The recommended factored nominal bearing resistances provided in Table 5, above, are based on the following design criteria:

1) The Bents 2, 3, and 4 footings shall be constructed at or below the recommended elevations shown in Table 3 above.

2) At the Bents 2, 3, 4 locations, native material below the bottom of spread footing elevations shall be subexcavated to the elevations shown in Table 3, above, and replaced with Class 3 concrete. The limits of subexcavation and replacement shall conform to the limits defined for relative compaction under retaining wall footings without piles as defined in section 19-5.03 of the Standard Specifications. If the bottom of footing elevations are lowered, the limit of subexcavation (elevations) are to be lowered accordingly.

3) The Bents 2, 3, and 4 footings have the minimum footing dimensions as shown in Table 3.

4) The controlling Bents 2, 3, and 4 footing vertical loads, moments, and shear forces used for footing design are as shown in Table 4.

If any of the above footing dimensions are reduced, bottom of footing elevations, vertical load, moment, or shear forces increased, or the scour elevation lowered, the Office of Geotechnical Design-South 2, Branch B, is to be contacted for reevaluation.

General Notes:

All support locations are to be plotted in plan view on the LOTB as stated in "Memo to Designers" 4-2. The plotting of support locations should be made prior to requesting a final foundation review.

Construction Considerations

- Groundwater was not encountered during the 2002 subsurface investigation, and it is not anticipated that the contractor will encounter groundwater during spread footing and CIDH pile construction. It should be noted that even though the Ivanpah Ditch is dry most of the year, it has the potential to flow and inundate the creek basin during periods of heavy rain. The contractor should select construction methods that take into account these conditions. At the time of construction, the groundwater surface elevations may be significantly higher or lower than those shown on the report, due to seasonal runoffs.

- At Abutments 1 & 5 support locations, the calculated capacity of all CIDH piles is based on skin friction only and no end-bearing was considered. The skin friction zones used to calculate geotechnical capacity of the CIDH piles are from elevation 2777.0 ft to elevation 2765.0 ft for both abutments.

- At Bents 2, 3, and 4 support locations, subexcavation and replacement is specified due to the presence of gravels and cobbles in the native material at the bottom of footing elevations. Due to the presence of gravels and cobbles, it will, most likely, be difficult for the contractor to be able to subexcavate cleanly to the bottom of footing elevations listed in Table 3, above, without leaving the bottom of excavations undisturbed. Therefore, the recommendation to subexcavate below the footing elevations, and backfill, up to bottom of footing elevations with Class 3 concrete, is presented here to prevent the footing concrete from being placed on disturbed native material, and to provide a uniform, level pad upon which to construct the footings.

- At Bents 2, 3, and 4 support locations, concrete for the subexcavation shall be placed neat against the native material at the bottom of subexcavations. Should the bottom of subexcavations be disturbed, then the bottom of the subexcavations shall be recompacted to 95% relative compaction.

Any questions regarding the above recommendations should be directed to the attention of TM Liao, (916) 227-5756, at the Office of Geotechnical Design-South 2, Branch B.

Prepared by: Date: 5-6-08

D. Te-Ming Liao, P.E., C59838
Transportation Engineer-Civil
Office of Geotechnical Design-South 2
Design Branch B

Reviewed by: Date: 5/6/08

Erich Neupert

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Engineering Geologist
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John Stayton - Specs & Estimates (4)
Rong Dang– District 08 (Project Engineer)
Abbas Abghari – OGDS-2
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Project File

State of California

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. DAN ADAMS
Structures Design
Office of Bridge Design
Design Branch 10
MS #9

Attention: Mr. Larry Wu

Date: May 6, 2008

File: 08-SBD-15-179.4 PMBridge
08-368501
Ivanpah Ditch (AIF Auto)
Br. #54-1215K

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 2 MS #5
Design Branch B

Subject: Revised Foundation Report

This Revised Foundation Report supercedes the "original" Foundation Report, dated June 12, 2002, for the proposed Ivanpah Ditch (AIF Auto) bridge (Br. #54-1215K). This Revised Foundation Report is in response to changes in pile diameters, pile cut-off elevations, and design loadings at the Abutment 1 and 5 locations, as well as changes in footing widths, bottom of footing elevations, and the changing in design from LFD to LRFD. The sole purpose of this Revised Foundation Report is to provide updated foundation recommendations based on the design changes mentioned above. All elevations provided in this report are based on the NGVD 29 vertical datum.

Project Description

The proposed Ivanpah Ditch (AIF Auto) bridge will be built over the Ivanpah Ditch/channel, located approximately 160 ft west of southbound Route 15. The site is located in San Bernardino County about 6 mi south of the California/Nevada State line, between Nipton and Yates Well roads. The creek channel is dry most of the year but carries occasional flash flood water.

The Ivanpah Ditch (AIF Auto) bridge (Br. #54-1215K), is proposed to be a 4-span, cast-in-place, reinforced concrete slab structure with end diaphragm abutments and eight-column bents.

Site Geology

The foundation investigation performed in January 2002 consisted of two mud rotary borings. Based on the 2002 foundation investigation, the site is underlain by alluvial valley and/or alluvial fan deposits. The earth materials encountered at that site can be generally separated into two units. The upper unit consists of medium dense, poorly and well graded sand with silt and gravel. The lower unit consists of dense to very dense, silty sand, poorly graded sand and well graded sand with silt, gravel and cobbles. For specific details regarding subsurface conditions, refer to the Log of Test Borings (LOTBs) sheets.

Scour Potential

The Final Hydraulic Report, dated April 11, 2008, states a potential scour depth of 4.0 ft and scour elevation of 2773.77 ft. The scour elevation is approximately at the top of the footing elevations at the bent locations. For additional hydrology and hydraulic information, refer to the Final Hydraulic Report, dated April 11, 2008, by Tony Nedwick of the Office of Design & Technical Services.

Groundwater

Groundwater was not encountered during the 2002 field investigation, and is not anticipated to be encountered during the footing constructions. The creek channel is dry most of the year but carries occasional flash flood water. It should be noted that even though the Ivanpah Ditch is dry most of the year, it has the potential to flow and inundate the creek basin during periods of heavy rain. The contractor should select construction methods that take into account these conditions. At the time of construction, the groundwater surface elevations may be significantly higher or lower than those shown in the LOTBs, due to seasonal runoffs.

Corrosion Potential

During the 2002 foundation investigation, soil samples were collected from Boring # 02-2 and were tested for corrosive potential by the District 7 laboratory. All of the soils samples tested are considered non-corrosive by current Caltrans standards. For specific test results, refer to Table 1 below.

Table No. 1 Soil-Corrosion Test Summary

Boring Number	Depth Interval (ft)	Sample Date	PH	Minimum Resistivity (ohm-cm)	Chloride Content*	Sulfate Content*
02-2	0.0-5.0	1/29/02	8.00	5380	N/A	N/A
02-2	5.0-50.0	1/29/02	8.73	1586	N/A	N/A
02-2	50.0-85.0	1/29/02	8.88	2584	N/A	N/A

Note: Caltrans currently defines a site to be corrosive to foundation elements if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: Chloride concentration is more than 500 ppm, sulfate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less. With the exception of MSE walls, soil and water are not tested for chlorides and sulfates if the minimum resistivity is greater than 1,000 ohm-cm.

Fault and Seismic Data

The structure site is potentially subject to strong ground motions from nearby sources during the design life of the new structure. The controlling fault for the site is Pahrump-Stateline fault located approximately 6.0 mi northwesterly of the site. The estimated peak horizontal bedrock acceleration at the site is 0.4g. The fault is capable of generating a Maximum Credible Earthquake moment magnitude (M_w) of 7.0. Mahmoud Khojasteh of the Office of Geotechnical Design-South 2 is in process of providing final seismic design recommendations, which will be forward to your office when completed.

Liquefaction Potential

Based on the dense to very dense state of underlying granular material combined with the fact that groundwater was not encountered, the potential for liquefaction is considered non-existent.

Foundation Recommendations

The revised pile cut-off elevations, design loadings, and specified pile tip elevations for Abutments 1 and 5 are presented in Table 2, below. The ultimate geotechnical pile capacity for the CIDH piles will meet or exceed the required nominal resistance in compression listed below in Table 2.

Table 2 Abutments 1 and 5 - CIDH Pile Data (Br. #54-1215K)

Location	Pile Type	Design Loading	Nominal Resistance		Pile Cut-off Elevation	Design Tip Elevation	Specified Tip Elevation
			Compression	Tension			
Abutment 1	16 in CIDH	90 kips	180 kips	-0-	2783.8 ft	2759.0 ft (1) (2)	2759.0 ft
Abutment 5	16 in CIDH	90 kips	180 kips	-0-	2782.5 ft	2759.0 ft (1) (2)	2759.0 ft

Note: Design tip elevation is controlled by the following demands: (1) Compression (2) Scour to elevation 2773.77 ft

Spread footings may be used for support at the Bents 2, 3 and 4 locations. The revised bottom of footing elevations, bottom of subexcavation elevations, and revised footing dimensions are shown below in Table 3. The controlling vertical loadings, moments, shears and effective footing dimensions are presented below in Table 4. The factored nominal bearing resistances for the controlling strength and extreme limit states are shown below in Table 5.

Table 3: Bent Spread Footing Dimensions (Br. #54-1215K)

Location	Bottom of Footing Elevation	Bottom of Subexcavation Elevation	Footing Dimensions			Depth of Footing[3] (D_f)
			Length (L_L)[1]	Length (L_T)[2]	Thickness (t)	
Bent 2	2770.4 ft	2769.4 ft	6.0 ft	6.0 ft	2.0 ft	2.0 ft
Bent 3	2771.8 ft	2770.8 ft	6.0 ft	6.0 ft	2.0 ft	2.0 ft
Bent 4	2771.8 ft	2770.8 ft	6.0 ft	6.0 ft	2.0 ft	2.0 ft

Notes: 1) (L_L) Longitudinal direction.
2) (L_T) Transverse direction.
3) (D_f) Minimum footing embedment depth used to determine factored nominal bearing resistances.

Table 4: Bent Controlling Loading Conditions (Br. #54-1215K)

Limit State[1]	Moment[2]		Shear[3]		Vertical Loading[4]	Effective Footing Dimensions		Estimated Settlement
	M_T	M_L	S_T	S_L		$(L_L)^5$	$(L_T)^6$	
Service	0 k-ft	0 k-ft	0 kips	0 kips	120 k	6.0 ft	6.0 ft	< 0.5 in
Strength	0 k-ft	0 k-ft	0 kips	0 kips	194 k	6.0 ft	6.0 ft	N/A
Extreme	0 k-ft	0 k-ft	0 kips	0 kips	99 k	6.0 ft	6.0 ft	< 0.5 in

Notes: 1) Only the controlling design Loading conditions for each Limit State are listed
2) (M_T) Moment in transverse direction at top of footing. (M_L) Moment in longitudinal direction at top of footing.
3) (S_T) Shear in transverse direction at top of footing. (S_L) Shear in longitudinal direction at top of footing.
Per accepted design practice and Seismic Design Criteria 7.7.1.1, designer did not use shear in moment calculation.
4) Vertical loading is the total vertical load , which includes the weight of the spread footing and soil cover on the footing.
5) (L_L) Longitudinal direction.
6) (L_T) Transverse direction.

Table 5: Bent Spread Footing Data (Br. #54-1215K)

Support Location	LRFD		
	Service	Strength $\varphi_b = 0.45$	Extreme Event $\varphi_b = 1.00$
	Permissible Net Contact Stress	Factored Nominal Bearing Resistance	Factored Nominal Bearing Resistance
Bent 2	N/A*	6.5 ksf	14.4 ksf
Bent 3	N/A*	6.5 ksf	14.4 ksf
Bent 4	N/A*	6.5 ksf	14.4 ksf

Note: *N/A due to bottom of footing on very dense alluvium.

The recommended factored nominal bearing resistances provided in Table 5, above, are based on the following design criteria:

1) The Bents 2, 3, and 4 footings shall be constructed at or below the recommended elevations shown in Table 3 above.

2) At the Bents 2, 3, 4 locations, native material below the bottom of spread footing elevations shall be subexcavated to the elevations shown in Table 3, above, and replaced with Class 3 concrete. The limits of subexcavation and replacement shall conform to the limits defined for relative compaction under retaining wall footings without piles as defined in section 19-5.03 of the Standard Specifications. If the bottom of footing elevations are lowered, the limit of subexcavation (elevations) are to be lowered accordingly.

3) The Bents 2, 3, and 4 footings have the minimum footing dimensions as shown in Table 3.

4) The controlling Bents 2, 3, and 4 footing vertical loads, moments, and shear forces used for footing design are as shown in Table 4.

If any of the above footing dimensions are reduced, bottom of footing elevations, vertical load, moment, or shear forces increased, or the scour elevation lowered, the Office of Geotechnical Design-South 2, Branch B, is to be contacted for reevaluation.

General Notes:

All support locations are to be plotted in plan view on the LOTB as stated in "Memo to Designers" 4-2. The plotting of support locations should be made prior to requesting a final foundation review.

Construction Considerations

- Groundwater was not encountered during the 2002 subsurface investigation, and it is not anticipated that the contractor will encounter groundwater during spread footing and CIDH pile construction. It should be noted that even though the Ivanpah Ditch is dry most of the year, it has the potential to flow and inundate the creek basin during periods of heavy rain. The contractor should select construction methods that take into account these conditions. At the time of construction, the groundwater surface elevations may be significantly higher or lower than those shown on the report, due to seasonal runoffs.

- At Abutments 1 & 5 support locations, the calculated capacity of all CIDH piles is based on skin friction only and no end-bearing was considered. The skin friction zones used to calculate geotechnical capacity of the CIDH piles are from elevation 2773.0 ft to elevation 2761.0 ft for both abutments.

- At Bents 2, 3, and 4 support locations, subexcavation and replacement is specified due to the presence of gravels and cobbles in the native material at the bottom of footing elevations. Due to the presence of gravels and cobbles, it will, most likely, be difficult for the contractor to be able to subexcavate cleanly to the bottom of footing elevations listed in Table 3, above, without leaving the bottom of excavations undisturbed. Therefore, the recommendation to subexcavate below the footing elevations, and backfill, up to bottom of footing elevations with Class 3 concrete, is presented here to prevent the footing concrete from being placed on disturbed native material, and to provide a uniform, level pad upon which to construct the footings.

- At Bents 2, 3, and 4 support locations, concrete for the subexcavation shall be placed neat against the native material at the bottom of subexcavations. Should the bottom of subexcavations be disturbed, then the bottom of the subexcavations shall be recompacted to 95% relative compaction.

Any questions regarding the above recommendations should be directed to the attention of TM Liao, (916) 227-5756, at the Office of Geotechnical Design-South 2, Branch B.

Prepared by: Date: 5-6-08

D. Te-Ming Liao, P.E., C59838
Transportation Engineer-Civil
Office of Geotechnical Design-South 2
Design Branch B

Reviewed by: Date: 5/6/08

Erich Neupert

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cc: R.E. Pending File
John Stayton - Specs & Estimates (4)
Rong Dang– District 08 (Project Engineer)
Abbas Abghari – OGDS-2
Mark DeSalvatore-OGDS-2
Project File

Memorandum

Flex your power!
Be energy efficient!

To: MR. DAN ADAMS, CHIEF
BRIDGE DESIGN BRANCH 10
OFFICE OF BRIDGE DESIGN SOUTH 2
STRUCTURE DESIGN, MS9–4/8I

Attention: Mr. Larry Wu

Date: May 6, 2008

File: 11-SBd-15-PM 179.39
08-368501

Joint Port of Entry
AIF Auto Lane Bridge
Bridge No. 54-1215K

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES - MS 5
OFFICE OF GEOTECHNICAL EARTHQUAKE ENGINEERING

Subject: Seismic Design Recommendations

This memorandum presents seismic design recommendations for the above bridge and supersedes our memorandum of June 27, 2007. .

Seismicity

The bridge is not listed on the 1996 Caltrans Seismic Hazard Map. By scaling, the site is located at a distance of about 10 km from the Pahrump-Stateline Fault (PAS, Mw = 7.0, Normal Fault) and is located within peak horizontal bedrock acceleration zone of PBA = 0.4g. The value of PBA was verified using Sadigh et al. (1997) attenuation relation. A copy of the local seismic map is attached.

Soil Profile Type

From the logs of test borings conducted in 2002, the site is classified as soil profile type C as defined in Appendix B of Seismic Design Criteria (SDC).

ARS Curve

Standard SDC acceleration response spectrum (ARS), Figure B-5, PBA = 0.4g, $M_w = 7.0$, and soil profile type C is recommended for design. ARS curve was modified for near fault directivity effect, as per SDC Version 1.4 Section 6.1.2.1. A copy of the design response spectrum is attached for your reference

Liquefaction

Subsurface soil consists of layers of dense to very dense sand and silty sand with fine to coarse gravel. Ground water has not been reported. As such the potential for liquefaction appears to be nil.

Surface Fault Rupture

The site is not located inside Earthquake Fault Zones as delineated by the California Geological Survey Maps developed under the Alquist-Priolo Earthquake Fault Zoning Act. The potential for surface fault rupture hazard is considered low.

If you have any questions, please call Mahmoud Khojasteh at (916) 227-7154.

M. Khojasteh

MAHMOUD KHOJASTEH
Senior Materials and Research Engineer

REGISTERED PROFESSIONAL ENGINEER
MAHMOUD KHOJASTEH
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STATE OF CALIFORNIA

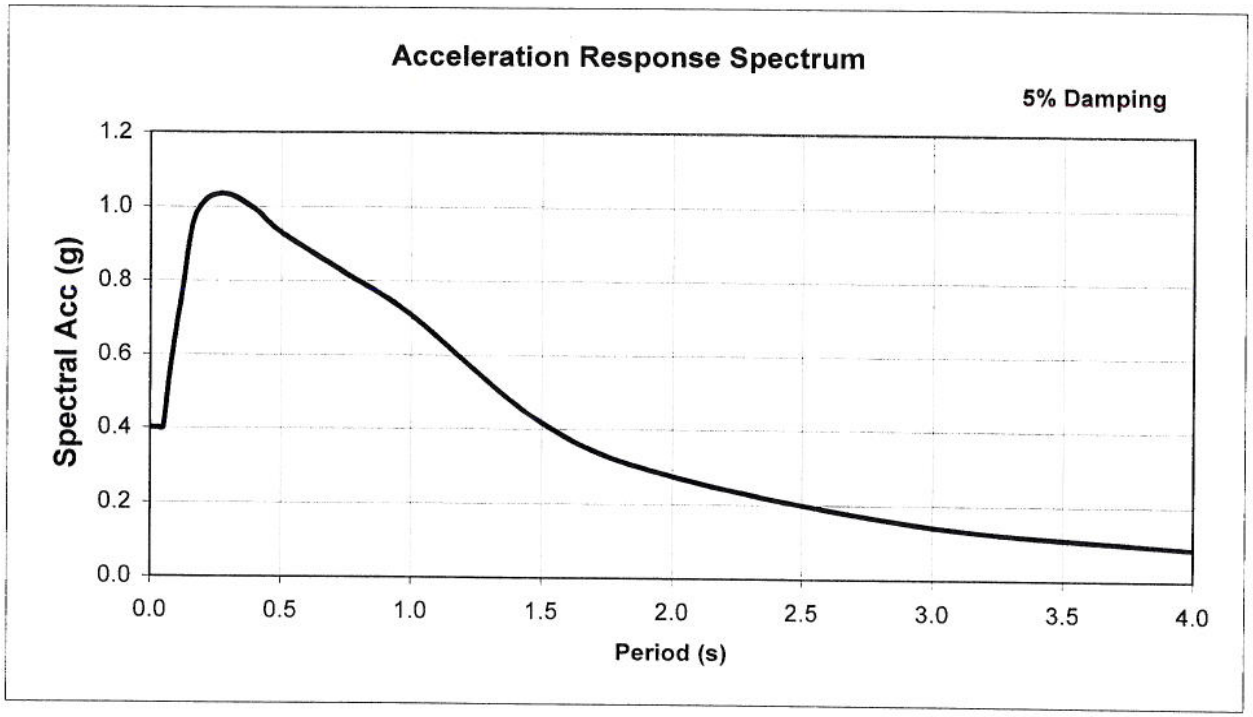
Attachments:

c: D. Liao – GDS2
M. DeSalvatore – GDS2
File

AIF Auto Lane Bridge

Bridge No. 54-1215K

Period (s)	ARS (g)
0.010	0.400
0.020	0.400
0.030	0.400
0.050	0.400
0.075	0.550
0.100	0.679
0.120	0.768
0.150	0.915
0.170	0.974
0.200	1.010
0.240	1.031
0.300	1.033
0.400	0.994
0.500	0.932
0.750	0.820
1.000	0.709
1.500	0.417
2.000	0.275
3.000	0.144
4.000	0.088



Fault	**Pahrump-Stateline**
Style	**Normal**
Magnitude	**7.0**
R (km)	**10**
PBA	**0.4g**
Soil Type	**C**
Note:	ARS curve was modified for Near Fault Directivity Effect (SDC Ver. 1.3 Section 6.1.2.1)

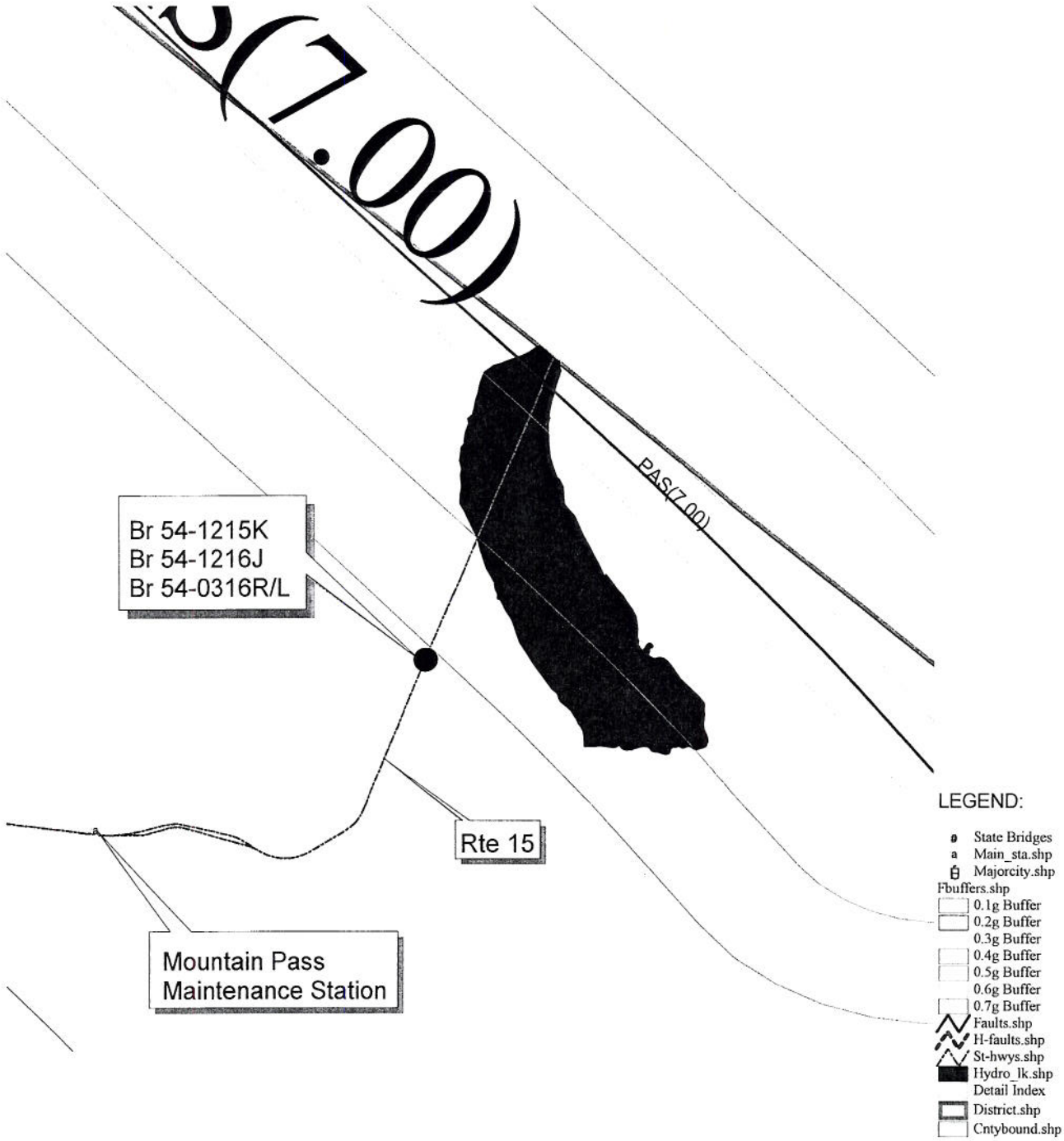
DEPARTMENT OF TRANSPORTATION

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY

ENGINEERING SERVICE CENTER

CALIFORNIA SEISMIC HAZARD DETAIL INDEX MAP 1996

BASED ON MAXIMUM CREDIBLE EARTHQUAKES (MCE)



NOTE: SEE ACCOMPANYING TECHNICAL REPORT FOR NAMES OF FAULTS CORRESPONDING TO FAULT CODES

REVISION 2 (July, 1997)
Plot Modified in January, 1999

State of California

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. DAN ADAMS
Structures Design
Office of Bridge Design
Bridge Design Branch 10
MS #9

Attention: Mr. Larry Wu

Date: May 6, 2008

File: 08-SBD-15-179.4 PM
08-368501
Ivanpah Ditch (AIF Truck)
Br. #54-1216J

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 2 MS #5
Design Branch B

Subject: Revised Foundation Report

This Revised Foundation Report supercedes the "original" Foundation Report, dated June 12, 2002, for the proposed Ivanpah Ditch (AIF Truck) bridge (Br. #54-1216J). This Revised Foundation Report is in response to changes in pile diameters, pile cut-off elevations, and design loadings at the Abutment 1 and 5 locations, as well as changes in footing widths, bottom of footing elevations, and the changing in design from LFD to LRFD. The sole purpose of this Revised Foundation Report is to provide updated foundation recommendations based on the design changes mentioned above. All elevations provided in this report are based on the NGVD 29 vertical datum.

Project Description

The proposed Ivanpah Ditch (AIF Truck) bridge will be built over the Ivanpah Ditch/channel, located approximately 330 ft west of southbound Route 15. The site is located in San Bernardino County about 6 mi south of the California/Nevada State line, between Nipton and Yates Well roads. The creek channel is dry most of the year but carries occasional flash flood water.

The Ivanpah Ditch (AIF Truck) bridge (Br. #54-1216J), is proposed to be a 4-span, cast-in-place, reinforced concrete slab structure with end diaphragm abutments and five-column bents.

Site Geology

The foundation investigation performed in January 2002 consisted of two mud rotary borings. Based on the 2002 foundation investigation, the site is underlain by alluvial valley and/or alluvial fan deposits. The earth materials encountered at that site can be generally separated into two units. The upper unit consists of medium dense, poorly and well graded sand with silt and gravel. The lower unit consists of dense to very dense, silty sand, poorly graded sand and well graded sand with silt, gravel and cobbles. For specific details regarding subsurface conditions, refer to the Log of Test Borings (LOTBs) sheets.

Scour Potential

The Final Hydraulic Report, dated April 11, 2008, states a potential scour depth of 4.0 ft and scour elevation of 2777.03 ft. The scour elevation is approximately 1.0 ft above the top of the footing elevations at the bent locations. For additional hydrology and hydraulic information, refer to the Final Hydraulic Report, dated April 11, 2008, by Tony Nedwick of the Office of Design & Technical Services.

Groundwater

Groundwater was not encountered during the 2002 field investigation, and is not anticipated to be encountered during the footing constructions. The creek channel is dry most of the year but carries occasional flash flood water. It should be noted that even though the Ivanpah Ditch is dry most of the year, it has the potential to flow and inundate the creek basin during periods of heavy rain. The contractor should select construction methods that take into account these conditions. At the time of construction, the groundwater surface elevations may be significantly higher or lower than those shown in the LOTBs, due to seasonal runoffs.

Corrosion Potential

During the 2002 foundation investigation, soil samples were collected from Boring # 02-1 and were tested for corrosive potential by the District 7 laboratory. All of the soils samples tested are considered non-corrosive by current Caltrans standards. For specific test results, refer to Table 1 below.

Table No. 1 Soil-Corrosion Test Summary

Boring Number	Depth Interval (ft)	Sample Date	PH	Minimum Resistivity (ohm-cm)	Chloride Content*	Sulfate Content*
02-1	0.0-5.0	1/30/02	7.90	5380	N/A	N/A
02-1	5.0-30.0	1/30/02	8.40	3614	N/A	N/A
02-1	30.0-50.0	1/30/02	8.60	3609	N/A	N/A
02-1	50.0-91.0	1/30/02	8.63	3133	N/A	N/A

Note: Caltrans currently defines a site to be corrosive to foundation elements if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: Chloride concentration is more than 500 ppm, sulfate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less. With the exception of MSE walls, soil and water are not tested for chlorides and sulfates if the minimum resistivity is greater than 1,000 ohm-cm.

Fault and Seismic Data

The structure site is potentially subject to strong ground motions from nearby sources during the design life of the new structure. The controlling fault for the site is Pahrump-Stateline fault located approximately 6.0 mi northwesterly of the site. The estimated peak horizontal bedrock acceleration at the site is 0.4g. The fault is capable of generating a Maximum Credible Earthquake moment magnitude (M_w) of 7.0. Mahmoud Khojasteh of the Office of Geotechnical Design-South 2 is in process of providing final seismic design recommendations, which will be forward to your office when completed.

Liquefaction Potential

Based on the dense to very dense state of underlying granular material combined with the fact that groundwater was not encountered, the potential for liquefaction is considered non-existent.

Foundation Recommendations

The revised pile cut-off elevations, design loadings, and specified pile tip elevations for Abutments 1 and 5 are presented in Table 2, below. The ultimate geotechnical pile capacity for the CIDH piles will meet or exceed the required nominal resistance in compression listed below in Table 2.

Table 2: Abutments 1 and 5 - CIDH Pile Data (Br. #54-1216J)

Location	Pile Type	Design Loading	Nominal Resistance		Pile Cut-off Elevation	Design Tip Elevation	Specified Tip Elevation
			Compression	Tension			
Abutment 1	16 in CIDH	90 kips	180 kips	-0-	2788.0 ft	2763.0 ft (1) (2)	2763.0 ft
Abutment 5	16 in CIDH	90 kips	180 kips	-0-	2787.0 ft	2763.0 ft (1) (2)	2763.0 ft

Note: Design tip elevation is controlled by the following demands: (1) Compression (2) Scour to elevation 2777.03 ft

Spread footings may be used for support at the Bents 2, 3 and 4 locations. The revised bottom of footing elevations, bottom of subexcavation elevations, and revised footing dimensions are shown below in Table 3. The controlling vertical loadings, moments, shears and effective footing dimensions are presented below in Table 4. The factored nominal bearing resistances for the controlling strength and extreme limit states are shown below in Table 5.

Table 3: Bent Spread Footing Dimensions (Br. #54-1216J)

Location	Bottom of Footing Elevation	Bottom of Subexcavation Elevation	Footing Dimensions			Depth of Footing[3] (D_f)
			Length (L_L)[1]	Length (L_T)[2]	Thickness (t)	
Bent 2	2774.2 ft	2773.2 ft	6.0 ft	6.0 ft	2.0 ft	3.0 ft
Bent 3	2774.0 ft	2773.0 ft	6.0 ft	6.0 ft	2.0 ft	3.0 ft
Bent 4	2774.0 ft	2773.0 ft	6.0 ft	6.0 ft	2.0 ft	3.0 ft

Notes: 1) (L_L) Longitudinal direction.
2) (L_T) Transverse direction.
3) (D_f) Minimum footing embedment depth used to determine factored nominal bearing resistances.

Table 4: Bent Controlling Loading Conditions (Br. #54-1216J)

Limit State[1]	Moment[2]		Shear[3]		Vertical Loading[4]	Effective Footing Dimensions		Estimated Settlement
	M_T	M_L	S_T	S_L		$(L_L)^5$	$(L_T)^6$	
Service	0 k-ft	0 k-ft	0 kips	0 kips	131 k	6.0 ft	6.0 ft	< 0.5 in
Strength	0 k-ft	0 k-ft	0 kips	0 kips	219 k	6.0 ft	6.0 ft	N/A
Extreme	0 k-ft	0 k-ft	0 kips	0 kips	108 k	6.0 ft	6.0 ft	< 0.5 in

Notes: 1) Only the controlling design Loading conditions for each Limit State are listed
2) (M_T) Moment in transverse direction at top of footing. (M_L) Moment in longitudinal direction at top of footing.
3) (S_T) Shear in transverse direction at top of footing. (S_L) Shear in longitudinal direction at top of footing.
Per accepted design practice and Seismic Design Criteria 7.7.1.1, designer did not use shear in moment calculation.
4) Vertical loading is the total vertical load , which includes the weight of the spread footing and soil cover on the footing.
5) (L_L) Longitudinal direction.
6) (L_T) Transverse direction.

Table 5: Bent Spread Footing Data (Br. #54-1216J)

Support Location	LRFD		
	Service	Strength $\varphi_b = 0.45$	Extreme Event $\varphi_b = 1.00$
	Permissible Net Contact Stress	Factored Nominal Bearing Resistance	Factored Nominal Bearing Resistance
Bent 2	N/A*	6.5 ksf	14.4 ksf
Bent 3	N/A*	6.5 ksf	14.4 ksf
Bent 4	N/A*	6.5 ksf	14.4 ksf

Note: *N/A due to bottom of footing on very dense alluvium.

The recommended factored nominal bearing resistances provided in Table 5, above, are based on the following design criteria:

1) The Bents 2, 3, and 4 footings shall be constructed at or below the recommended elevations shown in Table 3 above.

2) At the Bents 2, 3, 4 locations, native material below the bottom of spread footing elevations shall be subexcavated to the elevations shown in Table 3, above, and replaced with Class 3 concrete. The limits of subexcavation and replacement shall conform to the limits defined for relative compaction under retaining wall footings without piles as defined in section 19-5.03 of the Standard Specifications. If the bottom of footing elevations are lowered, the limit of subexcavation (elevations) are to be lowered accordingly.

3) The Bents 2, 3, and 4 footings have the minimum footing dimensions as shown in Table 3.

4) The controlling Bents 2, 3, and 4 footing vertical loads, moments, and shear forces used for footing design are as shown in Table 4.

If any of the above footing dimensions are reduced, bottom of footing elevations, vertical load, moment, or shear forces increased, or the scour elevation lowered, the Office of Geotechnical Design-South 2, Branch B, is to be contacted for reevaluation.

General Notes:

All support locations are to be plotted in plan view on the LOTB as stated in "Memo to Designers" 4-2. The plotting of support locations should be made prior to requesting a final foundation review.

Construction Considerations

- Groundwater was not encountered during the 2002 subsurface investigation, and it is not anticipated that the contractor will encounter groundwater during spread footing and CIDH pile construction. It should be noted that even though the Ivanpah Ditch is dry most of the year, it has the potential to flow and inundate the creek basin during periods of heavy rain. The contractor should select construction methods that take into account these conditions. At the time of construction, the groundwater surface elevations may be significantly higher or lower than those shown on the report, due to seasonal runoffs.

- At Abutments 1 & 5 support locations, the calculated capacity of all CIDH piles is based on skin friction only and no end-bearing was considered. The skin friction zones used to calculate geotechnical capacity of the CIDH piles are from elevation 2777.0 ft to elevation 2765.0 ft for both abutments.

- At Bents 2, 3, and 4 support locations, subexcavation and replacement is specified due to the presence of gravels and cobbles in the native material at the bottom of footing elevations. Due to the presence of gravels and cobbles, it will, most likely, be difficult for the contractor to be able to subexcavate cleanly to the bottom of footing elevations listed in Table 3, above, without leaving the bottom of excavations undisturbed. Therefore, the recommendation to subexcavate below the footing elevations, and backfill, up to bottom of footing elevations with Class 3 concrete, is presented here to prevent the footing concrete from being placed on disturbed native material, and to provide a uniform, level pad upon which to construct the footings.

- At Bents 2, 3, and 4 support locations, concrete for the subexcavation shall be placed neat against the native material at the bottom of subexcavations. Should the bottom of subexcavations be disturbed, then the bottom of the subexcavations shall be recompacted to 95% relative compaction.

Any questions regarding the above recommendations should be directed to the attention of TM Liao, (916) 227-5756, at the Office of Geotechnical Design-South 2, Branch B.

Prepared by: Date: 5-6-08

D. Te-Ming Liao, P.E., C59838
Transportation Engineer-Civil
Office of Geotechnical Design-South 2
Design Branch B

Reviewed by: Date: 5/6/08

Erich Neupert

Erich Neupert, P.G., 8137
Engineering Geologist
Office of Geotechnical Design-South 2
Design Branch B

REGISTERED PROFESSIONAL ENGINEER
DAVID T-M LIAO
No. C 59838
Exp. 12-31-09
CIVIL
STATE OF CALIFORNIA

PROFESSIONAL GEOLOGIST
ERICH NEUPERT
No. 8137
Exp. 2/28/10
STATE OF CALIFORNIA

cc: R.E. Pending File
John Stayton - Specs & Estimates (4)
Rong Dang– District 08 (Project Engineer)
Abbas Abghari – OGDS-2
Mark DeSalvatore-OGDS-2
Project File

Memorandum

Flex your power!
Be energy efficient!

To: MR. DAN ADAMS, CHIEF
BRIDGE DESIGN BRANCH 10
OFFICE OF BRIDGE DESIGN SOUTH 2
STRUCTURE DESIGN, MS9–4/8I

Attention: Mr. Larry Wu

Date: May 6, 2008

File: 11-SBd-15-PM 179.39
08-368501

Joint Port of Entry
AIF Truck Lane Bridge
Bridge No. 54-1216J

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES - MS 5
OFFICE OF GEOTECHNICAL EARTHQUAKE ENGINEERING

Subject: Seismic Design Recommendations

This memorandum presents seismic design recommendations for the above bridge and supersedes our memorandum of June 27, 2007. .

Seismicity

The bridge is not listed on the 1996 Caltrans Seismic Hazard Map. By scaling, the site is located at a distance of about 10 km from the Pahrump-Stateline Fault (PAS, $M_w = 7.0$, Normal Fault) and is located within peak horizontal bedrock acceleration zone of PBA = 0.4g. The value of PBA was verified using Sadigh et al. (1997) attenuation relation. A copy of the local seismic map is attached.

Soil Profile Type

From the logs of test borings conducted in 2002, the site is classified as soil profile type C as defined in Appendix B of Seismic Design Criteria (SDC).

ARS Curve

Standard SDC acceleration response spectrum (ARS), Figure B-5, PBA = 0.4g, $M_w = 7.0$, and soil profile type C is recommended for design. ARS curve was modified for near fault directivity effect, as per SDC Version 1.4 Section 6.1.2.1. A copy of the design response spectrum is attached for your reference

Liquefaction

Subsurface soil consists of layers of dense to very dense sand and silty sand with fine to coarse gravel. Ground water has not been reported. As such the potential for liquefaction appears to be nil.

Surface Fault Rupture

The site is not located inside Earthquake Fault Zones as delineated by the California Geological Survey Maps developed under the Alquist-Priolo Earthquake Fault Zoning Act. The potential for surface fault rupture hazard is considered low.

If you have any questions, please call Mahmoud Khojasteh at (916) 227-7154.

M. Khojasteh

MAHMOUD KHOJASTEH
Senior Materials and Research Engineer

REGISTERED PROFESSIONAL ENGINEER
MAHMOUD KHOJASTEH
No. C049260
Exp. 9/30/08
CIVIL
STATE OF CALIFORNIA

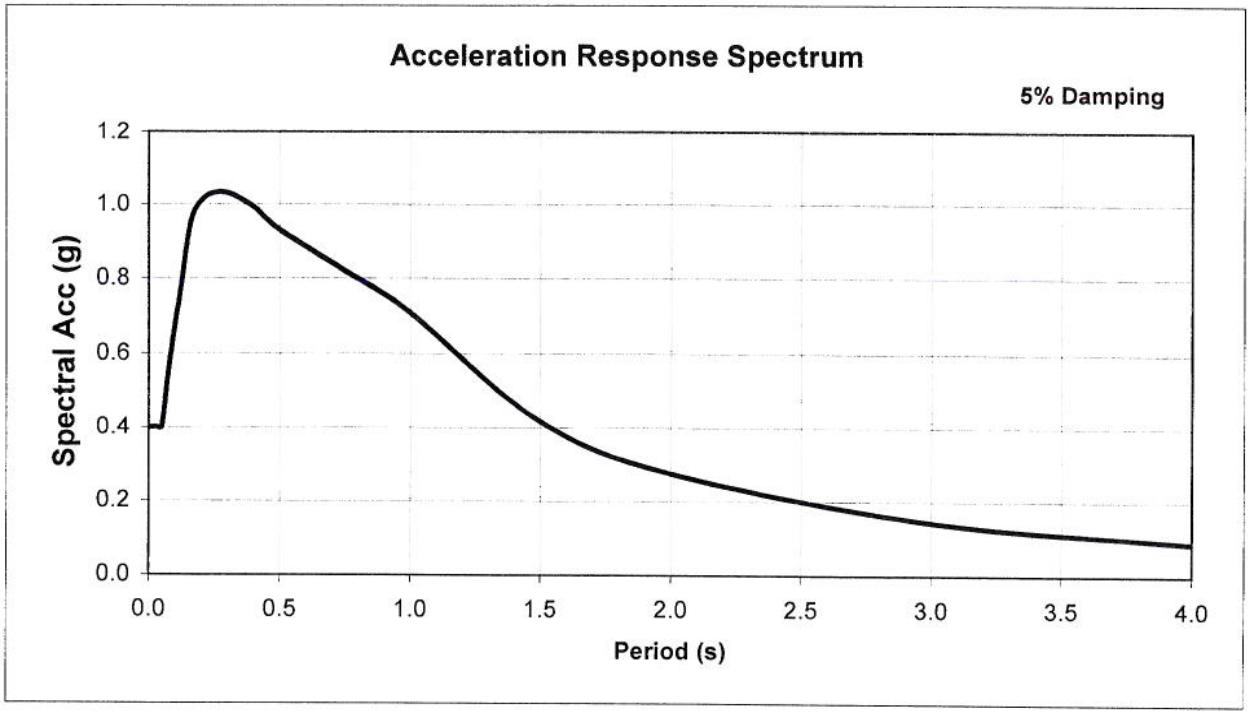
Attachments:

c: D. Liao – GDS2
M. DeSalvatore – GDS2
File

AIF Truck Lane Bridge

Bridge No. 54-1216J

Period (s)	ARS (g)
0.010	0.400
0.020	0.400
0.030	0.400
0.050	0.400
0.075	0.550
0.100	0.679
0.120	0.768
0.150	0.915
0.170	0.974
0.200	1.010
0.240	1.031
0.300	1.033
0.400	0.994
0.500	0.932
0.750	0.820
1.000	0.709
1.500	0.417
2.000	0.275
3.000	0.144
4.000	0.088



Fault	**Pahrump-Stateline**
Style	**Normal**
Magnitude	**7.0**
R (km)	**10**
PBA	**0.4g**
Soil Type	**C**
Note:	ARS curve was modified for Near Fault Directivity Effect (SDC Ver. 1.3 Section 6.1.2.1)

DEPARTMENT OF TRANSPORTATION

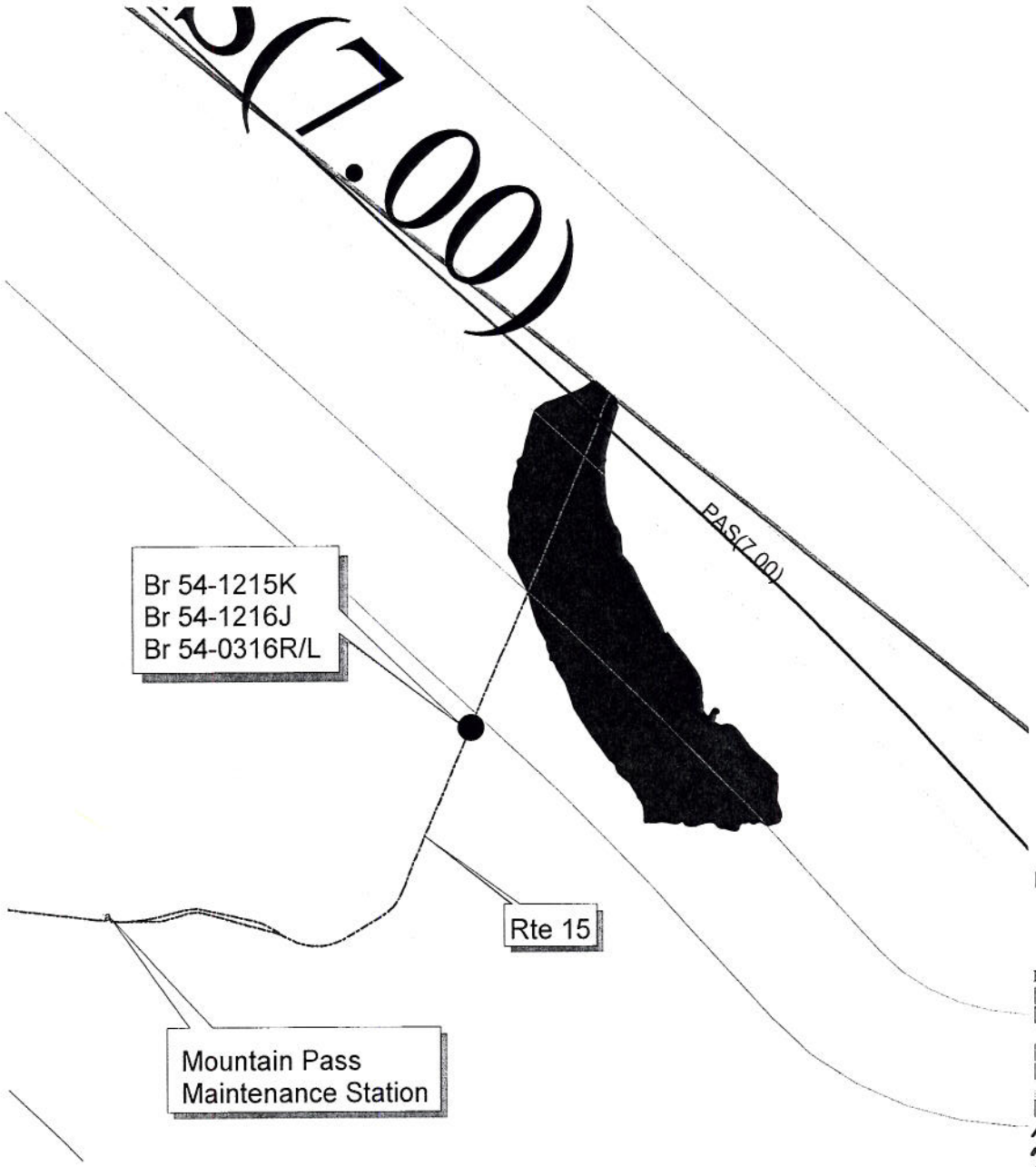
STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY

ENGINEERING SERVICE CENTER

CALIFORNIA SEISMIC HAZARD DETAIL INDEX MAP 1996

BASED ON MAXIMUM CREDIBLE EARTHQUAKES (MCE)

Caltrans



LEGEND:

- State Bridges
- Main_sta.shp
- Majorcity.shp

Fbuffers.shp

- 0.1g Buffer
- 0.2g Buffer
- 0.3g Buffer
- 0.4g Buffer
- 0.5g Buffer
- 0.6g Buffer
- 0.7g Buffer
- Faults.shp
- H-faults.shp
- St-hwys.shp
- Hydro_lk.shp

Detail Index

- District.shp
- Cntybound.shp

NOTE: SEE ACCOMPANYING TECHNICAL REPORT FOR NAMES OF FAULTS CORRESPONDING TO FAULT CODES

REVISION 2 (July, 1997)
Plot Modified in January, 1999

FOUNDATION REVIEW

DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES

To: **Structure Design**
1. Preliminary Report
2. ~~R.E. Pending File~~
3. Specifications & Estimates
4. File

Geotechnical Services
1. GS (Sacramento)
2. GS

District Project Development
District Project Engineer

Date: 12/22/08

Ivanpah Ditch AIF Aut
Structure Name

08 - SBd - 15 - 179.39
District County Route Post ~~Km~~ Mi

08 - 368501 54-1215K
E.A. Number Structure Number

Foundation Report By: D Liao
Dated: 5/6/08

Reviewed By: L. Wu (OSD) R. Price (GS)

General Plan Dated: 5/19/08
Foundation Plan Dated: 3/12/08

☐ No changes. ☒ The following changes are necessary.

Note to R.E. Pending File.
Please consider the possibility of subex, if disturbed material is exposed due to footing excavation. See Note on Foundation Report dated 5/6/08 Pg 5 "Construction Considerations" bullet pts 3 & 4

FOUNDATION CHECKLIST

- ✓ Pile Types and Design Loads
- ✓ Pile Lengths
- ✓ Predrilling
- ✓ Pile Load Test
- ✓ Substitution of H Piles For Concrete Piles ☐ Yes ☒ No
- ✓ Footing Elevations, Design Loads, and Locations
- ✓ Seismic Data
- ✓ Location of Adjacent Structures and Utilities
- ✓ Stability of Cuts or Fills
- ✓ Fill Time Delay
- ✓ Effect of Fills on Abutments and Bents
- ✓ LOTB's
- ✓ Fill Surcharge
- ✓ Approach Paving Slabs
- ✓ Scour
- ✓ Ground Water
- ✓ Tremie Seals/Type D Excavation

Office of Structure Design — Branch No. 10 — Geotechnical Services

Rev. 10/02

FOUNDATION REVIEW

DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES

To: **Structure Design**
1. Preliminary Report
2. R.E. Pending File
3. Specifications & Estimates
4. File

Geotechnical Services
1. GS (Sacramento)
2. GS

District Project Development
District Project Engineer

Date: 12/22/08

Ivanpah Pitch (AIF trud
Structure Name

08 - SBd - 15 - 179.39
District County Route Post Km

08-368501 54-1215J
E.A. Number Structure Number

Foundation Report By: D. Lizo

Dated: 5/6/08

Reviewed By: L. Wu (OSD) R. Price (GS)

General Plan Dated: 3/26/08

Foundation Plan Dated: 4/1/08

☐ No changes. ☒ The following changes are necessary.

See note on B/No. 54-1215K

FOUNDATION CHECKLIST

- ✓ Pile Types and Design Loads
- ✓ Pile Lengths
- ✓ Predrilling
- ✓ Pile Load Test
- Substitution of H Piles For Concrete Piles ☐ Yes ☒ No
- ✓ Footing Elevations, Design Loads, and Locations
- ✓ Seismic Data
- ✓ Location of Adjacent Structures and Utilities
- ✓ Stability of Cuts or Fills
- ✓ Fill Time Delay
- ✓ Effect of Fills on Abutments and Bents
- ✓ LOTB's
- ✓ Fill Surcharge
- ✓ Approach Paving Slabs
- ✓ Scour
- ✓ Ground Water
- ✓ Tremie Seals/Type D Excavation

Office of Structure Design — Branch No. 10 — Geotechnical Services

Rev. 10/02

State of California

Business, Transportation and Housing Agency

Memorandum

To : **Ms. Renee Sasse Senior Engineer**
Attention: Mr. Dung Huy Phan

Date : **July 28, 2008**

File No: **08-SBd-15- PM 177.3/181.1**
Construction of Commercial Vehicle Inspection Facility & Agricultural Inspection Station North of Nipton Rd IC and South of Yates Well Rd OC
EA 368501

From: **DEPARTMENT OF TRANSPORTATION**
Bruce W. Kean, District 8 Materials Engineer

Subject : **Materials Report - Final**

I. GENERAL

A. PROPOSED IMPROVEMENTS

This project concerns the proposed construction of a combined Commercial Vehicle Enforcement Facility (CVEF) and Agricultural Inspection Station(AIF) in San Bernardino County along southbound Interstate 15 (I-15) approximately nine miles south of California-Nevada stateline between Nipton Road Interchange and Yates Well Road Interchange.

Northern View of CVEF

Southern View of CVEF

The project includes construction of bypass lane, truck lane, auto lane, and auxiliary lane and an outside shoulder between entrance and exit ramps to and from the facility. Existing Ivanpah Ditch Bridge will be widened and three new bridges will be constructed. Drainage improvements will include earth channel and installing new culverts at few locations. The proposed project will be constructed mostly on fill.

Also part of this project is the demolition of the existing Agricultural Inspection Station by Yermo. It will include rehabilitating and reconstructing the existing pavement. This portion of the work will take place upon completion of the new combined facility.

B. CLIMATE

At this location the highest two months of rainfall are July and August months of rainfall are July and August. These two months are also noted as the hottest two months of the year.

Climate is characterized by low annual rainfall of 3.0 inches to 4.0 inches and daily temperatures that range from 30.2°F to 111.2°F.

Yermo -

Climate characteristics are similar to the described above.

C. TERRAIN AND GEOLOGY

The project location is characterized by rolling terrain going downward in the northerly direction. Historical data indicates that characteristic landforms include recent alluvium derived from the Clark Mountain Range and the Mescal Range. North of the project location is the Ivanpah Dry Lake where soil is principally composed of fine silty clay and sand.

North-West View of Project Location

II. EXISTING FACILITY

Within the project location, segment of I-15 have two lanes in each direction with the median width from 88 ft. to 99 ft. There is an existing truck climbing lane in southerly direction which begins at PM 180.84 to approximately PM 168.94 The inside and outside shoulders are 4.9 ft and 9.8 ft wide respectively. The existing pavement was originally constructed of asphalt concrete on embankment fill.

South Bound I-15
Beginning of Project PM 181.1

South Bound I-15 Truck Lane PM 180.93

South Bound I-15 PM 180.67

South Bound I-15 End of Project PM 177.3

III. SOILS

A. General Soils Information

Along the centerline of existing Interstate 15 historical data indicates that soil in the area west of Mountain Pass to Stateline consists of fine to coarse alluvium on the desert portions, massive in-place rock in the mountainous area with silts present near the summit of the Mountain Pass and silty clay, poorly consolidated alkaline soils in Ivanpah Dry Lake. The alluvium is mostly medium dense to very dense gravelly sand with silt. Basement soil consists of recent alluvial material of good structural properties.

The majority of the soils at this location is considered clean sands and is considered non-cohesive. The nature of these soils may make paving difficult, as the soils will not stay confined under heavy wheel loads. In addition, these soils tend to be highly erosive from surface runoff and concentrated water flows. We have included recommendations in this report to help address these potential problems.

D. Soil Test Data

Historical data along the existing I-15 alignment, indicates that material type consists mostly of silty sand and gravel. Percent passing #4 sieve, range from 74 to 94 percent (mostly medium to coarse sand) and percent passing #200 sieve, range from 8 to 19 percent (mostly silt with very little clay). The high range of passing #200 were from approximately post mile 182.00 and extends through stateline which is post mile 186.20. These previous test results had little indication of the presence of clay, however R-value dropped considerably (from above 70 to below 20) from approximately post mile 182.00, about a mile east of this project to stateline.

Based on few samples taken within the limit of this project particularly in the area of the two building structures, the soil description is fairly consistent. According to this test results soil are classified mostly as well graded sand with silt and gravel (SW-SM) and silty sand with gravel (SM). Majority of these tests results, which will be one of the bases of our recommendation for this report, are courtesy of Office of Structures Foundation (OSF). Tabulated results of laboratory soil tests are presented below. Please see attachments for other grading and corrosion test results from OSF.

Location	% Passing #4	% Passing #200	R-value	pH	Resistivity (ohm-inch)
Boring #21 (AIF)	83	12	73	7.86	3485
Boring #7 (CVEF)	78	9	81	7.90	4290
PM 178.50-30' from ES	86	15	74	7.78	3485
PM 180.80-20' from ES	93	8	74	7.67	4324

- ES-edge of shoulder
- **Caltrans currently defines** a corrosive area as an area where the soil and/or water contains more than 500 PPM chlorides, more than 2,000 PPM sulfates, has a minimum resistivity of less than 1,000 ohm-cm or has a pH of 5.5 or less.

The above tabulated test results indicate that soil is classified as SW-SM and SM. The pH and resistivity values signify that soils based on Caltrans criteria are considered non-corrosive.

The permeability test conducted by Headquarter Water and Wastewater Unit last December 2001 revealed that soil in the leach field area consist of brown loose sand with gravel.

Keep in mind that these tests results only covers a small area and may not represent the entire project location.

IV. CUTS AND EXCAVATIONS

Reference on cuts and excavations should be obtained from the Geotechnical Design Report as soon as it becomes available. Otherwise please refer to the revised Section 304 "Side Slopes" of Highway Design Manual which recommends a 1:4 (V:H) slope.

V. CORROSION INVESTIGATION

Historical data, which covered PM 163.7/186.2, indicates culvert corrosion will present a problem in the Ivanpah Dry Lake area and in some locations westerly of Mountain Pass. Potential problem on culvert corrosion within the project area was not indicated from this historical data.

Test results from the samples taken recently, indicate that soils are considered non corrosive based on Caltrans criteria. However using the minimum resistively and pH value obtained, a 0.05 inches (18 gage) corrugated steel pipe (CSP) may not yield a 50-year design life. Instead a thicker gage CSP or standard reinforced concrete pipe (RCP) should be used, particularly if abrasive condition exist within the area.

VI. STRUCTURAL DESIGN

A. Traffic Index (T.I)

The following Traffic Indeces (T.Is) were provided by Mr. Gary Green, Office of Forecasting/Traffic Analysis in the Memorandum dated June 12, 2008 and submitted with the request.

Mainline

Traffic Index	Auto Lane	Truck Lane	Shoulder
20-Year	11.5	14.0	8.5
40-Year	13.0	15.5	9.5

Yermo

Traffic Index	Mainline	Shoulder
20-Year	14.0	9.0
40-Year	15.5	10.0

B. R-Value

Based on log of test boring provided by the Division of Structures dated 07/29/2002 and the Materials Report dated July 2, 2002, an R-Value of 50 has been selected for the Commercial Vehicle Enforcement Facility (CVEF) and Agricultural Inspection Facility.

For reconstruction of the existing pavement at Yermo the following pavement structural section should be use. This is based on soil R-value of 40 (EA 476000).

C. Pavement Structural Section

Below is the recommended pavement structural section for this project:

C.1 Alternative #1- Rigid Pavement Design (JPCP)
These structural sections were obtained from the September 20, 2006 edition of the HDM, using the Rigid Pavement Design Catalog, Table 623.1 (H), Desert, Type I, with lateral support assumed.

20 Year TIs

	Auto Lanes (TI=11.5)	Truck lanes (TI=14.0)
JPCP	0.85'	1.00'
HMA-A (Bondbreaker)	0.10'	0.10'
Lean Concrete Base	0.40'	0.50'
Class II Aggregate Subbase (2)	0.40'	0.40'

40 Year TIs

	Auto Lanes (TI=13.0)	Truck lanes (TI=15.5)
JPCP	0.95'	1.10'
HMA-A (Bondbreaker)	0.10'	0.10'
Lean Concrete Base	0.50'	0.50'
Class II Aggregate Subbase (2)	0.40'	0.40'

1.-Please refer to Section 607 Figure 607.2A of the Highway Design Manual for details on tapered shoulder thickness.
2.-The layer of aggregate subbase (AS) was added to serve as a working platform for paving LCB. An R-Value of 50 or greater is required for aggregate SB.

Parking Area and Shoulders

20 Year TIs

	Parking Area/ Shoulders (TI=8.5)
JPCP	0.75'
AB	0.50'

40 Year TIs

	Parking Area/ Shoulders (TI=9.5)
JPCP	0.80'
AB	0.60'

C.2- Alternative #2- Flexible Pavement Design (HMA)

Pavement sections below were obtained employing CalFP ver. 1.1 a computer program based on design methodology as documented in Chapter 630 of the Caltrans Highway Design Manual (HDM).

20 Year TIs

	Auto Lanes (TI=11.5)	Truck Lanes (TI=14.0)	Shoulders/ Parking (TI=8.5)
HMA-HS	0.75'	0.95'	0.45'
AB	0.40'	0.45'	0.45'

40 Year TIs

	Auto Lanes (TI=13.0)	Truck Lanes (TI=15.5)	Shoulders/ Parking (TI=9.5)
RHMA-G (1)	0.20'	0.20'	0.20'
HMA-HS	1.10'	1.30'	0.80'
AB	0.50'	0.50'	0.50'

(2) The layer of aggregate subbase (AS) was added to serve as a working platform for paving LCB. An R-Value of 50 or greater is required for aggregate SB.

D. PAVEMENT RECONSTRUCTION AND REHABILITATION

From PM 177.4 to PM 178.7 and PM 179.9 to PM 180.7 mainline pavement rehabilitation is required.

The demolition of the exiting Border Inspection Station at Yermo will be performed after the opening of the new AIF for agricultural inspection. The vertical profile will be lowered to improve vertical sight distance visibility. Therefore, a new structural section will be required.

D.1 Mainline Ten-Year Recommendation Using HMA

The following recommendations are based on the Flexible Pavement Deflection Study Report dated June 2, 2000 under EA: 43930K from PM 176.6 to PM 182.5 on the SB direction.

Alternative 1 – Mill/ HMA Type A Conduct a field-review and locate specific areas of severe distress identified by rutting greater than 0.58 inches and/or spalling pavement. Cold plane the existing pavement 0.10 ft. deep and stockpile this material for future use. Dig out and repair localized distress areas and seal crack wider than 0.20 inches. Then:

- Place HMA Type HS 0.35 ft. thick
- This will increase the profile grade 0.25 ft.

Alternative 2 – RHMA-G Conduct a field-review and locate specific areas of severe distress such as rutting greater than 0.58 inches and/or spalling pavement. Dig out and repair the localized distressed areas and seal all crack wider than 0.20 inches. Then:

- Place Rubberized Hot Mix Asphalt Type G (RAC-G) 0.20 ft. thick.
- This will increase the profile grade 0.20 ft.

Alternative 3 – COLD PLANE EXISTING, REPLACE WITH HMA TYPE A (CAPM)
Capital Preventive Maintenance guidelines are based on design methodology as documented in Chapter 634.2 of the Caltrans Highway Design Manual (HDM).

A CAPM alternative as been proposed by District 8 Materials Engineering Department to address the concern of increasing the profile grade.

Conduct a field-review and locate specific areas of severe distress such as rutting greater than 0.58 inches and/or spalling pavement. Mill 0.20 ft. of the existing pavement. Dig out and repair the localized distressed areas and seal all cracks wider than 0.20 inches. Then:

- Place HMA Type HS 0.20 ft. thick.
- No grade increase will result from this alternative.

D.2 Yermo Reconstruction

SBd I-15 At Yermo PM 87.51 Southbound

SBd-15 at Yermo PM 87.31 Southbound

SBd-15 at Yermo PM 87.29 Southbound

SBd-15 at Yermo PM 87.18 Southbound

D.2.1 Alternative #1- Rigid Pavement Design (JPCP)
These structural sections were obtained from the September 20, 2006 edition of the HDM, using the Rigid Pavement Design Catalog, Table 623.1 (I), Desert, Type II, with lateral

support assumed.

20 Year TIs

	Auto Lanes (TI=11.5)	Truck Lanes (TI=14.0)
JPCP	0.85'	1.00'
HMA-A (Bondbreaker)	0.10'	0.10'
Lean Concrete Base	0.40'	0.50'

40 Year TIs

	Auto Lanes (TI=13.0)	Truck Lanes (TI=15.5)
JPCP	0.95'	1.10'
HMA-A (Bondbreaker)	0.10'	0.10'
Lean Concrete Base	0.50'	0.50'

D.2.2 Alternative #2- Flexible Pavement Design (HMA)

Pavement sections below were obtained employing CalFP ver. 1.1 a computer program based on design methodology as documented in Chapter 630 of the Caltrans Highway Design Manual (HDM).

20 Year TIs

	Auto Lanes (TI=14.0)	Shoulders (TI=9.0)
HMA-HS	0.95'	0.60'
AB	0.85'	0.50'

40 Year TIs

	Auto lanes (TI=15.5)	Shoulders (TI=10.0)
OGFC	0.10'	0.10'
HMA-HS	1.45'	0.95'
AB	0.50'	0.50'

V. LIFE CYCLE COST ANALYSIS (LCCA)

The LCCA is a useful tool for comparing the value of constructing this project with HMA-A versus JPCP. The LCCA must be conducted by the project engineer during the Design Phase and be an integral part of the decision making process. For information and guidance, please refer to the "Life-Cycle Cost Analysis Procedures Manual", available from the Caltrans Pavement Engineering website.

RECOMMENDED MATERIALS SPECIFICATIONS

1. Joint Plain Concrete Pavement (JPCP) should have both tie bars and dowels. JPCP joint details should be included on the plans.

2. JPCP shoulders used with JPCP are to be tied to adjacent lane with tie bars.

3. A 0.10' Opened Grade Friction Course (OGFC) layer shall be placed above the surface layer of flexible pavements with a pavement design life greater than twenty years.

4. Details should be shown clearly on the plans.

5. For dikes required on JPCP shoulders, we recommend the dikes to be PCC. They should be placed on top of an extension of the JPCP shoulder.

6. A 0.10 ft. thick Type A HMA (interlayer) bond breaker, using HMA PG 64-28 asphalt binder and conforming to 3/4 inches aggregate gradation should be included on all JPCP structural section. The amount of asphalt binder should be one percent higher than the mixes optimum asphalt binder content. This layer of HMA should be put in between LCB and JPCP to help prevent bonding of the two layers, which apparently is the cause of early cracking on JPCP. For the purpose of reducing and trying to prevent the likelihood of stripping, it is recommended to lime treat the aggregate to be use for this HMA interlayer.

7. Isolation joints are required between the existing HMA and new Joint P, and shall conform to the Section 40 of the Standard Specification.

8. The binder for Type HS HMA should be PG 64-28 PM and shall conform to Section 92 "Asphalt" of the Standard Specifications.

9. Produce and place Hot Mix Asphalt (HMA) Type HS using the QC/QA processes and comply with Amended Section 39, "Hot Mix Asphalt" within the Standard Specifications Provision (SSP) S1-020H.

10. It is recommended to construct rumble strip by grinding indentations in exiting asphalt concrete surfaces to get better compaction of shoulders. Please see SSP-39-350 and Amended Section 39.1.14.

11. Separate joint detail for JPCP and HMA/JPCP joints should be included on the plan.

12. Asphalt concrete (Type A Bond Breaker) shall be Grade PG 64-16 and shall conform to the provisions specified for Type A asphalt concrete in Section 39 of the Standard Specifications.

13. Lean Concrete Base shall conform to Section 28 "Lean Concrete Base" of the Standard Specifications.

14. For HMA pavement alternative, all traveled lanes and shoulders should use Type HS.

15. Aggregate Subbase (AS) shall be Class 2 and shall conform to Section 25 "Aggregate Subbases" of the Standard Specifications. Native material should not be used as substitute for aggregate subbase unless it meets the specifications of Section 25 of Standard Specifications. This should be specified in the Aggregate Subbase special provisions.

13. Aggregate Base (AB) shall be Class 2 and shall conform to Section 26.1 "Aggregate Bases" of the Standard Specifications.

14. Imported borrow should have an R-value of not less than 50. It is recommended to balance the cut and fill instead of using imported borrow.

15. Due to the nature of the soil in the area and to help protect the outside edge of shoulder surfacing from spalling, it is recommended to use shoulder backing. Please refer to the current shoulder backing specifications SSP 19-720 dated March 13, 2002.

16. It is also recommended that due to the nature of the native soil in this area, use of slope flatter than 1:4 (V:H) or providing slope protection should be considered particularly in the area of the proposed channel. This should be consulted with Roadway Geotechnical and the Landscape unit.

During construction soil testing for R-value and pH/resistively must be conducted preferably every 1,000 feet of the proposed lanes and proposed channel starting from the location of Boring #21 AIF to the north end of the project. Our concern is that there could be clay material within this area due to its proximity to the Ivanpah Dry Lake. If in any case an R-value below 50 and pH/resistivity considerably below the test results obtained from the samples mentioned above are found, please notify our office immediately. For we will need to adjust or change our recommendation accordingly.

Pertinent reports include Materials Report dated December 15, 1959; Materials Report for EA 447901 now EA 4393u1 dated February 5, 2001 and Deflection Study dated January 2, 2000 for EA 439300 now 439311.

If you have any question you may contact Francisco Codling of my staff at extension 4040 or myself at extension 4044.

cc: – Project Manager
file

State of California

Business, Transportation and Housing Agency

Memorandum

: RENEE SASEE- 08
Design Engineer

Date : March 7, 2008

File No. : 08-SBD-15-PM 179.4
08-368501
OH Sign Structures.

Attention : RON DANG

From : **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Office Of Geotechnical Design–South 2-MS #5

Subject : GDR for OverHead Sign Structures at the proposed Agricuture Inspection Station.

The Geotechnical Design Services-South 2 has completed a Geotechnical Design Report (GDR) for construction of the proposed overhead signs, located near the border between Nevada and California States, in the southbound direction of Interstate 15, San Bernardino County. The project plans installation of eighteen (18) one or two-posted, tubular signs at various locations in the project limit.

This report is based on site reconnaissance, literature search and references from previous Log of Test Borings (LOTB). The District provided structure plans, including typical cross-sections and layout sheets. The GDR discusses geotechnical aspects of the sites and provides foundation recommendations. This GDR is also in compliance of our Caltrans Procedure (DES/GS 01-2006) for Overhead Sign Foundation Report Guidelines.

References

1. "Log Of Test Borings (LOTB) for Overhead Signs and Retaining Wall," California Department of Transportation, Office of Geotechnical Design – South 2, May 17, 2007.

2. "Dry Lake Ditch Bridge (Widen); Revised Foundation Recommendations," California Department of Transportation, Office of Geotechnical Design – South 2, July 6, 2006.

3. "Log Of Test Borings (LOTB) for Ivanpah Ditch Bridge, Br. 54-316R," California Department of Transportation, Office of Geotechnical Design – South 2, August 19, 2004.

4. "Log Of Test Borings (LOTB) for Ivanpah Ditch Bridge, Br. 54-316R," California Department of Transportation, Division Of Highways, May 22, 1963.

5. "Log Of Test Borings (LOTB) for Dry Lake Ditch Bridge (Widen), Br. 54-317R," California Department of Transportation, Office of Geotechnical Design – South 2, July 6, 2004.

6. "Final Seismic Design Recommendations Report for Ivanpah Ditch Bridge," California Department of Transportation, Geotechnical Earthquake Engineering Branch, May 1, 2001.

Project Description

The District has planned a number of overhead traffic signs in the vicinity of a proposed inspection station near the borderline between Nevada and California States. The project is located along the southbound direction of I-15, approximately from 0.5 to 3.7 miles south of the Yateswell Overhead Crossing Bridge. Within the scope of this proposed project, seven overhead sign structures will be installed during construction of the nearby facilities. All seven overhead signs will be two-posted and tubular type. Locations and dimensions of the sign structures are shown in the attachment and summarized as follows:

Sign Nos.	Station "A" Line	Station "C" Line	Sign Str. Type	Length Across (Feet)	Post Height (Feet)	Post Type	Remarks Loads M(k-ft)
1	9535+00	***	N/A			Two Posts	
2	9523+00	***	N/A			Two Posts	
3		42+40*	N/A			Two Posts	"B" Line
4		65+50	23-4-100			Single Post	
5		62+00	N/A			Single Post	**R/W
6		58+50	23-4-100			Single Post	
7		53+00	N/A			Single Post	**R/W
8		39+77	26-4-100M	31.5	19.0	Single Post	65.0
9		29+20	OH Truss	75.0	22.0	II-S	349.0
10	9424+00		N/A			Single Post	
11		28+00	23-4-100			Single Post	
12		23+69	OH Truss	72.0	19.0	II-S	307.0
13		23+19	N/A			Single Post	
14		22+79	26-4-100M	40.5	19.0	Single Post	65.0
15		22+29	26-4-100M	40.5	19.0	Single Post	65.0
16		21+29	29-5-100M	52.5	22.0	Single Post	81.0
17		19+00	OH Truss	86.7	19.0	II-S	398.0
18	9370+00	***	N/A			Single Post	

Notes: * "B" Line; ** Outside State R/W; *** Out of range.

Existing Conditions

The proposed facilities for construction of the inspection station have not been built yet. The existing route I-15 on this proposed site was mostly built on a nearly flat land with minor cut and fill within this section. The embankment slope of the roadway varies from 4:1 (H:V) to flat. The existing sign structures in the southbound lanes are of one-post type and situated on the shoulder of travelled way. Based on our visual observation, the existing foundation of roadway and nearby structures in this project area have been performing well in the past without any noted problem.

Subsurface Investigation

No boreholes was drilled for soil samples. Soil information for subsurface conditions are obtained from several boreholes performed in the original as-built plan and in the recently 2004 soil exploration for the Ivanpah Ditch Bridge's widen project. Location of boreholes are shown on the attachment.

Subsurface Conditions

The area geology consists typically of nonmarine alluvium deposits including coarse to fine, gravelly well graded sand. Based on information obtained from the recent LOTB (references 3 and 4,) the soil component for structures foundation comprises of approximately 40 to 60 feet of medium dense to very dense, gravelly sand with scattered cobbles. Water was not encountered during past soil exploration in this area. However, surface run-off water might temporarily create some perched water.

Seismiscity

Please refer to our "Final Seismic Design Recommendations for Ivanpah Ditch Bridge" Report (reference 6).

Pile Foundation Information

According to information provided by the District and our Standard Plans (July 2004,) the pile design data for the single post and overhead two-post signs are listed as follows:

Post Type	Pile Diameter	Pile Depth	Maximum Axial Load	Maximum Moments
Single Post 23-4-100	3.0 ft (0.914 m)	8.9 ft (2.7 m)	2.3 Kips	65.0 Kip-ft
Single Post 26-4-100M	3.0 ft (0.914 m)	8.9 ft (2.7 m)	2.3 Kips	65.0 Kip-ft
Single Post 29-5-100M	3.0 ft (0.914 m)	9.2 ft (2.8 m)	2.9 Kips	81.0 Kip-ft
Overhead Two-Post II-S	4.5 ft (1.372 m)	14.8 ft (4.5 m)	16.3 Kips	398.0 Kip-ft

- Source: 2004 Standard Plans, ES-7F, ES-7G and S-14.

In general, based on assumed soil properties of 34 degrees for friction and no cohesion, the resisting forces were estimated and the depth of piles were verified. Results of calculation for Factors of Safety (F.S) are typically shown in the following table:

Post Type	Pull-up Force	Resisting Force	F.S	Remarks
Single Post 26-4-100M	19.4 Kips	121.7 Kips	6.2 >3.0	OK
Single Post 29-5-100M	24.7 Kips	143.0 Kips	5.8 > 3.0	OK
Overhead Two Post II-S	72.2 Kips	629.3 Kips	7.3 > 3.0	OK

Corrosion

The information obtained from our Lab's tests on previous project in this area indicates that soils within the project area are not corosive to buried metallic structures.

Conclusions and Recommendations

Based on our field reconaissance and information obtained from LOTB and SPT results for previous projects at this location, our conclusions and recommendations are as follows:

- Foundation materials are suitable for the proposed single post, and two-post overhead signs using the Caltrans 2004 Standard Plans.
- Soil parameters are recommended for foundation design as: Density $\gamma = 125$ pcf, frictional angle $\phi = 34°$ and cohesion $C = 0$ psf
- Drilling for sign posts may have some difficulties due to scattered gravel or cobbles. Also, a few loose sand pockets might cause locally caving problems.
- Drilling for CIDH near the Ivanpah Ditch Bridge and other drainage ditches may also temporarily encounter some perched water from surface water run-off.

If you have any question, please call Cuong Nguyen at (916) 227-4513 or CalNet 8-498-4513.

Report by:

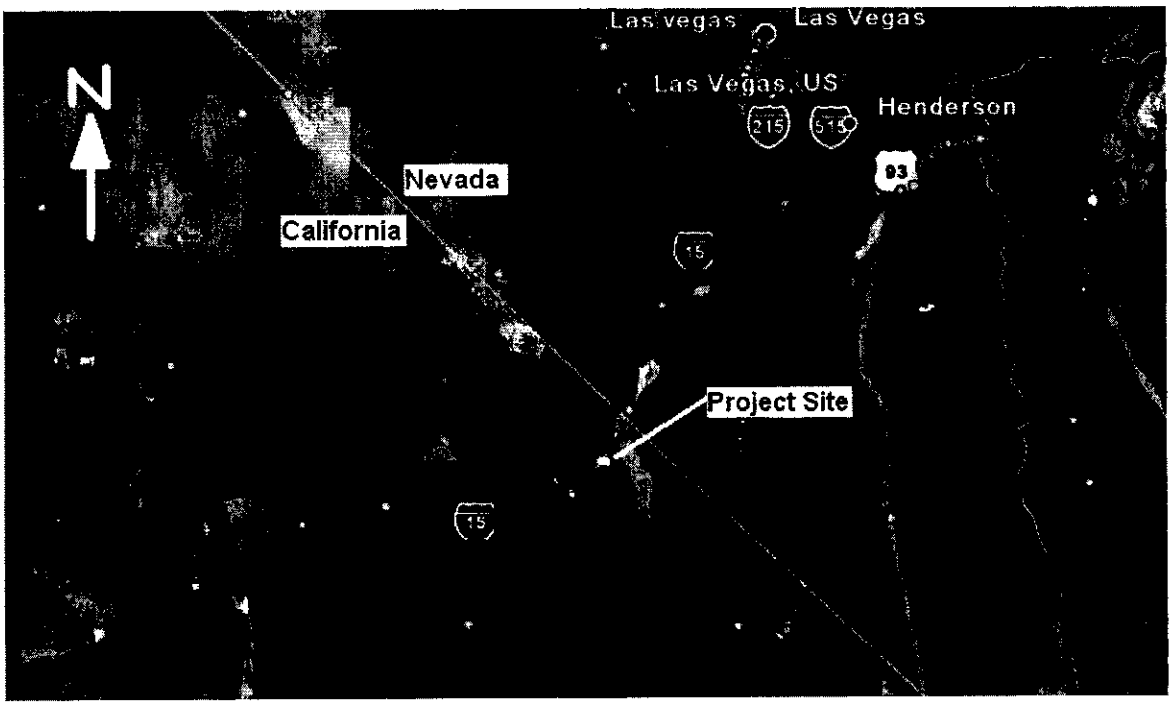
CUONG NGUYEN, P.E.
Associate Materials & Research Engineer
Geotechnical Section C
Attachment

Reviewed by:

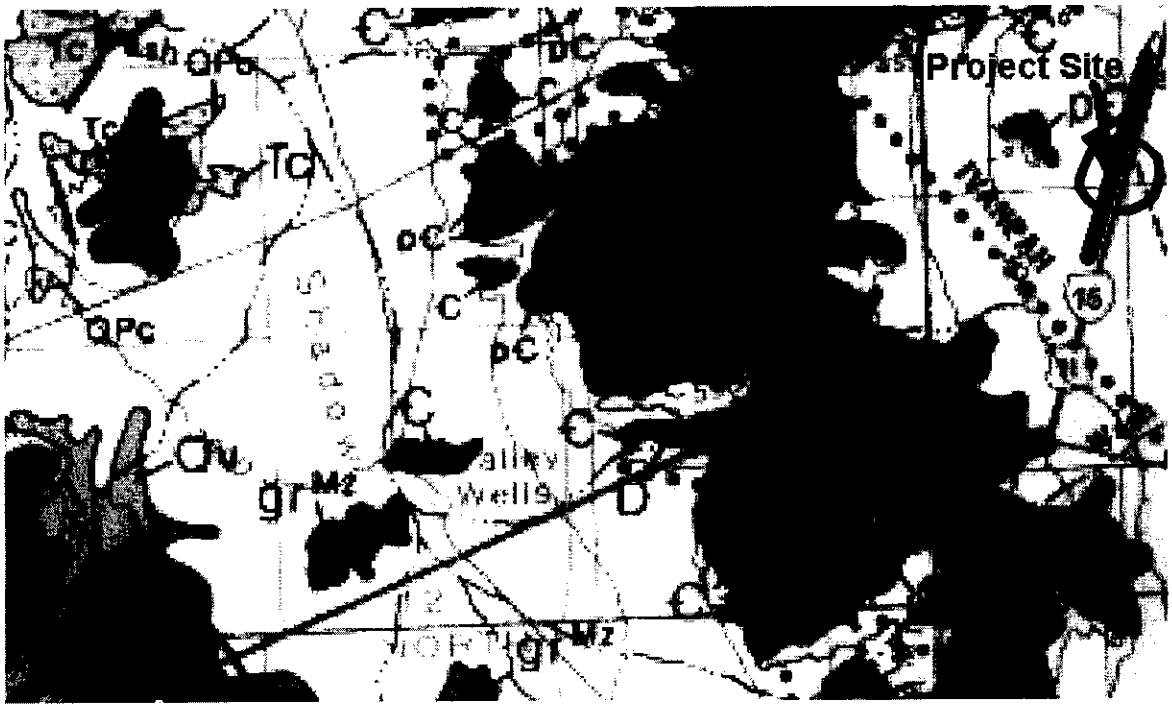
REGISTERED PROFESSIONAL ENGINEER
CUONG NGUYEN
No. CE032414
Exp. 12/31/08
CIVIL ENGINEER
STATE OF CALIFORNIA

c: AAbghari
SWei
GDBS.2

Attachment



Project Location



Geologic Map

DEPARTMENT OF TRANSPORTATION
OFFICE OF TRANSPORTATION ARCHITECTURE
DIVISION OF ENGINEERING SERVICES
1801 30TH STREET
SACRAMENTO, CA 95816
PHONE (916) 227-8290
FAX (916) 227-8009
Doug Lowe, Senior Architect

November 6, 2012

Steve Guarino, Supervisor
Fire and Life Safety Division
Office of the State Fire Marshal
California Department of Forestry and Fire Protection
1131 "S" Street
Sacramento, CA 95814

Dear Mr. Guarino,

This is a request for an extension of the approval period until 5/31/13 for the following project:

CSFM# 01-36-11-0051
Facility name: **Caltrans - Mountain Pass Joint Point of Entry (JPOE)**
Stamped Approval date of 1/20/2011
Stamp is valid until 1/20/2012
Reviewed and approved by Gregory Andersen

This project consists of two facilities. Due to the inability to secure funds from Department of Finance for one of the facilities, the project is being split into two stages with no changes to the design. This project has an anticipated bid opening by 5/31/2013 which is beyond the original SFM stamp approval date of 1/20/11.

If this project does not have a bid opening by 5/31/2013, our office will resubmit to the State Fire Marshal the drawings and specification for review and approval.

In an effort to meet our delivery schedule, please sign below the extension by November 30, 2012.

Should you have any questions, please contact me at (916) 227 - 8290.

Thank you,

DOUG LOWE, Branch Chief
Office of Transportation Architecture

The approval of the above referenced project, **CSFM# 01-36-11-0051, Mt Pass JPOE** shall be extended until May 31, 2013.

Steve Guarino, Supervisor, Office of the State Fire Marshal date 11/27/2012

DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT
464 WEST 4TH STREET
SAN BERNARDINO, CA 92401
PHONE (909) 556 8852

January 30, 2013

Steve Guarino, Supervisor
Fire and Life Safety Division
Office of the State Fire Marshal
California Department of Forestry and Fire Protection
1131 "S" Street
Sacramento, CA 95814

Dear Mr. Guarino,

This is a request for an extension of the approval period until 5/31/13 for the following project:

CSFM# 01-36-11-0051
Facility name: **Caltrans - Mountain Pass Joint Point of Entry (JPOE)**
Stamped Approval date of 1/20/2011
Stamp is valid until 1/20/2012
Reviewed and approved by Gregory Andersen

This project consists of two facilities. Due to the inability to secure funds from Department of Finance for one of the facilities, the project is being split into two stages with no changes to the design. This project has an anticipated bid opening by 7/31/2013 which is beyond the original SFM stamp approval date of 1/20/11.

If this project does not have a bid opening by 7/31/2013, our office will resubmit to the State Fire Marshal the drawings and specification for review and approval.

Should you have any questions, please contact the Senior Architect, Doug Lowe, at (916) 227 - 8290.

Thank you,

JASON BENNECKE, Project Manager
Caltrans District 8 Project Development

The approval of the above referenced project, **CSFM# 01-36-11-0051, Mt Pass JPOE** shall be extended until July 31, 2013.

Steve Guarino, Supervisor, Office of the State Fire Marshal date 2/4/2013

Date:
Page:

All Current Detectors

Site ID:	Port ID:	Node Address:

Device Address	Type Code Label	Flash Scan Type	Custom Label	Extended Label	Pre-Alarm Sensitivity	Fire Alarm Sensitivity	Cooperative Dectector Mode	Alarm Verification Participation	Control-By-Event
1	Smoke (Photo)	PHOTO	Electrical Room 11	SRL Bldg.	8	8	None (N)	NO	Z0,Z21
2	Heat (Fixed)	HEAT	IDF Room 14	SRL Bldg.	Fixed	Fixed	None (N)	NO	Z0,Z21

ASCII SPEED FILE FORMAT

FIELD	LENGTH	STARTS IN COLUMN
Lane	2	1
Hour	2	4
Count, 0-35 MPH	4	7
Count, 36-40 MPH	4	12
Count, 41-45 MPH	4	17
Count, 46-50 MPH	4	22
Count, 51-55 MPH	4	27
Count, 56-60 MPH	4	32
Count, 61-65 MPH	4	37
Count, 66-70 MPH	4	42
Count, 71-75 MPH	4	47
Count, 76-80 MPH	4	52
Count, 81-85 MPH	4	57
Count, > 86 MPH	4	62

ASCII CLASSIFICATION FILE FORMAT

FIELD	LENGTH	STARTS IN COLUMN
Lane	2	1
Hour	2	4
Count, Class 1	4	7
Count, Class 2	4	12
Count, Class 3	4	17
Count, Class 4	4	22
Count, Class 5	4	27
Count, Class 6	4	32
Count, Class 7	4	37
Count, Class 8	4	42
Count, Class 9	4	47
Count, Class 10	4	52
Count, Class 11	4	57
Count, Class 12	4	62
Count, Class 13	4	67
Count, Class 14	4	72
Count, Class 15	4	77

For the above two files:

Each field shall be comma delimited.
For each day's file there is one record
for each lane for each hourly period.

WEIGHT VIOLATION TABLE

==========

(All weights in pounds)

AXLE WEIGHT

Axle No. 1----------	12500
All other axles----------	20000

TANDEM AXLE WEIGHT

Two consecutive axles with an axle spacing not exceeding 8.4 feet----------	34000

GROSS VEHICLE WEIGHT

All vehicles----------	80000

BRIDGE WEIGHT

See page following----------

BRIDGE WEIGHT

Distance in nearest whole foot between the extremes of any group of 2 or more consecutive axles	2 axles	3 axles	4 axles	5 axles	6 axles	7 axles	8 axles	9 axles
<8	34,000	34,000	34,000	34,000	34,000	_____	_____	_____
8	34,000	34,000	34,000	34,000	34,000	_____	_____	_____
9	39,000	42,500	42,500	42,500	42,500	_____	_____	_____
10	40,000	43,500	43,500	43,500	43,500	_____	_____	_____
11	40,000	44,000	44,000	44,000	44,000	_____	_____	_____
12	40,000	45,000	50,000	50,000	50,000	_____	_____	_____
13	40,000	45,500	50,500	50,500	50,500	_____	_____	_____
14	40,000	46,500	51,500	51,500	51,500	_____	_____	_____
15	40,000	47,000	52,000	52,000	52,000	_____	_____	_____
16	40,000	48,000	52,500	52,500	52,500	_____	_____	_____
17	40,000	48,500	53,500	53,500	53,500	_____	_____	_____
18	40,000	49,500	54,000	54,000	54,000	_____	_____	_____
19	40,000	50,000	54,500	54,500	54,500	_____	_____	_____
20	40,000	51,000	55,500	55,500	55,500	_____	_____	_____
21	40,000	51,500	56,000	56,000	56,000	_____	_____	_____
22	40,000	52,500	56,500	56,500	56,500	_____	_____	_____
23	40,000	53,000	57,500	57,500	57,500	_____	_____	_____
24	40,000	54,000	58,000	58,000	58,000	74,000	_____	_____
25	40,000	54,500	58,500	58,500	58,500	74,500	80,000	_____
26	40,000	55,500	59,500	59,500	59,500	75,000	80,000	_____
27	40,000	56,000	60,000	60,000	60,000	76,000	80,000	80,000
28	40,000	57,000	60,500	60,500	60,500	76,500	80,000	80,000
29	40,000	57,500	61,500	61,500	61,500	77,000	80,000	80,000
30	40,000	58,500	62,000	62,000	62,000	77,500	80,000	80,000
31	40,000	59,000	62,500	62,500	62,500	78,000	80,000	80,000
32	40,000	60,000	63,500	63,500	63,500	78,500	80,000	80,000
33	40,000	60,000	64,000	64,000	64,000	79,500	80000	80,000
34	40,000	60,000	64,500	64,500	64,500	80,000	80,000	80,000
35	40,000	60,000	65,500	65,500	65,500	80,000	80,000	80,000
36	40,000	60,000	68,000	66,000	66,000	80,000	80,000	80,000
37	40,000	60,000	68,000	66,500	66,500	80,000	80,000	80,000
38	40,000	60,000	68,000	67,500	67,500	80,000	80,000	80,000
39	40,000	60,000	68,000	68,000	68,000	80,000	80,000	80,000
40	40,000	60,000	68,500	70,000	70,000	80,000	80,000	80,000
41	40,000	60,000	69,500	72,000	72,000	80,000	80,000	80,000
42	40,000	60,000	70,000	73,280	73,280	80,000	80,000	80,000
43	40,000	60,000	70,500	73,280	73,280	80,000	80,000	80,000
44	40,000	60,000	71,500	73,280	73,280	80,000	80,000	80,000
45	40,000	60,000	72,000	76,000	80,000	80,000	80,000	80,000
46	40,000	60,000	72,500	76,500	80,000	80,000	80,000	80,000
47	40,000	60,000	73,500	77,500	80,000	80,000	80,000	80,000
48	40,000	60,000	74,000	78,000	80,000	80,000	80,000	80,000
49	40,000	60,000	74,500	78,500	80,000	80,000	80,000	80,000
50	40,000	60,000	75,500	79,000	80,000	80,000	80,000	80,000
51	40,000	60,000	76,000	80,000	80,000	80,000	80,000	80,000
52	40,000	60,000	76,500	80,000	80,000	80,000	80,000	80,000
53	40,000	60,000	77,500	80,000	80,000	80,000	80,000	80,000
54	40,000	60,000	78,000	80,000	80,000	80,000	80,000	80,000
55	40,000	60,000	78,500	80,000	80,000	80,000	80,000	80,000
56	40,000	60,000	79,500	80,000	80,000	80,000	80,000	80,000
57	40,000	60,000	80,000	80,000	80,000	80,000	80,000	80,000
58	40,000	60,000	80,000	80,000	80,000	80,000	80,000	80,000
>58	40,000	60,000	80,000	80,000	80,000	80,000	80,000	80,000

REAL TIME VIEW

****

Veh No.: _____ Class: _____ Lane:_____ Speed:_____

Time: _____ Date: _____ Vehicle Length:_____

Invalid Measurements Code: _____ Weight Violation (s):_____

		AXLE NO.								
TOTALS		1	2	3	4	5	6	7	8	9
Axle Wt.(kip)	76.1	10.9	15.0	16.2	17.2	16.8				
Axle. Space (feet)	56.9	11.8	4.5	36.4	4.2					

****

Note: Entries following Axle Wt. and Axle Space are for example purpose only.

TRUCK RECORD BATCH PRINT
==========

Site Designation: _____ Lane: _____ Time: _____ Date: _____ Speed:_____

Vehicle No.: _____ Class: ____ Invalid Code: _____ Veh. Wheelbase: _____ Veh. Length: _____

Gross Wt. (kip): _____Weight Violation(s) : _____

Axle No.	1	2	3	4	5	6	7	8	9
Rt. Wheel Wt. (kip)	5.4	7.3	8.0	8.5	8.3				
Lt. Wheel Wt. (kip)	5.5	7.7	8.2	8.7	8.5				
Axle Wt.(kips)	10.9	15.0	16.2	17.2	16.8				
Axle Space (Feet)	11.8	4.5	36.4	4.2					

****

Note: Entries following Axle Wt. and Axle Space are for example purposes only.

DISTRIBUTION OF CLASS AND SPEED COUNTS BY LANE

SITE DESIGNATION:
DATE:

LANE NUMBER <number of lanes varies with contract requirements>

	1		2		3		4		5		6		ALL LANES	
	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%
CLASS														
1	0	0.0	0	0.0					0	0.0	6	0.0	6	0.0
2	22521	82.4	24464	82.7					28540	90.6	23974	87.6	99499	85.9
3	2687	9.8	2395	8.1					2324	7.4	1919	7.0	9325	8.1
4	14	0.1	21	0.1					16	0.1	13	0.0	64	0.1
5	1152	4.2	1297	4.4	"COUNT"entries for				486	1.5	56	0.2	2991	2.6
6	82	0.3	101	0.3	example only				9	0.0	917	3.3	1109	1.0
7	1	0.0	3	0.0					0	0.0	24	0.1	28	0.0
8	280	1.0	402	1.4					3	0.0	32	0.1	717	0.6
9	340	1.2	544	1.8					4	0.0	0	0.0	888	0.8
10	10	0.0	1	0.0					0	0.0	1	0.0	4	0.0
11	84	0.3	104	0.4					0	0.0	0	0.0	188	0.2
12	3	0.0	5	0.0					0	0.0	0	0.0	8	0.0
13	1	0.0	0	0.0					0	0.0	0	0.0	1	0.0
14	28	0.1	46	0.2					0	0.0	0	0.	74	0.1
15	142	0.5	206	0.7					127	0.4	434	1.6	909	0.8
TOT.	27337	100.0	29589	100.0					31509	100.0	27376	100.0	115811	100.0
SPEED (MPH)														
1 - 5	2	0.0	6	0.0					2	0.0	4	0.0	14	0.0
6-10	0	0.0	0	0.0					4	0.0	10	0.0	14	0.0
11-15	10	0.0	5	0.0					32	0.1	28	0.1	75	0.1
16-20	48	0.2	33	0.1					75	0.2	88	0.3	244	0.2
21-25	271	1.0	280	0.9					269	0.9	179	0.7	999	0.9
26-30	641	2.3	615	2.1					480	1.5	349	1.3	2085	1.8
31-35	1047	3.8	838	2.8					731	2.3	606	2.2	3222	2.8
36-40	1165	4.3	1073	3.6					1077	3.4	891	3.3	4206	3.6
41-45	1645	6.0	913	3.1					927	2.9	997	3.6	4482	3.9
46-50	5140	18.8	2063	7.0					1027	3.3	89	3.3	9123	7.9
51-55	9487	34.7	5641	19.1					2508	8.0	1147	4.2	18783	16.2
56-60	5613	20.5	13537	45.8					14134	44.9	3243	11.8	36527	31.5
61-65	1872	6.8	3284	11.1					7211	22.9	9701	35.4	22068	19.1
66-70	277	1.0	1170	4.0					2749	8.7	6614	24.2	10810	9.3
71-75	79	0.3	90	0.3					234	0.7	2240	8.2	2643	2.3
76-80	24	0.1	34	0.1					45	0.1	327	1.2	430	0.4
81-85	13	0.0	7	0.0					4	0.0	51	0.2	75	0.1
86-90	3	0.0	0	0.0					0	0.0	8	0.0	11	0.0
91-95	0	0.0	0	0.0					0	0.0	0	0.0	0	0.0
96-100	0	0.0	0	0.0					0	0.0	0	0.0	0	0.0
> 100	0	0.0	0	0.0					0	0.0	0	0.0	0	0.0
TOT.	27337	100.0	29589	100.0					31509	100.0	27376	100.0	115811	100.0
AVG. SPEED	51		55						57		61		56	

DISTRIBUTION OF VEHICLE COUNTS BY HOUR OF DAY BY LANE

SITE DESIGNATION:
DATE:

HOURLY SUMMARY — LANE NUMBER <number of lanes varies with contract requirements>

HOUR	1	2	3	4	5	6	HOURLY TOTALS
00-01							
01-02							
02-03							
03-04							
04-05							
05-06							
QTR TOTALS							
06-07							
07-08							
08-09							
09-10							
10-11							
11-12							
QTR TOTALS							
12-13							
13-14							
14-15							
15-16							
16-17							
17-18							
QTR TOTALS							
18-19							
19-20							
20-21							
21-22							
22-23							
23-24							
QTR TOTALS							

DAILY SUMMARY — DAILY COUNTS BY LANE

1	2	3	4	5	6	DAILY TOTALS

DISTRIBUTION OF VEHICLE CLASSIFICATIONS BY HOUR OF DAY

SITE DESIGNATION: LANE NO's <display user's entry as to selected lane(s)>
DATE:

HOURLY SUMMARY VEHICLE COUNTS

HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	HOURLY TOTALS
00-01																
01-02																
02-03																
03-04																
04-05																
05-06																
QTR TOTALS																
06-07																
07-08																
08-09																
09-10																
10-11																
11-12																
QTR TOTALS																
12-13																
13-14																
14-15																
15-16																
16-17																
17-18																
QTR TOTALS																
18-19																
19-20																
20-21																
21-22																
22-23																
23-24																
QTR TOTALS																

DAILY SUMMARY VEHICLE COUNTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTAL TEHICLES
COUNT																
PERCENT																

DISTRIBUTION OF VEHICLE CLASSIFICATIONS BY DAY OF MONTH

SITE DESIGNATION: LANE NO's <display user's entry as to selected lane(s)>
DATE: 01/92

VEHICLE COUNTS

DAILY SUMMARY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTALS
1 WED																
2 THU																
3 FRI																
4 SAT																
DAILY AVG																
5 SUN																
6 MON																
7 TUE																
8 WED																
9 THU																
10 FRI																
11 SAT																
DAILY AVG																
12 SUN																
13 MON																
14 TUE																
15 WED																
16 THU																
17 FRI																
18 SAT																
DAILY AVG																
19 SUN																
20 MON																
21 TUE																
22 WED																
23 THU																
24 FRI																
25 SAT																
DAILY AVG																
26 SUN																
27 MON																
28 TUE																
29 WED																
30 THU																
31 FRI																
DAILY AVG																

VEHICLE COUNTS

MONTHLY SUMMARY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	TOTALS
TOTALS																
PERCENT																
DAILY AVG																

DISTRIBUTION OF VEHICLES BY SPEED BY HOUR

SITE DESIGNATION: LANE NO's <display user's entry as to selected lane(s)>
DATE:

SPEED RANGE, MPH

HOUR RANGE	00-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76-80	> 80
00 - 01												
01 - 02												
02 - 03												
03 - 04												
04 - 05												
05 - 06												
QTR TOTALS												
06 - 07												
07 - 08												
08 - 09												
09 - 10												
10 - 11												
11 - 12												
QTR TOTALS												
12 - 13												
13 - 14												
14 - 15												
15 - 16												
16 - 17												
17 - 18												
QTR TOTALS												
18 - 19												
19 - 20												
20 - 21												
21 - 22												
22 - 23												
23 - 24												
QTR TOTALS												

DAILY SPEED SUMMARY

Total Vehicles :	Total Vehicles > 55 MPH :	Percentage Vehicles > 55 MPH :
Average Speed :	Total Vehicles > 60 MPH :	Percentage Vehicles > 60 MPH :
Median Speed :	Total Vehicles > 65 MPH :	Percentage Vehicles > 65 MPH :
85th Percentile:	Total Vehicles > 70 MPH :	Percentage Vehicles > 70 MPH :

DISTRIBUTION OF TRUCK RECORD DATA BY LANE <report to cover all records contained in truck records file>

SITE DESIGNATION:
DATE:

LANE NUMBER <number of lanes varies with contract requirements>

	1		2		3		4		5		6		ALL LANES	
CLASS	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%
1	0	0.0	0	0.0					0	0.0	6	0.0	6	0.0
2	0	0.0	0	0.0					0	0.0	0	0.0	0	
3	152	3.7	342	14.7					87	4.0	74	1.9	655	5.2
4	18	0.4	13	0.6					3	0.1	5	0.1	39	0.3
5	560	13.6	354	15.2		"COUNT" entries for			306	14.2	574	14.7	1794	14.3
6	129	3.1	67	2.9		example only			66	3.1	104	2.7	366	2.9
7	3	0.1	0	0.0					0	0.0	27	0.7	30	0.2
8	350	8.5	134	8.8					278	12.9	357	9.1	1119	8.9
9	1775	43.1	918	39.4					961	44.4	1698	43.5	5352	42.7
10	3	0.1	1	0.0					4	0.2	4	0.1	12	0.1
11	783	19.0	332	14.2					302	14.0	754	19.3	2171	17.3
12	56	1.4	30	1.3					32	1.5	68	1.7	186	1.5
13	5	0.1	2	0.1					0	0.0	7	0.2	14	0.1
14	122	3.0	34	1.5					37	1.7	104	2.7	297	2.4
15	158	3.8	66	2.8					78	3.6	128	3.3	430	3.4
TOTAL	4121	100.0	2330	100.0					2161	100.0	3907	100.0	12520	100.0

LANE NUMBER

	1		2		3		4		5		6		ALL LANES	
STATUS	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%
LEGAL	3353	81.4	1866	80.1					1976	91.4	3076	78.7	10271	82.0
OVR'WT	662	16.0	384	16.5					127	5.9	715	18.3	2249	18.0
INVALID	106	2.6	80	3.4					59	2.7	116	3.0	361	2.9

Note:
The line items under "STATUS" are to be based upon the Contractor's coding scheme for weight violation and invalid measurements. If the coding system identifies invalid measurements other than imbalance (such as "out-of-range" values, system errors, etc.), each unique type of invalid measurement should be broken down as a "STATUS" line item.

TOTAL	4121	100.0	2330	100.0					2162	100.0	3907	100.0	12520	100.0

DISTRIBUTION OF TRUCK RECORD DATA BY LANE <report to cover all records contained in truck records file>

SITE DESIGNATION:
DATE:

LANE NUMBER <number of lanes varies with contract requirements>

	1		2		3		4		5		6		ALL LANES	
CLASS	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%
1	0	0.0	0	0.0					0	0.0	6	0.0	6	0.0
2	0	0.0	0	0.0					0	0.0	0	0.0	0	
3	152	3.7	342	14.7					87	4.0	74	1.9	655	5.2
4	18	0.4	13	0.6					3	0.1	5	0.1	39	0.3
5	560	13.6	354	15.2		"COUNT" entries for			306	14.2	574	14.7	1794	14.3
6	129	3.1	67	2.9		example only			66	3.1	104	2.7	366	2.9
7	3	0.1	0	0.0					0	0.0	27	0.7	30	0.2
8	350	8.5	134	8.8					278	12.9	357	9.1	1119	8.9
9	1775	43.1	918	39.4					961	44.4	1698	43.5	5352	42.7
10	3	0.1	1	0.0					4	0.2	4	0.1	12	0.1
11	783	19.0	332	14.2					302	14.0	754	19.3	2171	17.3
12	56	1.4	30	1.3					32	1.5	68	1.7	186	1.5
13	5	0.1	2	0.1					0	0.0	7	0.2	14	0.1
14	122	3.0	34	1.5					37	1.7	104	2.7	297	2.4
15	158	3.8	66	2.8					78	3.6	128	3.3	430	3.4
TOTAL	4121	100.0	2330	100.0					2161	100.0	3907	100.0	12520	100.0

LANE NUMBER

	1		2		3		4		5		6		ALL LANES	
STATUS	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%	COUNT	%
LEGAL	3353	81.4	1866	80.1					1976	91.4	3076	78.7	10271	82.0
OVR'WT	662	16.0	384	16.5					127	5.9	715	18.3	2249	18.0
INVALID	106	2.6	80	3.4					59	2.7	116	3.0	361	2.9
TOTAL	4121	100.0	2330	100.0					2162	100.0	3907	100.0	12520	100.0

Note:
The line items under "STATUS" are to be based upon the Contractor's coding scheme for weight violation and invalid measurements. If the coding system identifies invalid measurements other than imbalance (such as "out-of-range" values, system errors, etc.), each unique type of invalid measurement should be broken down as a "STATUS" line item.

DISTRIBUTION OF WEIGHT VIOLATIONS AND INVALID MEASUREMENTS FOR VEHICLE CLASSIFICATIONS 4 THROUGH 15

SITE DESIGNATION: LANE NO's <display user's entry as to selected lane(s)>

DATE:

CLASS	TOTAL VEHICLES COUNTED	VEHICLES WITH INVALID MEASUREMENTS	TOTAL VEHICLES WEIGHED	TOTAL VEHICLES OVERWEIGHT	PERCENT VEHICLES OVERWEIGHT	*********NUMBER OF********** *****WEIGHT VIOLATIONS ******* AXLE	TANDEM	GROSS	BRIDGE
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
TOTALS									

PERCENT VEHICLES NOT CLASSIFIED (CLASS 15) : _____

PERCENT VEHICLES WITH INVALID MEASUREMENTS: _____

Notes:

"Percent Vehicles Not Classified" = Class 15 Total Vehicle Count / Total Vehicles Counted
"Percent Vehicles With Invalid Measurements" = Total Vehicles With Invalid Measurements / Total Vehicles Counted
"Vehicles Counted" - "Vehicles With Invalid Measurements" = "Vehicles Weighed"

All weight and weight violation reporting and calculations based on data for "weighed vehicles"

DISTRIBUTION OF WEIGHT VIOLATIONS BY HOUR OF DAY FOR VEHICLE CLASSIFICATIONS 4 THROUGH 14

SITE DESIGNATION: LANE NO's <display user's entry as to selected lane(s)>
DATE:

HOURLY SUMMARY

HOUR	TOTAL VEHICLES WEIGHED	TOTAL VEHICLES OVERWEIGHT	PERCENT VEHICLES OVERWEIGHT	********** NUMBER OF ********** ********** WEIGHT VIOLATIONS ********** AXLE	TANDEM	GROSS	BRIDGE
00-01							
01-02							
02-03							
03-04							
04-05							
05-06							
QTR TOTALS							
07-08							
08-09							
09-10							
10-11							
11-12							
QTR TOTALS							
12-13							
13-14							
14-15							
15-16							
16-17							
17-18							
QTR TOTALS							
18-19							
19-20							
20-2							
21-22							
22-23							
23-24							
QTR TOTALS							

DAILY SUMMARY

TOTAL VEHICLES WEIGHED	TOTAL VEHICLES OVERWEIGHT	PERCENT VEHICLES OVERWEIGHT	********** NUMBER OF ********** ********** WEIGHT VIOLATIONS ********** AXLE	TANDEM	GROSS	BRIDGE

DISTRIBUTION OF OVERWEIGHT VEHICLES BY HOUR OF DAY FOR VEHICLE CLASSIFICATIONS 4 THROUGH 14

SITE DESIGNATION: LANE NO's <display user's entry as to selected lane(s)>

DATE: 01/92

HOURLY SUMMARY — NUMBER OVERWEIGHT VEHICLES

HOUR	TOTAL VEH'S WEIGHED	TOTAL VEH'S OVERWT	PERCENT VEH'S OVERWT	4	5	6	7	8	9	10	11	12	13	14
00-01														
01-02														
02-03														
03-04														
04-05														
05-06														
QTR TOTALS														
06-07														
07-08														
08-09														
09-10														
10-11														
11-12														
QTR TOTALS														
12-13														
13-14														
14-15														
15-16														
16-17														
17-18														
QTRTOTALS														
18-19														
19-20														
20-21														
21-22														
22-23														
23-24														
QTR TOTALS														

DAILY SUMMARY — NUMBER OVERWEIGHT VEHICLES

TOTAL VEH'S WEIGHED	TOTAL VEH'S OVERWT	PERCENT VEH'S OVERWT	4	5	6	7	8	9	10	11	12	13	14

DISTRIBUTION OF GROSS WEIGHTS FOR VEHICLE CLASSIFICATIONS 4 THROUGH 14

SITE DESIGNATION: LANE NO's <display user's entry as to selected lane(s)>
DATE:

VEHICLE COUNTS

GROSS WT KIPS	4	5	6	7	8	9	10	11	12	13	14	TOTALS
0 - 5												
5 - 10												
10 - 15												
15 - 20												
20 - 25												
25 - 30												
30 - 35												
35 - 40												
40 - 45												
45 - 50												
50 - 55												
55 - 60												
60 - 65												
65 - 70												
70 - 75												
75 - 80												
80 - 85												
85 - 90												
90 - 95												
95-100												
100-105												
105-110												
110-115												
115-120												
>120												
TOTALS												

DISTRIBUTION OF 18 KIP ESALS BY HOUR OF DAY FOR VEHICLE CLASSIFICATIONS 4 THROUGH 14
FOR _____ <display user's entries as to pavement type and str. no. or slab thickness>

SITE DESIGNATION: LANE NO's <display user's entry as to selected lane(s)>
DATE: VEH STATUS <display user's entry as to "LEGAL ONLY", "OVWT ONLY" or "ALL" (default)

HOURLY SUMMARY

			ESALS BY HOUR BY CLASS										
HOUR	TOTAL VEH'S WEIGHED	TOTAL ESALS	4	5	6	7	8	9	10	11	12	13	14
00-01													
01-02													
02-03													
03-04													
04-05													
05-06													
QTR TOTALS													
06-07													
07-08													
08-09													
09-10													
10-11													
11-12													
QTR TOTALS													
12-13													
13-14													
14-15													
15-16													
16-17													
17-18													
QTR TOTALS													
18-19													
19-20													
20-21													
21-22													
22-23													
23-24													
QTR TOTALS													

DAILY SUMMARY

	TOTALS	4	5	6	7	8	9	10	11	12	13	14
VEH'S WEIGHED :												
18 KIP ESALS :												
AVERAGE ESAL :												

DISTRIBUTION OF TRUCKS BY DAY OF MONTH FOR CLASSIFICATIONS 4 THROUGH 15

SITE DESIGNATION: LANE NO's <display user's entry as to selected lane(s)>

DATE: 01/92

DAILY SUMMARY

DAY	TOTAL VEHS CNTD	TOTAL VEHS WGHD	TOTAL VEHS OVWT	PCT VEHS OVWT	COUNTED VEHICLES 4	5	6	7	8	9	10	11	12	13	14	15
1 WED																
2 THU																
3 FRI																
4 SAT																
5 SUN																
6 MON																
7 TUE																
8 WED																
9 THU																
10 FRI																
11 SAT																
12 SUN																
13 MON																
14 TUE																
15 WED																
16 THU																
17 FRI																
18 SAT																
19 SUN																
20 MON																
21 TUE																
22 WED																
23 THU																
24 FRI																
25 SAT																
26 SUN																
27 MON																
28 TUE																
29 WED																
30 THU																
31 FRI																

MONTHLY SUMMARY

	TOTAL VEHS CNTD	TOTAL VEHS WGHD	TOTAL VEHS OVWT	PCT VEHS OVWT	COUNTED VEHICLES 4	5	6	7	8	9	10	11	12	13	14	15
TOTALS																
PERCENT																

Table D.4. Axle load equivalency factors for flexible pavements, single axles and p 2.5

Axle Load (kips)	Pavement Structural Number (SN)					
	1	2	3	4	5	6
2	.0004	.0004	.0003	.0002	.0002	.0002
4	.003	.004	.004	.003	.002	.002
6	.011	.017	.017	.013	.010	.009
8	.032	.047	.051	.041	.034	.031
10	.078	.102	.118	.102	.088	.080
12	.168	.198	.229	.213	.189	.176
14	.328	.358	.399	.388	.360	.342
16	.591	.613	.646	.645	.623	.606
18	1.00	1.00	1.00	1.00	1.00	1.00
20	1.61	1.57	1.49	1.47	1.51	1.55
22	2.48	2.38	2.17	2.09	2.18	2.30
24	3.69	3.49	3.09	2.89	3.03	3.27
26	5.33	4.99	4.31	3.91	4.09	4.48
28	7.49	6.98	5.90	5.21	5.39	5.98
30	10.3	9.5	7.9	6.8	7.0	7.8
32	13.9	12.8	10.5	8.8	8.9	10.0
34	18.4	16.9	13.7	11.3	11.2	12.5
36	24.0	22.0	17.7	14.4	13.9	15.5
38	30.9	28.3	22.6	18.1	17.2	19.0
40	39.3	35.9	28.5	22.5	21.1	23.0
42	49.3	45.0	35.6	27.8	25.6	27.7
44	61.3	55.9	44.0	34.0	31.0	33.1
46	75.5	68.8	54.0	41.4	37.2	39.3
48	92.2	83.9	65.7	50.1	44.5	46.5
50	112.	102.	79.	60.	53.	55.

Table D.5. Axle load equivalency factors for flexible pavements, tandem axles and p 2.5

Axle Load (kips)	Pavement Structural Number (SN)					
	1	2	3	4	5	6
2	.0001	.0001	.0001	.0000	.0000	.0000
4	.0005	.0005	.0004	.0003	.0003	.0002
6	.002	.002	.002	.001	.001	.001
8	.004	.006	.005	.004	.003	.003
10	.008	.013	.011	.009	.007	.006
12	.015	.024	.023	.018	.014	.013
14	.026	.041	.042	.033	.027	.024
16	.044	.065	.070	.057	.047	.043
18	.070	.097	.109	.092	.077	.070
20	.107	.141	.162	.141	.121	.110
22	.160	.198	.229	.207	.180	.166
24	.231	.273	.315	.292	.260	.242
26	.327	.370	.420	.401	.364	.342
28	.451	.493	.548	.534	.495	.470
30	.611	.648	.703	.695	.658	.633
32	.813	.843	.889	.887	.857	.834
34	1.06	1.08	1.11	1.11	1.09	1.08
36	1.38	1.38	1.38	1.38	1.38	1.38
38	1.75	1.73	1.69	1.68	1.70	1.73
40	2.21	2.16	2.06	2.03	2.08	2.14
42	2.76	2.67	2.49	2.43	2.51	2.61
44	3.41	3.27	2.99	2.88	3.00	3.16
46	4.18	3.98	3.58	3.40	3.55	3.79
48	5.08	4.80	4.25	3.98	4.17	4.49
50	6.12	5.76	5.03	4.64	4.86	5.28
52	7.33	6.87	5.93	5.38	5.63	6.17
54	8.72	8.14	6.95	6.22	6.47	7.15
56	10.3	9.6	8.1	7.2	7.4	8.2
58	12.1	11.3	9.4	8.2	8.4	9.4
60	14.2	13.1	10.9	9.4	9.6	10.7
62	16.5	15.3	12.6	10.7	10.8	12.1
64	19.1	17.6	14.5	12.2	12.2	13.7
66	22.1	20.3	16.6	13.8	13.7	15.4
68	25.3	23.3	18.9	15.6	15.4	17.2
70	29.0	26.6	21.5	17.6	17.2	19.2
72	33.0	30.3	24.4	19.8	19.2	21.3
74	37.5	34.4	27.6	22.2	21.3	23.6
76	42.5	38.9	31.1	24.8	23.7	26.1
78	48.0	43.9	35.0	27.8	26.2	28.8
80	54.0	49.4	39.2	30.9	29.0	31.7
82	60.6	55.4	43.9	34.4	32.0	34.8
84	67.8	61.9	49.0	38.2	35.3	38.1
86	75.7	69.1	54.5	42.3	38.8	41.7
88	84.3	76.9	60.6	46.8	42.6	45.6
90	93.7	85.4	67.1	51.7	46.8	49.7

Table D.6. Axle load equivalency factors for flexible pavements, triple axles and p 2.5

Axle Load (kips)	Pavement Structural Number (SN)					
	1	2	3	4	5	6
2	.0000	.0000	.0000	.0000	.0000	.0000
4	.0002	.0002	.0002	.0001	.0001	.0001
6	.0006	.0007	.0005	.0004	.0003	.0003
8	.001	.002	.001	.001	.001	.001
10	.003	.004	.003	.002	.002	.002
12	.005	.007	.006	.004	.003	.003
14	.008	.012	.010	.008	.006	.006
16	.012	.019	.018	.013	.011	.010
18	.018	.029	.028	.021	.017	.016
20	.027	.042	.042	.032	.027	.024
22	.038	.058	.060	.048	.040	.036
24	.053	.078	.084	.068	.057	.051
26	.072	.103	.114	.095	.080	.072
28	.098	.133	.151	.128	.109	.099
30	.129	.169	.195	.170	.145	.133
32	.169	.213	.247	.220	.191	.175
34	.219	.266	.308	.281	.246	.228
36	.279	.329	.379	.352	.313	.292
38	.352	.403	.461	.436	.393	.368
40	.439	.491	.554	.533	.487	.459
42	.543	.594	.661	.644	.597	.567
44	.666	.714	.781	.769	.723	.692
46	.811	.854	.918	.911	.868	.838
48	.979	1.015	1.072	1.069	1.033	1.005
50	1.17	1.20	1.24	1.25	1.22	1.20
52	1.40	1.41	1.44	1.44	1.43	1.41
54	1.66	1.66	1.66	1.66	1.66	1.66
56	1.95	1.93	1.90	1.90	1.91	1.93
58	2.29	2.25	2.17	2.16	2.20	2.24
60	2.67	2.60	2.48	2.44	2.51	2.58
62	3.09	3.00	2.82	2.76	2.85	2.95
64	3.57	3.44	3.19	3.10	3.22	3.36
66	4.11	3.94	3.61	3.47	3.62	3.81
68	4.71	4.49	4.06	3.88	4.05	4.30
70	5.38	5.11	4.57	4.32	4.52	4.84
72	6.12	5.79	5.13	4.80	5.03	5.41
74	6.93	6.54	5.74	5.32	5.57	6.04
76	7.84	7.37	6.41	5.88	6.15	6.71
78	8.83	8.28	7.14	6.49	6.78	7.43
80	9.92	9.28	7.95	7.15	7.45	8.21
82	11.1	10.4	8.8	7.9	8.2	9.0
84	12.4	11.6	9.8	8.6	8.9	9.9
86	13.8	12.9	10.8	9.5	9.8	10.9
88	15.4	14.3	11.9	10.4	10.6	11.9
90	17.1	15.8	13.2	11.3	11.6	12.9

Table D.13. Axle load equivalency factors for rigid pavements, single axles and p of 2.5.

Axle (Load (kips)	Slab Thickness, D (inches)								
	6	7	8	9	10	11	12	13	14
2	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
4	.003	.002	.002	.002	.002	.002	.002	.002	.002
6	.012	.011	.010	.010	.010	.010	.010	.010	.010
8	.039	.035	.033	.032	.032	.032	.032	.032	.032
10	.097	.089	.084	.082	.081	.080	.080	.080	.080
12	.203	.189	.181	.176	.175	.174	.174	.173	.173
14	.376	.360	.347	.341	.338	.337	.336	.336	.336
16	.634	.623	.610	.604	.601	.599	.599	.599	.599
18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.51	1.52	1.55	1.57	1.58	1.58	1.59	1.59	1.59
22	2.21	2.20	2.28	2.34	2.38	2.40	2.41	2.41	2.41
24	3.16	3.10	3.22	3.36	3.45	3.50	3.53	3.54	3.55
26	4.41	4.26	4.42	4.67	4.85	4.95	5.01	5.04	5.05
28	6.05	5.76	5.92	6.29	6.61	6.81	6.92	6.98	7.01
30	8.16	7.67	7.79	8.28	8.79	9.14	9.35	9.46	9.52
32	10.8	10.1	10.1	10.7	11.4	12.0	12.3	12.6	12.7
34	14.1	13.0	12.9	13.6	14.6	15.4	16.0	16.4	16.5
36	18.2	16.7	16.4	17.1	18.3	19.5	20.4	21.0	21.3
38	23.1	21.1	20.6	21.3	22.7	24.3	25.6	26.4	27.0
40	29.1	26.5	25.7	26.3	27.9	29.9	31.6	32.9	33.7
42	36.2	32.9	31.7	32.2	34.0	36.3	38.7	40.4	41.6
44	44.6	40.4	38.8	39.2	41.0	43.8	46.7	49.1	50.8
46	54.5	49.3	47.1	47.3	49.2	52.3	55.9	59.0	61.4
48	66.1	59.7	56.9	56.8	58.7	62.1	66.3	70.3	73.4
50	79.4	71.7	68.2	67.8	69.6	73.3	78.1	83.0	87.1

Table D.14. Axle load equivalency factors for rigid pavements, tandem axles and p of 2.5.

Axle Load (kips)	Slab Thickness, D (inches)								
	6	7	8	9	10	11	12	13	14
2	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
4	.0006	.0006	.0005	.0005	.0005	.0005	.0005	.0005	.0005
6	.002	.002	.002	.002	.002	.002	.002	.002	.002
8	.007	.006	.006	.005	.005	.005	.005	.005	.005
10	.015	.014	.013	.013	.012	.012	.012	.012	.012
12	.031	.028	.026	.026	.025	.025	.025	.025	.025
14	.057	.052	.049	.048	.047	.047	.047	.047	.047
16	.097	.089	.084	.082	.081	.081	.080	.080	.080
18	.155	.143	.136	.133	.132	.131	.131	.131	.131
20	.234	.220	.211	.206	.204	.203	.203	.203	.203
22	.340	.325	.313	.308	.305	.304	.303	.303	.303
24	.475	.462	.450	.444	.441	.440	.439	.439	.439
26	.644	.637	.627	.622	.620	.619	.618	.618	.618
28	.855	.854	.852	.850	.850	.850	.849	.849	.849
30	1.11	1.12	1.13	1.14	1.14	1.14	1.14	1.14	1.14
32	1.43	1.44	1.47	1.49	1.50	1.51	1.51	1.51	1.51
34	1.82	1.82	1.87	1.92	1.95	1.96	1.97	1.97	1.97
36	2.29	2.27	2.35	2.43	2.48	2.51	2.52	2.52	2.53
38	2.85	2.80	2.91	3.03	3.12	3.16	3.18	3.20	3.20
40	3.52	3.42	3.55	3.74	3.87	3.94	3.98	4.00	4.01
42	4.32	4.16	4.30	4.55	4.74	4.86	4.91	4.95	4.96
44	5.26	5.01	5.16	5.48	5.75	5.92	6.01	6.06	6.09
46	6.36	6.01	6.14	6.53	6.90	7.14	7.28	7.36	7.40
48	7.64	7.16	7.27	7.73	8.21	8.55	8.75	8.86	8.92
50	9.11	8.50	8.55	9.07	9.68	10.14	10.42	10.58	10.66
52	10.8	10.0	10.0	10.6	11.3	11.9	12.3	12.5	12.7
54	12.8	11.8	11.7	12.3	13.2	13.9	14.5	14.8	14.9
56	15.0	13.8	13.6	14.2	15.2	16.2	16.8	17.3	17.5
58	17.5	16.0	15.7	16.3	17.5	18.6	19.5	20.1	20.4
60	20.3	18.5	18.1	18.7	20.0	21.4	22.5	23.2	23.6
62	23.5	21.4	20.8	21.4	22.8	24.4	25.7	26.7	27.3
64	27.0	24.6	23.8	24.4	25.8	27.7	29.3	30.5	31.3
66	31.0	28.1	27.1	27.6	29.2	31.3	33.2	34.7	35.7
68	35.4	32.1	30.9	31.3	32.9	35.2	37.5	39.3	40.5
70	40.3	36.5	35.0	35.3	37.0	39.5	42.1	44.3	45.9
72	45.7	41.4	39.6	39.8	41.5	44.2	47.2	49.8	51.7
74	51.7	46.7	44.6	44.7	46.4	49.3	52.7	55.7	58.0
76	58.3	52.6	50.2	50.1	51.8	54.9	58.6	62.1	64.8
78	65.5	59.1	56.3	56.1	57.7	60.9	65.0	69.0	72.3
80	73.4	66.2	62.9	62.5	64.2	67.5	71.9	76.4	80.2
82	82.0	73.9	70.2	69.6	71.2	74.7	79.4	84.4	88.8
84	91.4	82.4	78.1	77.3	78.9	82.4	87.4	93.0	98.1
86	102.	92.	87.	86.	87.	91.	96.	102.	108.
88	113.	102.	96.	95.	96.	100.	105.	112.	119.
90	125.	112.	106.	105.	106.	110.	115.	123.	130.

Table D.15. Axle load equivalency factors for rigid pavements, triple axles and p of 2.5

Axle Load (kips)	Slab Thickness D (inches)								
	6	7	8	9	10	11	12	13	14
2	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
4	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003
6	.001	.001	.001	.001	.001	.001	.001	.001	.001
8	.003	.002	.002	.002	.002	.002	.002	.002	.002
10	.006	.005	.005	.005	.005	.005	.005	.005	.005
12	.011	.010	.010	.009	.009	.009	.009	.009	.009
14	.020	.018	.017	.017	.016	.016	.016	.016	.016
16	.033	.030	.029	.028	.027	.027	.027	.027	.027
18	.053	.048	.045	.044	.044	.043	.043	.043	.043
20	.080	.073	.069	.067	.066	.066	.066	.066	.066
22	.116	.107	.101	.099	.098	.097	.097	.097	.097
24	.163	.151	.144	.141	.139	.139	.138	.138	.138
26	.222	.209	.200	.195	.194	.193	.192	.192	.192
28	.295	.281	.271	.265	.263	.262	.262	.262	.262
30	.384	.371	.359	.354	.351	.350	.349	.349	.349
32	.490	.480	.468	.463	.460	.459	.458	.458	.458
34	.616	.609	.601	.596	.594	.593	.592	.592	.592
36	.765	.762	.759	.757	.756	.755	.755	.755	.755
38	.939	.941	.946	.948	.950	.951	.951	.951	.951
40	1.14	1.15	1.16	1.17	1.18	1.18	1.18	1.18	1.18
42	1.38	1.38	1.41	1.44	1.45	1.46	1.46	1.46	1.46
44	1.65	1.65	1.70	1.74	1.77	1.78	1.78	1.78	1.79
46	1.97	1.96	2.03	2.09	2.13	2.15	2.16	2.16	2.16
48	2.34	2.31	2.40	2.49	2.55	2.58	2.59	2.60	2.60
50	2.76	2.71	2.81	2.94	3.02	3.07	3.09	3.10	3.11
52	3.24	3.15	3.27	3.44	3.56	3.62	3.66	3.68	3.68
54	3.79	3.66	3.79	4.00	4.16	4.26	4.30	4.33	4.34
56	4.41	4.23	4.37	4.63	4.84	4.97	5.03	5.07	5.09
58	5.12	4.87	5.00	5.32	5.59	5.76	5.85	5.90	5.93
60	5.91	5.59	5.71	6.08	6.42	6.64	6.77	6.84	6.87
62	6.80	6.39	6.50	6.91	7.33	7.62	7.79	7.88	7.93
64	7.79	7.29	7.37	7.82	8.33	8.70	8.92	9.04	9.11
66	8.90	8.28	8.33	8.83	9.42	9.88	10.17	10.33	10.42
68	10.1	9.4	9.4	9.9	10.6	11.2	11.5	11.7	11.9
70	11.5	10.6	10.6	11.1	11.9	12.6	13.0	13.3	13.5
72	13.0	12.0	11.8	12.4	13.3	14.1	14.7	15.0	15.2
74	14.6	13.5	13.2	13.8	14.8	15.8	16.5	16.9	17.1
76	16.5	15.1	14.8	15.4	16.5	17.6	18.4	18.9	19.2
78	18.5	16.9	16.5	17.1	18.2	19.5	20.5	21.1	21.5
80	20.6	18.8	18.3	18.9	20.2	21.6	22.7	23.5	24.0
82	23.0	21.0	20.3	20.9	22.2	23.8	25.2	26.1	26.7
84	25.6	23.3	22.5	23.1	24.5	26.2	27.8	28.9	29.6
86	28.4	25.8	24.9	25.4	26.9	28.8	30.5	31.9	32.8
88	31.5	28.6	27.5	27.9	29.4	31.5	33.5	35.1	36.1
90	34.8	31.5	30.3	30.7	32.2	34.4	36.7	38.5	39.8