Draft Final Supplemental Environmental Assessment

Construction, Operation, and Maintenance of the New Weed Army Community Hospital at Fort Irwin, California

Department
Of the Army

Installation
Management
Command

February 2016

Notice: Reviewers should provide the Department of the Army (DA) with their comments during the review period of the Supplemental Environmental Assessment (SEA). This will enable the DA to analyze and respond to the comments at one time and to use information acquired in the preparation of the SEA, thus avoiding undue delay in the decision making process. Reviewers have an obligation to structure their participation in the National Environmental Policy Act (NEPA) process so that it is meaningful and alerts the agency to the reviewers' position and contentions (Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 553, 1978). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the FEIS (City of Angoon v. Hodel, 9th Cir, 1986; and Wisconsin Heritages Inc., v. Harris, 490F. Supp. 1334, 1338, E.D. Wis. 1980). Comments on the SEA should be specific and should address the adequacy of the statement and the merits of the alternatives discussed (40CFR 1503.3).

Comments received in response to this document, including names and addresses of those who comment, will be considered part of the public record on this proposed action and will be available for public inspection. Comments submitted anonymously will be accepted and considered; however, those who submit anonymous comments will not have standing to appeal the subsequent decision under 36 CFR Parts 215 or 217. Additionally, pursuant to 7 CFR 1.27(d), any person may request the agency to withhold a submission from the public record by showing how the Freedom of Information Act (FOIA) permits such confidentiality. Persons requesting such confidentiality should be aware that, under FOIA, confidentiality may be granted in only very limited circumstances, such as to protect trade secrets. The DA will inform the requester of the agency's decision regarding the request for confidentiality, and where the request is denied the agency will return the submission and notify the requester that the comments may be resubmitted, with or without name and address.

Additional documentation, reports, and analysis referenced in this document can be found in the administrative record files. These items have not been included in this document due to technical nature, excessive length, or are reference materials used to develop the analysis in this document. All supporting documents in the planning record are located at the Environmental Management Division, Department of Public Works, Fort Irwin, California.

SIGNATURE PAGE

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

Construction, Operation, and Maintenance of the New Weed Army Community Hospital at Fort Irwin, California

Proponent: U.S. Army Garrison, Fort Irwin, California

NEPA Lead agency: U.S. Army Garrison, Fort Irwin, California

CEQA Lead Agency: California State Water Resources Control Board

APPROVAL

This Supplemental Environmental Assessment meets the requirements of NEPA, 40 CFR 1500-1508, Army Regulation 200-1, Environmental Protection and Enhancement, dated 13 December 2007 and 32 CFR 651(AR 200-2) Environmental Analysis of Army Actions, dated 29 March 2002.

Date	Justine E. Dishart Chief, Environmental Management Division
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Executive Summary

ES.1 Introduction

This Supplemental Environmental Assessment (SEA) analyzes and documents potential impacts on the human and natural environment that would result from implementation of additional design element changes identified during construction of the new Weed Army Community Hospital. An Environmental Assessment (EA)/Initial Study (IS), titled *Construction and Operation of a New Weed Army Community Hospital,* was prepared in 2011 analyzing the construction of the replacement hospital that would comply with current building standards, and is hereafter referred to as 2011 EA. The 2011 EA analyzed the construction and operation, including associated maintenance, of a replacement hospital, within a 79-acre parcel that would comply with current building standards. This SEA analyzes the design element changes and incorporates the 2011 EA analysis by reference.

ES.2 Purpose and Need of the Proposed Action

The purpose of the Proposed Action is to implement design element changes to the construction and operation of the new hospital that were not fully analyzed in the 2011 EA. These new/changed hospital features would comply with current building codes and standards and would meet the health care needs of the Fort Irwin community.

The project is needed to accomplish the following:

- Implement the final design for the hospital
- Provide additional resiliency to hospital utilities
- Provide a renewable energy offset for the electricity that would be used by the new hospital

ES.3 Proposed Action and No Action Alternative

Two alternatives were selected for detailed and equal analysis: the Proposed Action and the No Action Alternative. No additional alternatives were considered.

ES.3.1 Proposed Action

The Proposed Action includes construction and operation of the following design element changes within the 79-acre parcel evaluated in the 2011 EA:

- 518,000-gallon emergency water storage tank
- Ten 50,000-gallon emergency wastewater storage tanks (total of 500,000 gallons)
- 2.4-megawatt (MW) fixed photovoltaic (PV) solar array
- Two 25,000-gallon belowground fuel storage tanks
- Five 2.5-million British thermal unit (MBTU) and two 1.0-MBTU boilers
- Three 1.5-MW diesel generators

ES.3.2 No Action Alternative

Under the No Action Alternative, the new design elements would not be incorporated. The new hospital would be constructed without adequate support and resiliency to hospital systems. Backup water supply and wastewater storage would not be provided. Emergency power from generators, fuel storage to support generators, and heat energy from boilers would be inadequate. Solar power generation would not be used to offset the operational power needs of the new hospital.

ES.4 Summary of Impacts

ES.4.1 Direct Impacts

Effects on environmental and socioeconomic resources resulting from implementation of Proposed Action and the No Action Alternative are summarized in Table ES-1.

TABLE ES-1
Summary of Impacts
Supplemental Environmental Assessment, Fort Irwin, California

Resource	Proposed Action Environmental Consequences	No Action Alternative Environmental Consequences
Geology, Soils, and Mineral Resources		
Geology and Mineral Resources	No effect	No effect
Soils	Short-term potential for soil erosion effects on disturbed soils during construction as discussed in the 2011 EA.	No effect
Seismicity	No effect	No effect
Biological Resources		
Flora	Negligible effects from construction in degraded habitat. No effect once in operation.	No effect
Fauna	Temporary, negligible effect during construction due to disturbances in degraded habitat. No effects once in operation.	No effect
Special-status Species	Negligible effects from/to desert tortoise during construction with mitigation measures implemented. No effects once in operation.	No effect
Pest Species	Negligible effects from attracting pest species during construction and operation. Good housekeeping and fencing would be used to deter pest species.	No effect
Water Resources		
Surface Water	Temporary effect from construction in potential drainages. BMPs would be utilized during construction and the grade of drainages would be returned to pre-construction conditions. No effects once in operation.	No effect
Groundwater	Negligible effects from dust control, soil compaction, and general housekeeping practices during construction. Less-than-significant effects from operation and maintenance of the additional boilers, water storage tank, and water used for cleaning the PV solar array.	No effect
Air Quality	Potential for short-term fugitive dust emissions from soil disturbance during construction. Short-term vehicle and equipment exhaust emissions during construction. Less-than-significant emissions from operation of generators and fuel storage tanks.	No effect

TABLE ES-1
Summary of Impacts
Supplemental Environmental Assessment, Fort Irwin, California

Resource	Proposed Action Environmental Consequences	No Action Alternative Environmental Consequences
Utilities		
Water Distribution	Negligible effects from dust control during construction. Less-than-significant effects from operation and maintenance of the additional boilers, water storage tank, and water used for cleaning the PV solar array	No effect
Water Treatment	No effect	No effect
Wastewater Treatment	No effect during construction. The ten 50,000-gallon wastewater storage tanks would provide a long-term benefit to hospital operations in emergency conditions.	No effect
Stormwater	No effect	No effect
Energy and Communications	No effect during construction. The PV facility would provide long-term benefits to the Fort Irwin energy utility	No effect
Solid Waste	Negligible short-term effects from generation of construction waste. Operation and maintenance of the PV facility and boilers would generate minor amounts of solid waste.	No effect
Hazardous and Toxic Substances	Use of small quantities of potentially hazardous materials (e.g., oils, grease) during construction. Waste would be characterized and disposed in an appropriate manner as discussed in the 2011 EA. Operation of the PV facility would results in a minor increased use of hazardous or toxic substances. Less-than-significant impacts would be expected with proper staff training, use of BMPs, and implementation of an SPCCP and maintenance plan.	No effect
Noise	Short-term negligible increase in noise level from construction activities. No effect from design features once in operation.	No effect
Aesthetics	Negligible long-term effect from change to view shed due to water storage tank.	No effect
Transportation	Negligible effects on traffic in the cantonment area during construction with use of traffic control plan as discussed in the 2011 EA. Intersection improvements were recommended in the 2011 EA to offset the minor traffic effects from the new hospital location. Helicopter traffic to and from the hospital during operation could be affected by minor glare impacts from the PV field.	No effect

TABLE ES-1
Summary of Impacts
Supplemental Environmental Assessment, Fort Irwin, California

Resource	Proposed Action Environmental Consequences	No Action Alternative Environmental Consequences
Land Use Planning		
Project Area	No effect	No effect
Surrounding Area	No effect	No effect
Geology, Soils, and Mineral Resources		
Geology and Mineral Resources	No effect	No effect
Soils	Short-term potential for soil erosion effects on disturbed soils during construction as discussed in the 2011 EA.	No effect
Seismicity	No effect	No effect
Cultural Resources	No effect	No effect
Socioeconomics	Short-term beneficial effects on regional economic activity from construction as discussed in the 2011 EA. No Environmental Justice and Protection of Children effects.	No effect
Recreation	No effect	No effect
Health and Human Safety	Long-term beneficial effect by meeting new California buildings requirements.	Long-term adverse effects by not meeting new building requirements.

BMP = best management practice
PV = photovoltaic
SPCCP = Spill Prevention, Control, and Countermeasures Plan

ES.4.2 Cumulative Impacts

Constructing new facilities, as well as modifying existing facilities and infrastructure, are ongoing at Fort Irwin. Multiple construction projects could occur on Fort Irwin simultaneously and could include constructing a pipeline and water storage tank to provide fire flows to the Ammunition Supply Point, new water treatment plant (Irwin Water Works), wastewater and water infrastructure improvements, construction related to an Energy Savings Performance Contract at the Fort Irwin landfill, facilities to support the operation of a new Unmanned Aircraft Systems unit, a new training airfield, and a solar facility. Cumulative effects on groundwater and air quality from the Proposed Action could occur, but would be temporary and minimal with use of mitigation measures. No long-term cumulative effects would result from the Proposed Action.

ES.5 Summary of Mitigation Measures

Measures would be implemented to ensure that adverse environmental effects of construction and operation of the Proposed Action would be avoided or minimized. These measures would be incorporated into the final design, implemented by the construction contractor, and included in the contract documents. A summary of these measures is presented in Table ES-2.

TABLE ES-2
Summary of Mitigation Measures
Supplemental Environmental Assessment, Fort Irwin, California

Resource	Potential Impact	Mitigation Measure
Geology, Soils and Mineral Resources		
	Soil erosion	Construction Phase: Employ BMPs for control of erosion and sediment Implement SWPPP Operation Phase: No mitigation is needed/proposed.
Biological Resources		
	Desert tortoise (no effect)	Construction Phase: Within 2 weeks of the onset of construction, 100 percent coverage ground surveys would be conducted of the project area for tortoises, signs of use, or burrows. If no tortoises or active burrows are identified, then construction would proceed without interruption. If active burrows or tortoises are identified, then tortoises would be relocated to areas off the construction site, and burrows collapsed. Tortoise relocation would require a Section 10(a) permit issued by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973. During land clearing and construction, a biological monitor would be available to observe construction activities and to verify that no tortoises wander into the construction area. If a tortoise is present, construction in the immediate vicinity would be halted while the tortoise is relocated out of the construction area. Before construction begins, personnel working on the site would be given a briefing on the desert tortoise, detailing its life history as well as the protocol to follow if a tortoise is encountered. Operation Phase: No mitigation is needed/proposed.
	Special-status species (potential disturbance)	Construction Phase: Land and vegetation clearing would occur outside the breeding season for birds of concern, defined as February 15 to August 31, where practicable. If vegetation clearing is required during the breeding season, then preconstruction surveys of breeding birds would be conducted. If active nests are identified, they would be protected from disturbance by a 500-foot nesting buffer, which would remain in place until the young have fledged from the nest, and no new nests would be initiated for the season. Operation Phase: No mitigation is needed/proposed.

TABLE ES-2
Summary of Mitigation Measures
Supplemental Environmental Assessment, Fort Irwin, California

Resource	Potential Impact	Mitigation Measure
	Pest species	Construction Phase: During construction, all trash and debris would be placed in receptacles for delivery to approved landfill facilities. Site cleanup of trash and debris would be required on a daily basis, including emptying and disposing of trash receptacles. Operation Phase: Proper waste management on the hospital grounds, fencing around the PV solar array, and removal of any dead or injured animals would limit the potential for pest species to occur.
Water Resources		
Surface Water	Soil erosion, runoff, and sedimentation impacts	Construction Phase: Proper BMPs would be implemented before land grading begins. Natural vegetation would be preserved when possible. Erosion, runoff, and sediment control measures would be implemented in case of a stormwater event. Erosion and stormwater control measures would be implemented per the SWPPP. Operation Phase: During operation of the Proposed Action, potential impacts on surface waters would be minimized by practicing good housekeeping at the facility to prevent any unwanted materials from being washed away during storm events. Examples of good housekeeping practices could include proper materials storage and keeping the site free of spills. Post-construction BMPs, consisting of detention ponds, would maintain pre-development runoff flows for 10-year floods and attenuate larger storm events.
Water Supply	Reduction in water usage	Construction Phase: Use tertiary-treated wastewater for dust control. Operation Phase: No mitigation is needed/proposed.
Hazardous and Toxic Substances		
	Releases from equipment maintenance	Construction Phase: Construction activities would be conducted consistent with hazardous waste and pollution regulations and with guidelines dictated in an SWPPP. Operation Phase: An SPCCP would be developed, implemented, and followed for the storage and use of cleaning agents, the use of fuels, and other hazardous wastes. The underground storage tanks supplying the fuel to the generators are equipped with a double wall leak detection system and the PV panels are encased to prevent any leakage.

TABLE ES-2
Summary of Mitigation Measures
Supplemental Environmental Assessment, Fort Irwin, California

Resource	Potential Impact	Mitigation Measure
Noise		
	Noise impacts during construction	Construction Phase: Construction would only occur during normal daytime working hours.
	Adverse recurring short-term impacts from operation of diesel-powered emergency generator	Operation Phase: Measures that could be implemented include installation of an exhaust silencer and placement of the generator unit in a sound-attenuating enclosure. Exhaust silencers can achieve noise attenuation, up to 52 decibels. Placement of the generator inside a building or enclosure could achieve even greater noise attenuation.
Transportation		
Air Transportation	Glare	Construction Phase: No mitigation is needed/proposed.
		Operation Phase: The panels are tilted to minimize the potential for debris and water to collect on the panels' surfaces. The panels' surfaces are constructed with an anti-glare reflective coating that reflect approximately 2 percent of the sunlight (FAA, 2010).

SWPPP Stormwater Pollution Prevention Plan

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Acronyms and Abbreviations

°F	degrees Fahrenheit
2011 EA	Environmental Assessment/Initial Study, titled *Construction and Operation of a New Weed Army Community Hospital*
AB 32	Global Warming Solutions Act of 2006
AR	Army Regulation
ARB	Air Resources Board
BLM	Bureau of Land Management
BMP	best management practice
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	*Code of Federal Regulations*
CH4	methane
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CWA	Clean Water Act
dBA	decibel (A-weighted scale)
DDW	Division of Drinking Water
DOE	U.S. Department of Energy
EA	Environmental Assessment
ECP	environmental condition of property
EO	Executive Order
ESA	Endangered Species Act of 1973
FAA	Federal Aviation Administration
Fort Irwin	U.S. Army National Training Center at Fort Irwin
GHG	greenhouse gas
gpd	gallons per day
HFC	hydrofluorocarbon
IS	Initial Study

LEED	Leadership in Energy and Environmental Design
LRWQCB	Lahontan Regional Water Quality Control Board
$\mu g/m^3$	micrograms per cubic meter
MBTA	Migratory Bird Treaty Act
MBTU	million British thermal unit
MDAQMD	Mojave Desert Air Quality Management District
MEDCOM	U.S. Army Medical Command
MG	million gallons
mgd	million gallons per day
MW	megawatt
N2O	nitrous oxide
NA	not applicable
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
O_3	ozone
PFC	perfluorocarbon
PM_{10}	particulate matter less than 10 microns in aerodynamic diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in aerodynamic diameter
ppm	parts per million
PV	photovoltaic
RCRA	Resource Conservation and Recovery Act of 1976
RO	reverse osmosis
RONA	Record of Non-Applicability
SEA	Supplemental Environmental Assessment
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Office
SIP	state implementation plan
SO_2	sulfur dioxide
SO_x	sulfur oxide
SPCCP	Spill Prevention, Control, and Countermeasures Plan
SWPPP	Stormwater Pollution Prevention Plan
U.S.C.	U.S. Code

USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
VOC	volatile organic compound
WWTP	wastewater treatment plant

SECTION 1

Purpose and Need

1.1 Introduction

The U.S. Army Garrison, Fort Irwin (Fort Irwin) is located approximately 37 miles northeast of Barstow, California, in the north-central part of the High Mojave Desert (Figure 1-1) (Fort Irwin, 2012). The Fort Irwin reservation encompasses approximately 1,190 square miles (761,405 acres). Approximately half of Fort Irwin's land area is used for desert battlefield training. A cantonment area occupies approximately 3 square miles and provides temporary and permanent living quarters for soldiers and their families. The cantonment area consists of residential areas, support facilities, retail centers, restaurants, and health care facilities.

Fort Irwin's population includes approximately 4,448 assigned military members, a 7,201-person civilian workforce, and 4,754 family members. In addition, approximately 5,600 soldiers visit Fort Irwin during training rotations, which occur approximately 10 times each year, which makes for a daily population of approximately 24,979 people(Fort Irwin, 2015). The Weed Army Community Hospital is the primary health care facility for these individuals. The mission of the hospital is to provide and manage the health care of soldiers, military families, and retirees; to support the readiness and deployment of a medically protected force while achieving effective health care practices; and to meet diverse future requirements. In addition, there typically are 4,000 to 5,000 civilian contractors who work as support personnel on Base and who could also use the hospital in a medical emergency.

The Weed Army Community Hospital building is outdated and does not comply with California building requirements (Senate Bill 1953), primarily due to seismic concerns. Alterations or additions to the current building cannot be performed without a seismic retrofit, which would be cost prohibitive. An Environmental Assessment (EA)/Initial Study (IS), titled *Construction and Operation of a New Weed Army Community Hospital,* was prepared in 2011 analyzing the construction of a replacement hospital that would comply with current building standards, and is hereafter referred to as 2011 EA. The 2011 EA analyzed the construction and operation, including associated maintenance, of a replacement hospital, within a 79-acre parcel that would comply with current building standards. During the construction, several design element changes were identified that would require additional National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) analysis prior to implementation. This Supplemental EA (SEA) analyzes and documents potential impacts on the human and natural environment that would result from implementation of these additional design element changes. Details of the Army's Proposed Action are provided in Section 2. The 2011 EA is incorporated by reference and attached as Appendix A in this SEA.

1.2 Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to implement design element changes to the construction, operation, and maintenance of the new hospital that were not fully analyzed in the 2011 EA. These elements include a water storage tank, an increase in emergency wastewater storage tanks, a fixed photovoltaic (PV) solar array, an increase in underground fuel storage tanks, an increase in boilers, and an increase in diesel generators. These new/changed hospital features are described in Section 2.1. They would comply with current building codes and standards and would meet the health care needs of the Fort Irwin community.

1.2.1 Project Need

The final hospital design included elements required to provide support and resiliency to hospital systems that were not fully analyzed in the 2011 EA or that have changed since the 2011 EA was

completed. The proposed elements would provide backup water supply and wastewater storage, additional emergency power from generators and fuel storage for generators, additional heat energy from boilers, and solar power generation to offset the operational power needs of the new hospital.

1.2.2 Project Objectives

The Proposed Action would achieve the following objectives:

- Implement the final design for the hospital
- Provide additional resiliency to hospital utilities
- Provide a renewable energy offset for the electricity that would be used by the new hospital

1.3 Scope of Analysis

This SEA was prepared in accordance with NEPA and implementing regulations specified in 40 *Code of Federal Regulations* (CFR) Part 1500 through Part 1508, and 32 CFR Part 651. The purpose of this SEA is to describe current environmental resources on and adjacent to the location of the proposed new facility and to inform decision makers and the public of the potential environmental consequences of implementing design changes while presenting the rationale used for evaluating and determining impacts. Mitigation measures are identified and described where warranted. The SEA evaluates the Proposed Action as described in Section 2 and does not evaluate the actions from the original 2011 EA. The 2011 EA is incorporated by reference and attached as Appendix A in this SEA.

This SEA identifies, documents, and evaluates potential environmental and socioeconomic effects of the Proposed Action and seeks to ensure that appropriate consideration has been given to environmental resources. It includes a thorough evaluation of direct, indirect, and cumulative impacts, both temporary and permanent, that could occur as a result of implementing the Proposed Action. Reasonably foreseeable future actions are identified in Section 4. Any additional requirements stemming from other unrelated military actions would undergo separate NEPA analysis and evaluation. This SEA also considers the potential impacts of the No Action Alternative, as required by NEPA. The No Action Alternative provides a benchmark against which the potential impacts of the Proposed Action and the alternatives can be compared.

An interdisciplinary team of environmental scientists, biologists, planners, economists, engineers, archaeologists, historians, and military technicians has analyzed the Proposed Action and alternatives in light of existing conditions and has identified relevant beneficial and adverse effects associated with the action and alternatives.

This document also includes an IS (Appendix B), pursuant to CEQA. Similar to NEPA, CEQA requires that discretionary actions by state agencies (see Section 1.5) be reviewed for their potential to cause significant effects on the environment and to identify measures to avoid or mitigate these effects.

1.3.1 Resource Areas Eliminated from Analysis

The following resource areas have been eliminated from analysis in the SEA because there is no potential for impacts to them from the Proposed Action. These resource areas will not be further discussed in the SEA.

1.3.1.1 Land Use

The Proposed Action would occur within the cantonment on land currently designated for military use. No modifications to existing uses would occur as a result of the Proposed Action and no changes in use of adjacent land would occur. There would be no changes to land use as a result of the Proposed Action.

Figure 1-1
Vicinity Map
MEDCOM Supplemental EA
Fort Irwin, California

0 12.5 25 50
Miles

N

ES051512042359ATL Fig1-1_vicinity_Map_v4 10/29/2015 bp

CH2MHILL

1.3.1.2 Geology, Soils, Mineral Resources, and Seismicity

Impacts associated with soils, geological and mineral resources, and seismicity would be the same as described in the 2011 EA and would occur within the disturbed footprint analyzed in that document. As noted in the 2011 EA, the design and engineering of the hospital would be based on California seismic requirements. There would be no new impacts as a result of the Proposed Action.

1.3.1.3 Cultural Resources

The Proposed Action would occur within the footprint analyzed in the 2011 EA. There would be no impacts as a result of the Proposed Action.

1.3.1.4 Socioeconomic Resources

The Proposed Action consists of small changes to the project that was analyzed in the 2011 EA. These changes would be within the estimates of construction impacts and would not result in any change to operational impacts. No change to the beneficial socioeconomic impacts would be anticipated.

1.3.1.5 Ground Transportation

Impacts to ground transportation would be the same as described in the 2011 EA. Temporary adverse impacts to traffic could occur during construction due to increased traffic congestion. No additional transportation routes would be impacted and no new impacts would occur.

1.3.1.6 Health and Safety

Impacts to safety and occupational health would be the same as described in the 2011 EA. All activities would occur within the parcel analyzed in that EA. Portions of the parcel were and are being remediated for Munitions and Explosives of Concern to prevent exposure to construction workers. Construction areas would continue to be secured to prevent access to unauthorized personnel. Construction activities would continue to comply with U.S. Army and Occupational Safety and Health Administration requirements. No new impacts would occur.

1.3.1.7 Recreation

The Proposed Action would occur within the footprint analyzed in the 2011 EA. There would be no impacts to recreational resources as a result of the Proposed Action.

1.3.1.8 Environmental Justice and Protection of Children

The Proposed Action would occur over land controlled by Fort Irwin within the footprint analyzed in the 2011 EA. This area is on Fort Irwin and is restricted from the public. There would be no impacts to low-income populations, minorities, or children.

1.3.2 Resource Areas Analyzed

This SEA includes an analysis of all other resource areas that could be impacted by the Proposed Action. These include the following, which are discussed in Sections 3 and 4:

- Biological Resources
- Water Resources
- Air Quality
- Utilities
- Hazardous Materials
- Noise
- Aesthetics/Visual Resources
- Air Transportation

1.4 Framework for Decision Making

The U.S. Army is the lead agency for completing a NEPA analysis for the Proposed Action, while the State Water Resources Control Board, Division of Drinking Water is the lead agency for CEQA. The SEA and

CEQA Supplemental IS will be used to identify any potentially significant effects of the Proposed Action, to identify environmental concerns in advance of project implementation, and to discuss any appropriate mitigation measures for those concerns; they may also be used to support obtaining permits and approvals from other agencies, including the U.S. Army Corps of Engineers (USACE), California Department of Health Services, California Regional Water Quality Control Board-Lahontan Region, State Water Resources Control Board, and Mojave Desert Air Pollution Control District. Agencies could use the SEA or CEQA Supplemental IS to support their decision to issue approvals and/or permits for the Proposed Action.

Although a number of Responsible and Trustee Agencies have been identified, discussions with those agencies would be required to determine the specific nature of any future permits or approvals that might be required from those agencies. Their inclusion in this document is intended to acknowledge the potential role of these agencies and ensure their notification and subsequent inclusion of any comments from them.

1.5 Permits, Approvals, and Agreements Required by Other Agencies

This section lists and summarizes some of the permits and approvals that may be needed to implement the Proposed Action. This section provides the reader with a general understanding of the regulatory requirements that may need to be met before the Proposed Action is implemented. Discussions with those agencies would be required to determine the specific nature of any future permits or approvals that might be required from those agencies. Their inclusion in this document is intended to acknowledge the potential role of these agencies and ensure their notification and subsequent inclusion of any comments from them. This list is not intended to be all inclusive; for example, a variety of permits and approvals might be needed from local and regional agencies that are not reflected here. In addition, the permits and approvals required would vary depending on the implementing agency. Table 1-1 lists permits and approvals that may be required for the Proposed Action.

TABLE 1-1
Permits and Approvals
Supplemental Environmental Assessment, Fort Irwin, California

Permitting or Approval Agency	Permit or Approval	Requirement	Comments
California Department of Toxic Substances Control	Various permits and approvals related to hazardous materials	The storage, transport, and disposal of hazardous materials are primarily regulated by the California Department of Toxic Substances Control under various federal and state regulations.	Applies to any implementing agency.
California Department of Transportation or Federal Highway Administration	Encroachment and Transportation Permits	Encroachment permits would be needed for any activities in a federal, state, or county road or highway right-of-way. Transportation Permits would be needed for oversized vehicles or extralegal loads.	Applies to any implementing agency.
LRWQCB	CWA Section 401 Water Quality Certification	Section 401 of the CWA requires that federally authorized discharges not violate state water quality standards.	Required if a CWA Section 402 Permit is required.

TABLE 1-1
Permits and Approvals
Supplemental Environmental Assessment, Fort Irwin, California

Permitting or Approval Agency	Permit or Approval	Requirement	Comments
	CWA Section 402 NPDES Permit	Section 402 of the CWA authorizes states to issue NPDES permits for discharges to surface water both from point sources and non-point sources. Compliance is required for construction projects that would disturb 1 acre or more.	Applies to any implementing agency.
	Waste Discharge Requirements, Porter-Cologne Water Quality Control Act	Waste Discharge Requirements are required for activities that may discharge waste in a diffuse manner (such as from soil erosion or waste discharges to land), including the discharge of waste from construction operations	Activities undertaken by a federal agency are not subject to Waste Discharge Requirements.
	Water Quality Control Plan Amendment	In accordance with the Porter-Cologne Water Quality Control Act, the LRWQCB has prepared a Water Quality Control Plan that identifies the beneficial uses of water that should be protected, establishes water quality objectives (limits or levels of water constituents based on both federal and state laws), and defines an implementation program to meet water quality objectives. An amendment may be required for any alternative that is not consistent with the LRWQCB Water Quality Control Plan.	Applies to any implementing agency.
Project Lead Agency (implementing agency) and all Responsible Agencies	Project-level CEQA Compliance	CEQA applies to all discretionary activities proposed to be carried out or approved by public agencies, including State, regional, county, and local agencies in the State of California. CEQA also applies to private activities that require discretionary approval by a public agency.	CEQA does not apply to federal activities, unless such activities require a discretionary action from a public agency in California.
Project Lead Agency (Federal), all Federal Cooperating Agencies, and the Advisory Council on Historic Preservation	Section 106 of the National Historic Preservation Act	Section 106 requires federal agencies to evaluate the effects of federal undertakings on historical, archeological, and cultural resources. An agency is required to coordinate with the SHPO or Tribal Historic Preservation Officer and other interested parties on effects on historical, cultural, and Tribal resources.	Applies to all actions on federal lands, sponsored or permitted by a federal agency, or funded with federal monies.
MDAQMD	CAA General Conformity Determination	The CAA Section 176(c) requires federal actions to conform to applicable federal or SIPs to ensure that the actions do not interfere with strategies employed to attain the NAAQS.	Applicable to federal actions. May require modification of the SIP emission budgets for NO_x and respirable PM_{10}.
MDAQMD	Permits to Construct and Operate Stationary Sources and portable sources where applicable.	Various air quality permits would be needed for construction and operations and maintenance of stationary sources such as generators, pumping plants, and treatment facilities.	Applies to any implementing agency.

TABLE 1-1
Permits and Approvals
Supplemental Environmental Assessment, Fort Irwin, California

Permitting or Approval Agency	Permit or Approval	Requirement	Comments
MDAQMD	Approval of Large Operation Notification (Dust Control Plan)	The purpose is to reduce the amount of particulate matter entrained in the ambient air as a result of manmade fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions. Compliance with this regulation would be required for a variety of alternative activities.	Applies to any implementing agency.
USFWS	ESA Section 7 Incidental Take Statement, or Section 10 Incidental Take Permit	The ESA requires the USFWS to maintain lists of threatened and endangered species and protects these listed species (and any designated critical habitat) from unauthorized take. Section 7 of the ESA requires all federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat. Section 10 describes how the USFWS may authorize take of a listed species by non-federal agencies.	The ESA applies to any action that may result in a "may affect" determination for a federally listed species, regardless of the implementing agency.

CAA Clean Air Act
CWA Clean Water Act
ESA Endangered Species Act of 1973
LRWQCB Lahontan Regional Water Quality Control Board
MDAQMD Mojave Desert Air Quality Management District
NAAQS National Ambient Air Quality Standards
NO_x nitrogen oxide
NPDES National Pollutant Discharge Elimination System
PM_{10} particulate matter less than 10 microns in aerodynamic diameter
SHPO State Historic Preservation Office
SIP state implementation plan
USFWS U.S. Fish and Wildlife Service

1.6 Relevant Statutes, Regulations, and Executive Orders

A decision on whether to proceed with the Proposed Action depends on numerous factors, including mission requirements, regulatory requirements, and environmental considerations. In addressing environmental considerations, Fort Irwin and the U.S. Army Medical Command (MEDCOM) were guided by relevant statutes (and their implementing regulations) and Executive Orders (EOs) that establish standards and provide guidance on environmental and natural resources management and planning.

These include, but are not necessarily limited to the following:

Federal and State Statutes

- CAA (42 U.S. Code [U.S.C.] 7401 et seq., as amended)
- CWA of 1977 and the Water Quality Act of 1987 (33 U.S.C. 1251 et seq., as amended)
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (as amended by the Superfund Amendments and Reauthorization Act of 1986 [42 U.S.C. 9601 et seq.])
- ESA (16 U.S.C. 1531-1543)

- Energy Policy Act of 2005 (42 U.S.C. 15801)
- Energy Independence and Security Act of 2007
- Fish and Wildlife Coordination Act (16 U.S.C. 661, et seq.)
- Migratory Bird Treaty Act (MBTA) (16 U.S.C. 701, et seq.)
- National Energy Conservation Policy Act (42 U.S.C. 8251)
- NEPA (42 U.S.C. 4321-4370)
- Noise Control Act of 1972 (42 U.S.C. 4901 - 4918)
- Resource Conservation and Recovery Act of 1976 (RCRA) (42 U.S.C. 6901)
- Toxic Substances Control Act (15 U.S.C. 2601 et seq., as amended)
- California Environmental Quality Act (California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000–15387)

Regulations

- Army Regulation (AR) 190-13, The Army Physical Security Program
- AR 200-1, Environmental Protection and Enhancement
- AR 210-20, Installation Master Planning
- AR 385-10, The Army Safety Program
- AR 525-13, Antiterrorism
- Council on Environmental Quality Regulations for Implementing NEPA (Title 40 CFR, Parts 1500-1508 [40 CFR 1500-1508])
- Environmental Analysis of Army Actions (32 CFR 651)
- General Conformity Air Quality (40 CFR 51 and 93)

Executive Orders

- EO 11514, Protection and Enhancement of Environmental Quality (amended by EO 11991)
- EO 12088, Federal Compliance with Pollution Control Standards
- EO 12372, Intergovernmental Review of Federal Programs
- EO 12580, Superfund Implementation
- EO 12902, Energy Efficiency and Water Conservation at Federal Facilities
- EO 13101, Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition
- EO 13123, Greening the Government Through Efficient Energy Management
- EO 13149, Greening the Government Through Federal Fleet and Transportation Efficiency
- EO 13154, Federal Leadership in Environmental, Energy, and Economic Performance
- EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds
- EO 13327, Federal Real Property Asset Management (amended by EO 13423)
- EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management
- EO 13693, Planning for Federal Sustainability in the Next Decade

1.7 Agency and Public Participation

The U.S. Army invites public participation in the proposed federal action through the NEPA process. Consideration of the views and information of all interested persons promotes open communication and enables better decision making. All agencies, organizations, and members of the public having a potential interest in the Proposed Action, including minority, low-income, disadvantaged, and Native American groups, are urged to participate in the decision making process. Coordination letters were submitted to the California SHPO, and potential interested tribal governments on September 30, 2010. The original 2011 EA (included in Appendix A) contains correspondence with these entities. A no effects determination was made by the Fort Irwin environmental staff in relation to federally threatened and endangered species based on the location of the Proposed Action and an August 2010 survey of the site. USFWS coordination was determined to be unnecessary. Public participation opportunities with respect to this SEA and decision making on the Proposed Action are guided by 32 CFR Part 651. Upon completion of the SEA, the Final Draft SEA and Draft Finding of No Significant Impact will be made available to the public for comment for a period of 30 days. At the end of the 30-day public review, the U.S. Army will consider all comments submitted by individuals, agencies, and organizations. As appropriate, the U.S. Army may then execute the Finding of No Significant Impact and proceed with implementation if the action would not result in significant impacts, or the U.S. Army would publish in the Federal Register a Notice of Intent to prepare an environmental impact statement or would not take the action.

Throughout this process, the public may obtain information on the status and progress of the Proposed Action and the EA through Mr. Clarence Everly, Fort Irwin Directorate of Public Works, Environmental Division, Building 602, P.O. Box 105085, Fort Irwin, California, 92310-5085 or via e-mail at clarence.a.everly.civ@mail.mil.

SECTION 2

Description of Proposed Action and Alternatives

This section describes the Proposed Action and alternatives for implementing design elements to the construction, operation, and maintenance of a new hospital at Fort Irwin that meet the project purpose and need as described in Section 1.2. Two alternatives (the Proposed Action and the No Action Alternative) were selected for detailed analysis. No additional alternatives were considered.

2.1 Proposed Action

The Proposed Action is the preferred alternative and would entail construction and operation of the following design element changes within the 79-acre parcel evaluated in the 2011 EA:

- 518,000-gallon emergency water storage tank
- Ten 50,000-gallon emergency wastewater storage tanks (total of 500,000 gallons)
- 2.4-megawatt (MW) fixed PV solar array
- Two 25,000-gallon belowground fuel storage tanks
- Five 2.5-million British thermal unit (MBTU) and two 1.0-MBTU boilers
- Three 1.5-MW diesel generators

Figure 2-1 highlights the location of these design elements within the 79-acre parcel. The Proposed Action would replace or update the following elements evaluated in the original 2011 EA, as shown in Table 2-1.

TABLE 2-1
Proposed Changes from 2011 EA
Supplemental Environmental Assessment, Fort Irwin, California

Elements in 2011 EA	Proposed Changes Addressed in SEA
79 acres of land disturbance for construction and construction staging	No change and not further addressed
216,374-square foot hospital building on 26 acres	No change and not further addressed
Helicopter pad	No change and not further addressed
Parking for 600 vehicles	No change and not further addressed
Access roads	No change and not further addressed
Central utility plant	No change and not further addressed
RO water treatment plant	No change and not further addressed
PV solar energy facility – details not specified	2.4-MW fixed PV solar array. Permanent development of 7.82 acres within the 79-acre hospital project area.
Landscaping	No change and not further addressed
Force protection	No change and not further addressed
Stormwater management	No change and not further addressed
Two 800-kilowatt diesel generators	Three 1.5-MW diesel generators
Two 5,000-gallon fuel storage tanks	Two 25,000-gallon belowground fuel storage tanks

TABLE 2-1
Proposed Changes from 2011 EA
Supplemental Environmental Assessment, Fort Irwin, California

Elements in 2011 EA	Proposed Changes Addressed in SEA
Boilers totaling up to 5.1 MBTU and up to 200,000 British thermal units in capacity	Boilers totaling 14.5 MBTU configured as five 2.5-MBTU and two 1.0-MBTU boilers
492 staff and contractors	No change and not further addressed
No emergency water storage	518,000-gallon emergency water storage tank
No emergency wastewater storage	Ten 50,000-gallon emergency wastewater storage tanks (total of 500,000 gallons)

PV = photovoltaic
RO = reverse osmosis

Temporary construction staging areas for the elements in the Proposed Action would be located within the 79-acre area evaluated in the 2011 EA.

The fixed PV solar array was constructed based on the assessment in the 2011 EA, which included an evaluation of impacts from construction within the identified 79-acre project area (that is, approximate area of ground disturbance); however, the 2011 EA did not include the specific size of the array or an evaluation of impacts from operation and maintenance of this element. The SEA will evaluate impacts from operation and maintenance and measures that would be implemented to reduce potential impacts.

2.2 No Action Alternative

Under the No Action Alternative, the new design elements would not be incorporated. The new hospital would be constructed without adequate support and resiliency to hospital systems. Backup water supply and wastewater storage would not be provided. Emergency power from generators, fuel storage to support generators, and heat energy from boilers would be inadequate. Solar power generation would not be used to offset the operational power needs of the new hospital.

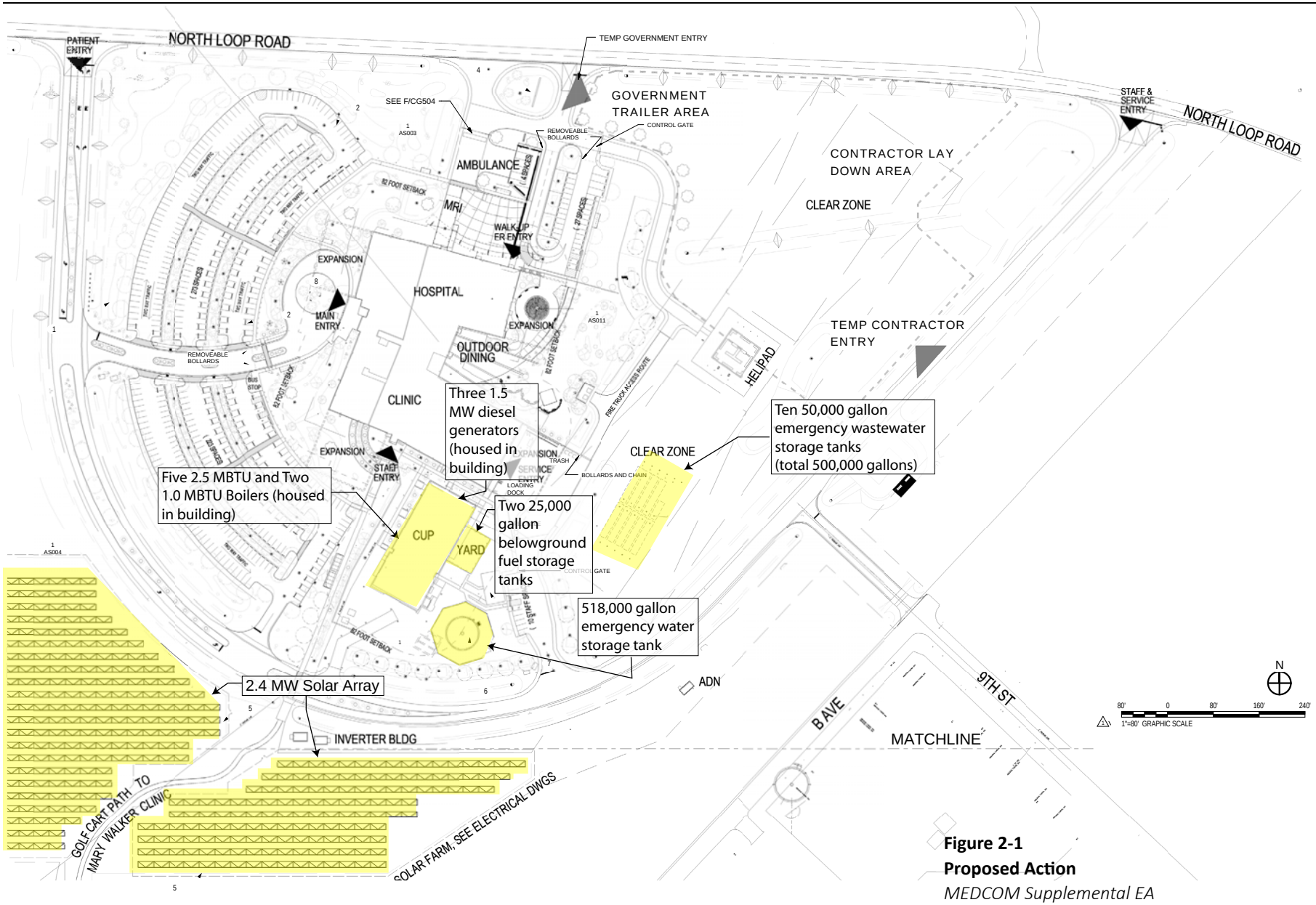

Figure 2-1
Proposed Action
MEDCOM Supplemental EA
Fort Irwin, California

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SECTION 3

Affected Environment

Section 3 describes existing environmental conditions of the preferred alternative area that could be affected by implementing the Proposed Action. These resources include biological resources, water resources, air quality, utilities, hazardous materials, noise, aesthetics/visual resources, and air transportation. Resources that would not be affected include land use; geology, soils, seismicity, and mineral resources; socioeconomics; cultural resources; ground transportation; health and safety; and recreation. These resource areas are not discussed in detail because they would not be affected by the Proposed Action. The 2011 EA is incorporated by reference and attached as Appendix A in this SEA.

3.1 Biological Resources

Biological resources include plants (flora) and animals (fauna) and the habitats in which they occur. Major vegetation communities are described in terms of the representative species present, with special attention placed on special-status species afforded some level of federal, state, or local protection. General wildlife species expected to occur are described, with emphasis placed on special-status species.

3.1.1 Regulatory Considerations

Regulations concerning biological resources are discussed in Sections 3.1.1.1 through 3.1.1.3.

3.1.1.1 Endangered Species Act of 1973

The ESA (16 USC Sections 1531 et. seq.) was established to protect and allow for recovery of species in danger of extinction and their associated habitat. Under the ESA, species may be listed as endangered or threatened. Endangered species includes those in danger of extinction throughout all or a part of its range. Threatened includes species likely to become endangered within the foreseeable future. The ESA also protects habitat considered critical to the existence and recovery of listed species. Section 7 of the ESA specifies that any agency that proposes a federal action that could jeopardize a listed species or result in destruction or adverse modification of its habitat must participate in an interagency cooperation and consultation process with the USFWS or the National Oceanic and Atmospheric Administration.

3.1.1.2 California Endangered Species Act

The purpose of the California Endangered Species Act (CESA) is to ensure all native species of flora and fauna, including their associated habitat, threatened by extinction, and/or significantly declining populations that could lead to a threatened or endangered designation, are protected. The CESA delegates the responsibility of maintaining a list of state threatened and endangered species to the California Department of Fish and Wildlife (CDFW). CESA encourages consultation with CDFW if a proposed action may affect a state-listed species.

3.1.1.3 Migratory Bird Treaty Act

The purpose of the MBTA (16 USC Section 703 et. seq.) is to allow for protection of bird species that migrate between the U.S. and other countries. The MBTA states that it is unlawful to pursue, hunt, take, capture, wound, or kill a migratory bird by any means, including any part, egg, or nest unless otherwise authorized, such as within legal hunting seasons. The list of bird species protected by the MBTA is included in 50 CFR Section 10.13.

3.1.2 Flora

The project area lies within the central Mojave Desert region of the desert floristic province. Historically, the proposed project area was cleared and used for various ranges and buildings. The site has been

disturbed historically by military training activities. The 2011 EA assessed the impacts for the development of the 79-acre parcel for the replacement hospital. Most of the 79-acre hospital parcel has been cleared and graded to support initial construction activities for the replacement hospital complex. The proposed activities analyzed in this SEA would be within this previously disturbed area.

Much of the vegetation is considered transitional due to previous land uses. A floral study performed on August 20, 2010 found that the project area contains one vegetative community type, the Mojave creosote bush scrub vegetation community. This community is dominated by the large shrub creosote bush (*Larrea tridentata*). This is the most widespread vegetation community on Fort Irwin. A discussion about the species observed during the 2010 field study in the project areas is provided in the 2011 EA.

3.1.2.1 Special-status Flora

Special-status flora and species of interest include the following:

- Species listed as threatened, endangered, proposed for listing, or candidate for listing under the ESA
- Species designated by the Bureau of Land Management (BLM) as sensitive that require special management consideration
- Species designated by USFWS as Species of Concern, representing those species formerly designated as candidates for listing as endangered or threatened, but for which information is insufficient to make a determination
- Species listed as threatened or endangered under the CESA by the CDFW
- Species designated by the California Native Plant Society (CNPS) as Category 1B (rare, threatened, or endangered in California and elsewhere) or Category 2 (rare, threatened, or endangered in California, but more common elsewhere)

3.1.2.2 Special-status Species Descriptions

One federally endangered plant species has been identified on Fort Irwin. USFWS listed the Lane Mountain milkvetch (*Astragalus jaegerianus)* as endangered on October 6, 1998. The species also is designated as CNPS Category 1B (plants rare, threatened, or endangered in California and elsewhere). Lane Mountain milkvetch occurs in Joshua tree woodland, mixed Mojave scrub, and creosote bush scrub in poorly developed sandy or granitic gravely soils. In 2001, biologists from the Fort Irwin Natural Resources Section conducted a survey and mapped four major geographic populations of the Lane Mountain milkvetch over 21,000 acres. Based on this survey and the project area location within the cantonment area, it is presumed that the Lane Mountain milkvetch would not occur on or near the proposed project area. More information about the 2001 survey is provided in the 2011 EA.

Six species at Fort Irwin have been identified by the CNPS as Category 1B or Category 2 and four of these also are USFWS Species of Concern or being considered for federal listing. The Clokey's cryptantha (*Cryptantha clokeyii*) is listed as a CNPS Category 1B species, but is not a federal species of concern.

Four species listed as Category 1B species are also federal species of concern, including the alkali mariposa lily (*Calochortus striatus*), the Barstow woolly sunflower (*Eriophyllum mohavense*), and the Mojave monkeyflower (*Mimulus mohavensis*). The Barstow woolly sunflower is also a BLM sensitive species. The desert cymopterus (*Cymopterus deserticola*) was previously considered for federal listing, but listing was found to be not warranted, and the desert cymopterus is categorized as BLM sensitive. None of these species are expected to occur in the proposed project area. The nearest known population of any of the species is more than 5 miles west of the proposed project area within a 346-acre area designated for desert cymopterus conservation (U.S. Army, 2006). A discussion about these species is provided in the special-status species description in the 2011 EA.

One CNPS Category 2 species, the small-flowered androstephium (*Androstephium breviflorum*), has been identified at Fort Irwin. This species primarily occurs in open sandy flats and in bajadas at low to moderate elevations and is not expected to occur in the project area (U.S. Army, 2006). This habitat is not present in the proposed project area. A discussion of this species is provided in the 2011 EA.

3.1.2.3 Field Survey Results

During an August 20, 2010 field survey conducted to support the 2011 EA, no protected plants were identified at the proposed project area. Additional information on the survey is provided in the 2011 EA.

The construction area and staging areas of the Proposed Action do not provide suitable habitat for any of the rare or endangered species, due to the level of previous disturbance and the ongoing and recurring disturbances from hospital construction activities.

3.1.3 Fauna

Wildlife typical of Fort Irwin includes a variety of species adapted to the xeric conditions and the desert scrub habitats that provide little cover. Isolated seeps and springs provide perennial sources of water and support vegetative cover, leading to increased wildlife diversity in these areas. Rocky terrain provides additional cover and habitat for various reptile, rodent, bat, and bird species. Playas may support seasonal wetlands or pools with brine shrimp (*Artemia sp*.), which in turn may support migratory waterbirds. Lack of specialized aquatic habitat contributes to the absence of native amphibian and fish populations on the installation.

Game species include quail (*Callipepla sp.*), dove (*Zenaida macroura*), chukar (*Alectoris chukar*), desert cottontail rabbit (*Sylvilagus audubonii)*, black-tailed jackrabbit (*Lepus californicus)*, and coyote (*Canis latrans)*. Larger mammals that may occur in the Fort Irwin area include badger (*Taxidea taxus*), kit fox (*Vulpes macrotis*), grey fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), mountain lion (*Felis concolor*), and bighorn sheep (*Ovis canadensis*).

Abandoned mines, natural caves, trees, and built structures throughout the installation provide potential roosting habitat for bats. Bats also use the many cliff faces and rocky ledges of mountain ranges as sites for roosting; bats also could use Joshua trees as night roosts. The western pipistrelle (*Pipistrellus hesperus*) and California myotis (*Myotis californicus*) are the most common bat species.

3.1.3.1 General Wildlife

Wildlife Habitat

The proposed project area would provide marginally suitable habitat for wildlife species. The project area is within the cantonment area and adjacent to heavily developed areas, and was historically used as a small-arms range until 1984. At the start of hospital construction, the habitat was somewhat degraded compared with habitat outside of the cantonment area. Several roads and tank trails crossed the project area. Currently the site is highly disturbed and within a secured fenced area. The amount of human activity would likely limit the use of the project area by wildlife, except for those adapted to human activity. Use of the project area by wildlife would likely be limited to foraging and transient wildlife.

Mammals

A discussion of the eight small mammals potentially occurring within the cantonment and proposed project area common on Fort Irwin is included in the 2011 EA. The two most commonly observed species near the proposed project area are the western pipistrelle and California myotis. They have been observed foraging at the wastewater treatment plant (WWTP) ponds, and could forage within the proposed project area, but that would be unlikely.

Birds

The 2011 EA includes a complete description of the common bird species and owl species potentially occurring in or near the proposed project area. Habitat within and near the project area would provide suitable nesting and foraging habitat for common bird species adapted to arid conditions; however for

some of the raptor species, the lack of suitable habitat and the degree of human presence in the project area would likely limit foraging activities.

Reptiles and Amphibians

The project area consists of marginally suitable habitat for most reptile and snake species. A discussion of the common reptile and snake species potentially found at Fort Irwin is included in the 2011 EA.

3.1.3.2 Special-status Fauna

Following are special-status faunal species considered:

- Species listed as threatened, endangered, proposed for listing, or candidate for listing under the ESA
- Species designated by the BLM as sensitive that require special management consideration
- Species designated by USFWS as Species of Concern, representing those species formerly designated as candidates for listing as endangered or threatened, but for which information is insufficient to make a determination
- Species listed by the CDFW as threatened or endangered under the CESA
- Species designated by CDFW as Species of Special Concern

The 2011 EA discusses the status and habitat needs for the following special status species that have potential to occur at Fort Irwin: Peregrine Falcon (*Falco peregrinus anatum*), Southwestern Willow Flycatcher (*Empidonax traillii extimus*), Least Bell's Vireo (*Vireo bellii pusillus*), Desert Tortoise (*Gopherus agassizii*), and California Black Rail (*Laterallus jamaicensis coturniculus*). Other special status species with potential to occur are the Burrowing Owl (*Athene cunicularia*), Mojave Fringe-toed Lizard (*Uma scoparia*), and Desert Kit Fox (*Vulpes macrotis arsipus*). Due to specific habitat requirements, the level of disturbance, and ongoing human activity, none of these species would be expected to occur in the project area.

Other Special-Status Fauna

The WWTP percolation and evaporation ponds, which are on the southeast side of the cantonment, attract additional bird species, including some special-status species; however, it is unlikely that any of these species would utilize the proposed project area, except for occasional foraging opportunities, because of unsuitable habitat and degree of human activity. Bird surveys of the WWTP percolation ponds and 22-acre evaporation pond from 1994 observed the following special-status species, some of which were previously mentioned (Montgomery Watson Harza, 2003):

- American white pelican (*Pelecanus erythrorhynchos*)
- California gull (*Larus californicus*)
- White-faced ibis (*Plegadis chihi*)
- Golden eagle (*Aquila chrysaetos*)
- Northern harrier (*Circus cyaneus*)
- Ferruginous hawk (*Buteo regalis*)
- Sharp-shinned hawk (*Accipter striatus*)
- Cooper's hawk (*Accipter cooperii*)
- Prairie falcon (*Falco mexicanus*)
- Osprey (*Pandion haliaetus*)
- LeConte's thrasher (*Toxostoma lecontei*)
- Loggerhead shrike (*Lanius ludovicianus*)
- California black rail (*Laterallus jamaicensis coturniculus*)

The project area has a high level of disturbance and human activity and would not provide suitable habitat for many of these special-status species except for foraging. Eleven Species of Special Concern

that may occur in or around the cantonment are: Bendire's thrasher (*Toxostoma bendirei*), black tern (*Chlidonias niger*), burrowing owl, crissal thrasher (*Toxostoma crissale*), gray vireo (*Vireo vicinior*), long-eared owl (*Asio otus*), Vaux's swift (*Chaetura vauxi*), vermillion flycatcher (*Pyrocephalus rubinus*), Virginia's warbler (*Leiothlypis virginiae*), yellow warbler (*Setophaga petechia*), and yellow-breasted chat (*Icteria virens*). The potential occurrence for these species to occur in the project vicinity is highly unlikely because most of the foraging habitat has been cleared. The Bendire's thrasher, burrowing owl, crissal thrasher, and the Vaux's swifts main habitat is open desert. The Vaux's swift prefers open habitat and cliff sites. The black tern and the long-eared owl prefer wetlands. The gray vireo's primary habitat is woodlands. The vermillion flycatcher, Virginia's warbler, yellow warbler, and yellow-breasted chat prefer riparian habitats.

3.1.3.3 Field Survey Results

A field survey of the site was conducted in support of the 2011 EA. During that survey, no desert tortoises, scat, carcasses, or burrows were observed. This survey is discussed in the 2011 EA. The site is currently disturbed for site preparation and construction of the hospital. Due to the lack of vegetation and habitat present, and the fact that the project site is fenced, additional surveys were not conducted.

3.1.3.4 Pest Species

Common ravens (*Corvus corax*) are native in the Mojave Desert; however, their numbers have increased substantially as a result of expanding human use of the desert. Raven populations have grown beyond the natural carrying capacity of the desert environment because of resources provided by humans. Because ravens are known to prey on juvenile desert tortoises, increased populations of ravens could have negative effects on desert tortoise populations at Fort Irwin (U.S. Army, 2006).

3.2 Water Resources

This section describes water resources, both surface and ground, within the project area.

3.2.1 Surface Water

Prior to disturbance for construction, the Proposed Action site contained a few ephemeral drainages, as discussed in the 2011 EA. Fort Irwin has received a Jurisdictional Determination from the USACE Los Angeles Regulatory District confirming that no waters subject to regulation under Section 404 of the CWA are on Fort Irwin (USACE, 2013); therefore, there are no waters of the United States on Fort Irwin.

The State of California regulates waters that may not be regulated by USACE. These are "waters of the State of California" under the Porter-Cologne Water Quality Control Act (California Water Code, Division 7), effective January 1, 2014. No state waters are in the proposed project area.

3.2.2 Groundwater

Several groundwater basins have been identified within the vicinity of Fort Irwin, including Bicycle Lake, Capital City, Coyote Lake, Goldstone Lake, Irwin, Langford Lake, and Superior Lake Basin.

The Fort Irwin water supply is provided by wells from a combination of the Bicycle Lake Basin, Langford Lake Basin, and Irwin Basin, all of which occur within the confines of the Fort Irwin boundary and are located near the cantonment. The Irwin Basin is located at the cantonment. Fort Irwin withdraws more water from the aquifers than is being replenished, except for the Irwin Basin (Fort Irwin, 2014). Beginning in 1992, artificial recharge rates from percolation of treated sewage to the groundwater has exceeded pumpage rates and has stabilized water-level declines in the Irwin Basin (U.S. Geological Survey [USGS], 2003). Fort Irwin has implemented conservation measures and is building a new water treatment plant that would be more efficient. Fort Irwin has contracted with USGS to identify future water sources within the boundaries of the base (Fort Irwin, 2014).

A water supply investigation was conducted for Fort Irwin in 2007. The investigation considered an average pumping rate of 3.5 million gallons per day (mgd) and a water level floor elevation of either

1,700 feet mean sea level or 1,900 feet mean sea level. Under these parameters, it is estimated that the water level in the Irwin Basin would continue to increase due to artificial recharge, the Bicycle Basin could sustain production through 2050, and production in the Langford Basin would decline below sustainable levels between 2035 and 2050. If the average pumpage rate was doubled to 7.0 mgd, it is estimated that the Irwin Basin water level would continue to increase, through artificial recharge, and the Bicycle Lake Basin could sustain production levels until 2030 or 2043, while the Langford Lake Basin would sustain production until 2023 or 2035 (Fort Irwin, 2007).

Fort Irwin monitors the quality of its groundwater because it is the only source for drinking water. Water from wells in all three basins has high fluoride concentrations, with 90 percent of all wells sampled having fluoride above the California maximum contaminant level of 2 milligrams per liter. Arsenic has also been detected at concentrations above the state maximum contaminant level of 10 micrograms per liter in 80 percent of the wells sampled. Potential sources of both fluoride and arsenic are the volcanic rocks common to the area. Water used for drinking is treated to required standards.

3.3 Air Quality

This subsection describes air quality at Fort Irwin and in the Mojave Desert region and discusses regulatory considerations.

3.3.1 Regulatory Setting

3.3.1.1 Federal

Federal air quality policies are regulated through the federal CAA. Pursuant to this act, the U.S. Environmental Protection Agency (USEPA) has established NAAQS for the following air pollutants (termed “criteria” pollutants): carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter defined as particulate matter less than 10 microns in aerodynamic diameter (PM_{10}), fine particulate matter defined as particulate matter less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$), and lead (Table 3-1). The act was amended in 1977 to require each state to maintain a state implementation plan (SIP) for achieving compliance with the NAAQS. In 1990, the act was amended again to strengthen regulation of emissions from both stationary sources and motor vehicles. The CAA also requires USEPA to designate areas (counties or air basins) as attainment or nonattainment with respect to each criteria pollutant, depending on whether the area meets NAAQS. An area that is designated nonattainment does not meet one or more NAAQS, and is subject to planning requirements to attain the standard. Conformity of a proposed action to the required planning documents or SIP is defined under the 1990 CAA amendments as conformity with the plan’s purpose in eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of these standards.

TABLE 3-1
Ambient Air Quality Standards
Supplemental Environmental Assessment, Fort Irwin, California

Criteria Pollutant	Federal Standard (Averaging Period) [a]	Federal Attainment Status	State Standard (Averaging Period) [b]	State Attainment Status
CO	35 ppm (1 hour)	Attainment	20 ppm (1 hour)	Attainment
	9 ppm (8 hour)	Attainment	9 ppm (8 hours)	Attainment
NO_2	0.100 ppm (1 hour)	Attainment	0.18 ppm (1 hour)	Attainment
	0.053 ppm (annual arithmetic mean)		0.030 ppm (annual arithmetic mean)	

TABLE 3-1
Ambient Air Quality Standards
Supplemental Environmental Assessment, Fort Irwin, California

Criteria Pollutant	Federal Standard (Averaging Period) [a]	Federal Attainment Status	State Standard (Averaging Period) [b]	State Attainment Status
O_3	0.070 ppm (8 hour)	Attainment [c]	0.070 ppm (8 hours)	Nonattainment
			0.09 ppm (1 hour)	Nonattainment
$PM_{2.5}$	12 μg/m³ (annual arithmetic mean)	Unclassified/ Attainment	12 μg/m³ (annual arithmetic mean)	Nonattainment
	35 μg/m³ (24 hour)[d]	Unclassified/ Attainment	No separate Standard (24 hours)	
PM_{10}	NA	NA	20 μg/m³ (annual arithmetic mean)	Nonattainment
	150 μg/m³ (24 hour)	Nonattainment	50 μg/m³ (24 hours)	Nonattainment
SO_2	NA	NA	0.04 ppm (24 hours)	Attainment
	0.5 ppm (3 hour, secondary standard)	Unclassified/ Attainment	NA	NA
	0.075 ppm (1 hour) [d]	Unclassified	0.25 ppm (1 hour)	Attainment
Lead [e]	0.15 μg/m³ (rolling 3-month average)	Attainment	1.5 μg/m³ (30-day average)	Attainment
Sulfates	No federal standards		25 μg/m³ (24 hours)	Attainment
Hydrogen sulfide			0.03 ppm (1 hour)	Unclassified
Vinyl chloride [e]			0.01 ppm (24 hours)	Attainment
Visibility reducing particles			Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent	Unclassified

Source: http://www.arb.ca.gov/research/aaqs/aaqs.htm, http://www3.epa.gov/ttn/naaqs/criteria.html, as of October 2015.
μg/m³ = micrograms per cubic meter
ppm = parts per million, by volume
NA = not applicable

Notes:
[a] National standards other than O_3, particulate matter, and those based on annual averages or annual arithmetic means are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m³ is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, is equal to or less than the standard.
[b] California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, and suspended particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles) are values that are not to be exceeded. All others are not to be equaled or exceeded.

[c] The southern portion of the installation (below the 90 Universal Transverse Mercator grid line) is designated nonattainment for O_3 for federal standards.
[d] To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 parts per billion.
[e] The California Air Resources Board (ARB) has identified lead and vinyl chloride as toxic air contaminants with no threshold level of exposure for adverse health effects determined. This determination was made following the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Under the 1990 CAA amendments, USEPA issued two types of SIP conformity guidelines: transportation conformity rules that apply to transportation plans and projects and general conformity rules that apply to all other federal actions. The following section discusses general conformity and how these requirements apply to the Proposed Action.

General Conformity

USEPA has issued regulations addressing the applicability and procedures for ensuring that federal activities comply with the amended CAA. The USEPA Final Conformity Rule requires federal agencies to ensure that federal actions resulting in nonattainment or maintenance criteria pollutant emissions conform to an approved or promulgated state or federal implementation plan. This ensures that a federal action would not meet any of the following criteria:

- Cause a new violation of the NAAQS
- Contribute to any increase in the frequency or severity of violations of existing NAAQS
- Delay the timely attainment of any NAAQS interim or other attainment milestones

Applicability of General Conformity to the Proposed Action

The Proposed Action would include approval by a federal agency and would be in a federal nonattainment area for PM_{10}, so general conformity applies to the Proposed Action. If a project would result in a total net increase in direct and indirect emissions of nonattainment, or maintenance pollutants are less than the applicable *de minimis* thresholds established in 40 CFR 93.153(b), then detailed conformity analyses are not required pursuant to 40 CFR 93.153(c).

The net emissions increase includes evaluating stationary sources, area sources, and mobile sources that result from the federal action and are not covered by another permitting program. Revisions to the General Conformity Rule effective on July 6, 2010, removed the regionally significant emissions test from the applicability determination; therefore, this test was not included in the applicability determination for the Proposed Action.

3.3.1.2 State

California established air pollution control programs before federal requirements were enacted. Responsibility for air quality management programs in California is divided between the California ARB, as the primary state air quality management agency, and air pollution control districts, as the primary local air quality management agencies. The California ARB oversees air quality policies in California and is responsible for preparing and submitting the SIP to USEPA. California established state ambient air quality standards (California Ambient Air Quality Standards [CAAQS]) in 1969. These standards are generally more stringent and include more pollutants than the NAAQS. The California CAA was approved in 1988 and requires each local air district to prepare an air quality plan to achieve compliance with the CAAQS. Similar to USEPA, the California ARB designates counties in California as attainment or nonattainment with respect to the CAAQS. San Bernardino County, where the Proposed Action would occur, is designated as nonattainment for the state PM_{10}, $PM_{2.5}$, and O_3 ambient air quality standards.

3.3.1.3 Local

The MDAQMD has local jurisdiction over the portion of San Bernardino County that includes Fort Irwin and primary responsibility for regulating stationary sources of air pollution within its jurisdictional boundaries. The MDAQMD implements air quality programs required by state and federal mandates, enforces rules and regulations based on air pollution laws, and educates business owners and residents about their role in protecting air quality. The MDAQMD air quality plan applicable to the Proposed Action is the *Federal Particulate Matter (PM_{10}) Attainment Plan* (MDAQMD, 1995). In addition, the Proposed Action must comply with the applicable MDAQMD Rules and Regulations. Construction of the Proposed Action would be subject to MDAQMD Rule 403 and 403.2.

3.3.2 Existing Conditions

San Bernardino County, where Fort Irwin is located, is designated nonattainment for PM_{10} for both federal and state standards. The southern portion of the installation (below the 90 Universal Transverse Mercator grid line) is designated nonattainment for O_3 for both federal and state standards. The Proposed Action is located north of the federal O_3 nonattainment area; therefore, the project is located in a federal attainment area for O_3.

Air quality at Fort Irwin is influenced by the local climate. The area experiences hot summers, mild winters, infrequent rainfall, and moderate afternoon winds. The average high and low temperatures during the summer at Fort Irwin are 100 degrees Fahrenheit (°F) and 70°F, respectively. The average high and low temperatures during the winter are 62°F and 37°F, respectively. Average annual precipitation is approximately 2.5 inches, with most precipitation falling in the winter or during isolated summer thunderstorms.

High particulate matter concentrations in the Mojave Desert are typically the result of wind erosion from exposed or disturbed land areas. Activities at Fort Irwin, such as vehicle travel on unpaved roads and training maneuvers, create fugitive PM_{10} emissions. Fort Irwin has conducted PM_{10} monitoring since 1994 and operates eight PM_{10} monitoring sites within its boundary. Fort Irwin implements standard management practices to reduce particulate emissions, including but not limited to the following:

- Using water for short-term surface stabilization
- Minimizing tracking of dirt onto paved roads
- Covering haul trucks
- Stabilizing sites with chemicals or vegetation
- Paving parking lots
- Placing gravel to control windblown dust

3.3.3 Climate Change and Greenhouse Gases

This section discusses the existing conditions, regulatory background, and potential greenhouse gas (GHG) emissions from the Proposed Action.

3.3.3.1 Existing Conditions

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind, lasting for an extended period (decades or longer). Climate change may result from any of the following conditions (USEPA, 2010):

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun
- Natural processes within the climate system (such as changes in ocean circulation)
- Human activities that change the atmosphere's composition (such as burning fossil fuels) and the land surface (such as deforestation, reforestation, urbanization, and desertification)

GHGs include the following pollutants (USEPA, 2010):

- Carbon dioxide (CO_2) is a naturally occurring gas and a by-product of burning fossil fuels and biomass, land use changes, and other industrial processes. It is the principal anthropogenic GHG that affects the Earth's radiative balance.
- Methane (CH_4) has a global warming potential approximately 20 times that of CO_2. CH_4 is produced through anaerobic (without oxygen) decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

- Nitrous oxide (N_2O) has a global warming potential approximately 300 times that of CO_2. Major sources of N_2O include soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.
- Hydrofluorocarbons (HFCs) are compounds containing only hydrogen, fluorine, chlorine, and carbon. HFCs have been introduced as a replacement for the chlorofluorocarbons identified as ozone-depleting substances.
- Perfluorocarbons (PFCs) are compounds containing only fluorine and carbon. Similar to HFCs, PFCs have been introduced as a replacement for chlorofluorocarbons. PFCs are also used in manufacturing and are emitted as by-products of industrial processes. PFCs are powerful GHGs.
- Sulfur hexafluoride (SF_6) is a colorless gas that is soluble in alcohol and ether and slightly soluble in water. This compound is a very powerful GHG used primarily in electrical transmission and distribution systems, as well as dielectrics in electronics.

3.3.3.2 Regulatory Background

Federal

The USEPA Mandatory Reporting Rule became effective on December 29, 2009, and sources required to report were to begin collecting data on January 1, 2010. In general, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of carbon dioxide equivalent (CO_2e) emissions are required to submit annual reports to USEPA. The USEPA reporting requirements continue to be updated. On November 8, 2010, reporting requirements for petroleum and natural gas systems were finalized.

In addition, the Supreme Court decision in *Massachusetts et al. v. Environmental Protection Agency et al.* (Supreme Court Case 05-1120) found that USEPA has the authority to list GHGs as pollutants and to regulate emissions of GHGs under the CAA. On April 17, 2009, USEPA found that CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 may contribute to air pollution and may endanger public health and welfare.

State and Regional

In 2006, the California State Legislature signed the Global Warming Solutions Act of 2006 (AB 32), which provides the framework for regulating GHG emissions in California. This law requires California ARB to design and implement emission limits, regulations, and other measures such that statewide GHG emissions are reduced in a technologically feasible and cost-effective manner to 1990 levels by 2020. The statewide 2020 emissions limit is 427 million metric tons of CO_2e (ARB, 2007). CO_2 emissions account for approximately 90 percent of the statewide GHG emissions (ARB, 2007). CH_4, N_2O, HFCs, PFCs, and SF_6 emissions account for the remainder of the statewide GHG emissions (ARB, 2007).

The first regulation adopted by ARB pursuant to AB 32 was the regulation requiring reporting of GHG emissions. The regulation requires large industrial sources emitting more than 25,000 metric tons of CO_2 per year to report and verify their GHG emissions from combustion of both fossil fuels and biomass-derived fuels (ARB, 2008).

3.4 Utilities

This section describes existing utilities at Fort Irwin, including water treatment and distribution, wastewater, stormwater, and energy.

3.4.1 Water Treatment and Distribution

Water is extracted through four wells at Bicycle Lake, three wells at Langford Lake, and one well at Irwin Basin (eight wells in total). Nine storage tanks are in the cantonment area and include both aboveground and belowground storage tanks (USTs). The stored water is distributed through two separate systems, one providing potable drinking water and the other providing chlorinated domestic

water for other uses such as showering, washing, and flushing toilets. Approximately 25 to 40 years of groundwater are available in the aquifer that supplies the installation (Fort Irwin, 2007).

The current well production capacity is approximately 3.5 mgd with an average daily use for 2015 of 1.9 mgd. The average daily use for 2014 was 1.92 mgd. Two new wells are predicted to come online in the next few months, pending permits from California Division of Drinking Water (DDW) that would bring the total capacity to 5.0 mgd. The RO system provides potable water and the domestic use system provides non-potable water for irrigation, fire protection, dust control, showering, washing, and flushing toilets (Green, 2015).

Drinking water is processed through an RO plant to remove fluoride, arsenic, and other contaminants before entering the drinking water distribution system. The treatment capacity of the RO plant is approximately 150,000 gallons per day (gpd). The treated water is stored in three elevated tanks with a total capacity of 0.43 million gallons (MG). Drinking water demand ranges from 100,000 to 110,000 gpd. It is drawn from a designated faucet located at kitchen sinks and in some bathrooms of each housing unit.

Four large storage tanks serve the domestic water system with a capacity of 4 MG. The annual average demand for domestic (nonpotable) water typically ranges from 2 mgd to more than 3 mgd. During the summer, peak daily water demand can approach 5 mgd. The water storage capacity of 4 MG at Fort Irwin is adequate for the level of development on the installation. The storage tanks along Goldstone Road provide sufficient water pressure throughout the distribution system. The average daily production ranged from 1.4 to 3.8 mgd, with an average daily demand of approximately 2.4 mgd between January 2006 and February 2010.

The domestic water treatment plant has a maximum daily capacity of 6.0 mgd, and would have the capability to expand up to 12.0 mgd to accommodate future demand increases. The treatment plant provides a single source of potable water for the entire cantonment.

3.4.2 Wastewater

The WWTP at Fort Irwin is operated and maintained by a private installation service contractor. The WWTP is permitted to treat 2.0 mgd of wastewater. Recent historical flow data at the Fort Irwin WWTP indicate that the average daily flow is 0.98 mgd and the maximum average flow is 1.31 mgd. While the plant is permitted to treat 2.0 mgd of wastewater, the permit requires Fort Irwin to plan for a second oxidation ditch if the inflow exceeds 1.5 mgd, which is 75 percent of the permitted capacity, for 30 consecutive days. The sanitary sewer collection system provides adequate service. The outfall line has sufficient capacity to allow for an average flow rate of 3.0 mgd, based on a 2.5 peaking factor. Considering the average flow rate of the outfall line, the collection system can support an effective population of almost 43,000.

Fort Irwin recently expanded the WWTP to include a tertiary treatment system to meet Title 22 regulations for effluent reuse. Water previously treated to secondary standards has been used for irrigating a restricted-access golf course. With the new tertiary system in place, the planned use areas for recycled water include the pitch-and-putt area, dust suppression, construction areas, and irrigation of five permit-designated areas.

3.4.3 Stormwater

Most stormwater at Fort Irwin drains by surface flow. A storm drain system serves one small area of the cantonment area that uses surface drains and piping around the troop housing quarters. A stormwater ditch crosses the southeast area of the proposed site. Additional discussion of stormwater is included in the 2011 EA.

3.4.4 Energy

This section discusses energy use at Fort Irwin, including liquid petroleum gas, heating and cooling systems, and electricity.

3.4.4.1 Liquid Petroleum Gas

Fort Irwin uses liquid petroleum gas as its energy source for space heating and hot water heating. The fuel is conveyed by truck to the installation and stored in tanks at two locations.

3.4.4.2 Electricity

Southern California Edison owns the electrical system at Fort Irwin and is the responsible entity to ensure that adequate electrical capacity and service are available for existing and future needs at Fort Irwin. The Tiefort Substation serves the cantonment at Fort Irwin. The substation houses two 28-megavolt ampere transformers for a total capacity of 56 megavolt amperes. The substation is a 115-kilovolt substation that steps down to 33 kilovolts and feeds two distribution substations in the interior of the Base, the Military Substation and Irwin Substation.

3.4.5 Communications

A discussion of the communication cables that serve the public and family housing of the cantonment areas is provided in the 2011 EA.

3.4.6 Solid Waste Management

Solid waste is collected and transported to a landfill on the installation by standard compacting garbage trucks. On designated collection days, the Base operations contractor collects waste from the garbage and recycling containers in the family housing areas. Most other facilities on the installation use large trash receptacles segregated for garbage disposal and recycling.

The Fort Irwin Base operations contractor is responsible for collecting recyclable materials throughout the installation. Recyclable materials include mixed office paper, aluminum beverage cans, tin and bimetal food and beverage containers, corrugated cardboard, plastic containers, glass bottles and jars, and newspapers.

The sanitary landfill at Fort Irwin is a Class III permitted facility located approximately 1 mile east of the cantonment area. Landfill operations at Fort Irwin started in the 1970s, and the landfill was expanded in 1981 from 160 acres to 467 acres. The active portion of the sanitary landfill is 18 acres, and the remaining landfill area is subdivided into seven 25-acre disposal areas. Within the active portion of the landfill, each cell is excavated to a depth of 25 feet below ground surface and will have a height of 60 feet above the existing grade. This active portion of the landfill expansion area has a liner, a leachate collection system, and a baler facility. The total landfill capacity is estimated at 19 million cubic yards. Assuming the waste is baled and the annual fill rate remains at 36,000 cubic yards, the remaining landfill life would be approximately 265 years. The solid waste generation rate of 36,000 cubic yards per year is equivalent to an average of 99 cubic yards per day.

The sanitary landfill is permitted to receive non-liquid, non-hazardous waste. The facility does not accept hazardous materials, hazardous waste, ammunition, oil-contaminated products, petroleum, oil, lubricant-contaminated soil, batteries, friable asbestos, biological waste, polychlorinated biphenyls, toxic chemicals, or lithium/magnesium batteries. Employees at the landfill entrance inspect all deliveries to ensure that only acceptable materials are disposed of at the landfill.

3.5 Hazardous and Toxic Substances

This section describes hazardous and toxic substances in the region, at Fort Irwin, and within the footprint of the proposed new hospital. A Phase II environmental condition of property (ECP) assessment was conducted in January 2011 to determine the presence and extent of unexploded ordnance at the proposed project area.

3.5.1 Hazardous Waste Disposal

Fort Irwin has a RCRA permit as a large-quantity generator of hazardous waste. The installation does not operate any storage facilities, but it does operate 90-day accumulation points. The landfill is a Class III disposal area. The Directorate of Public Works for the installation is responsible for managing hazardous wastes, which are placed temporarily in a number of accumulation points distributed throughout the cantonment area for less than 90 days prior to transport to an approved offsite hazardous waste disposal facility.

The Weed Army Community Hospital is a RCRA large generator for hazardous waste. Biohazards and pharmaceutical wastes from the hospital are disposed of via a contractor hired by the hospital.

3.5.2 Special Hazards

3.5.2.1 Unexploded Ordnance

A Phase I ECP was conducted in 2002, which indicated the potential for unexploded ordnance within the 79-acre project area (TechLaw, 2002). The proposed project area was previously used for various ranges. A Phase II ECP was recommended and was implemented in January 2011.

Based on the findings from the Phase II ECP, unexploded ordnance identified within the 79-acre parcel and project area was removed prior to construction.

3.6 Noise

3.6.1 Regional Noise Environment

Fort Irwin is located within the 19,600-square-mile restricted area R-2508 Special Use Airspace Complex that includes all the airspace and associated land used and managed by Fort Irwin, the United States Air Force Flight Test Center at Edwards Air Force Base, and Naval Air Weapons Station China Lake.

The R-2502N and R-2502E areas of the R-2508 Complex consist almost entirely of Fort Irwin. Military operations primarily determine the ambient noise environment within those areas. Military training exercises that contribute to noise at Fort Irwin include army vehicle ground maneuvers, artillery firing, small arms firing, military demolition activities, air operations, air-to-ground weapons firing, and transportation to, from, and within Fort Irwin during and after maneuvers.

Air operations at the Mojave B Range of Naval Air Weapons Station China Lake and aircraft stationed at Edwards Air Force Base also contribute to ambient noise in the area. Bicycle Lake Army Airfield is approximately 2.5 miles north of the cantonment area.

3.6.2 Local Environment

Existing noise levels within the cantonment during normal working hours would be consistent with a noisy urban environment. Vehicular traffic and helicopter traffic are the main contributors to ambient noise levels in the cantonment. Other contributors to ambient noise levels include military training activities such as army vehicle ground maneuvers, artillery firing, small arms firing, military demolition activities, air operations, and air-to-ground weapons firing. Noise levels would generally be highest during normal business hours, when traffic volume in the cantonment is higher. Vehicle traffic from Fort Irwin and Outer Loop Roads and military training activities would be the main contributors to ambient noise levels near the project area.

3.6.3 Sensitive Receptors

Sensitive receptors would include those who could perceive an increase in noise and those who would be considered most sensitive to increases in noise.

Sensitive receptors in the cantonment area schools, day care facilities, medical facilities, and residences. Most on-post housing units for military personnel are located in the western section of the cantonment area, bounded by North Loop Road, Outer loop Road, Inner Loop Road, and Barstow Road. There is a

residential housing area approximately 100 feet to the northwest of the project area on Pork Chop Hill Road.

3.6.4 Noise Policies

Army environmental noise policies are based on land use compatibilities as indicated by objective noise levels. The main noise effects within the cantonment are overhead army aircraft noise, large caliber weapon noise, and traffic noise from major arterial roadways, such as Inner Loop Road and Outer Loop Road at Goldstone Road. The number and frequency of military aircraft operating at Fort Irwin are not sufficient to generate noise contours that would normally be used to analyze noise exposure on a Department of Defense installation. Noise levels from rotary-winged aircrafts used at Fort Irwin typically range from 92 decibel (A-weighted scale) (dBA) at a 200-foot altitude to 60 dBA at a 3,000-foot altitude. Fixed-wing aircraft noise levels range from 96 dBA at a 1,000-foot altitude to 55 dBA at a 10,000-foot altitude (U.S. Army, 2008). A discussion of the noise measurements used to assess noise compatibility is included in the 2011 EA.

3.7 Aesthetics

Aesthetics refers to the beauty in both form and appearance of visual resources, including natural and built components of the environment perceived by humans. Perceptions of what is beautiful or appealing vary between individuals based on personal preferences.

The proposed project area is located within the cantonment and is adjacent to the heavily developed portions of the installation. The project area consists of degraded desert scrub habitat and active construction areas. The locations reflect a high degree of human activity within and adjacent to the project area. The Tiefort Mountain Range is a prominent feature in the landscape, along with other mountains nearby.

3.8 Transportation

3.8.1 Air Transportation

Fort Irwin is served by one on-post airfield—the Bicycle Lake Army Airfield. The main Fort Irwin helicopter pad is located near the Weed Army Community Hospital. Military flights occur over and near the containment area. Various other helicopter and airstrip facilities are used in support of training areas. Bicycle Lake Army Airfield is on a dry lakebed 2.5 miles north of the cantonment area.

Fort Irwin is encompassed by one of the largest military special use airspace areas in the United States. It is referred to as the R-2508 Complex, covering approximately 19,600 square miles. Fort Irwin contains two zones of special use restricted airspace, R-2502E and R-2502N, where air operations are restricted from the surface to the top of the atmosphere (Michael Baker, Jr., Inc. 2008). The active time for restricted use is continuous, but released to the Federal Aviation Administration when not in use.

A discussion of the other modes of transportation, including traffic, used in and around the cantonment area at Fort Irwin is provided in the 2011 EA.

SECTION 4

Environmental Consequences

This section assesses the environmental consequences associated with the Proposed Action and the No Action Alternative. Direct, indirect, and cumulative environmental effects are described for each resource. These effects are defined as follows:

- Direct effects are caused by the action and occur at the same time and place (40 CFR Section 1508.8).
- Indirect effects are caused by the action and occur later in time or farther removed in distance but are still reasonably foreseeable (40 CFR Section 1508.8).
- Cumulative effects are those that result from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions (40 CFR Section 1508.7).

Effects were analyzed for each of the resources identified in the previous section as potentially affected by implementation of the Proposed Action. Resources that would not be affected include land use; geology, soils, seismicity, and mineral resources; socioeconomics; cultural resources; ground transportation; health and safety; and recreation. These resource areas are not further discussed in this section. The 2011 EA is incorporated by reference and attached as Appendix A in this SEA.

4.1 Biological Resources

Potential impacts to biological resources related to implementation of the Proposed Action would be associated with operation and maintenance of the components under the Proposed Action, including the PV facility. Ground disturbance of the 79-acre parcel during the construction of the replacement hospital was analyzed in the 2011 EA. Most of this area was cleared and graded during initial site preparation for the construction of the hospital, including the 7.82 acres for construction of the PV solar facility.

Impacts to biological resources are considered significant if one or more of the following criteria are met with the implementation of the Proposed Action:

- Any loss of individuals or populations of a federally listed or proposed endangered or threatened species or its habitat
- Substantial loss of populations or habitat of a federal species of concern, California species of concern, or otherwise regionally rare or sensitive species that could jeopardize the continued existence of that species in the project region
- Substantial loss or long-term disruption of a major wildlife movement corridor
- Loss of at least 5 percent of undisturbed habitats within a biogeographic region, such as that found in a single valley, mountain range, or coastline
- Substantial loss of natural vegetation communities that are slow to recover
- Substantial loss of native plant or animal species or community diversity

4.1.1 Proposed Action

4.1.1.1 Construction Phase

Flora

The 7.82 acres of previously cleared land for the fixed PV solar array would be permanently lost as a result of the Proposed Action. This area is within the 79-acre parcel analyzed in the 2011 EA that would be disturbed during construction activities. No new losses or impacts to biological resources from ground disturbance during construction would occur. The 7.82 acres of the PV solar array would not be restored following construction. The effect on biological resources would be minimal because substantial creosote bush scrub habitat is available in the vicinity and throughout the Fort Irwin area, which are more favorable as habitat.

The remaining components of the proposed action, including the water tank, wastewater storage tanks, fuel storage tanks, boilers, and generators would be located within the 26-acre portion of the parcel analyzed for permanent loss in the 2011 EA. No new impacts to flora would occur.

Fauna

The permanent loss of 7.82 acres of previously cleared land would not be expected to have a substantial adverse effect on wildlife species, including migratory bird species, or with established native resident or migratory wildlife corridors, because ample areas of undisturbed creosote bush scrub habitat are present in the vicinity of the Proposed Action. Extensive areas of this habitat are present throughout Fort Irwin and would be expected to continue to support general wildlife populations.

Measures to ensure protection for protected species, such as the desert tortoise, as discussed in the 2011 EA would continue to be followed during implementation of the Proposed Action. No impacts would occur.

Potential Effects from Pest Species

As discussed in the 2011 EA, construction activities could attract pest species, including ravens and coyotes, to the site. This would be temporary, and pest species would disperse when construction is complete.

4.1.1.2 Operation and Maintenance Phase

Common and special-status wildlife may return to the Proposed Action area upon completion of construction for foraging or stopovers during migration periods. Expansive foraging habitats are available nearby for these species, and no long-term impacts would be anticipated from implementation of the Proposed Action.

The PV facility would pose a less than significant permanent impact to birds. Collision-related fatalities of birds have been documented at solar projects, including PV systems (U.S. Department of Energy [DOE], 2015). The causes of collision-related fatalities may include the following:

- Solar arrays emit glare or polarized light that could attract insects and in turn attract foraging birds
- Migrant waterfowl and shorebirds may strike the array because they perceive the reflective surface of the PV panels as bodies of water, known as the “lake effect”, and attempt to land on the surface (DOE, 2015).

No empirical research has been completed to assess the attraction of PV facilities to migrating birds (DOE, 2015). The PV solar array of Fort Irwin is a fixed array as opposed to a tracking system. There would be a limited view angel that would have the potential for birds to perceive it as a water surface. The PV structures are designed to absorb sunlight (rather than reflect it) and have anti-reflective coating that would minimize the potential impact of glare and reduce the attraction to wildlife.

The remaining components of the proposed action, including the water tank, wastewater storage tanks, fuel storage tanks, boilers, and generators would be located within the 26-acre portion of the parcel analyzed for permanent loss in the 2011 EA. The wastewater storage tanks and fuel storage tanks would be located below ground. The boilers and generators would be included in the previously analyzed central utility plant. The water storage tank would not contain any features that could interfere with fauna. No new operational impacts to flora would occur.

4.1.1.3 Potential Effects from Pest Species

Development in the cantonment area would attract pest species. Pest species, including ravens and coyotes, would be managed using good housekeeping and proper waste management practices as discussed in Section 4.1.4. No significant impacts would occur.

Good housekeeping during construction would minimize the attraction to pest species onsite. Potential impacts and design measures that would be taken to reduce adverse environmental impacts of construction and operation of the Preferred Alternative is provided in the 2011 EA.

A fence would be constructed around the PV facility to prevent access by coyotes and prevent any potential vehicle collisions. The fence would be placed around the fixed PV solar array to prevent the predation of birds after a nonfatal collision with the solar panels. In addition, the PV solar panel area would be inspected daily to ensure that any dead or injured birds do not remain on the ground for extended periods of time.

4.1.2 No Action Alternative

4.1.2.1 Flora

Under the No Action Alternative, the modifications to the design of the replacement hospital would not be constructed. The 79-acre construction area would still be cleared of vegetation during construction of the hospital. There would be no permanent loss of 7.82 acres of previously cleared land in the proposed project area.

4.1.2.2 Fauna

Under the No Action Alternative, as documented in the 2011 EA the modifications to the design of the hospital would not be constructed; however, potential impacts to wildlife would still occur through construction of the hospital.

4.1.3 Cumulative Impacts

Fort Irwin is continually developing the cantonment area, reducing the amount of creosote bush habitat in that area. A permanent loss of 7.82 acres of previously cleared land would occur from the Proposed Action; however, this land provides little to no habitat value because it is degraded from ongoing construction activity. Ample intact habitat is available in the region and outside of the cantonment area; therefore, the loss of 7.82 acres of previously cleared land at the proposed project site would be insubstantial with regard to cumulative impacts to biological resources. Direct effects on desert tortoise would be unlikely because the proposed site does not appear to be occupied habitat; therefore, no cumulative impacts would be anticipated.

Capital improvement projects are ongoing at Fort Irwin. Fort Irwin is replacing the water main in the cantonment. Water meters in the cantonment are being installed or upgraded. Fort Irwin plans to construct a pipeline and water storage tank to provide fire flows to the Ammunition Supply Point, which would occur on the southern edge of the developed cantonment just south of Outer Loop Road. Upgrades and/or maintenance activities are occurring at the Fort Irwin WWTP. Fort Irwin is constructing a new water treatment plant (Irwin Water Works) planned to be completed in 2016. Fort Irwin plans to expand its RV park by 30 acres and add an additional 40 acres of stormwater management structures. These projects would also affect habitat in the cantonment area. Habitat in the cantonment area is generally of lower quality due to fragmentation and the presence of human activities. Given the ample

amount of intact and higher quality habitat available in the region and outside of the cantonment area no cumulative impacts to flora or fauna would occur.

4.1.4 Mitigation Measures

The proposed fixed PV solar array is in an urban environment. The fixed PV solar array is adjacent to the replacement hospital under construction in a heavily developed portion of the cantonment. The fixed PV solar array is constructed as two separate clusters with space between them, which would limit the size of the “lake effect.” Each cluster is approximately 4 acres and would be separated by a golf cart trail, which forms an approximately 80-foot buffer at the narrowest distance between the two clusters. Each row of solar panels is 12 feet apart. The solar panel would be fixed and not track the sun; therefore, avian species would have a limited view angel from the panels that could potentially be perceived as a waterbody.

Some collisions with structures may not be fatal, leaving the bird vulnerable to predators (Kagan et. al, 2014). To reduce predation on birds with nonfatal collisions, a fence would be placed around each cluster of the fixed PV solar array. Also, to reduce pest species in the hospital complex and potential predation within the solar array, roosting deterrents, such as bird spikes, would be utilized at certain locations. A fence would be constructed around the PV facility to prevent coyotes from entering the area and prevent predation of birds after a nonfatal collision with the solar panels. In addition, the solar panel area would be inspected daily to ensure that any dead or injured birds do not remain on the ground for extended periods of time.

The fixed PV solar array at the replacement hospital would create a new source of glare. The panels would have an anti-reflective coating to reduce the glare. The PV facility would be expected to reflect approximately 2 percent of the sunlight (FAA, 2014).

Since the fixed PV solar array would be small in size and in two separate clusters, and located in an urban environment, impacts to bird species would be expected to be Less-Than-Significant with the use of mitigation.

Construction activity could attract additional pest species, including ravens, where additional food or trash is available. To reduce attraction to pest species, a traditional stainless steel spike system would be placed around the buildings’ loading docks where the trash containers will be stored and at the outdoor dining trellis area.

4.2 Water Resources

This section addresses potential impacts to groundwater resources during construction and operation, including maintenance, of the Proposed Action.

Impacts to water resources are considered significant if:

- Groundwater table levels are reduced to such an extent that spring flows are diminished or production at existing wells within the basin or adjacent interconnected basins falls below economically feasible or practical engineering limits
- Groundwater quality changes occur because of increasing salinity or mineral content that can negate the water's value for domestic, industrial, or agricultural consumption
- Existing surface water drainage patterns are altered
- The quality of ephemeral surface water resources available for wildlife at dry lakes, spring flows, or linear riparian systems with ephemeral flows is degraded
- Increases in water quality constituents could lead to a violation of specific state and federal standards.

4.2.1 Proposed Action

4.2.1.1 Construction Phase

Project construction would require water for use during typical construction tasks and activities such as dust control, soil compaction, and general housekeeping practices. The source of water during construction would be a combination of groundwater from Bicycle Lake, Irwin, and Langford Lake groundwater basins. Tertiary treated wastewater from the Fort Irwin wastewater treatment plant would be available for dust suppression, which would be the largest use of water during construction. The water tank, wastewater storage tanks, fuel storage tanks, boilers, and generators would be located within the 26-acre portion of the parcel analyzed for permanent construction in the 2011 EA. Because additional water would not be needed for dust control and potable use, additional groundwater use for these components would be negligible. Construction of studies of large-scale solar PV projects found peak water use for most projects ranged from 1.3 to 2.6 acre-feet per MW per year (Sandia National Laboratory, 2013). This range would convert to approximately 85,000 to 169,000 gallons of water use for the one month primary construction period for the 2.4-MW fixed PV solar array. Of that amount, all but approximately 500 to 2,000 gallons would be for dust control (Sandia National Laboratory, 2013). As noted above, dust control would use treated wastewater and would not require additional pumping of groundwater. Based on the relatively small volume of water that would be used for construction purposes, negligible impacts to groundwater resources would occur.

4.2.1.2 Operation and Maintenance Phase

Overall water use for the new hospital was analyzed in the 2011 EA. Because the new hospital would be Leadership in Energy and Environmental Design (LEED) silver certified, it would be more efficient and use as much or less water than the hospital it is replacing.

The amount of water needed for the components of the Proposed Action, and specifically the additional boilers, water storage tank, and water used for cleaning the fixed PV solar array, would be minimal. The water storage tank would require 518,000 gallons of potable water for initial filling. However, Fort Irwin plans to remove an existing 1,000,000-gallon underground potable water storage tank located within the cantonment north of the residential area and outside the proposed hospital site. The underground concrete tank was constructed in 1944 to provide water to the cantonment area. Under a separate project, the tank will be decommissioned and disconnected from the Fort Irwin water system within the next six months and will be demolished within the next 18 months. This would offset the water required to fill the 518,000-gallon tank associated with the Proposed Action and would not significantly change annual water consumption during filling.

The proposed new 518,000-gallon potable water tank would only provide an emergency 3-day water supply to the proposed hospital, and the tank would have a long detention time due to infrequent demand. Therefore, operation of the proposed 518,000-gallon water storage tank would have a negligible impact on the consumption rate at Fort Irwin.

The Fort Irwin water system has a capacity of 3.5 mgd and the average use rate for 2014 was 1.92 mgd (Green, 2015). The solar panels would require 15,000 gallons of water per year for cleaning, which would be a negligible increase in annual water usage (0.002 percent). Water use by the boilers would be limited to initial filling of the boiler system and periodic maintenance of the system. This water use is included within the projected average daily flow rate of 30,000 gpd and a peak flow rate at 75,000 gpd estimated for operation and maintenance of the entire hospital, and additional water would not be needed (CH2M HILL, 2014). There would be no additional impacts to groundwater supplies from operation and maintenance of the boilers.

Operation and maintenance of the entire hospital would require an average of 30,000 gpd, including all of the components of the Proposed Action, except for cleaning the fixed PV solar array. This amount of water is about 1.6 percent of the average daily use rate for Fort Irwin (1.92 mgd) and would come from

wells in the Bicycle Lake Basin, Langford Lake Basin, and Irwin Basin. As noted in Section 3.2.2, Fort Irwin withdraws more water from the Bicycle Lake Basin and Langford Lake Basin aquifers than is being replenished (Fort Irwin, 2014). The impact of water use by the hospital would be decreased by a reduction in water use at the building currently housing the Weed Army Hospital. Improved efficiency in the new water treatment plant and ongoing conservation measures at Fort Irwin would further offset impacts from water withdrawals associated with the new hospital. The components of the Proposed Action would not meaningfully increase the water needed – 15,000 gallons per year for solar panel cleaning. The Fort Irwin water system has the capacity to support these additional features and groundwater supplies would not be substantially affected; therefore, a Less-Than-Significant Impact to groundwater supplies during the operation and maintenance phase would be expected as a result of the Proposed Action.

4.2.2 No Action Alternative

Under the No Action Alternative, there would be a minimal increase in water usage, but water consumption would not significantly change for the long-term.

4.2.3 Cumulative Impacts

Cumulative impacts on groundwater from new construction and increases in population at Fort Irwin could occur. However, given the negligible amount of additional water that would be used by the Proposed Action (15,000 gallons per year), the more efficient water treatment plant under construction, recycling of wastewater, and ongoing conservation measures, no significant cumulative impact to groundwater supplies or other water resources would occur.

4.2.4 Mitigation Measures

In an effort to reduce potential soil erosion, runoff, and sedimentation impacts during construction the Stormwater Pollution Prevention Plan (SWPPP) prepared for the project would be followed (Merrell Johnson Companies, 2014). Proper best management practices (BMPs) would be implemented before land grading begins. Natural vegetation would be preserved when possible. Erosion, runoff, and sediment control measures would be implemented in case of a stormwater event. Good housekeeping measures would be practiced during construction. Site-specific stormwater BMPs are detailed the SWPPP.

During operation and maintenance of the Proposed Action, potential impacts on surface waters would be minimized by practicing good housekeeping at the facility to prevent any unwanted materials from being washed away during storm events. Examples of good housekeeping practices could include proper materials storage and keeping the site free of spills. Post-construction BMPs, consisting of detention ponds, would maintain pre-development runoff flows for 10-year floods and attenuate larger storm events.

To reduce water consumption and demand, five acres of xeriscaping are planned for the Proposed Action. Continuing current education and conservation programs could also reduce water demand by as much as 5 percent.

4.3 Air Quality

This section evaluates potential air quality impacts and provides mitigation measures in case adverse air quality impacts were identified.

4.3.1 Significance Criteria

The air quality impacts of the project were evaluated by comparison of projected project emissions to the MDAQMD Significance Thresholds and the general conformity *de minimis* thresholds. The MDAQMD Significance Thresholds were used to evaluate the impacts from construction, operation, and maintenance of the Proposed Action.

If the emissions are predicted to be less than the thresholds, it was assumed the Proposed Action would not violate an ambient air quality standard. The Proposed Action would be in a federal moderate nonattainment area for PM_{10}, so the general conformity *de minimis* threshold of 15 tons per year was used for the conformity applicability analysis.

4.3.2 Proposed Action

The Proposed Action would implement design elements to the construction, operation, and maintenance of the new hospital that were not fully analyzed in the 2011 EA. These elements include a water storage tank, emergency wastewater storage tanks, a fixed PV solar array, an increase in the number of fuel storage tanks, an increase in the size and capacity of boilers, and an increase in the size and capacity of diesel generators.

4.3.2.1 Construction Phase

Project construction would result in short-term emissions of CO, NO_x, volatile organic compounds (VOCs), sulfur oxide (SO_x), PM_{10}, and $PM_{2.5}$. Exhaust emissions would result from construction equipment, vehicles, and fugitive dust emissions. Fugitive dust emissions include emissions from soil disturbing activities, unpaved roads, and paved roads. Detailed emission calculations for the remaining years of construction are provided in Appendix C. The annual peak construction emissions of the proposed project and the MDAQMD thresholds are compared in Tables 4-1 through 4-3.

The peak annual construction emissions would be less than the MDAQMD significance thresholds for each year; therefore, construction of the Proposed Action would not have a significant adverse effect on air quality. If all phases of the Proposed Action are implemented, construction will have begun in 2015 and is anticipated to end in late 2017. Table 4-1 shows emissions from the Proposed Action for 2015.

TABLE 4-1
Proposed Action Construction Emissions for 2015
Supplemental Environmental Assessment, Fort Irwin, California

	Emissions for 2015 (ton/yr)					
Emission Source	**VOC**	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Construction Emissions	0.971	8.85	6.51	0.0137	1.06	0.500
Vehicle Emissions	0.123	1.07	0.421	0.0016	0.0218	0.0166
Total Emissions	**1.09**	**9.92**	**6.93**	**0.0153**	**1.08**	**0.517**
MDAQMD Thresholds (ton/yr)	25	100	25	25	15	15
Thresholds Exceeded for Any Activity?	No	No	No	No	No	No

Source: Appendix C

Table 4-2 shows construction emissions resulting from the Proposed Action for 2016.

TABLE 4-2
Proposed Action Construction Emissions for 2016
Supplemental Environmental Assessment, Fort Irwin, California

	Emissions for 2016 (ton/yr)					
Emission Source	**VOC**	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Construction Emissions	0.755	7.47	4.68	0.0128	0.895	0.402
Vehicle Emissions	0.124	1.07	0.422	0.0016	0.0219	0.0167

Total Emissions	**0.879**	**8.54**	**5.10**	**0.0144**	**0.917**	**0.419**
MDAQMD Thresholds (ton/yr)	25	100	25	25	15	15
Thresholds Exceeded for Any Activity?	No	No	No	No	No	No

Source: Appendix C

Table 4-3 shows construction emissions resulting from the Proposed Action for 2017.

TABLE 4-3
Proposed Action Construction Emissions for 2017
Supplemental Environmental Assessment, Fort Irwin, California

	Emissions for 2017 (ton/yr)					
Emission Source	**VOC**	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Construction Emissions	0.494	4.95	3.11	0.0093	0.635	0.278
Vehicle Emissions	0.0901	0.778	0.307	0.0012	0.0159	0.000
Total Emissions	**0.584**	**5.73**	**3.42**	**0.0104**	**0.651**	**0.278**
MDAQMD Thresholds (ton/yr)	25	100	25	25	15	15
Thresholds Exceeded for Any Activity?	No	No	No	No	No	No

Source: Appendix C

4.3.2.2 Operation and Maintenance Phase

The Proposed Action would result in new emissions associated with the operation and maintenance of boilers and generators. The annual operational emissions from the Proposed Action would be less than the MDAQMD significant threshold and would not contribute to a violation of NAAQS (Table 4-4); therefore, operation and maintenance for the Proposed Action would not have a significant adverse effect on air quality.

TABLE 4-4
Proposed Action Operational Emissions
Supplemental Environmental Assessment, Fort Irwin, California

	Annual Emissions (ton/yr)					
Emission Source	**VOC**	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Operational Emissions	0.612	5.83	10.1	0.0138	0.522	0.522
Total Emissions	**0.612**	**5.83**	**10.1**	**0.0138**	**0.522**	**0.522**
MDAQMD Thresholds (ton/yr)	25	100	25	25	15	15
Thresholds Exceeded for Any Activity?	No	No	No	No	No	No

Source: Appendix C

4.3.2.3 General Conformity

General conformity means compliance with the SIP purpose of attaining or maintaining the NAAQS. To obtain federal conformity, a federal action would not: (1) cause a new violation of the NAAQS, (2)

contribute to any increase in the frequency or severity of violations of existing NAAQS, or (3) delay the timely attainment of any NAAQS interim or other attainment milestones.

According to the MDAQMD CEQA and Federal Conformity Guidelines (MDAQMD, 2011), a project conforms if it (1) complies with all applicable district rules and regulations, (2) complies with all proposed control measures that are not yet adopted from the applicable plans, and (3) is consistent with the growth forecasts in the applicable plans.

The Proposed Action would result in a short-term net increase in PM_{10} emissions from construction activities and a very small increase in operational emissions. Peak construction and operational emissions were compared to the *de minimis* threshold to evaluate general conformity applicability. Analysis indicates that PM_{10} emissions would peak with an increase of 1.14 tons due to construction activities and 0.036 tons due to operational activities in 2018. These values are well below the *de minimis* threshold of 15 tons per year; therefore, the Proposed Action would not require a conformity determination. As required by the Army, a Record of Non-Applicability (RONA) would be used to document that the Proposed Action is exempt from general conformity requirements. The RONA and emission calculations are provided in Appendix C.

The Proposed Action would comply with the applicable MDAQMD Rules and Regulations and would comply with proposed control measures presented in the List and Implementation Schedule for District Measures to Reduce PM Pursuant to Health and Safety Code §39614(d). As Table 4-4 shows, the Proposed Action conforms to the MDAQMD's approved air quality plan because the emissions of the nonattainment pollutant, PM_{10}, would be less than the general conformity *de minimis* threshold.

4.3.3 No Action Alternative

Under the No Action Alternative, there would be no impacts to air quality, as no construction would occur.

4.3.4 Cumulative Impact

Cumulative impacts are the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Construction of new facilities, as well as modifications to existing facilities and infrastructure, are ongoing at Fort Irwin. Multiple construction projects could occur at Fort Irwin simultaneously and could include capital improvement projects, water pipeline replacements in the cantonment, construction of a new water treatment plant, construction related to an Energy Savings Performance Contract at the Fort Irwin landfill, facilities to support the operation of a new Unmanned Aircraft Systems unit, a new training airfield, and a solar facility. If all projects were to occur at one time, air quality issues related to dust created during construction could create a nuisance; however, dust suppression BMPs would be implemented on all Fort Irwin construction activities.

Taking into account the additional ongoing construction projects, peak construction emissions continue to be anticipated as shown in Tables 4-1, 4-2, and 4-3. As stated previously, these emissions would be below the MDAQMD thresholds; therefore, the Proposed Action would not be expected to have an adverse cumulative effect on air quality.

4.3.5 Mitigation Measures

Mitigation measures are being used during construction to reduce fugitive dust emissions. BMPs, such as dust suppression techniques that include spraying the ground with water, are being implemented and will continue during construction activities. Fort Irwin currently implements dust abatement programs that address problems associated with wind erosion and suspension of particles, including chemical stabilization and revegetation (U.S. Army, 2006). Additionally, the requirements set forth in Rule 403.2, Fugitive Dust Control for the Mojave Desert Planning Area, would be adhered to (MDAQMD, 1995).

4.3.6 Climate Change and Greenhouse Gases

4.3.6.1 Proposed Action

The MDAQMD GHG emission threshold for significance for CO_2e is 100,000 tons per year (MDAQMD, 2011). The Proposed Action would generate GHG emissions from construction-related activities and during long-term operation. Construction year 2015 would have the highest amount of emissions among years left of construction. The anticipated CO_2e during 2015 was estimated to be 1,422 CO_2e tons, which includes the construction of the entire hospital complex, including the additional features. The estimated CO_2e emissions from construction are well below the MDAQMD threshold. Construction of the Proposed Action would result in a short-term less-than-significant increase in GHG emissions. The estimated yearly CO_2e emissions during operation of the emergency generators and boilers were estimated to be 8,963 tons, which is well below the MDAQMD threshold. The full air quality analysis is located in Appendix C.

The GHG emissions during the construction period and emissions during long-term operation would not be expected to contribute substantially to the regional GHG emission inventory or contribute to global climate change. Therefore, the project would result in a Less-Than-Significant Impact from GHG emissions.

4.3.6.2 No Action Alternative

Under the No Action Alternative, no new construction would occur. Since there would be no change from existing activities, the No Action Alternative would not result in an increase in GHG emissions.

4.4 Utilities

The proposed design changes to the hospital under the Proposed Action would continue to support the platinum LEED certification of the building. This includes compliance with the low impact development requirements of the Energy Independence and Security Act of 2007 (e.g. stormwater capture).

4.4.1 Proposed Action

4.4.1.1 Construction Phase

The utilities that would be impacted in the construction phase include water, wastewater, and solid waste. There would be no impacts to energy, communications, or the Fort Irwin stormwater utility.

The threshold level of significance for impacts to utilities and infrastructure would be an exceedance of the existing capacity of utilities or infrastructure.

Water

A minor increase in water usage would occur during construction. Water would mainly be needed during construction for dust suppression. The water for dust suppression is primarily supplied via treated wastewater (recycled water). Other construction water needs would be supplied by the Fort Irwin Water Treatment Plant. The use of water for construction would be temporary and the amount needed during construction would be minimal.

Solid Waste Management

The design changes in the Proposed Action would result in a minor addition in the amount of solid waste generated. The solid waste generated from construction of the PV array is nonhazardous and was disposed of at a Class III facility. The solid waste landfill on-post has approximately 265 years of remaining capacity. The on-post construction and demolition landfill has limited space, but the City of Barstow has a construction and demolition landfill, if needed. There would be negligible impacts to waste management utilities.

A small amount of construction waste could be generated; however, no demolition would be involved during construction activities. The Fort Irwin landfill would be used, but if the landfill is at its capacity or

reaches capacity during construction, a landfill with sufficient capacity would be available to accept the waste generated during construction.

4.4.1.2 Operation and Maintenance Phase

Water

The current water capacity at Fort Irwin is 3.5 mgd, while the average rate for 2015 up to October was 1.9 mgd. Two wells are expected to be online in the next few months, pending DDW permits, which could increase the average daily capacity to over 5.0 mgd. A less than significant impact would occur (Green, 2015). The water treatment plant has a maximum daily capacity of 6.0 mgd, and would have the capability to expand up to 12.0 mgd to accommodate future demand increases. The treatment plant provides a single source of potable water for the entire cantonment.

There would be a short-term increase in water usage to fill the 518,000-gallon potable water storage tank; however, as noted in Section 4.2.1.2, Fort Irwin is removing a 1,000,000-gallon potable water storage tank located within the cantonment area but outside the proposed hospital site. This would offset demand caused by filling the 518,000-gallon water storage tank. It is anticipated that 15,000 gallons of water would be needed to clean solar panels twice a year. The Fort Irwin water system has capacity to supply the additional features with the amount of needed water and no new or expanded entitlements would be needed; therefore, a less than significant impact would occur.

While the PV facility is in operation, the water usage for the PV facility is expected to be 15,000 gallons a year for the two cleaning events that would require 7,500 gallons each event. Water would be supplied from the Fort Irwin water treatment plant. The use of water from the construction of the PV facility would be minimal and would pose a less than significant impact to the Fort Irwin water utility.

The addition of six new boilers is not expected to have an impact on water usage beyond the demand already estimated for the hospital (30,000 gpd average and 75,000 gpd peak use).

Potential impacts to water supply from the Proposed Action are discussed in Section 4.2.

Wastewater

The ten 50,000-gallon wastewater storage tanks would provide for storage of wastewater in case of a potential outage at the Fort Irwin WWTP, which would be a long-term benefit to hospital operations in emergency conditions. The Proposed Action would not increase wastewater treatment requirements of Fort Irwin and no impact would occur.

The PV facility added an additional two to three full-time employees to Fort Irwin, which would have negligible effects on the Fort Irwin WWTP and wastewater management at Fort Irwin. Water used to clean the panels of the proposed PV facility would drip to the ground or evaporate on the panels. Because of the small amount of water (7,500 gallons per cleaning), the water would be expected to remain in the surface soils No wastewater that would be sent to the Fort Irwin WWTP would be generated by operation and maintenance.

Solid Waste Management

The PV facility added an additional two to three full-time employees to Fort Irwin, which will generate solid waste in day-to-day activities; however the minimal amount of solid waste from three additional employees is inconsequential compared to the daily solid waste generated at Fort Irwin. The waste from these three employees will not alter the life expectancy of landfills either on Fort Irwin or in nearby Barstow.

Operation and maintenance of the PV facility and boilers will generate minor amounts of solid waste. This amount of waste can be accommodated in landfills. Any hazardous wastes generated by maintenance activities would be separated and disposed as described in Section 4.5 below.

PV Facility

Implementation of the PV facility benefits the Fort Irwin energy utility. It satisfies and exceeds energy consumption and production mandates, including The Energy Policy Act of 2005 (Section 203), EO 13423, EO 13514, the National Defense Authorization Act of 2007 (which mandates a 25- percent reduction in the use of nonrenewable energy by 2025), and the Energy Independence and Security Act of 2007 (which directs reductions in the use of fossil fuels).

Generators

Three 1.5-MW generators will be installed inside the hospital for back up emergency power. The generators will be supplied with diesel fuel from two 25,000-gallon USTs.

The two 25,000-gallon USTs will only be used to supply the generators diesel fuel. The average annual fuel consumption to test one 1.5-MW diesel generator is expected to be approximately 2,400 gallons. Approximately 7,200 gallons of diesel fuel would be burned in 96 hours to test the three generators. The generators and the USTs would provide a beneficial impact to the hospital by providing a backup source of power.

Boilers

The addition of five 2.5-MBTU boilers and two 1-MBTU boilers used for heat production would not increase the average water consumption. The boilers are a closed system and would not require a continuous supply of new water. The water used to fill the boilers and for periodic maintenance is included in the 30,000-gpd use estimated for the entire hospital. Any water purged from the system during maintenance would be sent to the WWTP. There would be no additional impact to the water utilities from operation of the boilers. Impacts to the wastewater utility from purges of maintenance water would be negligible.

Water Storage Tank

The addition of a 518,000-gallon water storage tank would provide a short-term minor increase in water usage on Fort Irwin and in demand for treated water from the water treatment plant. The water used to fill the tank would come from groundwater from Bicycle Lake, Irwin, and Langford Lake groundwater basins. The current water supply capacity at Fort Irwin is 3.5 mgd with an average daily use of 1.9 mgd. The rate and timing of filling of the tank would be coordinated with the contractor operating the plant to prevent any service disruptions to the installation that could be caused from exceeding either the pumping rate or treatment rate for the water supply. Two wells are expected to be online in the next few months, pending DDW permits, which could increase the available supply to over 5.0 mgd and would allow for greater flexibility in filling the tank (Green, 2015).

Fort Irwin plans to remove a 1,000,000-gallon potable water storage tank. The treated water from the tank would be returned to the water supply system for distribution to other users. The filling of the proposed water storage tank would be offset by the planned decommissioning of the existing 1,000,000-gallon tank and no long-term impacts to water consumption would occur.

The proposed 518,000-gallon water storage tank would include a chlorination system. Army, federal, and state regulations require a chlorine residual, and warm temperatures in the desert environment can cause the chlorine residual to dissipate. The proposed chlorination system would include a recycling booster triplex pumping systems, duplex skid-mounted factory packaged chemical feed pumps, a residual monitoring system, and other assorted hardware housed within the mechanical room of the proposed hospital. The residual monitoring station shall monitor chlorine levels in the water storage tank using a sensor. If the sensor detects that chlorine levels are below acceptable concentrations, sodium hypochlorite would be injected into the storage tank mixing return piping. There would be approximately 500 linear feet of fill and discharge lines, constructed of restrained joint polyvinyl chloride

piping, connecting the tank to the mechanical room. Since the system is a closed, recycled loop within the proposed construction site, no impacts would occur.

4.4.2 No Action Alternative

Under the No Action Alternative, current conditions would continue.

4.4.3 Cumulative Impacts

Additions of new facilities and modifications to existing facilities and infrastructure are ongoing at Fort Irwin. The utility systems of the installation are adequate to accommodate fluctuations in utility usage and the overlap of multiple projects.

The hospital, including the components of the Proposed Action, would be designed as a silver LEED-certified building. The new hospital will be more efficient than Weed Army Community Hospital, reducing demand on utilities. In addition, the fixed PV solar array is designed to offset the predicted average electricity use of the hospital, further reducing demand.

Because of the offsets from the LEED design and fixed PV solar array and planning for utility needs as part of the planning for future projects, adverse cumulative impacts would not occur from implementation of the Proposed Action.

4.4.4 Mitigation Measures

No mitigation measures are planned for utilities.

4.5 Hazardous and Toxic Substances

Materials that could pose a health risk to humans or a threat to the environment would be associated with activities during the construction and operation and maintenance phases of the Proposed Action.

Hazardous and toxic substances impacts are considered significant under either or both of the following conditions:

- The generation of hazardous substances and/or materials would expose the general public to health risks through direct exposure, groundwater contamination, and/or airborne contaminants.
- The generation of hazardous substances and/or materials would expose wildlife or vegetation outside of the project area in a manner that is detrimental to longevity or propagation.

4.5.1 Proposed Action

4.5.1.1 Construction Phase

Project construction would require that petroleum, oil, and lubricant materials, and other potentially hazardous materials be transported to and used in the project area. Equipment servicing and repair activities temporarily could generate oily and hazardous wastes, such as spent solvents, residual fuels, used oils, antifreeze, and filters. Construction activities would be conducted consistent with hazardous waste and pollution regulations, with guidelines dictated in a SWPPP, and uncontrolled releases of hazardous substances to the environment would not be anticipated. A discussion about the hazardous materials used in the construction phase is provided in the 2011 EA.

4.5.1.2 Operation and Maintenance Phase

The hospital, including the design changes in the Proposed Action, would be considered an RCRA large generator once operational. Biohazards and pharmaceutical wastes from hospital operations and maintenance activities are disposed of via a contractor hired by the hospital. Chemical waste is handled by the post's existing RCRA permit. A discussion of how the potentially harmful materials are stored and handled is provided in the 2011 EA. Hazardous materials that would occur in the replacement hospital complex as a result of the Proposed Action would include fuel and small amounts of hazardous materials in the solar panels.

PV Facility

Long-term operation and maintenance of the fixed PV solar array would likely generate small amounts of dielectric fluids and high-performance solar cell materials, and herbicides associated with a noxious weed and vegetation management program. Because the fixed PV solar array would not track the sun, lubricants would not be required for maintenance.

Dielectric fluids are used in electrical equipment such as switches, transformers, and capacitors. High-performance solar cell materials contain small amounts of cadmium, selenium, and arsenic, which are used inside the solar cells as semiconductors. Dielectric fluids and high-performance solar materials are contained within the equipment and solar cells, respectively, and under normal circumstances do not represent a hazard to the public. Maintenance staff could be exposed to potentially hazardous materials while repairing or replacing damaged equipment or panels; however, staff would be properly trained and would use personal protective equipment, and a Spill Prevention, Control, and Countermeasures Plan (SPCCP) would be implemented. A maintenance plan would be implemented to ensure that equipment is replaced on a scheduled basis, reducing the potential for equipment failure or malfunction. A leak or spill of dielectric fluids or high-performance solar materials would be unlikely.

Hazardous waste generated from the disposal of expired, damaged, or malfunctioning solar equipment is recycled or characterized and disposed of as hazardous waste. The life of the equipment and panels used for the PV facility is such that only minor maintenance would be required. Some equipment would be replaced regularly. For example, inverters would be replaced every 10 to 15 years. PV technology is fairly new and some recycling opportunities exist; however, newer technology that does not use cadmium, selenium, or arsenic could limit the recycling value of certain solar equipment, reducing the potential for recycling opportunities.

Equipment servicing and repairs for the solar installation could temporarily generate hazardous waste and oils, such as spent solvents, residual fuels, used oils, used batteries, and filters from the equipment providing the service. The PV solar facility is designed to allow for maintenance personnel and trucks to have direct access to the panels and racks within the perimeter fence for cleaning and maintenance. The trucks will navigate between the rows of solar panels and water will be sprayed on the panels. To minimize the potential for a spill, the construction contractor would implement the following BMPs:

- Equipment would be maintained, but maintenance and refueling would not occur within the PV solar facility
- An SPCCP would be developed and implemented for maintenance activities at the PV solar facility

With implementation of the SPCCP, any impacts from the use of hazardous materials during maintenance of the PV panels would be expected to be minor.

Herbicides used to control vegetation at the proposed PV solar facility would be stored properly and staff would be trained on how to use and store such chemicals. The potential for environmental impacts from the use of cleaning agents and herbicides would be negligible.

There would be a minor increase in the use of hazardous or toxic substances during operation and maintenance of the PV facility. Less than significant impacts to hazardous materials and waste would be expected with proper staff training, use of BMPs, and implementation of an SPCCP and maintenance plan.

USTs

The Proposed Action would house two 25,000-gallon belowground diesel fuel storage tanks and ten 50,000-gallon emergency wastewater tanks. They would encompass an approximately combined total of 4.3 acres of underground storage. The only source of draw from the two 25,000-gallon USTs would be the diesel used for the generators.

Approximately 7,200 gallons of diesel fuel would be burned annually in 96 hours to test the three generators. Additional fuel would be consumed during emergency use of the generators. These three generators are the only source of draw from the two 25,000-gallon diesel fuel USTs. Air quality impacts from burning fuel are discussed in Section 4.3. No additional impacts from hazardous and toxic substances would occur.

For protection against petroleum contamination of underground water supplies, a double-walled storage tank would be used. The primary tank contains the fuel and the secondary wall is designed to protect against leaks into the environment. There is a cavity between the inner and outer tank wall. This cavity is filled with a non-toxic colored brine solution. To enable monitoring of the primary and secondary tanks, hydrostatic pressure is applied to the interstitial space. An alarm goes off when the brine levels change beyond the predetermined level. This method allows for 100 percent contact between the primary and secondary walls. A 30-year corrosion warranty applies to these tanks. Because of these protective measures, no impacts are expected to occur with the USTs (Containment Solutions, 2015)

4.5.2 No Action Alternative

Under the No Action Alternative, current conditions would continue.

4.5.3 Cumulative Impacts

The use of hazardous materials associated with the addition of new facilities and modifications to existing facilities and infrastructure are ongoing at Fort Irwin; however, adverse cumulative impacts are not anticipated.

4.5.4 Mitigation Measures

Construction activities would be conducted consistent with hazardous waste and pollution regulations and with guidelines dictated in a SWPPP. An SPCCP would be developed, implemented, and followed for the storage and use of cleaning agents, the use of fuels, and other hazardous wastes. The USTs supplying the fuel to the generators are equipped with a double wall leak detection system and the PV panels are encased to prevent any leakage, as described in Section 4.5.1.

4.6 Noise

4.6.1 Proposed Action

4.6.1.1 Construction Phase

Construction-related noise impacts would be associated with the operation of equipment and vehicles required for site preparation and building construction activities. Potential noise impacts from construction activities are assessed using a standard reference for construction noise (USEPA, 1971). A discussion about the noise levels of construction equipment and a table listing the noise levels of construction equipment at 50 and 100 feet are provided in the 2011 EA.

There would be temporary less-than-significant impacts from noise during construction. Impacts associated with groundborne vibration or groundborne noise resulting from construction in the 79-acre parcel were adequately assessed in the 2011 EA. As stated in the 2011 EA, should construction activity require the use of a pile driver, inappropriate noise levels could be experienced at family housing units and unaccompanied housing units as far away as approximately 3,200 feet; however, the use of a pile driver would likely be limited and it is expected that such activities would not expose residents to excessive groundborne vibration and impacts would be less-than-significant.

4.6.1.2 Operation and Maintenance Phase

Noise-generating activities during regular operations would include operating boilers and emergency generators. The emergency generators would operate automatically in case of a power outage and would be tested periodically. The generators would be enclosed and would have noise-reducing

mufflers. Noise from operation of the generators during emergencies or tests would be short-term and likely would not be perceivable by individuals in the area. The boilers would be enclosed. Because the fixed PV solar array would not track the sun, no noise would be generated from moving solar panels. The proposed new features would not result in a permanent source of noise and would not change noise levels for the long-term; therefore, no impact would occur.

The loudest noise source at the new hospital would be from landing and lift-off activities at the helicopter pad during delivery of patients, which could occur up to a few times each day. Black Hawk helicopters typically have an inflight noise level of approximately 106 dBA. However, the new helicopter pad would be placed near the existing helicopter pad. Therefore, noise levels in the area would be similar to existing conditions, with the exception of residents on Pork Chop Hill Road. These residences would most likely notice an increase in noise levels due to the closer helicopter pad location and would experience a minor negative impact due to noise generated from the use of the new helicopter pad.

There would be no significant impacts from noise during operation and maintenance of the proposed new features because there would be no long-term increase in ambient noise levels beyond intermittent helicopter operation.

4.6.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented. Noise would continue to be generated from the construction and operation of the hospital, but the new design components would not be included.

4.6.3 Cumulative Impacts

Cumulative impacts would result from individually minor but collectively significant actions taking place over a period of time. The backup generator possibly could be in operation at the same time that other noise-generating activities were to occur; however, with the mitigation measures in place, the Proposed Action would not be anticipated to have a cumulative adverse impact on noise.

4.6.4 Mitigation Measures

Mitigation measures would be implemented during the construction and operation and mitigation phases of the Proposed Action. To reduce noise levels experienced at sensitive receptor locations during construction, activities would occur only during normal daytime work hours.

During operation, the emergency diesel-powered backup generators could begin operation at any time and these generators would be tested periodically. The generators would be equipped with an exhaust silencer and placed in a sound-attenuating enclosure. Exhaust silencers are available that can achieve different levels of noise attenuation, ranging from 10 to 52 dBA. Placement of the generators inside a building or enclosure would achieve even greater noise attenuation.

The boilers would be constructed inside an enclosed area to reduce noise.

Implementation of these mitigation measures would result in acceptable noise levels at sensitive receptors. A summary of mitigation measures is presented in Section 4.12 of the 2011 EA.

4.7 Aesthetics

Potential impacts to aesthetics from development of the 79-acre parcel for the replacement hospital were determined to be less-than-significant in the 2011 EA. The Proposed Action would be compatible with the hospital complex and surrounding landscape of the cantonment. The ten 50,000-gallon emergency wastewater storage tanks and two 25,000-gallon USTs would be placed underground, while the boilers and generators would be placed indoors. These features would not be noticeable upon completion of construction.

The 518,000-gallon emergency water storage tank and fixed PV solar array would be visible upon completion of construction. The Fort Irwin Installation Design Guidelines promote visual order and enhance natural and manmade conditions through implementation of consistent architectural themes and standards (Michael Baker, Jr., Inc. 2008). The water storage tank would be 30 feet 8 inches tall and would be painted to blend in with the surrounding structures in the area. A 20-foot tall octagonal concrete retaining wall with a perimeter chain link fence would surround the water tank. The proposed fixed PV solar array would encompass 7.82 acres. The fixed PV solar array would be constructed adjacent to the replacement hospital. The water storage tank and fixed PV solar array would not substantially degrade the visual character of the area; therefore, impacts would be less than significant.

4.8 Transportation

Potential impacts to transportation infrastructure and performance are assessed for both the construction and operation and maintenance phases of the Proposed Action and No Action Alternatives.

4.8.1 Proposed Action

4.8.1.1 Construction Phase

During the 24- to 36-month construction period, vehicle trips associated with workers and deliveries to jobsites would occur. A discussion of the ground transportation impacts generated at Fort Irwin during the construction phase is provided in the 2011 EA. Ground transportation impacts would not change with implementation of the Proposed Action and are not re-analyzed in this SEA.

4.8.1.2 Operation and Maintenance Phase

A discussion of the ground transportation impacts generated at Fort Irwin during the operation phase is provided in the 2011 EA. Ground transportation impacts would not change with implementation of the Proposed Action and are not re-analyzed in this SEA.

Helicopter traffic to and from the hospital could be affected by minor glare impacts from the PV field. A glare analysis for the helicopter pad and fixed PV solar array at the new Army Hospital at Fort Irwin was completed on June, 5, 2014 with RLF Architecture, Engineering and Interiors. The analysis indicated that potential glare occurrence is likely from the west in the mornings between 6:00 am and 7:00 am in the spring and fall (RLF, 2014). Because the PV array would incorporate fixed-tilt PV panels rather than tracking panels, the time of day when glare could occur is limited.

Two helicopter flight path approaches were evaluated for glare using the Sandia National Laboratories Solar Glare Hazard Analysis Tool. This study found that helicopters landing and taking off from the hospital did not have any negative glare potentials from the fixed PV solar array. The only potential glare occurrence would occur in the early morning between 6:00 am and 7:00 am (RLF, 2014)

The panels are designed with some tilt so that if it does rain or when it is cleaned, the water and residue slide away from the panel as opposed to collecting on the panel’s surface. This aids in the panels energy production rate and reduces and additional glare potential. To further limit the reflection on the panel’s surface, they are constructed of dark, light-absorbing materials and covered with an anti-reflective coating.

4.8.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and current conditions would continue. The water storage tank, fuel tanks, additional boilers, generators, and wastewater storage tanks would not impact traffic for the long-term. The fixed PV solar array would be placed near the new hospital helicopter pad, which could affect air transportation due to potential glare. Ground and air transportation impacts associated with the hospital would continue to occur, but the new design components would not be included. Because it is constructed, the solar PV field would continue to present a minor glare impact.

4.8.3 Cumulative Impacts

The number of personnel assigned to Fort Irwin would fluctuate throughout the year and with changes in mission. Additions of new facilities and modifications to existing facilities and infrastructure are ongoing at Fort Irwin. The transportation infrastructure of the installation is adequate to accommodate these fluctuations and the overlap of multiple changes. Adverse cumulative impacts would not be anticipated.

4.8.4 Mitigation Measures

The panels are tilted to minimize the potential for debris and water to collect on the panels' surfaces. The panels' surfaces are constructed with an anti-glare reflective coating that reflect approximately 2 percent of the sunlight (FAA, 2010).

4.9 Summary of Impacts and Mitigation Measures

The resources with potential impacts and the mitigation measures implemented to reduce adverse environmental impacts of construction and operation and maintenance of the Preferred Alternative are summarized in Table 4-5.

TABLE 4-5
Summary of Mitigation Measures
Supplemental Environmental Assessment, Fort Irwin, California

Resource	Potential Impact	Mitigation Measure
Geology, Soils and Mineral Resources		
	Soil Erosion	Construction Phase: Employ BMPs for control of erosion and sediment Implement SWPPP Operation Phase: No mitigation is needed/proposed.
Biological Resources		
	Desert tortoise (no effect)	Construction Phase: Within 2 weeks of the onset of construction, 100 percent coverage ground surveys would be conducted of the project area for tortoises, signs of use, or burrows. If no tortoises or active burrows are identified, then construction would proceed without interruption. If active burrows or tortoises are identified, then tortoises would be relocated to areas off the construction site, and burrows collapsed. Tortoise relocation would require a Section 10(a) permit issued by the USFWS under the ESA. During land clearing and construction, a biological monitor would be available to observe construction activities and to verify that no tortoises wander into the construction area. If a tortoise is present, construction in the immediate vicinity would be halted while the tortoise is relocated out of the construction area. Before construction begins, personnel working on the site would be given a briefing on the desert tortoise, detailing its life history as well as the protocol to follow if a tortoise is encountered. Operation Phase: No mitigation is needed/proposed.

TABLE 4-5
Summary of Mitigation Measures
Supplemental Environmental Assessment, Fort Irwin, California

Resource	Potential Impact	Mitigation Measure
	Special-status species (potential disturbance)	Construction Phase: Land and vegetation clearing would occur outside the breeding season for birds of concern, defined as February 15 to August 31, where practicable. If vegetation clearing is required during the breeding season, then preconstruction surveys of breeding birds would be conducted. If active nests are identified, they would be protected from disturbance by a 500-foot nesting buffer, which would remain in place until the young have fledged from the nest, and no new nests would be initiated for the season. Operation Phase: No mitigation is needed/proposed.
	Pest species	Construction Phase: During construction, all trash and debris would be placed in receptacles for delivery to approved landfill facilities. Site cleanup of trash and debris would be required on a daily basis, including emptying and disposing of trash receptacles. Operation Phase: Proper waste management on the hospital grounds, fencing around the PV solar array, and removal of any dead or injured animals would limit the potential for pest species to occur.
Water Resources		
Surface Water	Soil erosion, runoff, and sedimentation impacts	Construction Phase: Proper BMPs would be implemented before land grading begins. Natural vegetation would be preserved when possible. Erosion, runoff, and sediment control measures would be implemented in case of a stormwater event. Erosion and stormwater control measures would be implemented per the SWPPP. Operation Phase: During operation of the Proposed Action, potential impacts on surface waters would be minimized by practicing good housekeeping at the facility to prevent any unwanted materials from being washed away during storm events. Examples of good housekeeping practices could include proper materials storage and keeping the site free of spills. Post-construction BMPs, consisting of detention ponds, would maintain pre-development runoff flows for 10-year floods and attenuate larger storm events.
Water Supply	Reduction in water usage	Construction Phase: Use tertiary-treated wastewater for dust control. Operation Phase: No mitigation is needed/proposed.
Hazardous and Toxic Substances		

TABLE 4-5
Summary of Mitigation Measures
Supplemental Environmental Assessment, Fort Irwin, California

Resource	Potential Impact	Mitigation Measure
	Releases from equipment maintenance	Construction Phase: Construction activities would be conducted consistent with hazardous waste and pollution regulations and with guidelines dictated in a SWPPP. Operation Phase: An SPCCP would be developed, implemented, and followed for the storage and use of cleaning agents, the use of fuels, and other hazardous wastes. The USTs supplying the fuel to the generators are equipped with a double wall leak detection system and the PV panels are encased to prevent any leakage.
Noise		
	Noise impacts during construction	Construction Phase: Construction would only occur during normal daytime working hours.
	Adverse recurring short-term impacts from operation of diesel-powered emergency generator	Operation Phase: Measures that could be implemented include installation of an exhaust silencer and placement of the generator unit in a sound-attenuating enclosure. Exhaust silencers can achieve noise attenuation, up to 52 dBA. Placement of the generator inside a building or enclosure could achieve even greater noise attenuation.
Transportation		
Air Transportation	Glare	Construction Phase: No mitigation is needed/proposed. Operation Phase: The panels are tilted to minimize the potential for debris and water to collect on the panels' surfaces. The panels' surfaces are constructed with an anti-glare reflective coating that reflect approximately 2 percent of the sunlight (FAA, 2010).

SECTION 5

List of Preparers

TABLE 5-1
List of Preparers
Supplemental Environmental Assessment, Fort Irwin, California

Name	Degree(s)	Years of Work Experience
Sara Kent	BS, Fisheries and Aquaculture	8
Rob Price	MS, Environmental Science and Masters of Public Affairs	20
Josh Jamell	BS, Ecology	13
Dani Aycock	BS, Ecology	3
Richard Reaves	BS, PhD, Wetland and Wildlife Ecology	20
Ron Vaughn	MS, Civil Engineering	19
Christine Mengel	BA, English	6

SECTION 6

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SECTION 7

Distribution List

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Appendix A
2011 Environmental Assessment

Department of the Army

Installation Management Command

Environmental Assessment/Initial Study

Construction and Operation of the New Weed Army Community Hospital, Fort Irwin, California

U.S. Army Garrison
Fort Irwin, California

December 2011

SIGNATURE PAGE

ENVIRONMENTAL ASSESSMENT/INITIAL STUDY
CONSTRUCTION AND OPERATION OF A NEW WEED ARMY HOSPITAL
FORT IRWIN, CALIFORNIA

Lead agency: U.S. Army Garrison, Fort Irwin, California

Cooperating Agencies: None

APPROVAL

This Environmental Assessment meets the requirements of NEPA, 40 CFR 1500-1508, Army Regulation 200-1, *Environmental Protection and Enhancement, dated 13 December 2007* and 32 CFR 651(AR 200-2) *Environmental Analysis of Army Actions, dated 29 March 2002.*

1/11/12
Date

Justine E, Dishart
Chief, Environmental Management Division

1/11/12
Date

Lance Toyofuku
Director, Public Works

2/14/12
Date

Kurt J. Pinkerton
Col, IN
Commanding

FINDING OF NO SIGNIFICANT IMPACT (FNSI)

ENVIRONMENTAL ASSESSMENT/INITIAL STUDY FOR THE CONSTRUCTION AND OPERATION OF A NEW WEED ARMY COMMUNITY HOSPITAL AT THE NATIONAL TRAINING CENTER AND FORT IRWIN, CALIFORNIA

Weed Army Community Hospital serves as the primary health care facility at Fort Irwin for 4,500 soldiers and their families. It also provides services for an additional 4,000 to 6,000 soldiers during training rotations, which occur 10 times a year. The hospital does not meet the building requirements set forth in California Senate Bill (SB) 1953, primarily due to seismic concerns, and has multiple quality of life, safety, and code issues consistent with an outdated facility. SB 1953 requires that hospitals that do not meet seismic performance standards be replaced or retrofitted to higher seismic safety standards within a designated timeline. Otherwise, the provision of acute care services may no longer be allowed in the building. The current building cannot be altered or enlarged without a cost-prohibitive seismic retrofit. Fort Irwin has prepared an Environmental Assessment (EA) that provides an evaluation of the environmental and socioeconomic impacts of constructing and operating a new hospital to replace the existing hospital.

The actions considered in the EA are part of a major federal action, which must be evaluated under the National Environmental Policy Act (NEPA) of 1969. The attached EA, which is incorporated by reference, was prepared pursuant to 32 Code of Federal Regulations Part 651 and the President's Council on Environmental Quality regulations (Title 40, U.S. Code, Parts 1500-1508) for implementing the procedural requirements of NEPA.

In preparation of the EA, it was determined that no alternatives other than the proposed action would satisfy the purpose and need of the proposed action without greater costs and/or adverse impacts on resources. Two other sites in the Fort Irwin cantonment area were considered but dismissed from evaluation due to size constraints, interference with helicopter flight paths, inadequate space for force protection and set-backs, and inadequate space for future expansion.

Proposed Action Alternative. The proposed action consists of construction and operation of a new hospital on 79 acres of currently vacant land within the Fort Irwin cantonment. The hospital would be capable of providing tertiary care, emergency medicine, and clinical support activities. The new hospital would be built on an approximately 26-acre portion of the 79-acre parcel and be designed to exceed Leadership in Energy and Environmental Design silver certification.

The hospital would be a two-story 216,374-square-foot building. Access roads from the hospital would be constructed to 5th Street, Avenue B, and Outer Loop Road. The project would include a helipad, parking spaces for approximately 600 vehicles, reverse osmosis water treatment facility, solar photovoltaic energy facility, and a central utility plant. Associated features would include landscaping, force protection, and stormwater management. The hospital would require two diesel generators for emergency back-up power. Two fuel storage tanks would be required

for generator and back-up fuel. The hospital would have 10 in-patient beds and employ approximately 330 staff and 162 civilian contractors. Hospital capacity and staffing would represent no change from existing bed capacity and staff size.

The proposed action is the preferred alternative in this analysis.

No Action Alternative. Under the no action alternative, Fort Irwin would continue to use Weed Army Community Hospital and no new construction would occur. This building is an outdated hospital facility that does not meet current codes and criteria for building requirements and equipment and health care delivery. The provision of acute care services may no longer be allowed in this building if it does not meet the seismic requirements set forth in SB 1953. Soldiers and their families would not have access to a reliable health care facility under the no action alternative.

Environmental Effects. The EA evaluated potential impacts on land use planning and aesthetics, geology, soils, mineral resources, biological resources, water resources, air quality, noise and lighting, cultural resources, socioeconomics, environmental justice, transportation, utilities, hazardous and toxic substances, human health and safety, and recreation.

As discussed in the EA, implementation of the proposed action would result in permanent minor negative impacts on vegetation, surface waters, fauna, and noise from use of previously disturbed land and relocation of the helipad for the hospital. There would be temporary negative impacts on soils, air quality, and transportation from ground disturbance and added workers and equipment use during construction. There would be negligible temporary impacts on solid waste from generation of construction and demolition waste. There would be less than significant impacts to groundwater resources from consumptive uses during construction and operation. Measures would be implemented, as appropriate, to reduce impacts on these resources. Indirect impacts would not be expected as a result of the proposed action.

There would be a long-term beneficial impact on the Fort Irwin community by providing an adequate and reliable health care facility and that could function after a seismic event. There would be temporary minor beneficial impacts to the regional economy from jobs, income, and earnings from construction.

Public Involvement. The U.S. Army observed a 30-day period for agency and public review and comments on the Proposed Action, the EA, and the FNSI following the issuance of the final draft EA and FNSI. Throughout this process, the public was able to obtain information on the status of the Proposed Action and EA through the Fort Irwin Directorate of Public Works (DPW), Environmental Management Division. The review and comment period ended 22 December 2011.

Conclusion. Based on the analysis presented in the EA, I find that implementation of the proposed action, as described, would have no significant impact on the human or natural environment. Therefore, a Finding of No Significant Impact is issued for the proposed action, and no Environmental Impact Statement is required.

2/14/12
Date

KURT J. PINKERTON
Col, IN
Commanding

Notice: Reviewers should provide the Department of the Army (DA) with their comments during the review period of the EA. This will enable the DA to analyze and respond to the comments at one time and to use information acquired in the preparation of the EA, thus avoiding undue delay in the decision making process. Reviewers have an obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and alerts the agency to the reviewers' position and contentions (Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 553, 1978). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the FEIS (City of Angoon v. Hodel, 9th Cir, 1986; and Wisconsin Heritages Inc., v. Harris, 490F. Supp. 1334, 1338, E.D. Wis. 1980) Comments on the EA should be specific and should address the adequacy of the statement and the merits of the alternatives discussed (40CFR 1503.3).

Comments received in response to this document, including names and addresses of those who comment, will be considered part of the public record on this proposed action and will be available for public inspection. Comments submitted anonymously will be accepted and considered; however, those who submit anonymous comments will not have standing to appeal the subsequent decision under 36 CFR Parts 215 or 217. Additionally, pursuant to 7 CFR 1.27(d), any person may request the agency to withhold a submission from the public record by showing how the Freedom of Information Act (FOIA) permits such confidentiality. Persons requesting such confidentiality should be aware that, under FOIA, confidentiality may be granted in only very limited circumstances, such as to protect trade secrets. The DA will inform the requester of the agency's decision regarding the request for confidentiality, and where the request is denied the agency will return the submission and notify the requester that the comments may be resubmitted, with or without name and address.

Additional documentation, reports, and analysis referenced in this document can be found in the administrative record files. These items have not been included in this document due to technical nature, excessive length, or are reference materials used to develop the analysis in this document. All supporting documents in the planning record are located at the Environmental Management Division, Department of Public Works, Fort Irwin, California.

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Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
AB	Assembly Bill
ACM	asbestos-containing materials
ACR	Armored Cavalry Regiment
ADNL	average A-weighted day-night noise level
AFB	Air Force Base
afy	acre-feet per year
APE	area of potential effect
AR	Army Regulation
ARB	California Air Resources Board
BLM	Bureau of Land Management
BMPs	best management practices
BTU	British thermal unit
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CDMP	Community Development and Management Plan
CDNL	average C-weighted day-night noise level
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CH4	methane
CNPS	California Native Plant Society
CO	carbon monoxide

CWA	Clean Water Act
DAR	defense access road dB decibel
dBA	A-weighted sound pressure level
dBC	C-weighted sound pressure level
dBP	decibels unweighted
DPW	Directorate of Public Works
EA	environmental assessment
ECP	environmental condition of property
EFZ	earthquake fault zone
ESA	Endangered Species Act
FICRMBD	Fort Irwin Cultural Resources Management Database
FICRP	Fort Irwin Cultural Resources Program
FNSI	Finding of No Significant Impact
GHG	greenhouse gas
gpd	gallons per day
HFC	hydrofluorocarbon
HUD	Housing and Urban Development
INRMP	Integrated Natural Resources Management Plan
IMPLAN	Impact Analysis for Planning
I-O	input-output
JPL	Jet Propulsion Laboratory
kV	kilovolt
LBP	lead-based paint
LEED	Leadership in Energy and Environmental Design
LPG	liquid petroleum gas
µg	microgram
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level
MDAQMD	Mojave Desert Air Quality Monitoring District
MFH	military family housing

MG	million gallons
mgd	million gallons per day
msl	mean sea level
MVA	megavolt ampere
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NAWS	Naval Air Weapons Station
NEPA	National Environmental Policy Act
NO2	nitrogen dioxide
NO3	nitrite
NOx	oxides of nitrogen
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTC	National Training Center
N2O	nitrous oxide
O3	ozone
OWS	oil/water separator
PCB	polychlorinated biphenyls
PFC	perfluorocarbon
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in aerodynamic diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in aerodynamic diameter
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
RO	reverse osmosis
ROG	reactive organic gas
ROI	region of influence
RV	recreational vehicle
SB	Senate Bill
SCE	Southern California Edison

SF6	Sulfur hexafluoride
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO2	sulfur dioxide
SOx	oxides of sulfur
SPC	Structural Performance Category
SWPPP	stormwater pollution prevention plan
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
UTM	Universal Transverse Mercator
VOC	volatile organic chemical
WTP	water treatment plant
WWTP	wastewater treatment plant

Executive Summary

ES-1 Introduction

This Environmental Assessment describes the potential environmental consequences of the construction and operation of a new hospital (Proposed Action) to replace Weed Army Community Hospital, which does not meet seismic building standards nor support modern health care delivery needs. The proponent of the Proposed Action is the United States Army Medical Command. Construction would start on the new hospital in 2012.

ES-2 Environmental Impact Analysis Process

The U.S. Army is the agency carrying out the federal action and is responsible for complying with the requirements of the National Environmental Policy Act (NEPA). This EA also would be used as the basis for obtaining permits and approvals from other agencies, including the California Department of Health Services, California Regional Water Quality Control Board-Lahontan Region, California State Historic Preservation Office (SHPO), and Mojave Desert Air Pollution Control District.

ES-3 Purpose and Need of the Proposed Action

The purpose of the Proposed Action is to construct and operate a new hospital and associated structures, including parking lots, a helipad, and a central utility plant, to provide a reliable community-based health care facility focused on primary care and outpatient procedures for soldiers based at Fort Irwin and their families. The new hospital would comply with current building codes and standards and would meet the health care needs of the Fort Irwin community.

ES-3.1 Project Need

Weed Army Community Hospital, which was constructed between 1966 and 1968, does not comply with current seismic design standards nor support modern health care delivery needs. California Senate Bill (SB) 1953 requires that hospitals be replaced or retrofitted to higher seismic safety standards or acute care services may no longer be provided in the hospital building.

The existing hospital interior, construction techniques, and systems limit the ability to meet current building codes and criteria for medical equipment and health care delivery. Patient rooms are undersized, semi-private, and do not have dedicated bathrooms. There are multiple life safety and code issues consistent with an outdated inpatient infrastructure. Mechanical, electrical, communication, and plumbing systems have deteriorated beyond economical repair. The current hospital requires upgrade or replacement of electrical service and distribution to correct power conditions, overloaded electrical transformers, and non- compliant wiring at patient bed locations. Alterations or additions to the current building cannot be performed without a seismic retrofit, which would be cost prohibitive.

ES-4 Proposed Action and Alternatives

In addition to being situated within the Fort Irwin cantonment near other medical buildings (such as the Mary Walker Clinic), the new hospital and site must meet the following requirements:

- Be of suitable size to accommodate a two-story hospital, helipad, adequate parking for staff and visitors, and a central utility plant
- Be located to accommodate unrestricted flight paths for medical evacuation helicopters
- Have adequate space for required force protection and set-backs
- Have adequate space to allow for future expansion
- Comply with current codes and regulations including SB 1953
- Offer a reliable, modern community-based health care facility for the Fort Irwin community

ES-4.1 Proposed Action

The Proposed Action is the preferred alternative and would entail construction of a new hospital on 79 acres of vacant land within the Fort Irwin cantonment, adjacent to 5th Street and B Avenue. A two-story, 216,374-square-foot (ft^2) hospital would be built on an approximately 26-acre portion of that parcel. Access roads from the hospital would be constructed to 5th Street, Avenue B, and Outer Loop Road. The project would include a helipad, parking spaces for approximately 600 vehicles, and a central utility plant, reverse osmosis water treatment facility, and a photovoltaic energy facility. Associated features would include landscaping, force protection, and stormwater management. The hospital would require two diesel generators for emergency back-up power. Two fuel storage tanks would be required for generator and back-up fuel. The hospital would include 10 in-patient beds and would employ approximately 330 staff and 162 civilian contractors, which would be no change from existing bed capacity and staff size.

The new hospital would be capable of providing tertiary care (specialized consultative medical care), emergency medicine, and clinical support activities. The hospital would be designed in accordance with criteria prescribed in Department of Defense (DoD) Unified Facilities Criteria (UFC) 4-510-01, World Class and Evidence Based Design Principles, DoD Minimum Antiterrorism Standards for Buildings (UFC 4-010-01), barrier-free design in accordance with DoD criteria and the Deputy Secretary of Defense Memorandum "Access for People with Disabilities," dated October 31, 2008, base architectural guidelines, and applicable energy conservation legislation. Additionally, the new facility would be designed to exceed Leadership in Energy and Environmental Design silver certification.

ES-4.2 No Action Alternative

Under the No Action Alternative, Fort Irwin would continue to use Weed Army Community Hospital and no new construction would occur. This building is an outdated hospital that does not meet current codes and criteria for building requirements and equipment and health care delivery. The provision of acute care services may no longer be allowed in this building if it does not meet the seismic requirements set forth in SB 1953. Soldiers and their families would not have access to a reliable health care facility under the No Action Alternative.

ES-5 Summary of Impacts

ES-5.1 Summary of Impacts

Impacts to environmental and socioeconomic resources resulting from implementation of the Proposed Action and the No Action Alternative are summarized in Table ES-1.

ES-5.2 Cumulative Impacts

Construction of new facilities, as well as modifications to existing facilities and infrastructure, are ongoing at Fort Irwin. Planned projects include proposed renovations to the Mary Walker Clinic and the removal of four buildings (136, 172, 174, and 176). The incremental impacts associated with implementation of the Preferred Alternative would not be expected to have a cumulative impact when considered in combination with other developments.

TABLE ES-1
Summary of Impacts
Weed Army Community Hospital EA, Fort Irwin, CA

Resource	Preferred Alternative Environmental Consequences	No Action Alternative Environmental Consequences
Land Use Planning and Aesthetics		
Site and Installation of Preferred Alternative	Proposed use is compatible with installation land use plans and visual characteristics of its surroundings.	No Impact
Surrounding Area	No Impact	No Impact
Geology, Soils and Mineral Resources		
Geology and Mineral Resources	No Impact	No Impact
Soils	Short-term potential for soil erosion impacts	No Impact
Seismicity	New facilities would be exposed to seismic hazards but would be designed and constructed to meet safety requirements for those hazards.	Existing facility would be exposed to seismic hazards and does not meet current safety requirements for those hazards.
Biological Resources		
Flora	Long-term permanent loss of minor quantity of Mojave creosote bush scrub habitat	No Impact
Fauna	Minor long-term permanent loss of habitat for general wildlife species	No Impact
Special-Status Species	Potential short-term disturbance to transient desert tortoise (*Gopherus agassizii*) and selected bird species.	No Impact
Water Resources		
Surface Water	Minor short-term and long-term impacts to ephemeral drainages	No Impact
Groundwater	Less than significant impact from consumption of groundwater resources.	No Impact
Air Quality		
	Potential for short-term fugitive dust emissions from soil disturbance during construction. Short-term and long-term vehicle and equipment exhaust emissions.	No Impact

TABLE ES-1
Summary of Impacts
Weed Army Community Hospital EA, Fort Irwin, CA

Resource	Preferred Alternative Environmental Consequences	No Action Alternative Environmental Consequences
Noise		
	Short-term increase in noise level from construction activities. Long-term minor increase to nearby housing from emergency deliveries and helicopters from operations.	No Impact
Cultural Resources		
	No Impact	No Impact
Socioeconomics		
	Short-term minor beneficial impacts to regional economic activity from jobs, income, and earnings. No impacts to housing. No Environmental Justice and Protection of Children issues. Beneficial impacts to community resources.	Adverse impact to community resources due to potential lack of an adequate hospital on Fort Irwin.
Transportation		
	Minor short-term adverse impacts to level of service of Fort Irwin Road.	No Impact
Utilities		
Water Distribution	Short-and long-term less than significant impacts	No Impact
Water Treatment	Short- and long-term less than significant impacts	No Impact
Wastewater	No Impact	No Impact
Stormwater	No Impact	No Impact
Energy and Communications	No Impact	No Impact
Solid Waste	Negligible short-term impacts from generation of new construction and demolition waste.	No Impact
Hazardous and Toxic Substances		
	Short-term use of small quantities of potentially hazardous materials (e.g. oils, grease) during construction. Long-term use of hazardous materials, including biohazards and pharmaceutical wastes. Waste contents would be characterized periodically and disposed in an appropriate manner.	Long-term use of hazardous materials, including biohazards and pharmaceutical wastes. Waste contents would be characterized periodically and disposed in an appropriate manner.

ES-6 Summary of Mitigation Measures

Mitigation measures would be implemented to ensure that adverse environmental impacts of the construction and operation of the Proposed Action would be avoided or minimized to acceptable levels. These mitigation measures would be incorporated into the final design, implemented by the general construction contractor, and included in the contract documents. A summary of the measures is presented in Table ES-2.

TABLE ES-2
Summary of Mitigation Measures
New Weed Army Community Hospital, Fort Irwin, California

Resource	Potential Impact	Design Measure
Geology, Soils and Mineral Resources		
	Soil Erosion	Construction Phase: Employ best management practices (BMPs) for control of erosion and sediment Prepare and implement stormwater pollution prevention plan (SWPPP)
Biological Resources		
	Desert tortoise (no effect)	Construction Phase: Within 2 weeks of the onset of construction, 100 percent coverage ground surveys would be conducted of the project site for tortoises, signs of use, or burrows. If no tortoises or active burrows are identified, then construction would proceed without interruption. If active burrows or tortoises are identified, then tortoises would be relocated to areas off the construction area, and burrows collapsed. Tortoise relocation would require a Section 10(a) permit issued by the U.S. Fish and Wildlife Service under the Federal Endangered Species Act. During land clearing and construction, a biological monitor would be available to observe construction activities and to verify that no tortoises wander into the construction site. If a tortoise is present, construction in the immediate vicinity would be halted while the tortoise is relocated off the construction site. Before construction begins, personnel working on the site would be given a briefing on the desert tortoise detailing its life history as well as the protocol to follow if a tortoise is encountered.
	Special-status species (potential disturbance)	Construction Phase: Land and vegetation clearing would occur outside the breeding season for birds of concern, defined as February 15 to August 31, where practicable. If vegetation clearing is required during the breeding season, then preconstruction surveys of breeding birds would be conducted. If active nests are identified, they would be protected from disturbance by a 500-foot nesting buffer, which would remain in place until the young have fledged from the nest, and no new nests would be initiated for the season.

TABLE ES-2
Summary of Mitigation Measures
New Weed Army Community Hospital, Fort Irwin, California

Resource	Potential Impact	Design Measure
	Pest species	Construction Phase: During construction, all trash and debris would be placed in receptacles for delivery to approved landfill facilities. Site cleanup of trash and debris would be required on a daily basis, including emptying and disposing of trash receptacles. Operation Phase: Proper waste management on the hospital grounds would limit the potential for pest species to occur.
Water Resources		
Surface Water	Soil erosion, runoff, and sedimentation impacts	Construction Phase: Proper BMPs would be implemented before land grading begins. Natural vegetation would be preserved when possible. Erosion, runoff, and sediment control measures would be implemented in case of a stormwater event. Erosion control measures such as compost blankets, mulching, watering, riprap, seeding and sodding, geotextiles, and slope drains could be used to protect exposed soil and minimize erosion. BMPs such as check dams, slope diversions, and temporary diversion dikes could be implemented for runoff control. Sediment control measures that could be implemented include compost filter berms and socks; fiber rolls or berms; sediment basins, rock dams, filters, chambers, or traps; silt fences; storm drain inlet protection; and hay bales. Good housekeeping measures would be practiced during construction. Site-specific stormwater BMPs would be detailed in a construction SWPPP that would be prepared by the contracted construction company prior to breaking ground. Operation Phase: During operation of the Proposed Action, potential impacts on surface waters would be minimized by practicing good housekeeping at the facility to prevent any unwanted materials from being washed away during storm events. Examples of good housekeeping practices could include proper materials storage and maintaining the site free of spills. Post-construction BMPs, consisting of detention ponds, would maintain pre-development runoff flows for 10-year floods and attenuate larger storm events.
Water Supply	Reduction in water usage	Operation Phase: Five acres of xeriscaping are planned for the Proposed Action. Continuing current education and conservation programs could reduce water demand by as much as 5 percent.

TABLE ES-2
Summary of Mitigation Measures
New Weed Army Community Hospital, Fort Irwin, California

Resource	Potential Impact	Design Measure
Noise		
	Noise impacts during construction	Construction Phase: Construction would only occur during normal daytime working hours.
	Adverse recurring short-term impacts from operation of diesel-powered emergency generator	Operation Phase: Measures that could be implemented include installation of an exhaust silencer and placement of the generator unit in a sound-attenuating enclosure. Exhaust silencers can achieve noise attenuation, up to 52 A-weighted decibels. Placement of the generator inside a building or enclosure could achieve even greater noise attenuation.

1. Purpose and Need

1.1 Introduction

The United States (U.S.) Army National Training Center (NTC) at Fort Irwin (Fort Irwin) is located approximately 37 miles northeast of Barstow, California, in the north-central part of the High Mojave Desert (Figure 1-1) (Fort Irwin, 2010a). The Fort Irwin reservation encompasses approximately 1,190 square miles (761,405 acres). Approximately half of Fort Irwin's land area is used for desert battlefield training. A cantonment area occupies approximately 3 square miles and provides temporary and permanent living quarters for soldiers and their families. The cantonment area consists of residential areas, support facilities, retail centers, restaurants, and health care facilities.

Fort Irwin's population includes approximately 4,500 soldiers and their families. In addition, approximately 4,000 to 6,000 soldiers visit Fort Irwin during training rotations, which occur 10 times a year (CH2M HILL, 2010a). The Weed Army Community Hospital is the primary health care facility for these individuals. The mission of the hospital is to provide and manage the health care of soldiers, military families, and retirees; to support the readiness and deployment of a medically protected force while achieving effective health care practices; and to meet diverse future requirements. In addition, there typically are 4,000 to 6,000 civilian contractors who work as support personnel on base and who could also use the hospital in a medical emergency.

The Weed Army Community Hospital building is outdated and does not comply with California building requirements (Senate Bill [SB] 1953), primarily due to seismic concerns. Alterations or additions to the current building cannot be performed without a seismic retrofit, which would be cost prohibitive. The U.S. Army proposes to construct a replacement hospital that would comply with current building standards. Construction would occur from 2012 through 2015 and is referred to as the Proposed Action.

This environmental assessment (EA) analyzes and documents potential impacts on the human and natural environment that would result from implementation of the Army's Proposed Action. Details of the Proposed Action are provided in Section 2.

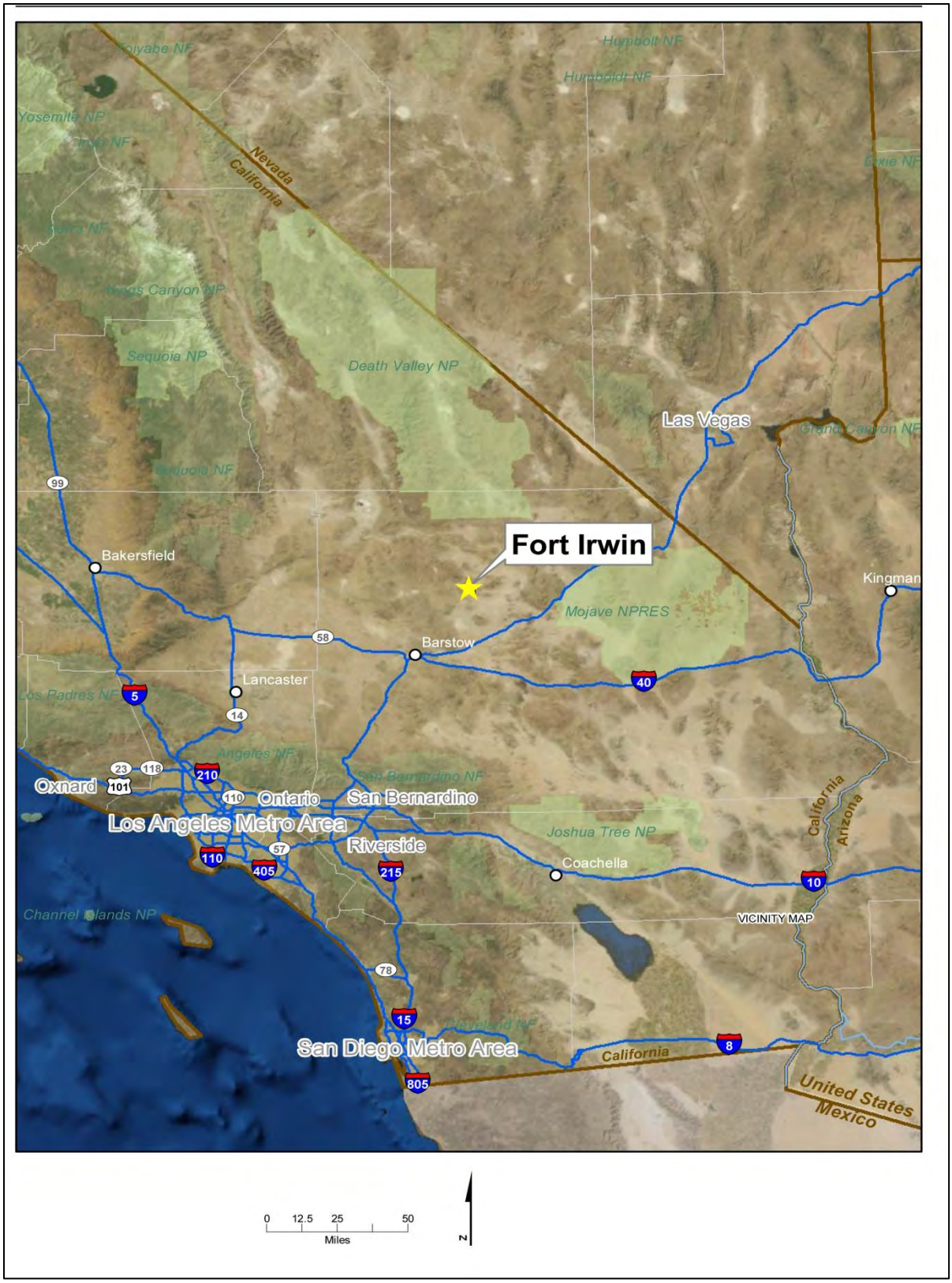


FIGURE 1-1 FORT IRWIN LOCATION MAP

1.2 Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to construct and operate a new hospital and associated structures including parking lots, a helipad, and a central utility plant to provide a community-based health care facility focused on primary care and outpatient procedures. The new hospital would comply with current building codes and standards and would meet the health care needs of the Fort Irwin community.

1.2.1 Project Need

Weed Army Community Hospital was constructed between 1966 and 1968 and does not meet required seismic building standards or support modern health care delivery. The hospital interior, construction techniques, and systems limit the ability to meet current building codes and criteria for medical equipment and health care delivery. Patient rooms are undersized, semi-private, and do not have dedicated bathrooms. There are multiple life safety and code issues consistent with an outdated inpatient infrastructure. Mechanical, electrical, communication, and plumbing systems have deteriorated beyond economical repair. The current hospital requires upgrade or replacement of electrical service and distribution to correct power conditions, overloaded electrical transformers, and non- compliant wiring at patient bed locations.

California SB 1953 developed seismic structural performance categories for hospitals. Subsequent regulations were promulgated for use in the retrofit, repair, modification, or alteration of existing hospital buildings. Examples include requiring bracing for major nonstructural systems, such as backup generators and exit lighting. California SB 1953 requires hospitals that have Structural Performance Category 1 (SPC-1) buildings (those that are considered hazardous and at risk of collapse or significant loss of life in the event of an earthquake) to replace such buildings or to retrofit them to higher seismic safety standards by 2013, or later with an approved extension. Otherwise, acute care services may no longer be allowed to be provided in the building(s). Furthermore, the current building cannot be altered or enlarged without a cost-prohibitive seismic retrofit. The ultimate goal of SB 1953
is to ensure that all hospitals remain operational after a major earthquake by 2030.

Due to the poor condition and age of the facility, the hospital could experience significant cost and service disruptions as a result of the needed infrastructure repairs and multiple operations and maintenance projects needed to upgrade existing health care space to current standards. Soldiers and their families in this remote location would not have access to a reliable, modern health care facility if a new hospital is not provided.

1.2.2 Project Objectives

The Proposed Action would achieve the following objectives:

- Comply with current codes and regulations, including SB 1953
- Provide a reliable, modern, community-based health care facility for the Fort Irwin community

1.3 Scope of Analysis

This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and implementing regulations specified in 40 Code of Federal Regulations (CFR) Part 1500 through Part 1508, and 32 CFR Part 651. The purpose of this EA is to describe current environmental resources on and adjacent to the location of the proposed new facility and inform decision-makers and the public of the potential environmental consequences of building it while presenting the rationale used for evaluating and determining impacts. Design measures are identified and described where warranted.

This EA identifies, documents, and evaluates potential environmental and socioeconomic effects of the Proposed Action and seeks to ensure that appropriate consideration has been given to environmental resources. It includes a thorough evaluation of direct, indirect, and cumulative impacts, both temporary and permanent, that could occur as a result of implementing the Proposed Action. Reasonably foreseeable future actions are identified in Section 4. Any additional requirements stemming from other unrelated military actions would undergo separate NEPA analysis and evaluation.

This EA also considers the potential impacts of the No Action Alternative, as required by NEPA. The No Action Alternative provides a benchmark against which the potential impacts of the Proposed Action and the alternatives can be compared.

An interdisciplinary team of environmental scientists, biologists, planners, economists, engineers, archaeologists, historians, and military technicians has analyzed the Proposed Action and alternatives in light of existing conditions and has identified relevant beneficial and adverse effects associated with the action and alternatives.

1.4 Framework for Decision Making

This EA will be used by the U.S. Army to ensure that all environmental considerations are addressed.

The U.S. Army is the lead agency under NEPA. This EA also will be used as the basis for obtaining permits and approvals from other agencies, including the U.S. Army Corps of Engineers (USACE), California Department of Health Services, California Regional Water Quality Control Board-Lahontan Region, State Water Resources Control Board, California State Historic Preservation Office (SHPO), and Mojave Desert Air Pollution Control District. These public agencies could use this EA as the basis for their decision to issue approvals and/or permits applicable to the Proposed Action. The role of each of these agencies is listed in Table 1-1.

TABLE 1-1
Permits, Approvals, and Agreements Required by Other Agencies

Agency (Division)	Permit, Approval, or Agreement
California Department of Health Services	Water Supply Permit
U.S. Army Corps of Engineers	Commenting Agency

TABLE 1-1
Permits, Approvals, and Agreements Required by Other Agencies

Agency (Division)	Permit, Approval, or Agreement
California Department of Health Services	Water Supply Permit
U.S. Army Corps of Engineers	Commenting Agency
Regional Water Quality Control Board-Lahontan Region	Notice of Plan Compliance and Notice of Authority to Operate Evaporation and Stormwater Retention Ponds
California State Historic Preservation Office	Commenting Agency
Mojave Desert Air Pollution Control District	Permit to Construct and Permit to Operate

The agencies and organizations listed in Table 1-1 could require the U.S. Army to obtain approvals for the Proposed Action. Although a number of Responsible and Trustee Agencies have been identified, discussions with those agencies would be required to determine the specific nature of any future permits or approvals that might be required from those agencies. Their inclusion in this document is intended to acknowledge the potential role of these agencies and ensure their notification and subsequent inclusion of any comments from them. In addition, reference to these agencies is intended to provide the agencies and the general public with an environmental basis under the California Environmental Quality Act (CEQA) to facilitate the dissemination of information deemed necessary to the discretionary approvals process and the approval or conditional approval of any aspect of the Proposed Action within their jurisdiction.

1.5 Relevant Statutes, Regulations, and Executive Orders

A decision on whether to proceed with the Proposed Action depends on numerous factors, including mission requirements, regulatory requirements, and environmental considerations. In addressing environmental considerations, Fort Irwin and the U.S. Army Medical Command (MEDCOM) were guided by relevant statutes (and their implementing regulations) and Executive Orders (EOs) that establish standards and provide guidance on environmental and natural resources management and planning. These include, but are not necessarily limited to the following:

Federal Statutes

- Archeological Resources Protection Act of 1979 (16 United States Code [USC] 470)
- American Indian Religious Freedom Act of 1978 (42 USC 1996, as amended)
- Clean Air Act (CAA) (42 USC 7401 et seq., as amended)
- Clean Water Act (CWA) of 1977 and the Water Quality Act of 1987 (33 USC 1251 et seq., as amended)

- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (as amended by the Superfund Amendments and Reauthorization Act of 1986 [42 USC 9601 et seq.])
- Endangered Species Act of 1973 (ESA) (16 USC 1531-1543)
- Energy Policy Act of 2005 (42 USC 15801)
- Farmland Protection Act of 1981 (7 USC 4201 et seq., as amended)
- Fish and Wildlife Coordination Act (16 USC 661, et seq.)
- Migratory Bird Treaty Act (MBTA) (16 USC 701, et seq.)
- National Energy Conservation Policy Act (42 USC 8251)
- NEPA (42 USC 4321-4370)
- National Historic Preservation Act of 1966 (16 USC 470 et seq., as amended)
- Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001 et seq., as amended)
- Noise Control Act of 1972 (42 USC 4901 - 4918)
- Resource Conservation and Recovery Act of 1976 (RCRA) (42 USC 6901)
- Toxic Substances Control Act (15 USC 2601 et seq., as amended)

Regulations

- Army Regulation (AR) 190-13, The Army Physical Security Program
- AR 200-1, Environmental Protection and Enhancement
- AR 210-20, Installation Master Planning
- AR 385-10, The Army Safety Program
- AR 525-13, Antiterrorism
- Council on Environmental Quality Regulations for Implementing NEPA (Title 40 CFR, Parts 1500-1508 [40 CFR 1500-1508])
- Protection of Historic Properties (36 CFR Part 800)
- Environmental Analysis of Army Actions (32 CFR 651)

Executive Orders

- EO 11514, Protection and Enhancement of Environmental Quality (amended by EO 11991)
- EO 11988, Floodplain Management
- EO 11990, Protection of Wetlands
- EO 12088, Federal Compliance with Pollution Control Standards

- EO 12372, Intergovernmental Review of Federal Programs
- EO 12580, Superfund Implementation
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- EO 12902, Energy Efficiency and Water Conservation at Federal Facilities
- EO 13007, Protection of Indian Sacred Sites
- EO 13045, Protection of Children from Environmental Health Risks and Safety Risk
- EO 13101, Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition
- EO 13123, Greening the Government Through Efficient Energy Management
- EO 13149, Greening the Government Through Federal Fleet and Transportation Efficiency
- EO 13175, Consultation and Coordination with Indian Tribal Governments
- EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds
- EO 13327, Federal Real Property Asset Management (amended by EO 13423) EO 13423,

  Strengthening Federal Environmental, Energy, and Transportation Management

1.6 Agency and Public Participation

The U.S. Army invites public participation in the proposed federal action through the NEPA process. Consideration of the views and information of all interested persons promotes open communication and enables better decision-making. All agencies, organizations, and members of the public having a potential interest in the Proposed Action, including minority, low-income, disadvantaged, and Native American groups, are urged to participate in the decision-making process. Coordination letters were submitted to the California State Historic Preservation Officer (SHPO), and potential interested tribal governments on September 30, 2010. Appendix A contains correspondence with these entities. A no effects determination was made by the Fort Irwin environmental staff in relation to federally threatened and endangered species based on the location of the Proposed Action and an August 2010 survey of the site. U.S. Fish and Wildlife Service (USFWS) coordination was determined to be unnecessary.

Public participation opportunities with respect to this EA and decision-making on the Proposed Action are guided by 32 CFR Part 651. Upon completion of the EA, the Final EA and Finding of No Significant Impact (FNSI) will be made available to the public for comment for a period of 30 days. At the end of the 30-day public review, the U.S. Army will consider all comments submitted by individuals, agencies, and organizations. As appropriate, the U.S. Army may then execute the FNSI and proceed with

implementation result in significant impacts, or the U.S. Army would publish in the Federal Register a Notice of Intent to prepare an environmental impact statement or would not take the action.

Throughout this process, the public may obtain information on the status and progress of the Proposed Action and the EA through Mr. John Baker, Fort Irwin Directorate of Public Works, Environmental Division, Building 602, P.O. Box 105085, Fort Irwin, California, 92310-5085 or via email to john.c.baker@us.army.mil.

2. Description of Proposed Action and Alternatives

This section describes the Proposed Action and alternatives for construction and operation of a new hospital at Fort Irwin designed to meet the project purpose and need as described in Section 1.2. Reasonable alternatives were evaluated using an interdisciplinary approach. Potential alternatives were evaluated against the following site selection requirements:

- Located within the Fort Irwin cantonment and near other medical buildings (e.g., Mary Walker Clinic)
- Suitable size to accommodate a two-story hospital, a helipad, adequate parking space, photovoltaic solar array, and a central utility plant
- Located to accommodate unrestricted flight paths for medical evacuation helicopters
- Adequate space for required force protection and set-backs
- Adequate space to allow for future expansion

From this process, two alternatives (the Proposed Action and the No Action Alternative) were selected for detailed and equal analysis. In addition, two other alternatives were considered but were not carried forward due to their inability to meet force protection requirements, size requirements, and operational constraints.

2.1 Proposed Action

The Proposed Action is the preferred alternative and would entail construction and operation of a new hospital on 79 acres of currently vacant land within the Fort Irwin cantonment, adjacent to 5th Street and B Avenue (Figure 2-1). Temporary construction staging areas would be located within the 79-acre area. The new hospital would be built on an approximately 26-acre portion of that parcel. The hospital would be a two-story 216,374-square-foot (ft^2) building. Access roads from the hospital would be constructed to 5th Street, Avenue B, and Outer Loop Road. The project would include a helipad, parking spaces for approximately 600 vehicles, and a central utility plant, reverse osmosis water treatment facility, and a photovoltaic energy facility. Associated features would include landscaping, force protection, and stormwater management. The hospital would require two diesel generators for emergency back-up power. Two fuel storage tanks would be required for generator and back-up fuel. The hospital would have 10 in-patient beds and employ approximately 330 staff and 162 civilian contractors, which represents no change from existing bed capacity and staff size.

The new hospital would be capable of providing tertiary care (specialized consultative medical care), emergency medicine, and clinical support activities. It would be designed in accordance with criteria prescribed in Department of Defense (DoD) Unified Facilities

Criteria (UFC) 4-510-01, World Class and Evidence Based Design Principles, DoD Minimum Antiterrorism Standards for Buildings (UFC 4-010-01), barrier-free design in accordance with DoD criteria and the Deputy Secretary of Defense Memorandum "Access for People with Disabilities," dated October 31, 2008, base architectural guidelines, and applicable energy conservation legislation. Additionally, the new facility would be designed to exceed Leadership in Energy and Environmental Design (LEED) silver certification.

Substantial water quality data were collected during pilot testing so that a comparison could be made with historical data to characterize and monitor trends and variations. All relevant water quality parameters were analyzed to determine the potential impact on treatment plant performance efficiency. After extensive evaluation, EDR was selected as the best technology for the needs of Fort Irwin.

FIGURE 2-1. FORT IRWIN PROPOSED ACTION VICINITY

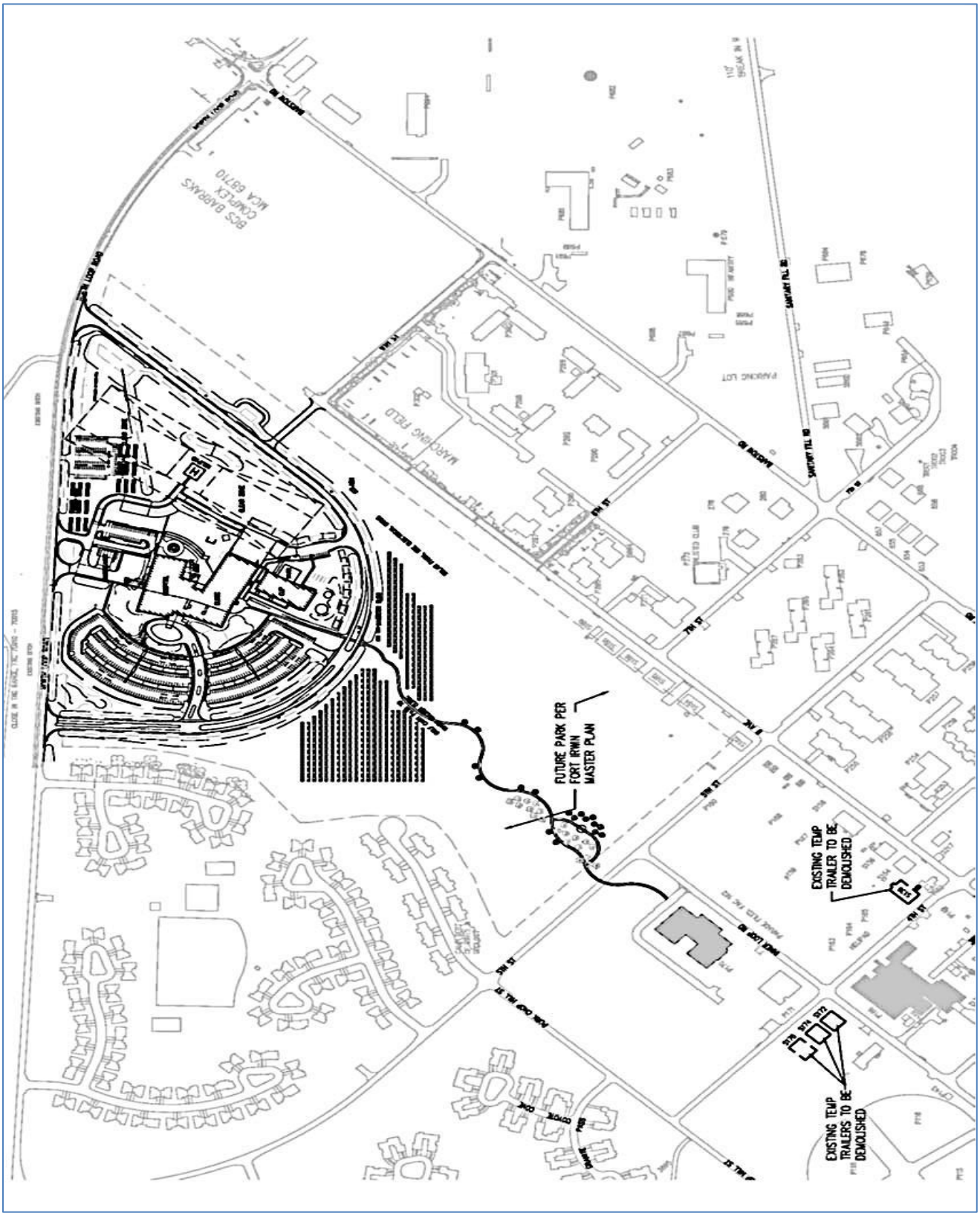
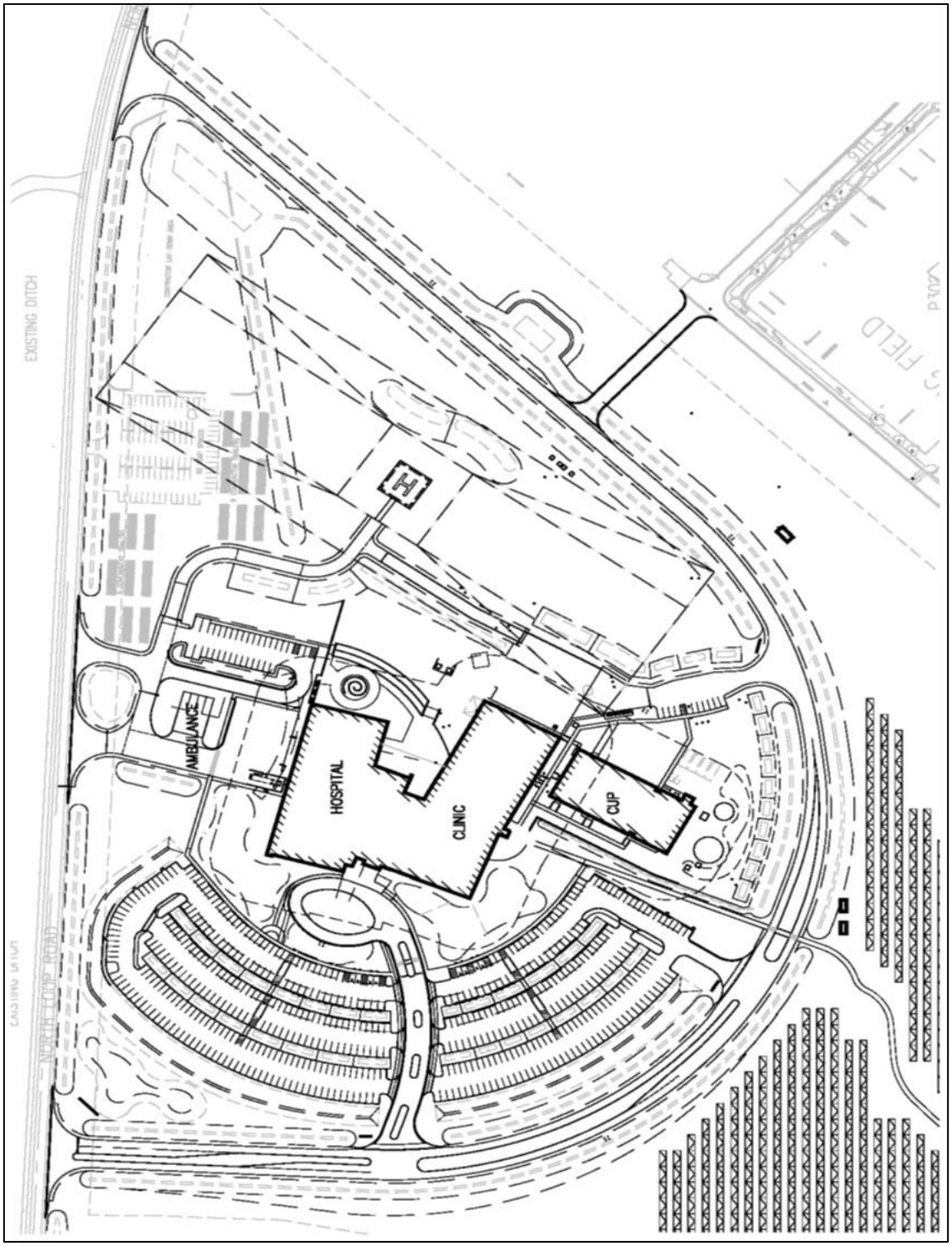


FIGURE 2-1. FORT IRWIN PROPOPSED ACTION FOOTPRINT



2.2 No Action Alternative

Under the No Action Alternative, Fort Irwin would continue to use Weed Army Community Hospital and no new construction would occur. This building is an outdated hospital facility that does not meet current codes and criteria for building requirements and equipment and health care delivery. The provision of acute care services may no longer be allowed in this building if it does not meet the seismic requirements set forth in SB 1953. Soldiers and their families would not have access to a reliable health care facility under the No Action Alternative.

2.3 Alternatives Considered but Not Carried Forward

Vacant parcels of land within the cantonment, not identified for another purpose, and near other medical facilities (e.g., Mary Walker Clinic) were evaluated. The site of the Proposed Action was the only vacant parcel to meet the site selection requirements.

Two potential alternative locations were considered but not carried forward for detailed analysis. These sites were evaluated to determine whether they could provide a feasible alternative but were rejected because of one or more constraints identified in the site selection process. These constraints included the following:

- Inadequate area to accommodate a hospital with a large enough ground floor, helipad, and required parking
- Interfere with flight paths for medical evacuation helicopters
- Inadequate space for force protection and set-backs
- Inadequate space for future expansion

The two sites are summarized below:

Site 1 is at Parade Field, the site of the existing Main Post Helipad, southeast of Weed Army Community Hospital. This alternative site area and configuration were inadequate to support the facilities required to deliver efficient and convenient medical care to the Fort Irwin population. This site would require a three-story hospital to yield the total area required to provide medical services and would not allow for a large enough ground floor. The three-story hospital configuration at the site would require dispersing clinical and administrative departments between floors, which would negatively impact operations and the overall delivery of health care services. It would also require shared routing for patient, staff, and emergency and delivery access. Additionally, the site is too small to meet site support requirements such as antiterrorism and force protection standoff distances. To meet parking requirements, some parking would have to be located east of 5th Street, which would create a safety hazard for staff and visitors, who would be required to cross a heavily travelled road to access the hospital. This site does not provide the flexibility to support potential future building expansion. The site was also eliminated because the helipad would have to be located at least 800 feet east of 5th Street, which would require patient transfer via ambulance (approximately 0.25 mile) and delay patient access to emergency care.

Site 2 is north of the Mary Walker Clinic adjacent to 5th Street and Pork Chop Hill. This site is also too small to meet the ground floor space needs for the hospital and site support requirements such as antiterrorism and force protection standoff distances. Site 2 would require shared routing for patient, staff, and emergency and delivery access. Parking would be located west of 4th Street and/or east of 5th Street, creating a safety hazard for staff and patients crossing those heavily travelled roads. The helipad would be located 0.25 mile from the emergency delivery, which would require patient transfer via ambulance and delay patient access to emergency care. This alternative also would not allow for future expansion.

3. Affected Environment

Section 3 describes existing environmental conditions of the Proposed Action area that could be affected due to implementation of the Proposed Action. The relevant resources include land use, geology and soils, biological resources, water resources (surface and groundwater), air quality, cultural resources, socioeconomics, noise, transportation, utilities, and hazardous materials.

3.1 Land Use Planning and Aesthetics

The attributes of land use addressed in this analysis focus on general land use patterns, management plans, policies, and regulations. These provisions determine the types of land uses that are allowable and identify appropriate design and development standards to address specially designated or environmentally sensitive areas.

3.1.1 Surrounding Land Use

The northern boundary of Fort Irwin is just south of Death Valley National Park, and the western boundary is adjacent to Naval Air Weapons Station (NAWS) China Lake. Much of the land southwest, south, and east is in public ownership and administered by the Bureau of Land Management (BLM) and the State of California. Small quantities of land are under private ownership, especially to the south in the vicinity of Barstow. Surrounding areas are mostly unpopulated and are used for activities such as grazing, mining, or recreation (BLM, 1996). Barstow and the other nearby smaller communities of Lenwood, Hinkley, Yermo, Daggett, and Newberry Springs are located over 30 miles southwest of the cantonment of Fort Irwin.

Certain operations associated with Fort Irwin extend beyond the boundary of the installation. These include use of railroad sidings along the Union Pacific Railroad at Yermo and Manix, the Southern California Logistics Airport, the Barstow-Daggett Airport, a tank trail from Manix north to the cantonment, and use of Fort Irwin Road from Barstow to the installation.

3.1.2 Installation Land Use

Fort Irwin is generally divided into nonmaneuver and maneuver areas. Nonmaneuver areas include the cantonment of Fort Irwin (approximately 15,300 acres), Leach Lake impact area (89,860 acres), Goldstone Deep Space Listening and Tracking Station (32,960 acres), environmental conservation areas (23,659 acres, primarily desert tortoise critical habitat), archaeological sites (3,250 acres), and recreation areas (7,100 acres). Also included in nonmaneuver areas are 111,900 acres of impassable areas that have slopes greater than 20 percent and where use of armored, mechanized, and wheeled vehicles is prohibited. The cantonment is the urbanized area of Fort Irwin and has the features of a small community, including family housing, commercial uses, recreational areas, community facilities, utilities, base operations, and administration. Maneuver areas cover the remaining 56 percent of the installation (about 358,700 acres) and are predominantly used for military maneuvers, live fire, and force-on-force training.

The only airfield at Fort Irwin, Bicycle Lake Army Airfield, is located 2.5 miles north of the cantonment. This tactical airfield acts as a forward staging base for aircraft operations associated with Fort Irwin's mission. Four helipads are on the installation—one at the Ammunition Supply Depot, one at Weed Army Community Hospital, and two in the range and training areas.

3.1.3 Proposed Action

The proposed 79-acre project area is located in the cantonment within the 11th Armored Cavalry Regiment long-range area development zone, which is considered a development opportunity area in the Fort Irwin Real Property Master Plan (Michael Baker, Jr., 2008). The area is considered the last piece of undeveloped land within the cantonment area (Fort Irwin, 2010a). The proposed project area is designated for either community uses or industrial uses.

- **Community land use** is land that promotes a mix of uses including religious, family support, personnel services, professional services, medical community, housing, commercial and recreational services. Community support land is concentrated in the central cantonment area near housing and operations facilities.
- **Industrial land use** is intended for high-intensity use that is intended for production, maintenance, depot, and other storage. Industrial areas are concentrated on the eastern side of the cantonment area and should be separated from other low intensity uses such as residential (Michael Baker Jr. Inc., 2008). Industrial areas tend to generate heavy traffic and noise.

The Proposed Action site includes evidence of past usage including heavy vehicle use, berms, scraping, structures, and pits. There are also at least two hexagon concrete pads, each about 20 feet in diameter with black doors about 1 foot in diameter on top, which were most likely used as cisterns or wells. Several unused exercise courses and bike trails also occur on the proposed project area. Chin-up bars and other exercise equipment exist from an old, unused exercise course (Fort Irwin, 2010a).

3.2 Geology, Soils, and Mineral Resources

This section describes the physiography, geology, seismicity, mineral resources, and soils in the area of the Proposed Action, as shown in Figure 2-1.

3.2.1 Physiography

Fort Irwin is situated in the Mojave Desert physiographic province. This area is characterized by high mountain peaks and ridges that are separated by broad alluvial fans and wide flat valleys. The average elevation of the Mojave Desert is approximately 2,500 feet above mean sea level (msl). The Basin and Range physiographic province is located to the east, and the Sierra Nevada Range is located to the north of Fort Irwin (USACE, 2006). The Mojave Desert is bounded on the west by the northwest-southeast-trending San Andreas Fault and on north by the east-west-trending Garlock Fault. The Mojave Block is the term used to generally describe the area between these faults that define the Mojave Desert.

Fort Irwin covers an area of approximately 1,190 square miles and contains several drainage basins. The cantonment (including the Proposed Action area) is situated within the Irwin groundwater basin, which is bounded on the east-northeast by Beacon Hill, on the northwest by Northwest Ridge, on the west by Southwest Ridge, and on the south by low-lying hills that separate the Irwin groundwater basin from the Langford Lake groundwater basin to the south.

The Proposed Action site is fairly flat with an overall slope to the east-southeast.

3.2.2 Geology

Geologic formations at Fort Irwin range in geologic time from the Precambrian era (over 600 million years ago) to the Holocene era (11,000 years ago to present). In general, geologic formations in the region consist of the Avawatz Mountains, Paleozoic sediments, Triassic metasedimentary and metavolcanic rocks, and Tertiary sediments and volcanic rocks. The Quail Mountains are located along the Garlock Fault zone and are composed generally of Mesozoic granitic and metamorphic rocks. Beacon Hill, situated to the northeast of the project site, is composed primarily of metamorphic bedrock with inclusions of limestone and granite. Similar bedrock is exposed to the south in low-relief hillocks (USACE, 2006).

Unconsolidated deposits include alluvium (clay, silt, sand, and gravel), aeolian (dune) sand, and playa deposits. In some areas of Fort Irwin, the alluvial materials result in clean sands and gravels that serve as water-bearing units. Other alluvial deposits contain fine-grained material, including silts and clays. In general, alluvium increases in thickness from edges of basins to their central floors. Alluvial valley fill forms the most important water-bearing unit in the vicinity of the project area. Numerous dry lakes exist at Fort Irwin. The thickness of deposits underlying many of these dry lakes is unknown; however, playa deposits of the Mojave Desert generally range from a few feet to 100 feet thick (USACE, 2006).

Proposed Action Site

The Proposed Action site is situated on alluvial fans or fan remnants (Fort Irwin, 2010b).

3.2.3 Seismicity

The Mojave Desert region, including Fort Irwin, has experienced moderate seismicity in the past. Death Valley Fault, located northeast of Fort Irwin, is a right-lateral, strike-slip fault that extends along the northeastern Avawatz Mountains and eastern Soda Mountains. Segments of Death Valley Fault have exhibited evidence of movement within the past 10,000 years. Garlock Fault, located north of Fort Irwin, is a major east-west trending fault in California. Garlock Fault is a strike-slip fault with left-lateral displacement and separates the Basin and Range province from the Mojave Desert province. Seismicity has been observed along the eastern portion of Garlock Fault. The Death Valley and Garlock Fault zones intersect in the eastern portion of Fort Irwin (USACE, 2006). The Proposed Action site is located within the cantonment at Fort Irwin, and the eastern termination of Garlock Fault is approximately 30 miles north of the cantonment.

Other faults in the region include the Mule Spring Fault, Manix Fault, an unnamed fault that runs between East Cronese Lake and Red Pass Lake, several faults in the Soda Mountains, and a fault along the northwest flank of the Silurian Hills. The Mule Spring Fault extends

the length of the northern Avawatz Mountains, and the Manix Fault runs roughly parallel to Interstate 15 south of Fort Irwin (USACE, 2006).

The California Division of Mines and Geology (CDMG) has not identified any Alquist-Priolo Fault-Rupture Hazard Zones in the cantonment at Fort Irwin, although several faults in the Irwin groundwater basin show evidence of displacement during the past 1.6 million years (CDMG, 1999). The faults that show displacement include Bicycle Lake Fault, Garlic Spring Fault (which trends northwest from Garlic Spring and along the north edge of the cantonment), a concealed fault that parallels Garlic Spring Fault about 1,300 feet to the south, and an unnamed fault that trends approximately east-west from south of Bicycle Lake across the cantonment. None of these faults has been identified as being active within the past 11,000 years (USACE, 2006).

Active faults close to the Proposed Action site include the Calico-Hidalgo, the Garlock (East), and the Blackwater Faults. Garlock (East) Fault, is located approximately 23.1 miles away and is capable of generating a maximum credible earthquake of magnitude 7.5. The Proposed Action site is not crossed by a mapped surface trace, nor is the site located in an Alquist-Priolo Earthquake Fault Zone (EFZ) associated with these faults (CH2M HILL, 2006a).

3.2.4 Mineral Resources

Mineral resources at Fort Irwin include precious metals and geothermal resources. Although minerals exist at Fort Irwin, no mining or exploration is carried out within the original boundaries of the Fort due to the exclusion signed by President Roosevelt in the 1940s. The installation has known gold reserves and potentially has silver. No known petroleum reserves exist onsite. Geothermal resources are too low in temperature to have commercial value (USACE, 2006).

3.2.5 Soils

The landscape in the vicinity of Fort Irwin is dominated by alluvial basins that lie between mountain ranges. Mountain tops in the region have been eroded, exposing outcrops of bedrock, while the land between consists of a variety of coarse and fine sediment materials.

Soils commonly occurring in the region include coarse materials derived from mountainous rock and finer materials located on the valley floors. Soils located on the alluvial fans along the bases of mountain ranges (upper bajadas) consist of coarse gravels that change to loamy gravels toward the toe of alluvial fans. Soils on the lower bajadas include sandy loams and finer loamy materials. Dry lakes (playas) located at the bottom of basins have silts and clays and typically develop salt pans (USACE, 2003; USACE, 2006).

Desert soils found in the region develop slowly and are fragile. Desert soils that are disturbed are highly susceptible to wind and water erosion. In addition, desert soils are highly vulnerable to compaction. Activities such as vehicle movement disturb the soil crusts, leaving them vulnerable to erosion by wind and water (USACE, 2006).

Another characteristic of some soils in the region is the formation of desert pavement. Desert pavement consists of a surface crust of pebbles and rocks that have developed a coating of manganese oxide due to sun exposure, rendering the surface dark and shiny. Desert pavement results from wind movement on the sand; however, once formed, desert

pavement protects fragile soils from further erosion. Once desert pavement is removed, re-establishment could take several thousand years (USACE, 2006).

The Fort Irwin cantonment is located within a transitional area between bajadas and playas that is underlain by alluvium. The cantonment is built on disturbed soils, so that the natural structure and profile of the soil are no longer intact.

The location of the Proposed Action site is generally in high-desert terrain on near-level ground with a surface cover of sand, gravel, cobble, rocks, and sparse vegetation. The Proposed Action is in an area of undeveloped but previously disturbed soils. The natural soil profile is intact in some areas and substantially disturbed in others.

The Natural Resources Conservation Service (NRCS) has mapped approximately 95 percent of Fort Irwin, including the Proposed Action site. The NRCS Web Soils Survey identifies the following soils occurring in the project area: Garlock-Ambrosia-Arizo Complex, Arizo Very Gravelly Sandy Loam, and Cavespring-Crackerjack-Eroded-Crackerjack Association (NRCS, 2010). Gently sloping soils on alluvial fans and alluvial fan remnants are characteristic of soils in the project area (USACE, 2006).

3.3 Biological Resources

Biological resources include plants (flora) and animals (fauna) and the habitats in which they occur. Major vegetation communities are described in terms of the representative species present, with special attention placed on special-status species (i.e., those afforded some level of federal, state, or local protection such as the Lane Mountain milkvetch (*Astragalus jaegerianus)*). General wildlife species expected to occur are described, with emphasis placed on special-status species of concern (i.e. the desert tortoise (*Gopherus agassizii)*, southwestern willow flycatcher (*Empidonax traillii extimus*), and least Bell's vireo (*Vireo bellii pusillus)*).

3.3.1 Regulatory Considerations

A number of regulatory considerations are pertinent to biological resources that can influence actions at Fort Irwin. Each is addressed below.

Endangered Species Act

The ESA, 16 United States Code (U.S.C.) Sections 1531 through 1534, protects plant and animal species (and their habitats) that are listed as endangered and threatened. Species are listed as endangered if they are found to be in danger of extinction throughout all or a significant portion of their range. Species are listed as threatened if they are likely to become endangered within the foreseeable future. The ESA also protects designated critical habitat for listed species, which are areas of physical or biological features that are essential to the conservation of the species and that may require special management considerations. The ESA requires federal agencies to consult with the United States Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS), as applicable, before initiating any action that may affect a listed species.

California Endangered Species Act

The CESA makes the California Department of Fish and Game (CDFG) responsible for maintaining a list of threatened and endangered species (California Fish and Game Code 2070). In addition, the CDFG maintains a list of candidate species that are under review for addition to either the list of endangered species or the list of threatened species. The CDFG also maintains lists of species of special concern, which serve as watch lists. Pursuant to the requirements of the CESA, an agency reviewing a proposed action within its jurisdiction must determine whether any California-listed endangered or threatened species could be present in the project area and determine whether a proposed action would have a potentially significant impact on such species. In addition, CDFG encourages informal consultation on any proposed action that could affect a candidate species.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA), 16 U.S.C. Sections 703 et seq., is a federal statute that implements U.S. treaties with several countries to conserve and protect migratory birds. The list of bird species covered by the MBTA is extensive and appears in the Code of Federal Regulations (CFR) at 50 CFR Section 10.13. Further, the regulatory definition of migratory bird is broad and includes any mutation or hybrid of a listed species, as well as any part, egg, or nest of such bird (50 CFR Section 10.12). The MBTA, which is enforced by the USFWS, makes it unlawful "by any means or manner, to pursue, hunt, take, capture [or] kill" any migratory bird, except as permitted by regulation. The applicable regulations prohibit the take, possession, import, export, transport, sale, purchase, barter, or the offering to partake in any of these activities, except as permitted by the implementing regulations.

Bald and Golden Eagle Protection Act of 1940

Under the Bald and Golden Eagle Protection Act, 54 Stat. 251, as amended (16 U.S.C. Sections 668 through 668d), it is illegal to possess, sell, transport, or trade American bald or golden eagles, dead or alive, their nests, or their eggs. The Secretary of the Interior can issue a permit for taking or transporting eagles for scientific, exhibition, and religious purposes or for transporting nests if the eagles interfere with resource development. Searches, seizures, and arrests are authorized by this act. Infrastructure must be built, installed, or expanded in such a manner as to avoid disturbing bald and golden eagles. If a nest is discovered in the affected area, a permit must be obtained to transport the nest to another site.

Sikes Act and Sikes Act Improvement Amendments

The Sikes Act, Pub. L. 86-797, as amended (16 U.S.C. Sections 670 through 670f), requires the Secretary of Defense to provide for conserving and rehabilitating natural resources on military installations; for sustaining multipurpose use of the resources (including hunting, fishing, trapping, and nonconsumptive uses); and for public access to military installations, subject to safety requirements and military security. To facilitate the program, the Secretary of the Army is required to prepare and implement an Integrated Natural Resource Management Plan (INRMP). Fort Irwin has prepared an INRMP (USACE, 2006), which describes existing conditions and acts as a resource management guide for the installation.

Management of Natural Resources—Land, Forest, and Wildlife

The Management of Natural Resources—Land, Forest, and Wildlife, Army Regulation (AR) 200-3, prescribes current Army policies, procedures, and standards for conserving,

managing, and restoring land and the renewable natural resources consistent with and in support of military mission and national policies.

Recovery Plans

Recovery plans are developed as required under the ESA. The plans are documents that detail the specific management practices and tasks needed to enable the recovery of species listed under the ESA. Recovery plans offer guidelines for private, federal, and state cooperation in conserving threatened and endangered species and areas where such species are or historically have been distributed. Current management direction requires that any action conform to any USFWS recovery plan for federally listed species. A recovery plan must include the following components: a description of site-specific management actions necessary to achieve the goals of the plan; objective measurable criteria, which, when met, would result in a determination that the species no longer needs the protection of the ESA and can be removed from the list; and estimates of the time and costs required to carry out the plan and to achieve intermediate steps toward the goal.

A revised recovery plan was developed for the desert tortoise (USFWS, 2010).

Waters of the U.S. Including Wetlands

Section 404 of the CWA delegates jurisdictional authority over Waters of the U.S. to the USACE and USEPA. Waters of the U.S. protected by the CWA include rivers, streams, estuaries, and most ponds, lakes, and wetlands. The USACE and USEPA jointly define wetlands as areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

3.3.2 Field Biological Resources Survey

A biological field survey of the Proposed Action site was conducted on August 20, 2010, by biologists from the Fort Irwin Natural Resources Section. The main purpose of the survey was to search for the federally endangered desert tortoise and tortoise evidence such as burrows and scat, and other sensitive species (Ft. Irwin, 2010a).

The survey was conducted over 84.5 acres, which included the 79-acre project area. The desert tortoise portion of the survey was conducted using standardized protocols developed by the USFWS. Biologists also searched for burrowing owl (*Speotyto cunicularia*) nests, recorded living plant species, and identified all animals, including birds protected by the federal MBTA.

3.3.3 Flora

Flora was surveyed during the August 20, 2010 field survey by biologists from the Fort Irwin Natural Resources Section. The flora consisted of a degraded Mojave creosote bush scrub vegetation community. The vegetative community in the proposed project area was noted as transitional due to previous land uses. The proposed project area was cleared and used for various ranges and buildings historically. The degraded Mojave creosote bush scrub community is dominated by the large shrub creosote bush (*Larrea tridentata*). It is the most widespread community of Fort Irwin, occurring throughout the range below 3,610 feet on alluvial slopes, valley floors, and mountain

slopes. A sub-association of this vegetation type is described as the creosote-bursage association based on the co-dominance between creosote bush and burro bush (*Ambrosia dumosa*). Many subdominant shrubs typically occur in creosote bush scrub, including range rhatany (*Krameria erecta*), silver cholla (*Opuntia echinocarpa*), Anderson's boxthorn (*Lycium andersonii*), desert straw (*Stephanomeria pauciflora*), wishbone bush (*Mirabilis bigelovii*), and cheesebush (*Hymenoclea salsola*). At higher elevations, subdominants include California buckwheat (*Erigonum fasciculatum*), spiny hopsage (*Grayia spinosa*), winter fat (*Krasheninnikovia lanata*), and bladdersage (*Salazaria mexicana*) (USACE, 2006).

The dominant vegetation of the proposed project area includes creosote bush and burro bush. Evidence of past physical disturbance was apparent, which has likely contributed to a low diversity of plants in this transitional vegetative community. Past physical disturbances include heavy vehicle use, various ranges, berms, scraping, structures, and pits (Fort Irwin, 2010a). Plant species observed during the site survey are listed in Table 3-1.

TABLE 3-1
Plant Species Observed During Field Survey
Weed Army Community Hospital EA, Fort Irwin, CA

Scientific Name	Common Name
Ambrosia dumos	Burro bush
Chrysothamnus sp.	Rabbitbrush
Datura meteloides	Nightshade
Eriogonum deflexum	Skeleton weed
Hymenoclea Salsola	Cheesebush
Larrea tridentate	Creosote bush
Salsola tragus	Russian thistle
Schismus barbatus	Mediterranean grass
Tamarix ramosissima	Saltcedar or Tamarisk

Source: Fort Irwin, 2010a

Special-Status Flora

Special-status flora species of interest include the following:

- USFWS-listed threatened or endangered, proposed for listing, or candidate for listing (under the ESA)
- BLM-designated sensitive, indicating species requiring special management consideration
- Federally designated species of concern, representing species formerly designated as candidates for listing as endangered or threatened, but for which information is insufficient to make that determination
- California Department of Fish and Game (CDFG)-listed as threatened or endangered (under the California Endangered Species Act [CESA])
- California Native Plant Society (CNPS)-designated as Category 1B (rare, threatened, or

endangered in California and elsewhere), or Category 2 (rare, threatened, or endangered in California, but more common elsewhere)

No sensitive or rare native plants were identified in the proposed project area during the field survey (Fort Irwin, 2010a).

Special-Status Species Descriptions. One federally endangered plant species occurs on the installation, the Lane Mountain milkvetch (*Astragalus jaegerianus*), which was listed by the USFWS as endangered on October 6, 1998; the species also is included in CNPS Category 1B. Lane Mountain milkvetch occurs in Joshua tree woodland, mixed Mojave scrub, and creosote bush scrub in poorly developed sandy or granitic gravely soils. During 2001, a survey covering over 21,000 acres mapped four major geographic populations of Lane Mountain milkvetch. A new population of Lane Mountain milkvetch was discovered immediately south of the Goldstone facility that belongs to the National Aeronautics and Space Administration (NASA). Also, three previously known populations (Coolgardie Mesa, Paradise Valley, and Brinkman Wash) were found to be significantly larger than previously reported. Populations of Lane Mountain milkvetch were encountered at elevations from 3,100 to 4,200 feet above msl, generally in areas of small ridges, shallow bedrock, and granitic soils. The populations occur in Mojave creosote bush scrub and Mojave mixed woody scrub communities with diverse shrub assemblages. The most common host shrubs for the Lane Mountain milkvetch were turpentine broom (*Thamnosma montana*), bursage, Eastern Mojave buckwheat (*Eriogonum fasciculatum*), Cooper's goldenbush (*Ericameria cooperi*), and Nevada jointfir (*Ephedra nevadensis*) (USACE, 2006).

The alkali mariposa lily (*Calochortus striatus*) is a federal Species of Concern and is included in CNPS Category 1B. The alkali mariposa lily occurs in creosote brush scrub communities in the Mojave Desert and has been reported in the California Mojave Desert in small scattered populations in Kern, Los Angeles, and San Bernardino Counties. Alkali mariposa lily grows in alkaline meadows and moist creosote bush scrub plant communities where it flowers in the spring between April and June. The alkali mariposa lily has been observed at Two Springs and at Paradise Springs (USACE, 2006).

Populations of Clokey's cryptantha (*Cryptantha clokeyii*) are uncommon but have been observed in rocky areas surrounding Superior Valley and Paradise Valley. This species is in CNPS Category 1B and is a small annual in the Boraginaceae family. Plants typically occur in gravelly areas of course colluvium substrate and are most frequently found on upper slopes.

The small-flowered androstephium (*Androstephium breviflorum*) is a CNPS Category 2 species. Small-flowered androstephium is a white-flowered perennial herb of the lily family (Liliaceae). In California, small-flowered androstephium primarily occurs in open sandy flats and in bajadas at low to moderate elevations (USACE, 2006).

The desert cymopterus (*Cymopterus deserticola*) is designated as sensitive by the BLM and is a CNPS Category 1B species. The desert cymopterus is under consideration for federal listing by the USFWS. This herbaceous perennial in the carrot family (*Apiaceae*) is found on deep, loose, well-drained sandy soil that occurs on alluvial fans and basins. The desert cymopterus also occurs on stabilized low sand dune areas and occasionally on sandy slopes. One population of desert cymopterus is known from a site in the Superior Valley, which is

located just south of the NAWS China Lake boundary. Several additional populations, potentially containing several thousand plants, were observed during a survey of the Superior Valley (USACE, 2006).

The Barstow woolly sunflower (*Eriophyllum mohavense*) is a federal Species of Concern, a BLM sensitive species, and a CNPS Category 1B species. Barstow woolly sunflower is a small annual in the sunflower family (*Asteraceae*) and typically occurs in creosote bush scrub that is adjacent to or within an overstory of Joshua trees and saltbush scrub. The Barstow woolly sunflower is found in open, flat, barren sites, most commonly on the sandy margins of alkali depressions distributed among the more common creosote bush plant community. The range of the Barstow woolly sunflower extends within the west-central Mojave Desert. All known locations of Barstow woolly sunflower are south, southwest, and west of Fort Irwin, with the closest known population located on Coolgardie Mesa, about 5 miles outside Fort Irwin (USACE, 2006).

The Mojave monkeyflower (*Mimulus mohavensis*) is a federal Species of Concern and a CNPS Category 1B species. An annual plant, the Mojave monkeyflower is a member of the figwort family (*Scrophulariaceae*) found in Joshua tree woodland and creosote bush scrub, primarily in granitic soils on gravelly banks of desert washes, in sandy openings between creosote bushes and along badland slopes above washes (areas that are not subject to regular water flows). The species range is within the Mojave Desert of California, generally occurring south of Fort Irwin, with the highest density of occurrence in areas just south of Daggett and Barstow. All recorded occurrences of the Mojave monkeyflower are outside the Proposed Action area, to the south and southwest.

Field Survey Results. The federally endangered Lane Mountain milkvetch was not observed during the August 20, 2010 field survey by biologists from the Fort Irwin Natural Resources Section of the Proposed Action site. Generally, the Lane Mountain milkvetch occurs at higher elevations than occur on the proposed site and is unlikely to be found there. The proposed site is not in any of the major population areas identified during surveys for the species. In addition, the extensive disturbance on the Proposed Action site has reduced the potential for a special-status species occurrence.

The alkali mariposa lily was not observed on the Proposed Action site and is not expected to occur. This species generally occurs in alkali or moist sink conditions and would not be expected to occur in the dry, upland conditions observed on the Proposed Action site. The alkali mariposa lily has been observed at Fort Irwin only in areas associated with springs.

The desert cymopterus was not identified on the Proposed Action site. Although some suitable habitat could exist, the species has not been documented in the area and is not likely to occur. Populations have been documented in Superior Valley, just south of the NAWS China Lake boundary (USACE, 2006).

The Barstow woolly sunflower, the small-flowered androstephium, and the Mojave monkeyflower were not identified on the Proposed Action site. None of these species has been detected as far north as Fort Irwin, and they are not expected to occur near the proposed site.

Waters of the U.S. including Wetlands

Wetlands are transitional areas between terrestrial and aquatic systems. For purposes of this classification, wetlands must have one or more of the following three attributes:

- At least periodically, the land supports predominantly hydrophytes.
- The substrate is predominantly undrained hydric soil.
- The substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

No wetlands are located within the Proposed Action site or within the water main extension corridor, as evidenced by the lack of hydrophytic vegetation, hydric soil, or standing shallow water. However, dry washes exist throughout the area. USACE guidelines for arid regions state that the presence of native riparian species in a dry wash indicates that the stream channel usually exhibits surface flow during small and moderate storm events (USACE, 2001a). Washes located on the Proposed Action sites contain vegetation in a pattern indicating that they convey flow only during extremely large storm events. No riparian vegetation is associated with these washes. Washes are described in further detail in Section 3.4, Water Resources.

3.3.4 Fauna

Wildlife present at Fort Irwin consists of a variety of species adapted to desert scrub habitats that provide little cover and xeric conditions. Some isolated seeps and springs provide perennial sources of water and vegetative cover that contribute to increased wildlife diversity in these areas. Rocky terrain provides additional cover and habitat for various reptile, rodent, bat, and bird species. Playas could support seasonal wetlands or pools with brine shrimp, which in turn support migratory waterbirds. Lack of specialized aquatic habitat contributes to the absence of native amphibian and fish populations on the installation. Game species at Fort Irwin include quail, dove, chukar partridge, cottontail rabbit, jackrabbit, and coyote. Descriptions of common wildlife species potentially associated with the Mojave creosote bush scrub on the proposed sites follow.

General Wildlife

Mammals. Small mammals potentially occurring on the proposed sites include blacktail jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), and whitetailed antelope squirrel (*Ammospermophilus leucurus*). Small rodent species could include kangaroo rats (*Dipodomys* spp.), pocket mice (*Chaetodipus formosus*; *Perognathus* spp.), and field mice (*Peromyscus* sp.). Desert woodrat (*Neotoma lepida*) and Botta's pocket gopher (*Thomomys bottae*) are also common. Larger mammals could include badger (*Taxidea taxus*), kit fox (*Vulpes macrotis*), grey fox (*Urocyon cinereoargenteus*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and mountain lion (*Felis concolor*). The kit fox and coyote are expected to occur throughout the area, whereas the others are localized and fairly rare. Abandoned mines, natural caves, trees, and manmade structures throughout the installation provide potential roosting habitat for bats. Bats also use the many cliff faces and rocky ledges of mountain ranges as sites for roosting and have the potential to use Joshua trees as night roosts. The

western pipistrelle (*Pipistrellus hesperus*) and California myotis (*Myotis californicus*) are the two species most commonly observed.

Birds. Common bird species potentially occurring on the proposed sites include the black-throated sparrow (*Amphispiza bilineata*), rock wren (*Salpinctes obsoletus*), horned lark (*Eremophila alpestris*), common raven (*Corvus corax*), and greater roadrunner (*Geococcyx californianus*). Additional species could occur as migrants or could winter on the project site. Some common species include the yellow-rumped warbler (*Dendroica coronata*), Hutton's vireo (*Vireo huttoni*), cliff swallow (*Hirundo pyrrhonata*), ruby-crowned kinglet (*Regulus calendula*), and white-crowned sparrow (*Zonotrichia leucophrys*). Raptors, which may occur on the proposed sites, include red-tailed hawks (*Buteo jamaicensis*), northern harriers (*Circus cyaneus*), golden eagles (*Aguila chrysaetos*), and prairie falcons (*Falco mexicanus*). Owls that might exist on the proposed sites include the burrowing owl (*Speotyto cunicularia*) and barn owl (*Tyto alba*); however, no burrowing owl burrows were observed during field surveys.

Most bird species at Fort Irwin are protected under the MBTA.

Reptiles and Amphibians. The Mojave creosote bush scrub on the proposed sites could support a diverse assemblage of reptiles, including common lizards such as zebra-tailed lizards (*Callisaurus draconoides*), side-blotched lizards (*Uta stansburiana*), desert spiny lizard (*Sceloporus magister*), and western whiptails (*Cnemidophorus tigris*). Less common lizards might include the desert horned lizard (*Phrynosoma platyrhinos*), long-nosed leopard lizard (*Gambelia wislezenii*), and desert iguana (*Dipsosaurus dorsalis*). Habitat specialists might include the chuckwalla (*Sauromalus obesus*) in rocky habitats and the common (desert) night lizard (*Xantusia vigilis*). Common snake species include the coachwhip (*Masticophis flagellum*), gopher snake (*Pituophis melanoleucus*), western patch-nosed snake (*Salvadora hexalepis*), western shovel-nosed snake (*Chionactis occipitalis*), and sidewinder (*Crotalus cerastes*). Less common species include the blind snake (*Leptotyphlops humulis*) and ground snake (*Sonora semiannulata*). Unlike lizards, most of which are primarily diurnal, most snake species on the installation are nocturnal. The desert tortoise (*Gopherus agassizii*) occurs in varying densities throughout Fort Irwin and the surrounding area. However, signs of individuals of this species were not observed during the site survey.

Special-Status Fauna

Special-status faunal species considered here include the following species of interest: (1) those species that are listed as threatened or endangered, proposed for listing, or candidates for listing by the USFWS under the ESA; (2) those species designated as sensitive by the BLM, indicating species requiring special management consideration; (3) those species designated by the federal government as Species of Concern; in some cases this represents species formerly designated as candidates for listing as endangered or threatened, but for which information is insufficient to make that determination; (4) those species listed by the CDFG as threatened or endangered under the CESA; and (5), those species designated by CDFG as Species of Special Concern.

The following species have potential to occur at Fort Irwin and are listed by the USFWS as threatened or endangered under the ESA, or by CDFG as threatened or endangered under the CESA.

Peregrine Falcon *(Falco peregrinus anatum)*. This subspecies of peregrine falcon was delisted from federal endangered status in August 1999; however, it continues to be listed as State endangered. This subspecies is found primarily in the western United States. During winter, they can be found throughout most of California. Summer range is more restricted to northern California, along the coast from Santa Barbara northward, and in the Sierra Nevada Mountains. Peregrines typically nest on high cliffs, or less commonly, on buildings and structures in urban areas. They forage over wetlands or other habitats with large concentrations of birds, their primary food source. Peregrines are uncommon winter migrants to the West Mojave. A peregrine falcon was observed at Bitter Springs in 1997. This subspecies would not be expected except as an occasional transient within the proposed sites.

Southwestern Willow Flycatcher *(Empidonax traillii extimus)*. This species was listed as federally endangered in 1995. Southwestern willow flycatcher breeds in riparian woodland habitats with willows (Salix sp.), cottonwoods (Populus sp.), and/or alders (Alnus sp.). Scattered records exist of this species occurring at various locations throughout Fort Irwin. However, in all cases the observations represented transient birds detected during spring and fall migration periods. While the southwestern willow flycatcher is a summer resident in the region, the species is not expected to occur regularly at Fort Irwin in the breeding season because of a lack of appropriate habitat; however, the species might occur during brief periods of migration at springs and riparian areas.

Least Bell's Vireo *(Vireo bellii pusillus)*. This species was listed as federally endangered in 1986. The least Bell's vireo is a summer resident in the region and breeds in riparian habitat, preferring areas of dense mulefat (*Baccharis salicifolia*) with an overstory of willows. In 1986 a least Bell's vireo was observed on Fort Irwin at Bitter Springs. This species is not expected to occur regularly at Fort Irwin because of the lack of suitable habitat; however, it might occur near springs for brief periods during migration.

Desert Tortoise *(Gopherus agassizii)*. This species was listed as federally threatened in 1990. Desert tortoise is a large, herbivorous reptile found throughout much of the Mojave and Sonoran Deserts; its range roughly approximates the distribution of creosote bush scrub. The desert tortoise is active in the spring, summer, and autumn when daytime temperatures are below 90 degrees Fahrenheit (°F) (32 degrees Celsius [°C]). Most activity occurs during spring and early summer.

The USFWS determined that the Mojave population of the desert tortoise warranted listing in response to documented population declines over large portions of its range. The declines are thought to be due to a number of reasons, including upper respiratory tract disease exacerbated by the stress of several drought seasons, loss of habitat, predation by ravens, livestock grazing, and direct disturbance by humans.

The desert tortoise is well studied at Fort Irwin. Numerous surveys have been conducted over the years to document the distribution and estimated size of tortoise populations throughout the installation. The desert tortoise is known to occur throughout Fort Irwin in low to moderate numbers, with the highest concentration along the southern boundary.

California Black Rail *(Laterallus jamaicensis coturniculus)*. This species was listed as state threatened in 1971. The California black rail is an uncommon, local resident of marshes, swamps, and wet meadows. A black rail was observed at the wastewater evaporation and

percolation ponds at Fort Irwin during fall 1994, but it has not been detected since. The occurrence of this species in the central Mojave Desert is extremely unusual, and it would not occur at the proposed sites due to lack of habitat.

Swainson's Hawk *(Buteo swainsoni).* This species was listed as state threatened in 1983. The Swainson's hawk was once a widespread breeder in the nonforested areas of northern California and the Central Valley. This species is migratory and is not expected to occur regularly at Fort Irwin or forage in the area for prolonged periods. Swainson's hawk has been observed at Bitter Springs and might occasionally use the project area for transient forage habitat during migration.

Mohave Ground Squirrel *(Spermophilus mohavensis).* This species was listed as state threatened in 1971. The Mohave ground squirrel generally occurs in habitat that consists of large alluvial-filled valleys with deep fine- to medium-textured soils vegetated with creosote scrub, shadscale scrub, or alkali sink scrub with the absence of desert pavement and shallow eroded soils. Recent reports of Mohave ground squirrel populations at Fort Irwin were from the Goldstone area and immediately east of the Gary Owen impact area. These surveys were concentrated in the northern and eastern portions of the installation; other populations of Mohave ground squirrels could occur in areas with suitable habitat yet to be surveyed. Previous surveys indicated the presence of this species at 12 sites, including several in the vicinity of Goldstone Lake, the Echo site, Nelson Lake, Bicycle Lake, Drinkwater Lake, the north end of Lucky Fuse, and Lizard Gulch. The current status of these populations is unknown. This species was not observed during field surveys.

Other Special-Status Fauna. Other special-status faunal species are proposed for listing, candidates for listing, California Species of Concern, or designated as Sensitive by the BLM. This list is steadily growing for the Mojave Desert region. Including the above-listed species, the list includes 98 plant or animal species either observed at Fort Irwin or occurring in the Mojave Desert ecosystem. A list of other potentially occurring special-status species, habitat requirements, and information on potential occurrence on the proposed sites is provided in Table 3-2.

TABLE 3-2
Potential Special-Status Species and Use at Proposed Action Sites

Species	Status[a]	Habitat	Potential Occurrence
Bendire's thrasher	CSC	Open desert	Breeding
Black tern	CSC	Wetlands	No habitat
Burrowing owl	CSC	Open desert	Breeding
California gull	CSC	Wetlands	Forage
Cooper's hawk	CSC	Woodlands	No habitat
Crissal thrasher	CSC	Open desert	Breeding
Ferruginous hawk	CSC	Open desert, wintering	Wintering – forage
Golden eagle	CSC, FP	Open desert	Forage
Gray vireo	CSC	Woodlands	No habitat
Le Conte's thrasher	CSC	Open desert	Breeding
Loggerhead shrike	CSC	Open desert	Breeding
Long-eared owl	CSC	Wetlands	No habitat
Northern harrier	CSC	Wetlands, agricultural	Forage
Sharp-shinned hawk	CSC	Woodlands	No habitat
Vaux's swift	CSC	Open desert, cliff sites	Forage
Vermillion flycatcher	CSC	Riparian	No habitat
Virginia's warbler	CSC	Riparian	No habitat
White-faced ibis	CSC	Wetlands	No habitat
Yellow warbler	CSC	Riparian	No habitat
Yellow-breasted chat	CSC	Riparian	No habitat

[a]Status:
CSC – California Species of Special Concern
FP – Federally protected

Field Survey Results. During field surveys of the Proposed Action, no desert tortoises, scat, carcasses, or burrows were observed. With its low diversity of perennial shrubs, proximity to developed areas, and high amount of existing disturbance, the Proposed Action site is not good habitat for the desert tortoise. The desert tortoise is known to occur in bordering lands to the northwest, where tortoises have been observed in low densities. Desert tortoises are occasionally spotted in the cantonment area (Figure 3-1). It is unlikely but possible that the desert tortoise could migrate to the project area during the spring, when tortoises occasionally search out for new home ranges. Overall, the desert tortoise is unlikely to be present on the site.

No sensitive faunal species were observed during the August 2010 field survey. Three species of lizard, two species of rodent, and five species of bird were identified during the field survey (Table 3-3). Birds are attracted to the area due to the adjacent housing

area (Fort Irwin, 2010a).

TABLE 3-3
Identified Animal Species from Field Survey
Fort Irwin Hospital Replacement EA

Common Name	Scientific Name	Taxon
Desert iguana	*Dipsosaurus dorsalis*	Lizard
Whiptail	*Cnemidophorus sp.*	Lizard
Zebra-tailed lizard	*Callisaurus draconoides*	Lizard
Jack rabbit	*Lepus californicus*	Rodent
Desert cottontail	*Silvilagus adubonii*	Rodent
Chuckar	*Alectoris chuckar*	Bird
Doves	*Zenaida macroura*	Bird
Raven	*Corvus corax*	Bird
Sparrows	Multiple	Bird
Finch	*Carpodacus* sp.	Bird

Source: Ft. Irwin, 2010a

Pest Species

Common Ravens. Ravens are native birds in the Mojave Desert; however, their numbers have increased significantly over the past several decades as a result of expanding human use of the desert. Raven populations have grown beyond the natural carrying capacity of the desert environment because of resources provided by humans. In certain areas of the Western Mojave, raven populations have increased 1,500 percent from 1968 to 1992. Because ravens are known to prey on juvenile desert tortoises, increased populations of ravens could have negative impacts on the desert tortoise populations at Fort Irwin.

3.4 Water Resources

This section describes water resources, both surface and ground, within the ROI for the resource and within or adjacent to the footprint of the proposed action area as shown in Figure 2-1.

3.4.1 Regulatory Considerations

Under provisions of the CWA, USACE has jurisdictional authority over Waters of the U.S. According to the *Guidelines for Jurisdictional Determinations for Waters of the United States in the Arid Southwest* (USACE, 2001b), with nontidal waters, in the absence of adjacent wetlands, the extent of USACE jurisdiction is defined by the Ordinary High Water Mark (OHWM). Generally, USACE considers the OHWM to be the elevation to which water flows at a 2-year frequency (i.e., 50 out of 100 years).

3.4.2 Surface Water

Surface water resources are scarce at Fort Irwin and the surrounding region. Washes descending from mountains and other elevated landforms provide intermittent channels that route stormwater runoff into basins where water is stored until percolation or evaporation occurs. All streams are intermittent, and naturally occurring standing water is ephemeral, evident only during and immediately after heavy rains. Levees have been erected to protect the cantonment from floodwaters. Substantial water flow and accumulation takes place only during greater-than-normal storm events, which are expected to occur approximately once every 10 years (USACE, 2001a).

Alluvial fans commonly are observed in and around Fort Irwin. Bedload material composed of sand, gravel, cobbles, and rocks is deposited in alluvial fans during heavy rainfall events. Significant subsurface flows might occur in the unconsolidated sand and gravel channel deposits found in washes and alluvial fans, even after surface flows have ceased. Local groundwater recharge could occur along washes where water temporarily pools (USACE, 2006).

Fort Irwin has six springs that produce meager to small quantities of water and four intermittent springs that produce little to no water during the summer, depending on the seasonal amount of rainfall (USACE, 2006). None of the springs is in the immediate vicinity of the water main extension corridor or Proposed Action site. Fort Irwin also has a series of man-made storage, percolation, and evaporation ponds, designed for the effluent from the WWTP, located approximately 3 miles to the southeast of the proposed WTP site. The first in the series is the effluent percolation pond with a surface area of 4.9 acres (212,906 square feet). From the percolation pond, water can be pumped to a 22-acre evaporation pond or to irrigation for the Pitch and Putt Golf Course and driving range. Alternatively, water can flow via an overflow pipe to a series of three ponds called the "Duck Ponds," which have a combined surface area of approximately 4 acres. These bodies of water exist due to the influent treated wastewater and are not considered Waters of the U.S.

Waters of the U.S.

The Proposed Action site contains a few ephemeral drainages. However, these drainages do not exhibit typical riparian vegetation associated with washes in an arid region according to USACE guidelines. There are no waters of the U.S. in the proposed project

area.

Jurisdictional Delineation Conclusion

The Proposed Action site does not have any waters that are considered jurisdictional Waters of the U.S., subject to Section 404 of the CWA (33 U.S.C. 1344).

3.4.3 Groundwater

Several groundwater basins have been identified within the vicinity of Fort Irwin including Bicycle Lake, Capital City, Coyote Lake, Goldstone Lake, Irwin, Langford Lake, and Superior Lake basin. Current water supply for Fort Irwin is groundwater from the Bicycle Lake, Langford Lake, and Irwin groundwater basins.

According to the United States Geological Survey (USGS), very little natural groundwater recharge occurs in these basins (USGS, 1997a). Average annual natural recharge to the Irwin groundwater basin is about 0.04 mgd or 50 acre-feet per year (afy) (USGS, 1997b). Bicycle Lake and Langford Lake groundwater basins have a recharge rate of 0.03 mgd (30 afy) and 0.07 mgd (75 afy), respectively (CH2M HILL, 2007).

Water Quality

Fort Irwin monitors the quality of its groundwater, as it is the only source for drinking water. Water from wells in all three basins has high fluoride concentrations, with 90 percent of all wells sampled having fluoride above the California maximum contaminant level (MCL) of 2 mgL^{-1}. Arsenic has also been detected at concentrations above the state MCL of 10 μgL^{-1} in 80 percent of the wells sampled. Potential sources of both fluoride and arsenic are the volcanic rocks common to the area.

3.5 Air Quality

This subsection describes air quality at Fort Irwin and in the Mojave Desert region and includes a discussion of regulatory considerations.

3.5.1 Regional Setting

Fort Irwin is located within the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD) in San Bernardino County. Fort Irwin experiences hot summers, mild winters, infrequent rainfall, and moderate afternoon winds. High particulate matter concentrations in the Mojave Desert are typically the result of wind erosion from exposed or disturbed land areas. Activities at Fort Irwin, such as vehicle travel on unpaved roads and training maneuvers, create fugitive dust, and monitoring sites have been operated at Fort Irwin since 1994. Currently, Fort Irwin operates eight such monitoring sites along the boundary of the installation, and in the Superior Valley and Silurian Hills land expansion areas.

Fort Irwin has implemented a number of management practices to reduce particulate emissions, including the following:

- Using water for short-term surface stabilization
- Minimizing tracking of dirt onto paved roads
- Covering haul trucks

- Stabilizing sites with chemicals or vegetation
- Paving parking lots
- Placing gravel to control windblown dust

3.5.2 Regulatory Setting

Federal

Federal air quality policies are regulated through the federal CAA. Pursuant to this act, USEPA has established National Ambient Air Quality Standards (NAAQS) for the following air pollutants (termed criteria pollutants): carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter defined as particulate matter less than 10 microns in aerodynamic diameter (PM_{10}), fine particulate matter defined as particulate matter less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$), and lead. The act was amended in 1977 to require each state to maintain a State Implementation Plan (SIP) for achieving compliance with the NAAQS. In 1990, the act was amended again to strengthen regulation of emissions from both stationary sources and motor vehicles. The federal CAA also requires USEPA to designate areas (counties or air basins) as attainment or nonattainment with respect to each criteria pollutant, depending on whether the area meets the NAAQS. An area that is designated nonattainment means the area does not meet the NAAQS and is subject to planning requirements to attain the standards. Conformity of a proposed action to the required planning documents, or SIP, is defined under the 1990 CAA amendments as conformity with the purpose of the plan in eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of these standards.

Under the 1990 CAA amendments, USEPA issued two types of SIP conformity guidelines: transportation conformity rules that apply to transportation plans and projects, and general conformity rules that apply to all other federal actions. Under transportation conformity, the U.S. Department of Transportation cannot fund, authorize, or approve federal actions to support programs or projects that are not first found to conform to the CAA requirements. Under general conformity, USEPA requires all federal agencies to ensure that any federal action resulting in criteria pollutant emissions for which the area has been designated as a nonattainment or maintenance area conforms to an approved or promulgated state or federal implementation plan. The following section discusses general conformity and how these requirements apply to the Proposed Action.

General Conformity. USEPA regulations address the applicability and procedures for ensuring that federal activities comply with the amended CAA. Per the Final Conformity Rule, USEPA requires all federal agencies to ensure that any federal action resulting in nonattainment or maintenance criteria pollutant emissions conforms to an approved or promulgated state or federal implementation plan. Conformity means compliance with the purpose of attaining or maintaining the NAAQS. Specifically, conformity means ensuring that the federal action would not: (1) cause a new violation of the NAAQS, (2) contribute to any increase in the frequency or severity of violations of existing NAAQS, or (3) delay the timely attainment of any NAAQS interim or other attainment milestones.

Applicability of General Conformity to the Proposed Action. General conformity applies in federally designated nonattainment and maintenance areas, such as San Bernardino County. Under the general conformity provisions of the federal CAA, no federal agency can approve

a project unless the project has been demonstrated to conform to the applicable air quality management plan or SIP. The Proposed Action would include approval by a federal agency (i.e., the U.S. Army); therefore, general conformity applies to the project. If a project meets the following requirements, detailed conformity analyses are not required pursuant to 40 CFR 93.153(c):

- The total direct and indirect emissions of nonattainment or maintenance pollutants are less than the applicable de minimis thresholds established in 40 CFR 93.153(b).
- The total emissions are not regionally significant (emissions are regionally significant if they equal or exceed 10 percent of the air quality control area for the applicable pollutant).

State

The California Air Resources Board (ARB) oversees California air quality policies and is responsible for preparing and submitting the SIP to USEPA. California established state ambient air quality standards (CAAQS) in 1969. These standards are generally more stringent and include more pollutants than the NAAQS. The California CAA was approved in 1988 and requires each local air district in the state to prepare an air quality plan to achieve compliance with the CAAQS. Similar to USEPA, the ARB designates counties in California as attainment or nonattainment with respect to the CAAQS.

California established air pollution control programs before federal requirements were enacted. Responsibility for air quality management programs in California is divided between the ARB, as the primary state air quality management agency, and air pollution control districts, as the primary local air quality management agencies.

Local

The MDAQMD has local jurisdiction over the portion of San Bernardino County where Fort Irwin is located. The MDAQMD has primary responsibility for regulating stationary sources of air pollution within its jurisdictional boundaries. The MDAQMD implements air quality programs required by state and federal mandates, enforces rules and regulations based on air pollution laws, and educates business owners and residents about their role in protecting air quality. The MDAQMD air quality plan applicable to the Proposed Action is the *Federal Particulate Matter (PM_{10}) Attainment Plan* (MDAQMD, 1995). In addition, the Proposed Action must comply with the applicable MDAQMD rules and regulations. Construction of the Proposed Action would be subject to MDAQMD Rules 403 and 403.2. Operation of stationary sources under the Proposed Action would be subject to MDAQMD Regulation XIII – New Source Review.

3.5.3 Ambient Air Quality Standards

Currently, Fort Irwin is designated nonattainment for PM_{10} for both federal and California standards. The southern portion of the installation (below the 90 Universal Transverse Mercator [UTM] grid line) is designated nonattainment for ozone for federal and California standards. The Proposed Action would be located north of the federal ozone nonattainment area and, therefore, in a federal attainment area for ozone. Federal and state ambient air quality standards are listed in Table 3-6.

3.5.4 Existing Conditions

Air quality at Fort Irwin is influenced by the local climate. The area experiences hot summers, mild winters, infrequent rainfall, and moderate afternoon winds. The average high and low temperatures during the summer at Fort Irwin are 100° Fahrenheit (°F) and 70°F, respectively. The average high and low temperatures during the winter are 62°F and 37°F, respectively. Average annual precipitation is about 2.5 inches, with most precipitation falling in the winter or during isolated summer thunderstorms.

High particulate matter concentrations in the Mojave Desert are typically the result of wind erosion from exposed or disturbed land areas. Activities at Fort Irwin, such as vehicle travel on unpaved roads and training maneuvers, create fugitive PM10 emissions, basically respirable dust. PM10 monitoring sites have been operated at Fort Irwin since 1994. Fort Irwin operates eight PM10 monitoring sites within its boundary, and implements standard management practices (such as the following) to reduce particulate emissions:

- Using water for short-term surface stabilization
- Minimizing tracking of dirt onto paved roads
- Covering haul trucks
- Stabilizing sites with chemicals or vegetation
- Paving parking lots
- Placing gravel to control windblown dust

3.5.5 Climate Change and Greenhouse Gases

This section discusses the existing conditions, regulatory background, and potential greenhouse gas (GHG) emissions from the Proposed Action.

Existing Conditions

Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from any of the following conditions (USEPA, 2010):

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun
- Natural processes within the climate system (e.g. changes in ocean circulation)
- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g. deforestation, reforestation, urbanization, and desertification)

GHGs include the following pollutants (USEPA, 2010):

- Carbon dioxide (CO_2) is a naturally occurring gas and a by-product of burning fossil fuels and biomass, land use changes, and other industrial processes. It is the principal anthropogenic GHG that affects the Earth's radiative balance.

- Methane (CH_4) has a global warming potential approximately 20 times that of CO_2. CH_4 is produced through anaerobic (without oxygen) decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.
- Nitrous oxide (N_2O) has a global warming potential approximately 300 times that of CO_2. Major sources of N_2O include soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.
- Hydrofluorocarbons (HFCs) are compounds containing only hydrogen, fluorine, chlorine, and carbon. HFCs have been introduced as a replacement for the chlorofluorocarbons identified as ozone depleting substances.
- Perfluorocarbons (PFCs) are compounds containing only fluorine and carbon. Similar to HFCs, PFCs have been introduced as a replacement for chlorofluorocarbons. PFCs are also used in manufacturing and are emitted as by-products of industrial processes. PFCs are powerful GHGs.
- Sulfur hexafluoride (SF_6) is a colorless gas that is soluble in alcohol and ether, and slightly soluble in water. This compound is a very powerful GHG used primarily in electrical transmission and distribution systems, as well as dielectrics in electronics.

Regulatory Background

Federal

The USEPA Mandatory Reporting Rule became effective on December 29, 2009, and sources required to report were to begin collecting data on January 1, 2010. In general, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of carbon dioxide equivalent (CO_2e) emissions are required to submit annual reports to the USEPA. The USEPA reporting requirements continue to be updated. On November 8, 2010, reporting requirements for petroleum and natural gas systems were finalized.

In addition, the Supreme Court decision in *Massachusetts et al. v. Environmental Protection Agency et al.* (Supreme Court Case 05-1120) found that the USEPA has the authority to list GHGs as pollutants and to regulate emissions of GHGs under the CAA. On April 17, 2009, the USEPA found that CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 may contribute to air pollution and may endanger public health and welfare.

State and Regional

In 2006, the California State Legislature signed the Global Warming Solutions Act of 2006 (AB 32), which provides the framework for regulating GHG emissions in California under AB 32. This law requires ARB to design and implement emission limits, regulations, and other measures such that statewide GHG emissions are reduced in a technologically feasible and cost-effective manner to 1990 levels by 2020. The statewide 2020 emissions limit is 427

million metric tons CO_2e (ARB, 2007). CO_2 emissions account for approximately 90 percent of the statewide GHG emissions (ARB, 2007). CH_4, N_2O, HFCs, PFCs, and SF_6 emissions account for the remainder of the statewide GHG emissions (ARB, 2007).

Part of ARB's direction under AB 32 was to develop a scoping plan that contains the main strategies California would use to reduce GHG emissions that cause climate change. The scoping plan includes a range of GHG reduction actions, which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 cost of implementation fee regulation to fund the program (ARB, 2008). The first regulation adopted by ARB pursuant to AB 32 was the regulation requiring reporting of GHG emissions. The regulation requires large industrial sources emitting more than 25,000 metric tons of CO_2 per year to report and verify their GHG emissions from combustion of both fossil fuels and biomass-derived fuels.

TABLE 3-6
Ambient Air Quality Standards

Criteria Pollutant	Federal Standard (Averaging Period) [a]	Federal Attainment Status	State Standard (Averaging Period)[b]	State Attainment Status
Carbon Monoxide (CO)	35 ppm (1 hour)	Attainment	20 ppm (1 hour)	Attainment
	9 ppm (8 hour)	Attainment	9 ppm (8 hour)	Attainment
Nitrogen Dioxide (NO_2) [a]	0.053 ppm (annual arithmetic mean)	Attainment	0.030 ppm	Attainment
	0.100 ppm (1 hour)[c]		0.18 ppm (1 hour)	
Ozone (O_3)	0.075 ppm (8 hour)	Nonattainment[d]	0.070 ppm (8 hour)	Nonattainment
			0.09 ppm (1 hour)	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	15 $\mu g/m^3$ (annual arithmetic mean)	Unclassified/ Attainment	12 $\mu g/m^3$ (annual arithmetic mean)	Nonattainment
	35 $\mu g/m^3$ (24 hour)[e]	Unclassified/ Attainment	No separate Standard (24 hour)	
Particulate Matter (PM_{10})	--	NA	20 $\mu g/m^3$ (annual arithmetic mean)	Nonattainment
	150 $\mu g/m^3$ (24 hour)	Nonattainment	50 $\mu g/m^3$ (24 hour)	Nonattainment
Sulfur Dioxide (SO_2)	0.030 ppm (annual arithmetic mean)	Attainment	--	--
	0.14 ppm (24 hour)	Attainment	0.04 ppm (24 hour)	Attainment
	--	--	0.25 ppm (1 hour)	Attainment

TABLE 3-6
Ambient Air Quality Standards

Criteria Pollutant	Federal Standard (Averaging Period) [a]	Federal Attainment Status	State Standard (Averaging Period)[b]	State Attainment Status
Lead	1.5 $\mu g/m^3$ (calendar quarter) 0.15 mg/m^3 (Rolling 3-month Average)	Attainment	1.5 $\mu g/m^3$ (30 day average)	Attainment
Sulfates	No Federal Standards		20 $\mu g/m^3$ (24 hour)	Attainment
Hydrogen Sulfide			0.03 ppm (1 hour)	Unclassified
Vinyl Chloride			0.01 ppm (24 hour)	Attainment
Visibility-Reducing Particles			Extinction coefficient of 0.23 per kilometer — visibility of 10 miles or more due to particles when relative humidity is less than 70 percent.	Unclassified

Source: http://www.arb.ca.gov/research/aaqs/aaqs.htm, as of March 16, 2010

ppm: parts per million, by volume
NA: not applicable
$\mu g/m^3$: micrograms per cubic meter

Notes:

[a] National standards, other than ozone, particulate matter, and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, is equal to or less than the standard.

[b] California standards for ozone, carbon monoxide, sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter (PM_{10}, $PM_{2.5}$, and visibility-reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded.

[d] The southern portion of the installation (below the 90 UTM grid line) is designated nonattainment for ozone for federal standards.

[e] To attain this standard, the 3-year average of the 98th percentile 24-hour concentration at each population-oriented monitor within an area must not exceed 35 mg/m3 (effective December 17, 2006).

3.6 Noise

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although exposure to very high noise levels can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, the perceived

importance of the noise, its appropriateness in the setting, the time of day, the type of activity during which the noise occurs, and the sensitivity of the individual.

3.6.1 Regional Noise Environment

Fort Irwin is located within the 19,600-square-mile restricted area R-2508 Complex, a special-use airspace complex that includes all the airspace and associated land presently used and managed by Fort Irwin, the U.S. Air Force Flight Test Center at Edwards Air Force Base (AFB), and NAWS China Lake. The R-2502N and R-2502E Areas of the R-2508 Complex consist almost entirely of Fort Irwin. Military operations determine primarily the ambient noise environment within those areas. Military training exercises that contribute to noise at Fort Irwin include army vehicle ground maneuvers, artillery firing, air operations, air-to-ground gunnery and firing, and transportation to, from, and within Fort Irwin during and after maneuvers.

Air operations at the Mojave B Range of NAWS China Lake and aircraft stationed at Edwards AFB also contribute to the ambient noise in the area.

3.6.2 Local Environment

Existing noise levels at and adjacent to the Proposed Action site are affected by noises associated with residential areas to the west, as well as traffic on Outer Loop Road, 5th Street, and B Avenue. The Proposed Action site is within a large caliber noise zone, rated at 115 decibels (dB) (mean). The nearest range is 3 to 4 miles west of the cantonment area.

A helipad associated with Weed Army Community Hospital is adjacent to the Proposed Action, just southwest of 5th Street, and air traffic at this helipad generates noise.

3.6.3 Sensitive Receptors

A number of noise-sensitive receptors are on-post, including schools, day care facilities, medical facilities, and residences. Most on-post housing units for military personnel are located in the western section of the cantonment area, bounded by North Loop Road, Outer Loop Road, Inner Loop Road, and Barstow Road. The nearest sensitive receptor to the proposed site would be residential housing located approximately 100 feet northwest of the Proposed Action site on Pork Chop Hill Road.

3.6.4 Regulatory Considerations

The goals of the Environmental Noise Management Program (Army Regulation 200-1, Section 7) are to:

- Control environmental noise to protect the health and welfare of people, on- and off-post, impacted by Army-produced noise, including on- and off-post noise sources
- Reduce community annoyance from environmental noise to the extent feasible, consistent with Army training and materiel-testing activities

Army environmental noise policies are based on land use compatibilities as indicated by objective noise levels. A number of noise measurements are used to assess compatibility, including the following:

- dB (decibel). A measurement of the sound pressure level.
- dBA (A-weighted sound pressure level). Sound pressure level, in decibels, as measured on a sound level meter using an A-weighting filter network, which de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitive range of the human ear.
- dBC (C-weighted sound pressure level). Sound pressure level, in decibels, as measured on a sound level meter using a C-weighting filter network, which emphasizes the very low frequency components of the sound.
- ADNL (A-weighted day-night level). Average A-weighted day-night noise level.
- CDNL (C-weighted day-night level). Average C-weighted day-night noise level.

Noise generated by transportation sources (such as vehicles and aircraft) and from continuous sources (such as generators) is assessed using ADNL. Impulsive noise resulting from armor, artillery, and demolition activities is assessed using CDNL. Noises from small arms ranges are assessed using the peak unweighted sound level (dBP). Using these measurement scales, noise limits and associated zones are defined as shown in Table 3-7.

TABLE 3-7
Noise Compatibility Zones

Noise Zone	Population (% highly annoyed)	Transportation (ADNL)	Impulsive (CDNL)	Small Arms (dBP)
I	Less than 15%	Less than 65 dBA	Less than 62 dBC	Less than 87 dBP
II	15% - 39%	65-75 dBA	62-70 dBC	87-104 dBP
III	More than 39%	More than 75 dBA	More than 70 dBC	More than 104 dBP

Source: U.S. Army Regulation 200-1, Chapter 7, Environmental Noise Management Program

Noise-sensitive land uses such as housing, schools, and medical facilities are compatible with the noise environment in Zone I, normally incompatible in Zone II, and incompatible in Zone III.

According to the 1986 U.S. Army Environmental and Occupational Hygiene Laboratory Report, prepared by the Army Environmental Hygiene Agency, noise produced on the installation has minimal impacts due to the size and remote location of the installation. The size of the installation allows for the dispersion of noise. The only notable noise impact within the cantonment area is associated with operation of the hospital helipad (Nakata Planning Group, 1996). The helicopter typically used at the hospital helipad is the UH-60 Blackhawk. The UH-60 has a noise level of 106 dBA at the source and 88 dBA at 200 feet (U.S. Army Center for Health and Preventive Medicine, 2010 and U.S. Army, 2008). Buildings typically reduce noise levels by 25 dBA (USEPA, 1974). At 200 feet, existing indoor noise levels from helicopter operations would be 63 dBA.

3.7 Cultural Resources

This section describes cultural resources in the region of influence for the Proposed Action,

which is defined as the area of potential effect (APE) within and adjacent to the footprint of the proposed new hospital, as shown in Figure 2-1.

Cultural resources include prehistoric, Native American, and historic. Prehistoric resources are physical properties resulting from human activities that predate written records and generally are identified as isolated finds or sites. Prehistoric resources can include village sites, temporary camps, lithic (stone tool) scatters, roasting pits or hearths, milling features, petroglyphs (rock art), rock features, and burial sites.

Native American resources are sites, areas, and materials important to Native Americans for religious, spiritual, or traditional reasons. These resources include villages, burial sites, petroglyphs, rock features, or springs. The belief in the sacred character of physical places, such as mountain peaks, springs, or burial sites is fundamental to Native American religion. Traditional rituals often prescribe the use of particular native plants, animals, or minerals. Thus, activities that might affect sacred areas, their accessibility, or the availability of materials used in traditional practices are of primary concern.

Historic resources consist of physical properties, structures, or built items resulting from human activities that occurred after European settlement. Historic resources can include archaeological remains and architectural structures. Historic archaeological site types include town sites, homesteads, agricultural or ranching features, mining-related features, refuse concentrations, and features or artifacts associated with early military use of the land. Historic architectural resources include houses, cabins, barns, and lighthouses; local structures such as churches, post offices, and meeting halls; and early military structures such as hangars, administration buildings, barracks, officer quarters, warehouses, and guardhouses.

3.7.1 Project Area Cultural Resources

Fort Irwin Cultural Resources Program (FICRP) established an APE for the proposed site. The direct APE includes the 79-acre area is within an irregular linear tract between 5th Street and North Loop Road (Outer Loop Road). The indirect APE includes 0.62 mile (1 kilometer) beyond the direct APE of the proposed site.

FICRP personnel consulted the Fort Irwin Cultural Resources Management Database (FICRMDB), Geographic Information System (GIS) database, curation database, digital and paper files, and databases within the California Office of the Historic Preservation, California Historical Resources, California Historical Landscapes, California Historical Landmarks, California Points of Historical Interest, California Register of Historical Resources, and the National Register of Historic Places. The records search indicated that the site had been surveyed in 2003 by the FICRP, that the indirect APE had been surveyed six times from 2006 to 2010 by Fort Irwin and contractors, and that no archaeological resources had been found in the direct or indirect APE. A pedestrian survey of the proposed site was not required, due to existing information.

Records indicate the presence of 18 structures that are 45 to 50-plus years old within the indirect APE. Five of the buildings are known as Unaccompanied Personnel Housing, which are exempt from consultation requirements as set forth by the Advisory Council on

Historic Preservation and three others were determined ineligible based on previous assessments. The other 10 buildings were assessed for eligibility within the National Register of Historic Places (NRHP). According to the assessment none of the 18 buildings within the indirect APE have distinctive characteristics of construction, association with notable events or
people, or the potential to yield additional information to the history of Fort Irwin. There are no NRHP eligible properties within the direct or indirect APE (Fort Irwin, 2010b).

On October 6, 2010, Fort Irwin requested SHPO concurrence that the Proposed Action would have no effect on historic properties, and on October 27, 2010, the SHPO granted that concurrence (Appendix A).

Greater detail is provided in the Cultural Resources Survey and Evaluation Report (Appendix A).

3.7.2 Regulatory Considerations

Cultural resources are protected primarily through the NHPA (16 U.S.C. Sections 470 through 470x-6) and its implementing regulations (found at 36 CFR Part 800). For a cultural site to be considered historic, the site must meet certain criteria, which enables the site to be considered eligible for the NRHP. Section 106 of the NHPA and its implementing regulations require federal agencies to take into account the impact of federal undertakings on historic properties that are listed on or eligible for the NRHP. The Section 106 process includes identifying and evaluating historic properties, assessing the effects of the undertaking on those properties, consulting with the SHPO regarding these effects and any actions that might be taken to address them, and providing the Advisory Council on Historic Preservation with an opportunity to comment. The following significance criteria are the basis for determining inclusion of a property on the NRHP (36 CFR 60.4).

- Association with events that have made a significant contribution to the broad patterns of our history
- Association with the lives of persons significant to our past
- Resources that embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master or that possess high artistic values or that represent a significant and distinguishable entity whose component might lack individual distinction
- Resources that have yielded or might be likely to yield information important in prehistory or history

Section 101(d)(6)(A) of the NHPA, as amended, allows properties of traditional religious and cultural importance to a tribe to be determined eligible for inclusion in the NRHP.

3.8 Socioeconomics

This section describes the socioeconomic conditions in the ROI, including economic development, demographics, housing, quality of life, environmental justice, and the protection of children. The ROI for this study is defined as the geographical area within

which social and economic impacts of project implementation are likely to occur. Major factors used to determine the ROI are the residency distribution of Fort Irwin employees, commuting distances and times, and locations of the businesses providing goods and services to Fort Irwin. Although the predominant economic and social impacts of the project proposed are likely to be centered in the area surrounding the installation, for purposes of the economic modeling analysis, the affected environment is defined as the entire county in which Fort Irwin is located (i.e., San Bernardino County). Economic impacts associated with the construction and operation phases of the project are assessed on a countywide basis. However, certain demographic and income data are reported for smaller geographical areas, such as a census tract. Because Fort Irwin is relatively isolated within a large county containing few large urban areas, housing and demographic impacts would be confined primarily to the installation and the neighboring urban area of Barstow.

3.8.1 Population

Between 2000 and 2010, San Bernardino County population increased by an annual average rate of 2 percent with the addition of over 363,715 inhabitants to reach the most current population statistic of 2,073,149 (Table 3-6). This growth rate exceeded that of the State of California, which registered an average annual rate of slightly over 1 percent between 2000 and 2010. The City of Barstow experienced a growth rate of 1 percent annually between 2000 and 2010.

TABLE 3-6
Population Change for the City of Barstow, San Bernardino County, and the State of California (2000 to 2010)
Weed Army Community Hospital EA, Fort Irwin, CA

	City of Barstow	San Bernardino County	State of California
2000[a]	21,119	1,709,434	33,871,648
2010 Estimate[b]	24,281	2,073,149	38,648,090
Population Change (2000 to 2010)			
Numeric	3,162	363,715	4,776,442
Percent	13%	18%	12%
Average Annual Percent	1%	2%	1%

[a] Source: U.S. Census Bureau, 2000
[b] Source, California Department of Finance (CDOF), 2010

3.8.2 Housing

On-Post Housing

Fort Irwin has 2,028 military family housing (MFH) units in nine major housing areas on the installation (Table 3-9). Of the total MFH units, 378 are allocated to officers and 1,650 to enlisted personnel. Under the Community Development and Management Plan (CDMP) negotiated between the Army and Clark Pinnacle (a private developer), projections are that the number of MFH units at Fort Irwin will increase to 2,615. To date, 715 new housing units are in Crackerjack Flats, Sandy Basin Phase I, Sleepy Hollow, and Sandy Basin Phase II. Sandy Basin Phase II is currently being completed, which would add an additional 92 units.

Off-Post Housing

Most of the military and civilian personnel who reside off-post live in Barstow and the adjacent small communities of Lenwood, Hinkley, Yermo, Daggett, and Newberry Springs, or in the communities of Victorville, Hesperia, and Apple Valley.

The housing stock is divided almost equally between owner-occupied and renter-occupied units, reflecting the influence on the rental housing market of off-post Fort Irwin personnel. The vacancy rate is between 15 and 16 percent, and the large majority of vacant units are rental units. Characteristic of most communities of this size, the large majority of units are detached, single-family units, with over 10 percent of the total number of housing units being mobile homes.

TABLE 3-9
Housing Development Summary by Housing Area

Housing Area	Number of Units	Demolished Units	New Units	Final Inventory
Bitter Springs	126	0	0	126
Cactus Cove	214	94	53	173
Calico Estates	252	0	0	252
Coyote Springs	254	9	17	262
Desert Winds	260	0	0	260
Mojave	150	0	0	150
Sage Brush	184	0	0	184
Tiefort View	297	297	383	383
Sandy Basin I & II	291	291	292	292
Sandy Basin III	0	0	92	92
Sleepy Hollow	0[a]	0[a]	182	182
Crackerjack Flats	0	0	241	241
Military Construction[b]	0	0	18	18
Total	**2,028**	**691**	**1,278**	**2,615**

[a]The 84 existing units at the mobile home park are not included as part of the beginning family housing inventory. These units would be removed before new units would be built.

TABLE 3-9
Housing Development Summary by Housing Area

Housing Area	Number of Units	Demolished Units	New Units	Final Inventory

[b]The military construction units would be constructed by the Army and managed by the private sector developer.

3.8.3 Economic Development

Economic development in the region is described in terms of total employment, employment by type of industry, unemployment, and personal income.

As of September 2010, the total workforce was 856,700 in San Bernardino County (California Employment Development Department [CEDD], 2010). A majority of the San Bernardino County workforce is employed by the services, trade, state and local governments, and manufacturing sectors. Approximately 27,200 are employed in the construction industry as of 2009 (CEDD, 2009). As of September 2010, approximately 14.2 percent of the workforce in San Bernardino County was unemployed. In 2006, per capita income in San Bernardino County was $27,134, 32 percent less than the State of California at $39,626 (CDOF, 2006).

A high degree of interdependence exists between Fort Irwin and the City of Barstow. Fort Irwin is the largest employer in the area, with more than 10,000 military and civilian personnel assigned to the installation. In turn, Barstow acts as the commercial center and provider of services for residents of Fort Irwin. Other major employers in the area include the Marine Corps Logistics Base (more than 1,800 military and civilian personnel), factory outlet stores (1,200 employees), Burlington Northern Santa Fe Railroad (800 employees), Barstow Unified School District (700 employees), Barstow Community Hospital (200 employees), and NASA Goldstone Tracking Site (190 employees). The City of Barstow private sector employment base is dominated by establishments serving military personnel and their families, and travelers on Interstate 15 and Interstate 40. As discussed under Housing, many off-base personnel live in Barstow, Lenwood, Hinkley, Yermo, Daggett, and Newberry Springs. Civilian personnel assigned to the installation also commute from the Victorville area located more than 40 miles southwest of Barstow along Interstate 15.

Median household income in Barstow is almost 10 percent higher than in Fort Irwin, and per capita income is 28 percent higher. The proportion of the population living below the poverty level is more than 16 percent for Barstow and just over 3 percent for Fort Irwin. Income levels for both areas are substantially lower than the corresponding levels for the State of California.

3.8.4 Community Services

A number of services and facilities available on the Post contribute to the quality of life experienced by residents. These services include law enforcement, fire protection, medical services, schools, family support services, retail shops and services, and recreational facilities.

Law Enforcement Services

Law enforcement at Fort Irwin is provided by 60 personnel. The installation also maintains a cooperative agreement with the San Bernardino County Sheriff.

Fire Protection Services

Off-post fire protection services in the region are provided by the Barstow Fire Protection District, which has three fire stations. The Fire Protection District is staffed by 25 paid firefighters, 6 volunteer firefighters, and 2 non-firefighting employees (Fire Departments Net, 2007). Fort Irwin maintains a mutual assistance agreement with the Barstow Fire Protection District.

Medical and Dental Services

The Medical Department Activity and Dental Activity at the installation provide essential health services to Fort Irwin residents. Weed Army Community Hospital is a 29-bed, one-story facility that houses inpatient and ancillary functions. The hospital was built originally in 1968, with two subsequent additions in the 1980s. The Mary E. Walker Clinic is an ambulatory-care clinic built in 1997 to consolidate most outpatient functions, including outpatient-related administrative functions. Outpatient services include primary care, optometry, audiology, orthopedics, obstetrics and gynecology, mental health, emergency services, preventive medicine, internal medicine, Exceptional Family Member Program, laboratory, pediatrics and baby care, physical exams, physical therapy, radiology, social work services, and substance abuse and rehabilitation services.

The on-post dental care facility is approved to provide dental care to active duty military members. Services provided include general dentistry, pediatric dentistry, oral surgery, and orthodontics. Family members acquire dental services from providers located off-post in neighboring communities.

The primary off-post healthcare provider in the area is the Barstow Community Hospital, with a 56-bed capacity. Also in the immediate area are 61 physicians and surgeons, 19 dentists, 4 optometrists, 6 chiropractors, a convalescent home, and an ambulance air service.

Schools

School districts receive federal funding for students whose parent or parents live on or work on federal property. The amount of federal school aid a district receives is based on the number of students who are considered “federally connected” and attend district schools.

The Silver Valley Unified School District provides K-12 educational services at Fort Irwin with three elementary schools, two middle schools, and two high schools. Three schools are located on the installation, including Lewis Elementary School with a capacity of 695

students; Tiefort View Intermediate School with a capacity of 500 students; and Fort Irwin Middle School with a capacity of 594 students. Enrollment in the 2009/2010 school year at Lewis Elementary was 798, at Tiefort View Intermediate it was 465, and at Fort Irwin Middle School it was 398 (California Department of Education, 2010).

Family Support

Fort Irwin supports numerous programs and services to assist installation residents and employees. Family support includes family counseling, career counseling, and financial counseling. Fort Irwin has two child development centers, a teen center, a school liaison, and youth sports and fitness planning.

Shops and Services

Services available on Fort Irwin include two shoppettes, a laundry facility, a hotel, and several fast food restaurants. On-post shopping includes the Main Store Mall (12 shops), the Mini Mall (shops and services), the commissary, and the thrift shop. Services available include beauty and barber services, dry cleaning, flower shops, tailoring, eye care, video rental, auto rental agency, two gas stations, and laundry facilities. One multiplex theatre is on the installation.

3.8.5 Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations." The Executive Order is designed to focus the attention of federal agencies on the human health and environmental conditions in minority communities and low-income communities. Environmental justice analyses are performed to identify potential disproportionately high and adverse impacts from proposed actions and identify alternatives that might mitigate the impacts.

Information concerning race, ethnicity and poverty levels for the City of Bartow, Barstow vicinity (ZIP Code area 92311), San Bernardino County, and the State of California is presented in Table 3-10. The proportion of the total population of minority groups is higher for the City of Barstow than for San Bernardino County and the State of California, while that for ZIP Code area 92311 is lower. Proportions of minority populations for all geographical areas exceed 50 percent. The proportion of the population below the poverty level in the City of Barstow and in ZIP Code area 92311 is higher than for San Bernardino County and the State of California.

TABLE 3-10
Minority Population and Persons Living Below the Poverty Level for the Fort Irwin and Barstow Area

	City of Barstow	Barstow Vicinity (ZIP Code Area 92311)	San Bernardino County	State of California
Total Population	**20,988**	**31,288**	**1,709,434**	**33,871,648**
Hispanic or Latino (regardless of race)	7,879	10,863	669,902	10,969,132
Non-Hispanic or Latino (except White)	4,277	5,491	290,38	7,131,353
Minority Population	12,106	16,354	960,210	18,100,485

TABLE 3-10
Minority Population and Persons Living Below the Poverty Level for the Fort Irwin and Barstow Area

	City of Barstow	Barstow Vicinity (ZIP Code Area 92311)	San Bernardino County	State of California
Total Population	**20,988**	**31,288**	**1,709,434**	**33,871,648**
Hispanic or Latino (regardless of race)	7,879	10,863	669,902	10,969,132
Percent Minority Population	57.7%	52.3%	56.2%	53.4%
Percent of Population Below Poverty Level	20.3%	16.9%	15.8%	14.2%

Source: Bureau of the Census, Census 2000, SF 3, American FactFinder.

3.8.6 Protection of Children

Executive Order 13405 seeks to protect children from disproportionately incurring environmental health or safety risks that might arise as a result of Army policies, programs, activities, and standards.

Fort Irwin has engaged in an aggressive MFH replacement and upgrade program in recent years. This program has resulted in the construction of 438 housing units since 2000. Potential health and safety concerns are often associated with the presence of lead-based paint and asbestos-containing material (ACM) in residential and other buildings. With the replacement and upgrade of the on-post housing units, the potential for adverse impacts to children has been reduced substantially.

3.9 Transportation

Transportation refers to the movement of vehicles throughout a road and highway network, as well as pedestrian and bicycle activity. The local transportation system at Fort Irwin consists of roadways, pedestrian walkways, and bike paths and is used for normal on-post traffic demands for everyday working, living, or recreational trips. In addition, personnel living off-post commute daily to and from work, and retired military and family members use the service facilities at the installation. The existing cantonment roadway network is adequate to serve the transportation needs of the roughly 15,000 people living and working on the installation. Due to its location, Fort Irwin has limited public transportation. The NTC express bus provides service between Barstow and Fort Irwin five times in the morning between 4:20 a.m. and 6:35 a.m., with five return routes between 3:45 p.m. and 6:00 p.m. Two additional early morning routes to Fort Irwin originate in the Victorville area, returning in the afternoon.

3.9.1 Regional Roads and Conditions

Fort Irwin Road provides public and military access to Fort Irwin from Interstate 15, northeast of Barstow. Fort Irwin Road is a two-lane defense access road (DAR). The U.S. Department of Transportation Federal Highway Administration administers the Federal Lands Highway Program, which includes survey, design, and construction of DARs and other roads for federal lands. The DAR Program was established for the military to fund the cost of public highway improvements necessary to mitigate impacts of defense activity. Fort Irwin Road is a paved, county-maintained road that provides one lane in each direction with numerous sections containing passing lanes. Through the DAR Program, the County of San Bernardino and the Army recently funded

rehabilitation and other improvements on Fort Irwin Road. Fort Irwin Road also can be accessed by Irwin Road, which extends from Barstow northeast to Fort Irwin Road. Fort Irwin Road has two lanes, one in each direction, and is maintained by the County of San Bernardino. According to a study conducted in 2000, the average daily traffic for Fort Irwin Road was 5,182 vehicles. Between October 1989 and September 1999, there were 178 crashes, 153 persons were injured, and 13 persons were killed on Fort Irwin Road.

3.9.2 Local Roads and Conditions

The road network at Fort Irwin resembles a wheel-and-spoke layout. The primary roads within the cantonment area are Outer Loop Road (also known as North Loop Road), Inner Loop Road, and South Loop Road. The Proposed Action is located between Pork Chop Hill Road and B Avenue on 5th Street and southwest of the intersection of B Avenue and Outer Loop Road in the north-central area of the cantonment.

Although access roads and parking areas on the installation are unpaved and semi- improved with gravel to stabilize the sandy earth below, roadways at Fort Irwin primarily consist of medium bituminous and asphaltic concrete pavements. Reinforced concrete pads are provided at some intersections and at other mid-block crossings that are designed to accommodate heavy tactical vehicle movements where asphalt pavement could not withstand such heavy use. There are plans in place to upgrade the shoulders of Fort Irwin road, within the post, by 2014.

A traffic study of local roads in the project area was conducted in the fall of 2010. Average daily traffic counts were collected on the roads surrounding the proposed project area. The roads and traffic counts are listed in Table 3-11 and the complete traffic study is included in Appendix B (CH2M HILL, 2010b).

TABLE 3-11
Average Daily Traffic Counts
Weed Army Community Hospital EA, Fort Irwin, CA

Location	Average Daily Traffic
Outer Loop Road north of the 5th Street intersection	1,880
Outer Loop Road near Fort Irwin Road	1,210
5th Street near Outer Loop Road intersection	3,000
5th Street north of Inner Loop Road	3,590
5th Street between Inner Loop Road and B Avenue	3,580
5th Street between B Avenue and Fort Irwin Road	3,160
Inner Loop Road near 5th Street	1,780
B Avenue between Langford Lake Road and 5th Street	2,510
B Avenue near 5th Street	3,770
The intersection of 5th Street and Fort Irwin Road	7,170
Fort Irwin Road north of the 5th Street intersection	3,240

3.9.3 Traffic Flow and Safety

A 2009 traffic analysis found that major intersections are congested during morning and evening commutes and at lunchtime, but that upgrades were not warranted (Michael Baker,

Jr., 2009). The number of vehicle crashes within the cantonment area between 2004 and October 2008 does not have a clear upward or downward trend, and does not fluctuate directly with soldier rotations (Michael Baker, Jr., 2009). An average of 102 accidents occur per year on Fort Irwin, but the locations of these accidents have not been recorded. Recommendations in the analysis included minor upgrades, such as placement of yield signs or closure of unused curb cuts that appear as driveways. It was anticipated that by 2028, more substantial upgrades would be required such as traffic signals and turn lanes. The existing 100 miles of paved roadways and 45 miles of graded roadways within the cantonment area serve the current needs and mission of the installation.

Fort Irwin generates all but a small amount of the traffic using Fort Irwin Road. The remainder of the traffic comes from ranches, mines, and homes in the area. With the recent growth of Fort Irwin, the amount of congestion on this two-lane highway has increased steadily. The highway experiences heavy traffic use at all times (but especially during the morning and evening peak hours) and safety problems exist. Dangerous conditions develop because heavy transport vehicles and privately owned automobiles share this road.

With the exception of some congestion at the center of the installation during the morning, noontime, and evening rush hours, the Fort Irwin roadways appear to operate well within their design capacities.

3.9.4 Intersection Control

Due to the small size and relatively low traffic flows of the installation, a limited number of intersection controls exist. Standard road signage such as four-way stop signs, yield signs, and pavement markings are used to control traffic. Four-way stop signs are effective for the low traffic flows on most of the primary roadways of Fort Irwin. Traffic signals are at the entrance to Fort Irwin on Fort Irwin Road and at the intersection of Fort Irwin Road and the loop roads. Traffic signals in the vicinity of the proposed site include the following:

- Stop sign for vehicles traveling east and west on Barstow Road at the intersection with North Loop Road near the beginning of the Bicycle Lake water main extension
- Stop signs for vehicles traveling east and west on Goldstone Road at the intersection with Outer Loop Road

3.9.5 Pedestrian and Bicycle Paths

A network of concrete and asphalt sidewalks, bike lanes, and paths throughout the installation is available to residents. Typically, paved paths and sidewalks link the various family and troop housing areas and provide access to administrative areas for pedestrians and bicycle traffic. One area not well served with pedestrian and bicycle paths is south of Barstow Road in the area of older operations and barracks.

3.9.6 Privately Owned Vehicle Parking

In general, privately owned vehicle parking facilities are adequate at Fort Irwin; however, some problem areas exist. These include areas where roadways and parking areas are combined around the main cantonment, which results in drivers backing out of parking

spaces directly into street traffic lanes. Also, some isolated facilities, such as baseball fields, experience congestion and inadequate parking during peak use times.

3.9.7 Aircraft Facilities

Fort Irwin is served by one on-post airfield: Bicycle Lake Army Airfield. Various other helicopter and airstrip facilities are used in support of the hospital and training areas at the installation. Bicycle Lake Army Airfield is on a dry lakebed 2.5 miles north of the cantonment. The helipad closest to the site for the Proposed Action is immediately north of Weed Army Community Hospital and adjacent to Inner Loop Road.

3.10 Utilities

This section describes existing utilities at Fort Irwin, including water treatment and distribution, wastewater collection, stormwater collection, energy sources, communications, and solid waste management.

3.10.1 Water Treatment and Distribution

A private company operates and maintains the Fort Irwin water system under a contract agreement. Fort Irwin draws water from three aquifers located at Bicycle Lake, Langford Lake, and Irwin groundwater basin. Water is extracted through four wells at Bicycle Lake, three wells at Langford Lake, and one well at Irwin groundwater basin (eight wells in total). Nine storage tanks are in the cantonment area, both aboveground and underground storage tanks (USTs). The stored water is distributed through two separate systems, one providing potable drinking water and the other providing chlorinated domestic water for other uses such as showering, washing, and flushing toilets. Approximately 25 to 40 years of groundwater are available in the aquifer that supplies the post (CH2M HILL, 2007).

Drinking water is processed through a reverse osmosis (RO) plant to remove fluoride, arsenic, and other contaminants before entering the drinking water distribution system. The treatment capacity of the RO plant is approximately 150,000 gallons per day (gpd). The treated water is stored in three elevated tanks with a total capacity of 0.43 million gallons (MG). Drinking water demand ranges from 100,000 to 110,000 gpd. It is drawn from a designated faucet located at kitchen sinks and in some bathrooms of each housing unit. Four large storage tanks serve the domestic water system with a capacity of 4 MG. The annual average demand for domestic (nonpotable) water typically ranges from 2 mgd to more than 3 mgd. During the summer, peak daily water demand often can approach 5 mgd. The water storage capacity of 4 MG at Fort Irwin is adequate for the level of development on the installation. The storage tanks along Goldstone Road provide sufficient water pressure throughout the distribution system. The average daily production ranged from 1.4 to 3.8 mgd, with an average daily demand of approximately 2.4 mgd between January 2006 and February 2010.

A new water treatment plant is planned, which will have a maximum daily capacity of 6.0 mgd, and would have the capability to expand up to 12.0 mgd to accommodate future demand increases (CH2M HILL, 2010a). The new treatment plant would provide a single source of potable water for the entire cantonment and eliminate the need for separate distribution systems.

Reverse Osmosis Treatment Facility

The RO facility originally was designed in 1988 for Irwin groundwater basin Well I-2A, which was taken out of service in 1996 due to high nitrate levels. The RO facility was then upgraded to treat disinfected domestic water from the water storage tanks. The existing RO plant was designed for 60 percent water recovery, but it currently operates at approximately 55 percent recovery with waste brine discharged to the sewer. The facility has a normal production capacity of 120,000 gpd and can produce up to 150,000 gpd at peak production. The RO system effectively removes all fluoride and arsenic in the treated water. RO-treated water with a fluoride concentration of approximately 0.1 mg/L is blended with domestic water to meet the desired concentration of 0.6 to 0.8 mg/L for prevention of dental cavities before being pumped to the distribution system.

A waste stream at the RO facility is generated from backwashing granular activated carbon (GAC), from the sand filters, and from cleaning the RO system. In addition, the RO system generates a continuous concentrated brine stream of approximately 47 gpm. The backwash water from the GAC and sand filters is stored in an 8,000-gallon storage tank prior to discharge to the sanitary sewer. The waste streams from the RO system, including brine concentrate and used membrane cleaning solution, are discharged into the Fort Irwin sewage system. All waste streams are conveyed eventually to the existing WWTP.

3.10.2 Wastewater

Fort Irwin has an extended aeration WWTP that consists of a headworks facility, oxidation ditch, two secondary clarifiers, NaOCl generators for disinfection, and an effluent disposal field. Fort Irwin recently expanded the WWTP to include a tertiary treatment system. The new system consists of equalization basins to collect flow after the secondary clarifiers, a pump station, filters, and a chlorine contact basin with provision to divert flow prior to discharging to the effluent percolation ponds. The tertiary system is designed to meet Title 22 regulations for effluent reuse. Water previously treated to secondary standards has been used for irrigating a restricted-access golf course. With the new tertiary system in place, the planned use areas for recycled water would include the pitch-and-putt area, dust suppression, construction areas, and irrigation of five permit-designated areas.

Recent historical flow data recorded at the Fort Irwin WWTP indicate that the average daily flow is 0.98 mgd and the maximum average flow is 1.31 mgd (Table 3-12). While the plant can adequately treat a greater volume of wastewater, the permit requires Fort Irwin to plan for a second oxidation ditch if the inflow exceeds 1.5 mgd, which is 75 percent of the permitted capacity, for 30 consecutive days. Overall, the sanitary sewer collection system provides adequate service.

TABLE 3-12
Wastewater Generation (2007-2009)

Month	Monthly Total (MG)	Daily Average (mgd)
January-07	29.6	0.96
February-07	27.9	1.00
March-07	25.4	0.82
April-07	27.1	0.90

TABLE 3-12
Wastewater Generation (2007-2009)

Month	Monthly Total (MG)	Daily Average (mgd)
May-07	29.8	0.96
June-07	25.6	0.85
July-07	27.0	0.87
August-07	27.8	0.90
September-07	31.1	1.04
October-07	28.0	0.90
November-07	26.8	0.89
December-07	24.2	0.78
January-08	27.4	0.88
February-08	26.7	0.95
March-08	27.0	0.87
April-08	25.8	0.86
May-08	27.4	0.88
June-08	26.8	0.89
July-08	32.3	1.04
August-08	32.2	1.04
September-08	39.3	1.31
October-08	32.2	1.04
November-08	29.6	0.99
December-08	27.3	0.88
January-09	32.1	1.03
February-09	29.2	1.04
March-09	33.2	1.07
April-09	31.1	1.04
May-09	33.2	1.07
June-09	28.1	0.94
July-09	37.3	1.20
August-09	35.2	1.13
September-09	33.2	1.11
October-09	32.0	1.03
November-09	30.8	1.03
December-09	31.6	1.02

TABLE 3-12
Wastewater Generation (2007-2009)

Month	Monthly Total (MG)	Daily Average (mgd)
Monthly Average	**30.4**	**0.98**

3.10.3 Stormwater

Most stormwater at Fort Irwin drains by surface flow; only a small portion of the installation is served by a storm drain system. Surface flow during high-intensity rainfall percolates into the sandy soil of the dry washes or collects on one of the 10 playas at Fort Irwin. The playas range in size from 340 acres to 1,300 acres. Standing water on the playas is a result of low infiltration rates in the evaporated clay lakebeds and is a temporary occurrence.

Stormwater originating from the mountainous regions surrounding the cantonment flows directly toward the developed areas of the installation. Drainage ditches along the northern edge of the cantonment collect runoff from the mountains, diverting the runoff around the installation to the south side where it is allowed to evaporate. Streets and curbs control stormwater drainage in most of the cantonment.

A storm drain system serves one small area of the cantonment that uses surface drains and piping around the troop housing quarters. Stormwater is directed into a collection pipe on Barstow Road. The collection pipe has a northeasterly flow along Barstow Road and eventually discharges into a vacant field. Other smaller self-contained storm drain systems typically collect localized stormwater runoff from maintenance areas and direct it to oil/water separators (OWSs) prior to discharge.

A stormwater ditch crosses the southeast area of the proposed site. The ditch conveys water from the central cantonment area to the northeast where the ditch terminates on the east side of B Avenue in an undeveloped area.

3.10.4 Energy Sources

This section discusses energy use at Fort Irwin, including liquid petroleum gas (LPG) and electricity.

Liquid Petroleum Gas

Fort Irwin uses LPG as its energy source for space heating and water heating. The fuel is conveyed by truck to the installation and stored in five tanks at Facility 4996 and four tanks at Facility 841.

Electricity

Southern California Edison (SCE) owns the electrical system at Fort Irwin and is the responsible entity to ensure that adequate electrical capacity and service are available for existing and future needs at Fort Irwin. The Tiefort Substation recently was upgraded and rebuilt to accommodate future growth at Fort Irwin. The substation now houses two 28-megavolt ampere (MVA) transformers for a total capacity of 56 MVA. The substation is a

115-kilovolt (kV) substation that steps down to 33 kV and feeds two distribution substations in the interior of the base, the Military Substation and Irwin Substation. Because new construction takes place in and around the cantonment of Fort Irwin, SCE is planning and frequently expanding the system to meet the needs of Fort Irwin. Both internal substations have been rebuilt and received significant increases in capacity in the last several years.

Generally, SCE would be expected to serve 12 kV to the site selected for the project. The 12-kV distribution system would be designed for the capacity of the new WTP. Medium-voltage switching and distribution equipment would be installed to distribute the required power throughout the project site. The estimated total design load for the 6-mgd plant is 4,000 to 5,000 kilovolt-amperes (kVA). The Military Substation is located at the northwest corner of the intersection of Goldstone Road and Rhineland Drive, approximately 0.5 mile east of the proposed WTP site. Underground duct banks exist along about half of the route to the proposed WTP site. A new duct bank, with road crossings and manholes, would be constructed to complete the service to the site.

3.10.5 Communications

Verizon, a public telephone service company, provides facilities and equipment for public and family housing areas of the cantonment. Approximately 350 miles of cable, consisting of 2,300 paired lines for local and commercial use, serve the installation. The cables are expandable to a capacity of 5,000 paired lines. Fort Irwin is linked to Barstow through an underground cable, consisting of 40 lines that can become overloaded due to limitations of the switching equipment.

3.10.6 Solid Waste Management

Solid waste generated at Fort Irwin includes municipal solid waste and wastes from commercial, industrial, construction, and demolition activities. Solid waste generated at Fort Irwin is disposed of at the permitted landfill on the installation. Alternatively, waste is recycled or transported off the installation for appropriate disposal. Medical waste generated at Weed Army Community Hospital is handled by a private contractor and is not disposed of in the installation landfill.

Solid waste is collected and transported to the landfill on the installation by standard compacting garbage trucks. On designated collection days, the base operations contractor collects waste from the garbage and recycling containers in the family housing areas. Most other facilities on the installation use large trash receptacles segregated for garbage disposal and recycling.

The Fort Irwin base operations contractor is responsible for collecting recyclable materials throughout the installation. Recyclable materials include mixed office paper, aluminum beverage cans, tin and bimetal food and beverage containers, corrugated cardboard, plastic containers, glass bottles and jars, and newspapers.

The sanitary landfill at Fort Irwin is a Class III permitted facility, located approximately 1 mile east of the cantonment. Landfill operations at Fort Irwin started in the 1970s, and the landfill was expanded in 1981 from 160 acres to 467 acres. The active sanitary landfill is 18 acres, and the remaining landfill is subdivided into seven 25-acre disposal areas. Each cell is excavated to a depth of 25 feet below ground surface and would have a height of 60 feet

above the existing grade. This portion of the landfill expansion area has a liner, a leachate collection system, and a baler facility. The total landfill capacity is estimated at 19 million cubic yards. Assuming the waste is baled and the annual fill rate remains at 36,000 cubic yards, the remaining landfill life would be approximately 400 years. The solid waste generation rate of 36,000 cubic yards per year is equivalent to an average of 99 cubic yards per day.

The sanitary landfill is permitted to receive nonliquid, nonhazardous waste. The facility does not accept hazardous materials, hazardous waste, ammunition, oil-contaminated products, petroleum, oil, lubricant-contaminated soil, batteries, friable asbestos, biological waste, polychlorinated biphenyls (PCBs), toxic chemicals, or lithium/magnesium batteries. Employees at the landfill entrance inspect all deliveries to ensure that only acceptable materials are disposed of at the landfill.

3.11 Hazardous and Toxic Substances

This section describes hazardous and toxic substances in the region, on Fort Irwin, and within the footprint of the Proposed Action, including the construction corridor of the water main extension.

3.11.1 Regulatory Considerations

For this analysis, the terms hazardous waste, hazardous materials, and toxic substances include those substances defined as hazardous by CERCLA, RCRA, or TSCA. In general, these substances include those that, because of their quantity, concentration, or physical, chemical, or toxic characteristics, might present substantial danger to public health or welfare or the environment when released into the environment (USEPA, 1999).

At the state level, the Carpenter-Presley-Tanner Hazardous Substance Account Act (Health and Safety Code Sections 25340 through 25392) was enacted in 1981 to address concerns similar to those addressed by CERCLA. In addition, a facility where hazardous waste or hazardous substances are produced is subject to the California Hazardous Waste Control Law of 1971 (Health and Safety Code Sections 25100 through 25249).

3.11.2 Hazardous Waste Disposal

Fort Irwin has a RCRA permit as a large-quantity generator of hazardous waste. The installation does not operate any storage facilities, but it does operate 90-day accumulation points. The landfill is a Class III disposal area. The DPW for the installation is responsible for managing hazardous wastes, which are placed temporarily in a number of accumulation points distributed throughout the cantonment for less than 90 days prior to transport to an approved offsite hazardous waste disposal facility.

3.11.3 Special Hazards

Asbestos-Containing Materials

The DPW at Fort Irwin maintains records relating to asbestos identification, control, and removal. Supervisors, maintenance workers, facility managers, project engineers, and contractors are required to review asbestos records before starting any maintenance, repair, renovation, or demolition activities. Trained and qualified personnel operate in accordance

with an approved operations and maintenance plan, which details the requirements for abatement of ACM.

Weed Army Community Hospital was built between 1966 and 1968 and could contain ACM.

Lead-Based Paints

Limited lead-based paint (LBP) surveys were conducted at Fort Irwin residential areas in 1994, 1995, and 1996. Sampling was conducted at 182 independent MFH units that were constructed prior to 1965. The random sampling protocol described in the Housing and Urban Development (HUD) guidance document was used in developing the sampling procedures for the LBP survey.

The results of the survey indicate that lead, as defined by HUD, is present on select component types within each of the four series of MFH units constructed prior to 1965. Fort Irwin housing units constructed since the 1990s have not been surveyed for LBP because the use of LBP ceased in 1978.

Army policy calls for controlling LBP by managing it in place (as opposed to mandated removal procedures). In-place management is used to prevent deterioration over time for those surfaces likely to contain LBP, followed by replacement, as necessary. Major renovation or demolition would require that LBP be removed from the housing units (U.S. Army, 1993.) LBP materials have been encapsulated or removed, in accordance with guidelines from the Army, HUD, and Occupational Safety and Health Administration (OSHA). Additionally, the military family housing contractor ensures that pamphlets are issued as individual quarters are leased to housing occupants notifying the inhabitants of the potential risks of LBP.

Polychlorinated Biphenyls

A field survey for PCBs concluded that 826 transformers are at the installation. The manufacturer had labeled 573 of these transformers as non-PCB; the remaining 253 transformers were sampled and tested in the state-approved laboratory. Ten transformers were found to have PCBs, ranging from 5 to 312 ppm. The other nine transformers containing PCBs were left in place with their labels attached and clearly visible. State and federal regulations do not require PCB-containing transformers to be removed, as long as they function properly with no leaks.

Underground Storage Tanks

Four 10,000-gallon underground storage tanks (USTs) are at Building 34. The USTs contain unleaded gasoline for vehicle refueling. No known contamination is associated with the USTs.

Radon

Atmospheric radon is diluted to insignificant levels; however, when concentrated in enclosed areas, radon can present human health risks. Based on field investigations, none of the housing units tested at Fort Irwin contained concentrations of radon greater than the action level of 4 picoCuries (pCi) per liter.

Oil/Water Separators

No OWSs are on the Proposed Action site. Most of the OWS units at Fort Irwin are on the north side of the cantonment and drain to the north of the cantonment.

Unexploded Ordnance

A Phase I ECP was conducted in 2002, which indicated the potential for unexploded ordnance within the 79-acre project area (TechLaw, 2002). The proposed project area was previously used for various ranges. A Phase II ECP was recommended and is scheduled for implementation in January 2011.

4. Environmental Consequences

This section assesses the environmental consequences associated with the Proposed Action and the No Action Alternative. Direct, indirect, and cumulative environmental impacts are described for each resource. Direct effects are caused by the action and occur at the same time and place (40 CFR Section 1508.8). Indirect effects are caused by the action and occur later in time or farther removed in distance but are still reasonably foreseeable (40 CFR Section 1508.8). Cumulative impacts are those that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (40 CFR Section 1508.7). Impact analysis is conducted for each of the resources addressed in the previous section (i.e., land use, geology and soils, biological resources, water resources, air quality, noise, cultural resources, socioeconomics, transportation, utilities, and hazardous materials). As an aid to state agencies involved in the issuance of permits required for implementation of the Proposed Action, impact determinations are provided in a format typically found in a CEQA-compliant EA. These determinations are found at the end of each resource section and in Section 4.13, which addresses growth-inducing aspects of the Proposed Action.

4.1 Land Use Planning and Aesthetics

Potential impacts to land use are assessed for the construction and operation phases of the Proposed Action and the No Action Alternative. Analysis assesses the consistency of the Proposed Action with current land use plans, uses of the proposed sites, and visual characteristics of the surrounding areas.

4.1.1 Proposed Action

Construction Phase

Construction of the Proposed Action would not impact designated land uses. The 79-acre project area is within an area designated by Fort Irwin for development. There would be no impacts to land use during the construction phase.

Operation Phase

The Proposed Action site is adjacent to compatible uses set forth by Fort Irwin and would separate MFH areas directly to the west from industrial areas to the east (Michael Baker, Jr., 2008). The proposed new hospital would be centrally located and easily accessible by Fort Irwin residents and would provide a buffer between housing and industrial areas. The Proposed Action would not result in a substantial degradation of the existing visual character or quality of the site and its surroundings. There would be no impacts to land use due to the Proposed Action.

4.1.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and current conditions would continue into the future.

4.1.3 Cumulative Impacts

Because the Proposed Action would be compatible with land use designations and would not induce any additional impacts on land use, no cumulative effects are anticipated on land use due to the construction and operation of the new hospital.

4.1.4 CEQA Impacts Determination

Land Use

Would the Proposed Action:

a) Physically divide an established community?

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

No Impact – The Hospital and associated facilities be located within the highly developed cantonment and, thus, would not physically divide an established community.

The Proposed Action site is adjacent to compatible uses including the current hospital and helicopter pad. The housing extends from the intersection with 5th Street on the north to Barstow Road on the south. The Proposed Action would not change existing land uses and would not conflict with existing general plan designations. Therefore, the Proposed Action would not conflict with any applicable land use plan, policy, or regulations.

The Proposed Action site is within the West Mojave Desert Conservation Plan area; however, the Proposed Action would not conflict with requirements of the plan. Therefore, the Proposed Action would not conflict with any applicable habitat conservation plan or natural community conservation plan.

Aesthetics

Would the Proposed Action:

a) Have a substantial adverse effect on a scenic vista?

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No Impact – No officially recognized scenic vistas are in the vicinity of the Proposed Action. Therefore, implementation of the Proposed Action would not cause a substantial adverse impact on a scenic vista.

No scenic resources or scenic highways are located at or in the vicinity of the Proposed Action site. Implementation of the Proposed Action would have no impact on trees, rock outcroppings, or historic buildings within the viewshed of a state scenic highway. Therefore, the Proposed Action would have no impact on scenic resources within a state scenic highway.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less Than Significant Impact – The new hospital would be located in the Fort Irwin cantonment and would replace the existing hospital facility. The Proposed Action site is adjacent to compatible uses set forth by Fort Irwin and would separate MFH areas directly to the west from industrial areas to the east (Michael Baker, Jr., 2008). The Proposed Action would not result in a substantial degradation of the existing visual character or quality of the site or its surroundings. Therefore, the Proposed Action would have a less than significant impact on the existing visual character or quality of the site and its surroundings.

The Proposed Action would not create a new source of light or glare. Temporary construction activities would occur primarily during daylight, and no lighting would be needed. Construction lighting for nighttime work activities would be directed downward and shielded so that light would not shine on adjacent areas. Therefore, the Proposed Action would have a less than significant impact associated with the creation of a new source of substantial light or glare affecting day or nighttime views in the area.

Agriculture

Would the Proposed Action:

a) *Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use?*

b) *Conflict with existing zoning for agricultural use, or a Williamson Act contract?*

c) *Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland, to nonagricultural use?*

No Impact - The Proposed Action site does not occupy, nor would it influence, any areas of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Therefore, the Proposed Action would have no impact on these agricultural resources.

The Proposed Action site is not zoned for agricultural use and is not under a Williamson Act contract and, therefore, would not conflict with zoning for agricultural use or with a Williamson Act contract.

The Proposed Action area does not contain farmland and would not affect agricultural resources including the conversion of Farmland to nonagricultural use. Therefore, the Proposed Action would not involve other changes in the existing environment that, due to their location or nature, could result in the conversion of Farmland to nonagricultural use.

4.1.5 Mitigation Measures

In the absence of significant impacts to land use, no mitigation measures are required.

4.2 Geology, Soils, and Mineral Resources

This section addresses the suitability of the potential sites for project construction and operation based on geologic, soils, and mineral resources

4.2.1 Proposed Action

Construction Phase

Geologic and Mineral Resources. No important geologic or mineral resources are present in the Proposed Action area; therefore, no potentially adverse impacts to geologic or mineral resources would occur due to construction.

Seismicity. The region is known for earthquake activity, and several faults are located within the immediate vicinity of the Proposed Action. The Proposed Action site is not crossed by a mapped surface trace, nor is it located in an Alquist-Priolo EFZ associated with these faults.

The design of the new hospital would be based on current building codes, standards, and regulations that take into account seismic engineering provisions. The design would also satisfy the requirements of California SB 1953. Because the design and engineering of the new hospital would follow codes, standards, and regulations that take seismic provisions into

account, the Proposed Action is not expected to result in significant impacts due to seismic activity.

Soils. No important soil resources are present in the Proposed Action area. The surface soils located on the Proposed Action site are highly disturbed, primarily from vehicle movement, community uses, and past construction endeavors. Further disturbance to soils would occur during construction of the new hospital. Construction of the new hospital would disturb soils and permanently alter the proposed site. Portions of the site would have a paved surface, which would inhibit soil exposure and change the soil infiltration capabilities.

Construction activities could temporarily increase soil erosion, especially wind erosion. Fine particulate matter found on the desert surface could become airborne and create adverse dust conditions. Heavy equipment would be used to grade the site, move and compact soils, and remove debris during construction and paving activities. The impacts would be temporary and could be reduced by using standard Best Management Practices (BMPs) such as dust suppression techniques that could include spraying the ground with water (see Section 4.5). Fort Irwin currently implements dust abatement programs that address problems associated with wind erosion and suspension of particles, including chemical stabilization and re-vegetation (USACE, 2006). Additionally, the requirements set forth in Rule 403.2, fugitive dust control for the Mojave Desert Planning Area, would be adhered to (Mojave Desert Air Quality Management District, 1995). Implementation of current practices and standard construction BMPs to reduce erosion and airborne dust would minimize negative impacts to soils during construction; therefore, less than significant impacts would occur.

Erosion of soils due to stormwater would be reduced by implementing BMPs for prevention of runoff (see Section 4.4) would minimize negative impacts to soils during construction; therefore, no significant adverse impacts to soils would occur.

Operation Phase

No change in the geologic and topographic conditions would occur during operation of the new hospital; therefore, no adverse impacts would result from implementation of the Proposed Action.

Operation of the new hospital would not result in an adverse long-term impact to site soils because standard erosion control practices currently implemented by Fort Irwin would continue. The grounds around the new hospital would be xeriscaped and post-construction stormwater BMPs would be designed and implemented to maintain 10-year storm pre-development flows onsite and attenuate the offsite impacts of larger storms. Operation of the new hospital would occur on paved surfaces; therefore, no adverse impacts to soils would occur due to operation of the Proposed Action.

4.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and current conditions would continue into the future.

4.2.3 Cumulative Impacts

In the absence of significant impacts to the geology, soils, or mineral resources at the site, no cumulative impacts would occur.

4.2.4 CEQA Impacts Determination

Would the Proposed Action:

Geology and Soils

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the state geologist for the area or based on other substantial evidence of a known fault?

No Impact – Surface fault rupture is the offset or rupture of the ground surface by relative displacement across a fault during a seismic event or earthquake. The 1999 updated version of the 1997 edition of Special Publication 42 indicates that the Proposed Action would not be located in an Alquist-Priolo Special Study Zone (CDMG, 1999). As such, no indications exist of the presence of known active faults crossing the Proposed Action site. Therefore, the Proposed Action would have no effects related to the exposure of people or structures to potentially substantial adverse impacts, including risk of loss, injury, or death, from the rupture of a known earthquake fault.

ii) Strong seismic ground shaking?

iii) Seismic-related ground failure, including liquefaction?

Less Than Significant Impact - The region is known for earthquake activity, and several faults are in the immediate vicinity of the Proposed Action site. A site-specific deterministic and probabilistic analysis of ground motion was performed for active faults within the region. The Proposed Action site is not crossed by a mapped surface trace, nor is the Proposed Action site in an Alquist-Priolo EFZ associated with these faults. Therefore, the Proposed Action would likely not be susceptible to significant hazards from fault rupture.

The design of the hospital and associated facilities would be based on the 2006 International Building Code, and standards and regulations that take into account seismic engineering provisions. Because the design and engineering of the hospital and associated facilities would follow codes, standards, and regulations that take seismic provisions into account, the Proposed Action would not be expected to result in significant impacts due to seismic activity.

The Proposed Action site is not in an area of shallow groundwater and the potential for liquefaction is low. Because construction would be temporary, and operations would require minimal onsite O&M staff, and because the Proposed Action would be constructed in conformance with the 2006 International Building Code, exposure of persons or structures to potential substantial adverse effects, including risk of loss, injury, or death, from seismic-related ground failure, including liquefaction, would be considered a less than significant impact.

iv) Landslides?

No Impact – The Proposed Action site is not in an area of probable landslides. Therefore, the Proposed Action would not result in an impact related to landslides.

b) Result in substantial soil erosion or the loss of topsoil?

c) *Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or offsite landslide, lateral spreading, subsidence, liquefaction or collapse?*

d) *Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?*

Less Than Significant with Mitigation - The surface soils on the Proposed Action site are highly disturbed, primarily from historical use and erosion due to water movement that has formed washes on the site. Further disturbance to soils would occur during construction of the hospital and associated facilities. Construction of the hospital and associated facilities would disturb soils and permanently alter the proposed site to a paved surface.

Construction activities could increase the hazard of soil erosion, especially wind erosion. Fine particulate matter found on the desert surface could become airborne and create adverse dust conditions. Heavy equipment would be used to grade the site, move and compact soils, and remove debris during construction and paving activities. The effects would be temporary and would be reduced by using standard dust suppression practices. Fort Irwin currently implements dust abatement programs that address problems associated with wind erosion and suspension of particles, which includes chemical stabilization and revegetation (USACE, 2006). Implementation of current practices, and standard construction BMPs to reduce erosion and airborne dust would minimize negative impacts to soils during construction. Erosion of soils due to water would be reduced by implementing BMPs for prevention of water runoff. Implementation of standard engineering design and construction practices would minimize impacts associated with soil erosion and loss of topsoil. Measures that would be taken to minimize soil erosion impacts are summarized in the mitigation measures section.

An evaluation of liquefaction and landslide potential is addressed in Items iii) and iv). The Proposed Action would be designed and constructed in conformance with the 2006 International Building Code seismic engineering standards. Furthermore, backfill would be placed to meet standard engineering design requirements and local grading practices. Potential impacts due to an unstable geologic unit or soil, including onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse, would be less than significant.

The Proposed Action would not result in a significant adverse impact from expansive soils, as defined in Table 18-1-B of the Uniform Building Code (an expansion index greater than 20), creating no substantial risks to life or property.

e) *Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?*

No Impact - No septic tanks or alternative wastewater disposal systems would serve the Proposed Action; therefore, the Proposed Action would not result in impacts related to septic tanks or wastewater disposal systems.

Mineral Resources

a) *Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?*

b) *Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?*

No Impact – The Proposed Action would not use mineral resources and would not affect the availability of any known mineral resources, nor would the Proposed Action result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.

The Proposed Action site is not in a delineated mineral resource recovery site; therefore, the Proposed Action would not result in the loss of availability of a locally important mineral resources recovery site.

4.2.5 Mitigation Measures

Although no significant adverse impacts to soils are anticipated, a number of measures would be implemented to reduce potential adverse impacts. To protect the soil surrounding the hospital and associated facilities project site during construction, numerous erosion and sediment control measures and other BMPs would be implemented. In addition, a stormwater pollution prevention plan (SWPPP) would be prepared, which would ensure that appropriate measures are taken to minimize soil erosion and protect the surrounding soils. Erosion control measures that could be used during construction to protect exposed soil and minimize erosion include compost blankets, mulching, riprap, seeding and sodding, geotextiles, and slope drains. Sediment control measures could include compost filter berms and socks; fiber rolls or berms; sediment basins, rock dams, filters, chambers, or traps; silt fences; storm drain inlet protection; and hay bales.

4.3 Biological Resources

Potential impacts to biological resources related to implementation of the Proposed Action would be associated with ground disturbance during the construction of the new hospital.

4.3.1 Proposed Action

Construction Phase

Flora

Potential Effects on Vegetation Communities

Approximately 79 acres of previously cleared, low quality Mojave creosote bush scrub habitat would be permanently lost as a result of the Proposed Action. Additional areas within the 79-acre project area would be temporarily disturbed during construction activities. However, the effect on biological resources would be minimal because substantial additional creosote bush scrub is in the vicinity and throughout the Fort Irwin area, including expansive areas that are undisturbed and more favorable as habitat.

Potential Effects on Special-Status Species

Federal- or State-Listed Species. Based on the August 2010 survey of the proposed project area, a no effects determination was made for federally protected plant species as a result of construction or operation of the Proposed Action. The Lane Mountain milkvetch was not observed during surveys and would not be anticipated to be present because the species generally occurs at higher elevations or on less disturbed sites than are found at the Proposed Action site or vicinity. As such, no impacts would be anticipated to affect the species from implementation of the Proposed Action.

Other Special-Status Species. The alkali mariposa lily was not observed on the Proposed Action site and would not be expected on the site due to lack of habitat. Therefore, no impacts would be anticipated to affect the species from the Proposed Action.

The desert cymopterus was not identified on the Proposed Action site. Although potential habitat may exist, the species has not been documented in the area and is not likely to occur. As such, no impacts to the species are anticipated from implementation of the Proposed Action.

No Barstow woolly sunflower, small-flowered androstephium, or Mojave monkeyflower were identified on the Proposed Action site. None of these species has been detected as far north as Fort Irwin and are not expected to occur on the project site. Therefore, no impacts would be anticipated to affect the species from implementation of the Proposed Action.

Jurisdictional Waters

No wetlands are present on or adjacent to the proposed site. Therefore, the Proposed Action would not have the potential to adversely impact wetlands. The ephemeral drainages on the proposed site are geologically isolated and are not navigable waterways. The ephemeral drainages on the proposed site do not contain the riparian vegetation typically associated with intermittent washes. Therefore, the ephemeral drainages within the proposed site are not subject to jurisdiction under Section 404 of the CWA. As such, no impacts to jurisdictional waters would occur from the implementation of the Proposed Action.

Wetlands

No wetlands are present on the Proposed Action site.

Fauna

Potential Effects on Federal- and State-Listed Species

Based on the August 2010 survey of the proposed project area, a no effects determination was made for federally protected animal species (e.g. the desert tortoise), as a result of construction or operation of the Proposed Action.

Peregrine Falcon. This subspecies would likely not be present at the Proposed Action site except as an occasional transient. The species is not dependent on the habitat potentially disturbed by the Proposed Action; therefore, no impacts on the species would be anticipated.

Southwestern Willow Flycatcher, Least Bell's Vireo, and California Black Rail. Riparian and wetland habitat are lacking at the Proposed Action site. As such, no impacts would be anticipated to affect southwestern willow flycatcher, least Bell's vireo, or California black rail from implementation of the Proposed Action.

Desert Tortoise. No desert tortoises, scat, carcasses, or burrows were observed within the Proposed Action site. Because of site disturbance, the lack of historical records in the immediate vicinity of the Proposed Action site, and the low population in the region, the likelihood of desert tortoise being present on the Proposed Action site is low. However, some possibility exists that a tortoise might be encountered during the construction period. Measures that should be taken to avoid an impact to tortoises are summarized in the mitigation measures section.

Swainson's Hawk. This species might migrate through Fort Irwin but would not breed in the vicinity of the Proposed Action site or forage in the area for prolonged periods. The species is not dependent on the habitat potentially disturbed by the Proposed Action; therefore, no impacts on the species would be anticipated.

Mohave Ground Squirrel. This species was not observed on the Proposed Action site during surveys. Preferred forage plants for this species (winter fat or spiny hopsage) were absent from the Proposed Action site. Because Mohave ground squirrels are most often found where these forage plants occur, the species is not likely to be present on the Proposed Action site. Therefore, no impacts on the species would be anticipated from implementation of the Proposed Action.

Potential Effects on Other Special-Status Species

Additional special-status species might occur on the Proposed Action site or in the vicinity. Of these species, Bendire's thrasher, burrowing owl, Crissal thrasher, Le Conte's thrasher, and loggerhead shrike have the potential to breed on the Proposed Action site. In addition to breeding birds, a number of special-status birds might forage on the Proposed Action site. These could include California gull, golden eagle, northern harrier, and Vaux's swift, and wintering ferruginous hawks. Although these species might avoid the project area during active construction, ample other foraging habitats are available nearby for these species, and no long-term impacts would be anticipated from implementation of the Proposed Action.

Wetlands and riparian habitats are absent from the Proposed Action site. Therefore, additional special-status species that typically utilize these habitats would not be affected by implementation of the Proposed Action.

Potential Effects from Pest Species

Construction activity could attract pest species, including ravens, to the site. This would be temporary, and pest species would disperse when construction is complete. Good housekeeping during construction would minimize pest species onsite (Table 4-6).

Operation Phase

Common and special-status wildlife may return to the Proposed Action area upon completion of construction for foraging or stopovers during migration periods. Expansive foraging habitats are available nearby for these species, and no long-term impacts would be anticipated from implementation of the Proposed Action. The permanent loss of low quality, highly disturbed Mojave creosote bush scrub is not expected to interfere with the movement of any native resident or migratory bird or wildlife species, or with established native resident or migratory wildlife corridors. The proposed site is surrounded by development. Ample undisturbed creosote bush scrub habitat is present in the vicinity of the Proposed Action site.

Potential Effects from Pest Species

Development, including the cantonment area, tends to attract pest species, including ravens, typically by improperly discarded waste. Good housekeeping and proper waste management while operating the hospital would minimize pest species onsite (Table 4-6).

4.3.2 No Action Alternative

Flora

Under the No Action Alternative, the new hospital would not be constructed and there would be no effect on plant communities in the proposed project area.

Fauna

Under the No Action Alternative, the new hospital would not be constructed. Potential impacts to wildlife, including general wildlife and special-status species that encompass federal- and state-listed species and other special-status species, would not occur.

4.3.3 Cumulative Impacts

Some loss of creosote bush habitat could occur; however, the habitat already is degraded substantially, and ample intact habitat is available in the region. Therefore, the loss of creosote bush habitat at the Proposed Action site would be insubstantial. Direct effects on desert tortoise would be unlikely because the proposed sites do not appear to be occupied habitat; therefore, no cumulative impacts would be anticipated.

4.3.4 CEQA Impacts Determination

Would the Proposed Action:

a) *Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?*

Less Than Significant with Mitigation – A number of special-status species, including the desert tortoise, Bendire's thrasher, burrowing owl, Crissal thrasher, Le Conte's thrasher, and loggerhead shrike have the potential to breed on the Proposed Action site. Other birds, including birds protected under the MBTA, could nest or forage on the Proposed Action site. Implementation of a number of mitigation measures that are detailed below as part of the Proposed Action would reduce potentially significant impacts to a level of less than significant. With implementation of these measures, the Proposed Action would not have a substantial adverse impact, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the USFWS.

b) *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?*

c) *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*

d) *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?*

e) *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?*

f) *Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?*

No Impact – The Proposed Action area does not support riparian habitat or other sensitive natural communities identified in local or regional plans, policies, or regulations.

The intermittent desert washes existing on the Proposed Action site drain to the Irwin groundwater basin, which is geologically isolated and is not a navigable waterway. Therefore, the Proposed Action would not require permitting under the jurisdiction of Section 404 of the CWA. As such, implementation of the Proposed Action would not affect jurisdictional waters. No wetlands are on the Proposed Action site.

The permanent loss of limited, highly disturbed Mojave creosote bush scrub is not expected to interfere with the movement of any native resident or migratory bird or wildlife species,

or with established native resident or migratory wildlife corridors. Ample undisturbed creosote bush scrub habitat is present in the vicinity of the Proposed Action site. No native wildlife nursery sites are located at the Proposed Action site.

The Proposed Action would not conflict with any local policies or ordinances protecting biological resources for the area of the Proposed Action site.

The Proposed Action site is located within the geographical area covered by the West Mojave Desert Conservation Plan; however, implementation of the Proposed Action would not conflict with its requirements. Therefore, the Proposed Action would not conflict with any applicable habitat conservation plan or natural community conservation plan.

4.3.5 Mitigation Measures

Desert Tortoise

To avoid potential effects to this federally listed species, the following measures would be implemented consistent with USFWS guidelines, during implementation of the project.

- Within 2 weeks of the onset of construction, 100 percent coverage ground surveys of the project site would be conducted for tortoises, signs of use, or burrows. If no tortoises or active burrows are identified, then construction would proceed without interruption.
- If active burrows or tortoises are identified, then tortoises would be relocated to areas off the construction area, and burrows would be collapsed. Tortoise relocation would require a Section 10(a) permit issued by the USFWS under the federal ESA.
- During land clearing and construction, a biological monitor would be available to observe construction activities and verify that no tortoises wander into construction sites. If a tortoise were to enter a construction site, construction in the immediate vicinity would be halted while the tortoise is relocated off the site.
- Before construction begins, all personnel working on the site would receive a briefing on the desert tortoise, detailing the life history of a tortoise and the protocol to follow if a tortoise is encountered at the work site.

Other Special-Status Species

Bendire's thrasher, burrowing owl, Crissal thrasher, Le Conte's thrasher, and loggerhead shrike have the potential to breed on the Proposed Action site. To avoid potential effects on nesting birds, including birds protected under the MBTA, the following measures would be implemented as part of the Proposed Action:

- Land and vegetation clearing would occur outside the breeding season for these birds, defined as February 15 to August 31, where practicable.
- If vegetation clearing is required during the breeding season, then preconstruction surveys of breeding birds would be conducted. Identified active nests would be protected from disturbance by a 500-foot nesting buffer, which would remain in place until the young have fledged and no new nests are initiated for the season.

Pest Species

Construction activity might attract additional pest species, including ravens, where additional food or trash is available. To avoid potential adverse impacts, the following measures would be implemented as part of the project.

- During construction, all trash and debris would be placed in receptacles for delivery to approved landfill facilities. Cleanup of trash and debris onsite would be required on a daily basis, including emptying and disposing of trash in receptacles.

4.4 Water Resources

This section addresses potential impacts to surface water and groundwater resources during construction and operations phases of the project.

4.4.1 Proposed Action

Construction Phase

Surface Water. Surface water impacts would be minimized during construction by implementing appropriate BMPs for stormwater. Proper BMPs would be implemented prior to start of land grading. Natural vegetation would be preserved when possible. Erosion, runoff, and sediment control measures would be implemented in case of a stormwater event. Erosion control measures such as compost blankets, mulching, riprap, watering, seeding and sodding, geotextiles, and slope drains could be used to protect exposed soil and minimize erosion. BMPs such as check dams, slope diversions, and temporary diversion dikes could be implemented for runoff control. Sediment control measures that could be implemented include compost filter berms and socks; fiber rolls or berms; sediment basins, rock dams, filters, chambers, or traps; silt fences; storm drain inlet protection; and weed-free hay bales. Good housekeeping measures would be practiced during construction. Site-specific stormwater BMPs would be detailed in a construction SWPPP, which would be prepared by the contracted construction company before breaking ground.

During operation of the Proposed Action, potential impacts on surface waters would be minimized by practicing good housekeeping at the facility to prevent unwanted materials from being washed away during storm events. Examples of good housekeeping practices include properly storing materials and maintaining the site free of spills. Additionally, post-construction BMPs, such as retention ponds, would be built to maintain 10-year storm pre-development flows on site and attenuate the offsite impacts of larger storms. A summary of project design measures is presented in Section 4.12 .

Groundwater. Project construction would require water for use during typical activities such as dust control, soil compaction, and general housekeeping practices. The source of water during construction would be a combination of groundwater from the Bicycle Lake, Irwin, and Langford Lake groundwater basins. Based on the relatively small estimated volume of water that would be used for construction purposes, little or no impact to groundwater resources would occur.

Operation Phase

Surface Water. Good housekeeping practices would be followed at the hospital site during operations; therefore, adverse impacts on surface water resources from spills or stormwater runoff would not be anticipated.

Groundwater. Continued operation of the existing WTP and operation of the hospital WTP could cause three types of impacts to groundwater resources (i.e., water levels, water quality, and subsidence).

Groundwater Production and Water Level. Average annual production rates for water demand are approximately half the peak demand. The current annual groundwater production from the Bicycle Lake, Irwin, and Langford Lake groundwater basins combined is 3.5 mgd.

Impacts are discussed per basin and are based on groundwater basin input versus output accounting (Table 4-1). For the Proposed Action, groundwater resources would continue to be affected in the Bicycle Lake and Langford Lake groundwater basins because groundwater pumping is greater than basin recharge. Approximately 1.37 mgd and 1.33 mgd of water would be drawn from the Bicycle Lake and Langford Lake reservoirs, respectively, which would result in a decline of groundwater levels due to the absence of significant recharge. In response to current demand, observed water levels in the Bicycle Lake and Langford Lake groundwater basins are declining steadily, supporting this conclusion (CH2M HILL, 2006a).

TABLE 4-1
Fort Irwin Estimated Average Annual Groundwater Recharge and Discharge Rates (mgd)

	Recharge		Total	Total	Basin
Basin	**Artificial**	**Natural**	**Recharge**	**Discharge**	**Impact**
Bicycle Lake		+ 0.03	+ 0.03	- 1.4	-1.37
Langford Lake		+ 0.07	+ 0.07	- 1.4	-1.33
Irwin	+ 0.8	+ 0.04	+ 0.84	- 0.7	+ 0.14
Total	**+ 0.8**	**+ 0.14**	**+ 0.94**	**- 3.5**	**- 2.56**

Note: Positive and negative signs refer to recharge and discharge, respectively

Water Quality. Contaminants in groundwater could increase in concentration as drawdown occurs.

Land Subsidence. Land subsidence is a direct function of water level drawdown in addition to other aquifer and aquitard properties. Modeling results have shown that at least 35 years, but no more than 50 years, would be required for water levels to drop by 200 and 400 feet under the existing demand scenario, resulting in 5 to 10 feet of land subsidence (CH2M HILL, 2006a). The higher values of subsidence could be significant and result in fissures, especially at the margins of the basin and/or where faults have lifted bedrock underneath the basin. In both such instances, land subsidence could lead to abrupt changes in land surface elevations and/or fissuring.

4.4.2 No Action Alternative

Under the No Action Alternative, water would continue to be extracted from each of the three groundwater basins that currently supply Fort Irwin. With extractions exceeding replenishment, groundwater levels would likely continue to fall in the Bicycle Lake and Langford Lake groundwater basins; water quality would continue to deteriorate in Irwin groundwater basin; and land subsidence would continue.

4.4.3 Cumulative Impacts

No cumulative impacts would be expected to surface waters due to the lack of substantial surface water features in the Proposed Action area. Most dry washes would be temporarily affected during construction and then return to preconstruction conditions.

The WWTP effluent currently is providing irrigation water for the Fort Irwin golf course. The combination of conservation and recycled water would reduce future demand. These efforts

would be anticipated to reduce the size of future expansions in WTP capacity, which would result in less water being withdrawn and fewer cumulative impacts on groundwater resources.

4.4.5 CEQA Impacts Determination

Would the Proposed Action:

a) *Violate any water quality standards or waste discharge requirements?*

b) *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?*

c) *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or offsite?*

d) *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?*

Less Than Significant with Mitigation – Ephemeral washes within the construction corridor of the extension of the water main would be avoided during construction when feasible. Temporary impacts to the quality of surface water could occur during construction of the Proposed Action. Temporary impacts would be associated with stormwater and include the potential for increased sediment and pollutant loading to surface waters from stormwater runoff. Exposed soil associated with trench excavation spoil would increase the potential that stormwater runoff would contribute runoff to the ephemeral washes.

Construction staging would occur within the Proposed Action site; thus, any residual oil, grease, or other fuel products from equipment would be maintained onsite and would not affect surface waters. Potential temporary construction-related impacts to surface water quality associated with increased sediment and residual oils in stormwater runoff would be minimized during construction by implementing appropriate BMPs for stormwater, which are summarized in the mitigation measures section. Washes that would be crossed during construction would be crossed using all applicable BMPs. The ephemeral washes would be restored to preconstruction conditions after construction activities are completed, leaving no long-term adverse impacts. No water quality standards or waste discharge requirements would be affected.

Operation of the Proposed Action would include discharge of 125,000 gallons per week of RO waste to the WWTP system. Operation of the Proposed Action would be anticipated to result in an impact that is less than significant to water quality, including quality of groundwater.

Regardless of the action taken, groundwater extractions would exceed replenishments, both natural and artificial. However, groundwater supplies would continue to be depleted with implementation of the Proposed Action. The local groundwater table level would continue to fall because total groundwater extractions would exceed replenishment by natural recharge and the percolation of wastewater. However, such extractions would be less than those under the No Action Alternative.

Implementation of mitigation measures outlined below would reduce impacts associated with erosion or siltation, on- or offsite, to a less than significant level.

Existing drainage courses of the site or area would be avoided during construction, where practicable, and would be restored to their preconstruction condition following the completion of construction activities, to the extent practicable.

e) *Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?*

No Impact – Construction activities would be limited to the Proposed Action site and BMPs would be implemented to control erosion and sedimentation of excavated soils from stormwater runoff. This would prevent erosion and sedimentation, associated with stormwater, from affecting surface waters. Operation of the Proposed Action would not create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems. The Proposed Action would not be anticipated to result in a significant adverse impact related to polluted runoff or the capacity of existing stormwater drainage systems.

f) *Otherwise substantially degrade water quality?*

Less Than Significant with Mitigation – Refer to Response VIII. a), which addresses potential impacts to water quality and proposes mitigation measures to reduce potential impacts to less than significant.

g) *Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?*

h) *Place within a 100-year flood hazard area structures which would impede or redirect flood flows?*

i) *Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?*

j) *Inundation by seiche, tsunami, or mudflow?*

No Impact – No housing development would be associated with the Proposed Action.

The Proposed Action would not include structures that would impede or redirect stormwater flows. Therefore, no impacts would be associated with the placement of structures that would impede or redirect flood flows within a 100-year flood hazard area.

No levee or dam would be within the vicinity of the Proposed Action. Therefore, no impacts would be associated with risk of loss, injury, or death involving flooding as a result of the failure of a levee or dam.

Based on the location of the Proposed Action site, inundation by a seiche or tsunami is virtually impossible, and the proposed site would not be exposed to mudflows.

4.4.6 Mitigation Measures

Surface Water

Surface water impacts would be minimized during construction by implementing appropriate BMPs for stormwater. Proper BMPs would be in place before land grading begins. Natural vegetation would be preserved when practicable. Erosion, runoff, and sediment control measures would be implemented in case of a stormwater event. Erosion control measures such as compost blankets, mulching, riprap, seeding and sodding, geotextiles, and slope drains would be used to protect exposed soil and minimize erosion. BMPs such as check dams, slope diversions, and temporary diversion dikes would be implemented for runoff control. Sediment control measures that would be implemented include compost filter berms and socks; fiber rolls or berms; sediment basins, rock dams, filters, chambers or traps; silt fences; storm drain inlet

protection; and hay bales. Good housekeeping measures would be practiced during construction. Site-specific stormwater BMPs would be detailed in a construction SWPPP, which would be prepared by the contracted construction company prior to breaking ground.

During operation of the Proposed Action, potential impacts on surface waters would be minimized by practicing good housekeeping at the facility to prevent any unwanted materials from being washed away during storm events. Examples of good housekeeping practices include properly storing materials and maintaining the site free of spills.

Groundwater

Mitigation of groundwater impacts would be achieved by increasing pumping of the Irwin groundwater basin for source water, because it is currently the only basin that is being recharged. This would lessen the pumping stress placed on the Bicycle Lake and Langford Lake groundwater basins. Mitigating subsidence can be done only by raising groundwater levels, which is accomplished at the Irwin groundwater basin by recharging the aquifer with treated effluent from the WWTP.

The desert location of Fort Irwin and the scarcity of water resources make water conservation and resource management critical. Initiatives are underway to increase the use of desert landscaping (xeriscaping) designed to use regional, arid-tolerant landscaping for new development on-post. In addition, redevelopment of existing large grassy areas that do not provide recreational opportunities and require extensive irrigation would be implemented where feasible. Education and conservation would reduce water demand by as much as 5 percent. Reducing groundwater uses that have high evaporation rates, such as landscaping, and conserving water would increase the ratio between wastewater discharge and groundwater production (currently about 30 percent) and would increase basin recharge, ultimately reducing impacts to groundwater resources and land subsidence.

Additionally, a new tertiary WWTP was brought online last year, and provides a source of recycled water for irrigation purposes. This source of water would provide an anticipated 0.2 to 0.4 mgd of water for irrigating military training fields, ball fields, and parks. Additional piping is planned to be installed to increase the availability of recycled water for irrigation purposes.

4.5 Air Quality

The air quality impacts of the action are evaluated by comparison to the MDAQMD significance thresholds (MDAQMD, 2002) and the general conformity de minimis thresholds. The MDAQMD significance thresholds, summarized in Table 4-2, are used to evaluate the impacts during construction and operation phases of the project. Project construction is expected to last approximately 24 months; thus, the total of construction and operation emissions are compared to the annual MDAQMD thresholds due to construction lasting greater than a year. If project-related emissions are predicted to be less than the thresholds, the project would not violate an ambient air quality standard. The Proposed Action would be in a federal moderate nonattainment area for PM_{10}; therefore, the general conformity de minimis threshold of 100 tons per year is used for the conformity analysis.

TABLE 4-2
Air Quality Significance Thresholds

Pollutant	Annual Threshold (tons per year)
Carbon Monoxide (CO)	100
Oxides of Nitrogen (NO_X)	25

TABLE 4-2
Air Quality Significance Thresholds

Pollutant	Annual Threshold (tons per year)
Volatile Organic Compounds (VOC)	25
Oxides of Sulfur (SO_X)	25
Particulate Matter (PM_{10})	15

Source: MDAQMD, 2002.

4.5.1 Proposed Action

The Proposed Action would entail construction of a new hospital on 79 acres of vacant land within the Fort Irwin cantonment, adjacent to 5th Street and B Avenue. The new hospital would be constructed on an approximately 26-acre portion of that parcel. Air quality impacts from construction and operation of the Proposed Action were evaluated based on the significance criteria presented above. Operation emissions resulting from the Proposed Action would include stationary sources, area sources, and mobile sources. The Proposed Action would include two diesel backup generators estimated at 800 kW each, boilers with up to 200,000-BTU capacity, a 5,000-gallon diesel tank, a helipad, 330 staff persons and 162 civilian contractors, and mobile sources from operation of the vacated facilities. It was assumed that the stationary sources at the existing hospital would be taken out of service once the replacement hospital becomes operational.

Construction Phase

Project construction would result in short-term emissions of CO, NOx, VOC, SOx, PM10, and PM2.5. Exhaust emissions would result from construction equipment and fugitive dust emissions would result from soil disturbing activities. Construction emissions were estimated using the URBEMIS2007 model and assuming construction of a 216,374-ft^2 hospital and disturbance of approximately 79 acres. The URBEMIS2007 output is included in Appendix C. Table 4-3 summarizes the peak construction emissions.

The peak annual construction emissions would be less than the MDAQMD significance thresholds; therefore, construction of the Proposed Action would not have an adverse effect on air quality.

TABLE 4-3
Proposed Action Construction Emissions
Weed Army Community Hospital EA, Fort Irwin, CA

	Peak Year Emissions (ton/yr)					
Emission Source	VOC[a]	CO	NOx	SOx	PM_{10}	$PM_{2.5}$
Construction Emissions	2.44	2.1	2.4	<0.01	3.6	0.84
MDAQMD Thresholds (ton/yr)	25	100	25	25	15	15
Thresholds Exceeded for Any Activity?	No	No	No	No	No	No

[a] The emissions for reactive organic gas (ROG) estimated using URBEMIS2007 were assumed to be the same as VOC. The peak VOC emissions would occur in the year 2013 resulting from architectural coating activities.
[b] Fugitive dust emissions resulting from construction were reduced using a control efficiency of 55% to account for watering.

Operation Phase

Operation emissions resulting from the Proposed Action would include stationary sources, area sources, and mobile sources. The stationary sources associated with the Proposed Action would include two 800-kW diesel backup generators, boilers with up to 200,000-British Thermal Unit (BTU) capacity, and a 5,000-gallon diesel tank. The area source emissions would include landscaping and periodic architectural coating. The mobile source emissions would include vehicle emissions from commute trips traveled by the 330 staff persons and 162 civilian contractors, vehicle emissions from patients/visitors to the hospital, vehicle emissions from persons using the old hospital facilities, and periodic helicopter emissions.

Operation emissions were estimated using the URBEMIS2007 model and the following assumptions. It was assumed that emissions from stationary sources at the replacement hospital (boilers, generators, and diesel fuel tank) would be equal to or less than the No Action Alternative. The diesel backup generators for the new hospital would be required to meet more stringent emission standards (Tier 4) than the existing engines and would be expected to result in lower emissions. In addition, it was assumed that the stationary sources at the existing hospital would be removed under the Proposed Action. Therefore, operation of the stationary sources under the Proposed Action would not be expected to result in an increase in emissions compared to the No Action Alternative. It was also assumed that the helicopter activity at the replacement hospital would be similar to the activity at the existing hospital. Therefore, periodic helicopter activity under the Proposed Action would not be expected to result in a net increase in emissions compared to the No Action Alternative. Finally, it was assumed the use of the old hospital facilities under the Proposed Action would be represented by the land use type "general office space" in the URBEMIS2007 model. The URBEMIS2007 output is included in Appendix C.

The estimated net increase in emissions under the Proposed Action is presented in Table 4-4. The net increase in emissions would be less than the MDAQMD significance thresholds; therefore, operation of the Proposed Action would not have an adverse effect on air quality.

TABLE 4-4
Proposed Action Operation Emissions
Weed Army Community Hospital EA, Fort Irwin, CA

	Emissions (ton/yr)					
Emission Source	**VOC[a]**	**CO**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$**
Proposed Action Emissions	4.68	45.16	6.47	0.060	10.17	2.01
No Action Alternative Emissions	2.96	32.89	4.52	0.05	7.69	1.52
Net Increase in Emissions	1.72	12.27	1.95	0.01	2.48	0.49
MDAQMD Thresholds (ton/yr)	25	100	25	25	15	15
Thresholds exceeded for any activity?	No	No	No	No	No	No

[a] The emissions for ROG estimated using URBEMIS2007 were assumed to be the same as VOC.

General Conformity

General conformity means compliance with the plan's purpose of attaining or maintaining the NAAQS. This means ensuring that a federal action would not: (1) cause a new violation of the NAAQS, (2) contribute to any increase in the frequency or severity of violations of existing NAAQS, or (3) delay the timely attainment of any NAAQS interim or other attainment

milestones.

According to the MDAQMD *CEQA and Federal Conformity Guidelines*, a project conforms if it (1) complies with all applicable district rules and regulations, (2) complies with all proposed control measures that are not yet adopted from the applicable plans, and (3) is consistent with the growth forecasts in the applicable plans (MDAQMD, 2002).

The Proposed Action would comply with the applicable MDAQMD Rules and Regulations (see Section 3.5) and would comply with proposed control measures presented in the *List and Implementation Schedule for District Measures to Reduce PM Pursuant to Health and Safety Code §39614(d)* (MDAQMD, 2005). The following analysis demonstrates that the Proposed Action conforms to the MDAQMD's approved air quality plan because the emissions of the nonattainment pollutant, PM10, would be less than the general conformity *de minimis* threshold.

Operation of stationary sources subject to permitting are not included in a general conformity applicability analysis. Therefore, the emission sources considered for general conformity applicability from operation of the Proposed Action would be mobile source emissions and area source emissions as described above. In addition, the Proposed Action would result in a short-term net increase in PM10 emissions from construction. Since peak construction emissions and operation emissions would occur in separate years, the emissions were separately compared to the *de minimis* threshold to evaluate general conformity applicability.

As shown in Table 4-5, PM10 emissions from the Proposed Action would be less than the *de minimis* threshold, so the Proposed Action would not require a conformity determination. As required by the Army, a Record of Non-Applicability would be used to document that the Proposed Action is exempt from general conformity requirements.

TABLE 4-5
Comparison to General Conformity Threshold
Weed Army Community Hospital EA, Fort Irwin, CA

Emission Source	Annual PM_{10} Emissions (ton/year)
Peak Year Construction Emissions	3.6
Proposed Action Net Increase in Emissions	2.5
De minimis Threshold	100

4.5.2 No Action Alternative

Under the No Action Alternative, Fort Irwin would continue to use Weed Army Community Hospital and no new construction would occur. The No Action Alternative would be continued operation of the existing hospital, which includes two 1,186 horsepower backup diesel generators, three boilers with a total heat input of 5.1 MMBTU/hr, a 5,000-gallon diesel tank, a helipad, and 330 staff persons and 162 civilian contractors.

This building is an outdated hospital facility that does not meet current codes and criteria for building requirements and equipment and health care delivery. Since there would be no change from existing activities, the No Action Alternative would have no adverse effects on air quality.

4.5.3 Cumulative Impact

Cumulative impacts are the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Project that may occur in the near future include construction of a new WTP, renovation of the Mary Walker Clinic, and removal of four existing buildings (136, 172, 174, and 176). If all projects were to occur at one time, air quality issues due to dust created during construction could create a nuisance. However, projects would most likely not begin construction at the same time.

As shown in Tables 4-2 and 4-3, the construction and operation emissions would be below the MDAQMD thresholds; therefore, the Proposed Action would not be expected to have an adverse cumulative effect on air quality.

4.5.4 Climate Change and Greenhouse Gases

Proposed Action

The Proposed Action would entail the construction of a new hospital. Construction and operation of the Proposed Action would generate GHG emissions. Emissions of CO_2 were estimated using URBEMIS2007 (version 9.2.4) and are presented in Appendix C. Construction of the hospital would result in a short-term increase in GHG emissions (total of 454 metric tons of CO_2). Operation of the Proposed Actions would result in a net increase of approximately 1,780 metric tons of CO_2. Based on the draft NEPA guidance for considering GHG emissions, a value of 25,000 metric tons of CO_2e would be an indication of whether a qualitative or quantitative assessment may be meaningful for decision-makers under NEPA (CEQ, 2010).

Construction and operation emissions from the Proposed Action would be below this level. The long-term minor net increase in GHG emissions from operation of the Proposed Action would result in providing the Fort Irwin community with a reliable, modern community- based health care facility.

No Action Alternative

Under the No Action Alternative, Fort Irwin would continue to use the existing Weed Army Community Hospital and no new construction would occur. Since there would be no change from existing activities, the No Action Alternative would not result in an increase in GHG emissions.

4.5.5 CEQA Impacts Determination

Would the Proposed Action:

a) *Conflict with or obstruct implementation of the applicable air quality plan?*

b) *Violate any air quality standard or contribute substantially to an existing or projected air quality violation?*

Less Than Significant Impact – Emissions would be associated predominantly with temporary construction activities, with some moderate emissions during operations.

Construction-related emissions would be primarily dust generated from excavation and exhaust associated with use of construction equipment and motor vehicles. Operational emissions would be associated with maintenance and testing of the stationary back-up generator, and minor exhaust emissions generated from worker commute trips and delivery truck trips. Construction and operation of the Proposed Action would not result in a significant air quality impact and, thus, would not conflict with or obstruct implementation of the MDAQMD air quality plan.

The Proposed Action would be within the Mojave Desert Air Basin, which is managed by the MDAQMD. As shown in Table 4-3, the sum of construction and operation emissions would not exceed MDAQMD thresholds. Therefore, the Proposed Action would not be expected to have an adverse impact on air quality or to affect ambient air quality standard.

c) *Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?*

d) *Expose sensitive receptors to substantial pollutant concentrations?*

No Impact –As shown in Table 4-3, the construction and operation emissions would be below the MDAQMD thresholds. Therefore, the Proposed Action would not be expected to have a cumulative adverse impact on air quality.

Sensitive receptors include schools, hospitals, and convalescent homes. Children, elderly people, and the infirm are considered to be more sensitive than others to criteria pollutants. As shown in Table 4-3, the construction and operation emissions would be below the MDAQMD thresholds and, thus, would not generate substantial pollutant concentrations. Therefore, the Proposed Action would have no impact related to the exposure of sensitive receptors to substantial pollutant concentrations.

e) *Create objectionable odors affecting a substantial number of people?*

Less Than Significant Impact – Construction activities and, to a lesser extent, operation activities could create a small amount of objectionable odors related to emissions from heavy equipment and motor vehicles. However, due to the location of the Proposed Action, those affected would be limited primarily to construction workers and operations workers. Therefore, the Proposed Action would have a less than significant impact associated with the creation of objectionable odors affecting a substantial number of people.

4.5.6 Mitigation Measures

As discussed in Section 4.5.1, the construction and operation emissions would not have an adverse impact on air quality. Therefore, mitigation measures for construction and operation would not be required. However, during operation, the Proposed Action would be required to comply with MDAQMD Rules 403 and 403.2, MDAQMD Regulation XIII, and ARB Airborne Toxic Control Measure for Stationary Compression Ignition Engines during operation.

4.6 Noise

4.6.1 Proposed Action

Construction Phase

Construction-related noise impacts would be associated with the operation of equipment and vehicles required for site preparation and building construction activities. Potential noise impacts from construction activities are assessed using a standard reference for

construction noise (USEPA, 1971).

As shown, heavy equipment can generate noise levels ranging from about 76 to 89 dBA when measured at 50 feet and 70 to 83 dBA when measured at 100 feet without implementation of noise-reduction measures. These noise levels would diminish with distance from the construction site, with a decrease of approximately 6 dBA per doubling of distance.

The closest potential noise-sensitive receptors (defined by the Army as housing, schools, and medical facilities) are residences on Pork Chop Hill Road located about 100 feet west of the site of the Proposed Action. The closest school, Lewis Elementary, is approximately 3,150 feet from the Proposed Action site.

A temporary increase in noise levels would be expected during the construction phase of the Proposed Action. Noise levels as high as 83 dBA associated with construction activities could be experienced at the closest residences located 100 feet to the west. Such an exterior noise level is borderline incompatible with this category of land use. The noise level 800 feet from an 83 dBA construction noise source would be 65 dBA.

Notably, these projected noise exposure levels are maximum values, and actual levels would be less because of the attenuating effects of intervening structures. Residences indoors would experience less noise due to the structure of the building, which could reduce noise levels by 25 dBA, bringing indoor noise levels at 100 feet from the construction site to 58 dBA (USEPA, 1974). Also, construction activities would occur during daytime hours only. Construction of the Proposed Action would cause minor adverse impacts due to nuisance noise levels potentially experienced by residents in MFH.

Operation Phase

Noise-generating activities during regular operations would include delivery of supplies, emergency delivery sirens, helicopter deliveries, and emergency generators. The emergency generators would operate automatically in case of a power outage and would be tested periodically.

The loudest noise source at the new hospital would be from landing and lift-off at the helicopter pad during delivery of patients, which could occur a few times each day. Black Hawk helicopters typically have an in flight noise level of approximately 106 dBA. However, the new helicopter pad would be placed near the existing helicopter pad. Therefore, noise levels in the area would be similar to existing conditions, with the exception of residents on Pork Chop Hill Road. These residences would most likely notice an increase in noise levels due to the closer helicopter pad location. There would be a minor negative impact to residents on Pork Chop Hill Road due to noise generated from the use of the new helicopter pad.

With the implementation of mitigation measures, projected noise exposure levels during operation of the proposed facility would be compatible with adjacent noise-sensitive receptors.

4.6.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and current conditions would continue into the future.

4.6.3 Cumulative Impacts

Cumulative impacts would result from individually minor but collectively significant actions taking place over a period of time. The back-up generator could be in operation at the same time

that other noise-generating activities occur. However, with the mitigation measures in place, the Proposed Action would not be expected to have a cumulative adverse impact on noise.

4.6.4 CEQA Impacts Determination

Would the Proposed Action:

a) *Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

b) *Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?*

c) *A substantial permanent increase in ambient noise levels in the Proposed Action vicinity above levels existing without the project?*

d) *A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?*

Less Than Significant Impact - Construction-related noise impacts would be associated with the operation of equipment and vehicles required for site preparation and building construction activities. Heavy equipment can generate noise levels ranging from about 76 to 89 dBA when measured at 50 feet and 70 to 83 dBA when measured at 100 feet without implementation of noise-reduction measures. In the event that pile-driving equipment is used, the maximum noise level would rise to 100 dBA measured at 50 feet. Similar to all construction equipment noise, these noise levels would diminish rapidly with distance from the construction site, with a decrease of approximately 6 dBA per doubling of distance.

The closest potential noise-sensitive receptors (defined by the Army as housing, schools, and medical facilities) are residences on the Outer Loop Road and North Loop Road. The closest school is about 14,000 feet from the proposed WTP.

A temporary increase in noise levels would be expected during the construction phase of the Proposed Action. Noise levels as high as 65 dBA associated with construction activities at the proposed site could be experienced at the closest residences located to the east. Construction of the extension of the water main could generate noise levels as high as about 77 dBA at the closest residences, and inappropriate noise levels would extend about 800 feet from the source of the noise. Should construction activity require the use of a pile driver, inappropriate noise levels could be experienced at family housing units and unaccompanied housing units as far as about 3,200 feet distant. These projected noise exposure levels are maximum values; actual levels would be less because of the attenuating effects of intervening structures. Additionally, construction activities would occur during daytime hours only. Impacts associated with exposure of persons to noise during construction are considered to be less than significant because construction activities would be temporary, would be limited to daytime hours, and would be primarily at distances from residents and noise-sensitive receptors that would allow for adequate noise reduction.

Construction of the Proposed Action would not require the substantial duration or amount of activities commonly known to produce excessive groundborne vibration or noise (e.g., pile driving). However, construction activity could require the limited use of a pile driver. In such instances, pile-driving activities would occur at distances from residents that such activities would not expose residents to excessive groundborne vibration. Therefore, the Proposed Action would have a less than significant impact associated with the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

A back-up generator would be installed at the proposed facility. The generator would operate automatically in case of a power outage and would be tested periodically. If the

back-up generator were to operate in the open with no exhaust silencer, noise levels as high as 70 dBA could be experienced at family housing on Outer Loop Road. Noise levels experienced at the nearest school (14,000 feet distant from the proposed site) would be below 60 dBA. Mitigation measures would be implemented to reduce noise levels experienced at sensitive receptor locations. They would include the installation of an exhaust silencer and placement of the generator in a sound-attenuating enclosure.

No substantial permanent increases in ambient noise levels would occur near the Proposed Action above levels existing without the project. As discussed immediately above, a substantial temporary or periodic increase in ambient noise levels could occur in the vicinity of the Proposed Action above levels existing without the project during the short construction phase of the project.

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

f) *For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?*

No Impact – The Proposed Action site is not located within an airport land use plan and is not within 2 miles of a public airport or public use airport. Therefore, no associated impact would occur.

The Proposed Action would not result in the exposure of people residing or working in the area to excessive noise associated with a private airstrip.

4.6.5 Mitigation Measures

Mitigation measures would be implemented during the construction and operations phases of the Proposed Action. To reduce noise levels experienced at sensitive receptor locations during construction, activities would occur only during normal daytime work hours.

During operations, the back-up generator would begin operations at any time and would be tested periodically. The generator would be equipped with an exhaust silencer and placed in a sound-attenuating enclosure. Exhaust silencers are available that can achieve different levels of noise attenuation, ranging from 10 to 52 dBA. Implementation of these mitigation measures would result in acceptable noise levels at sensitive receptors.

4.7 Cultural Resources

4.7.1 Proposed Action

Construction Phase

Based on background research and previous field surveys, no NRHP-eligible or -listed cultural resources are in the APE for the Proposed Action; therefore, no adverse impacts to known cultural resources would occur. However, if any previously undiscovered archaeological remains are uncovered during construction of the new hospital, any activity related to the project must be halted and the Fort Irwin archaeologist contacted.

Operation Phase

There would be no impact to cultural resources during the operation phase of the Proposed Action.

4.7.2 No Action Alternative

The No Action Alternative would have no impacts on NRHP-eligible or -listed cultural resources.

4.7.3 Cumulative Impacts

No cultural resources are present at the location of the Proposed Action, so no cumulative impacts would occur.

4.7.4 CEQA Impacts Determination

Would the Proposed Action:

a) *Cause a substantial adverse change in the significance of a historical resource as defined in section 15064.5?*

No Impact – The Proposed Action site does not contain any features or structures with qualities that would be considered historical resources. Construction and operation of the Proposed Action would have no impact on a historical resource as defined in Section 15064.5.

b) *Cause a substantial adverse change in the significance of an archaeological resource pursuant to section 15064.5?*

c) *Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?*

d) *Disturb any human remains, including those interred outside of formal cemeteries?*

Less Than Significant Impact If any previously undiscovered archaeological remains are uncovered during construction of the hospital, any activity related to the Proposed Action would be halted and the Post Archaeologist contacted. Because the Proposed Action site has been previously disturbed and existing sites have been determined ineligible for inclusion in the NRHP, implementation of the Proposed Action is not anticipated to cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.

The Proposed Action site has been disturbed previously; as a result, implementation of the Proposed Action is not anticipated to directly or indirectly destroy a unique paleontological resource or site, or a unique geologic find.

Because the Proposed Action site has been disturbed previously and existing sites were determined ineligible for inclusion in the NRHP, the Proposed Action site would not be anticipated to disturb human remains. Therefore, the Proposed Action would not result in a significant adverse impact related to the disturbance of human remains.

4.7.5 Mitigation Measures

No mitigation measures are necessary, because no adverse impacts would occur to cultural resources. However, in the event that any previously undiscovered archaeological remains are uncovered during the construction of the hospital, any activity related to the project would be halted and the Post Archaeologist would be contacted.

4.8 Socioeconomics

The capital costs associated with construction of the proposed facility are estimated to total approximately $250 million, and construction would be completed within 2.5 years. Of the capital costs, the majority (almost 70 percent) would be for procurement of equipment, materials, and supplies while 18 percent would be for construction payroll. Approximately 10 percent of construction expenditures on equipment, materials and supplies would be spent

locally, while about 60 percent of the construction payroll would be spent locally. The local expenditures on equipment, materials and supplies as well as those on local construction labor would generate construction-related employment in the region. The IMpact Analysis for PLANning (IMPLAN) model was used to estimate the annual indirect and induced impacts associated with construction of the proposed new hospital (Appendix D). IMPLAN is an economic input-output (I-O) model used to evaluate impacts associated with changes in regional expenditures.

4.8.1 Proposed Action

Construction Phase

According to an estimate generated by IMPLAN based on the annual local expenditures and local construction payroll, the annual indirect and induced employment would be 86 and 74, respectively. The 86 indirect jobs result from the local expenditures while the 74 induced jobs are from the local expenditures by construction workers and their families (i.e., personal consumption expenditures). In addition to employment impacts, the project would also result in an annual estimated indirect and induced income within the region of $3,439,600 and $3,036,900, respectively. Construction of the project would result in short-term beneficial impacts to the regional economy.

The construction workforce peak of 150-200 workers makes up a small proportion (less than 0.1 percent) of the construction workforce in San Bernardino County. Most construction workers would commute to the jobsite on a daily basis and would not relocate permanently (with or without their family members) to work on the proposed facility at Fort Irwin. Possibly, a number of the workers would commute to the jobsite on a weekly basis and stay in Barstow or nearby communities in motels and recreational vehicle (RV) parks and campgrounds.

In the absence of a measurable increase in resident population, impacts to housing and community facilities and services, including public schools, would be less than significant.

Operation Phase

The proposed new hospital would operate under the same number of staff as before and there would be no change in operations. The proposed new hospital would be accessible via Outer Loop Road, thereby bypassing congested areas in the central cantonment area, possibly reducing response times. There would be long-term beneficial impacts to the Fort Irwin community, thanks to the availability of a new reliable hospital.

The Fort Irwin fire department may require an additional ladder truck to adequately respond to emergencies that may occur at the proposed new hospital.

4.8.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented, and current conditions would continue into the future. Potential employment generated by implementation of the Proposed Action would not occur.

4.8.3 Cumulative Impacts

Additions of new, and modifications to existing, facilities and infrastructure are ongoing at Fort Irwin. Examples include the recent construction of onsite military family housing assets and additional residential developments that are scheduled for completion in the coming years. No cumulative adverse impacts on socioeconomic conditions in the area would occur.

4.8.4 CEQA Impacts Determination

Would the Proposed Action:

Population and Housing

a) *Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?*

b) *Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?*

c) *Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?*

No Impact – The Proposed Action would be consistent with existing and projected population demands at Fort Irwin. Therefore, the Proposed Action would not result in an impact related to inducing population growth.

Implementation of the Proposed Action would not displace substantial numbers of existing housing or people, necessitating the construction of replacement housing elsewhere.

Public Services

a) *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, to maintain acceptable service ratios, response times or other performance objectives for any of the public services:*

Fire protection; Police protection; Schools; Parks; or Other public facilities?

No Impact – An estimated five full-time employees would be needed onsite year-round, which would have a negligible effect on public services. Therefore, the Proposed Action would have no impact associated with public services.

Recreation

a) *Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?*

b) *Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?*

No Impact – The Proposed Action would not increase the use of parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. The Proposed Action would have no impact on the use of existing neighborhood and regional parks or other recreational facilities.

The Proposed Action would not include recreational facilities and would not require the construction or expansion of recreational facilities. Therefore, the Proposed Action would have no adverse impact to the environment related to recreational facilities.

4.8.5 Mitigation Measures

In the absence of adverse impacts, mitigation measures are not called for and are not proposed.

4.9 Transportation

Potential impacts to transportation infrastructure and performance are assessed for both the construction and operations phases of the Proposed Action and its alternatives.

4.9.1 Proposed Action

Construction Phase

During the 24- to 36-month construction period, vehicle trips associated with workers and deliveries to jobsites would occur. The 175 construction workers associated with the Proposed Action presumably would reside off-post in surrounding communities. Knowing exactly where these workers would reside is not possible. However, the Barstow and Victorville areas likely would contribute the largest share of workers, and these workers likely would commute to the jobsite on a daily basis. If a sufficient number of workers are not available locally, workers from more distant locations could take up temporary residence in hotels, motels, apartments, campgrounds, and RV parks in adjacent communities because no onsite accommodations would be available to the general public.

Fort Irwin generates most of the traffic using Fort Irwin Road. The rest of the traffic comes from ranches, mines, and homes in the area. With the exception of some congestion at the center of the installation during the morning, noontime, and evening rush hours, the Fort Irwin roadways appear to operate well within their design capacities. Traffic associated with the Proposed Action construction would be limited to material delivery and worker access and would not result in a substantial increase in traffic in relation to the existing traffic load. Therefore, the Proposed Action would not result in significant adverse traffic impacts.

Fort Irwin Road has adequate capacity to accommodate the increase in daily trips. Vehicle trips destined for the proposed site would not traverse the main cantonment area because that traffic would proceed along Outer Loop Road and North Loop Road to the construction site. The increase in traffic at the Proposed Action area that could result from the transport of workers and materials to the site during construction and operation would not be expected to result in a service change to the existing roadways. The Proposed Action would not result in a significant adverse impact.

Fort Irwin Road has adequate capacity to accommodate the increase in daily trips. Vehicle trips destined for the proposed site would not be required to traverse the main cantonment area. Traffic could proceed along Outer Loop Road and North Loop Road to the construction site. Parking and equipment and materials staging areas would be located adjacent to the Proposed Action site. Traffic impacts due to construction of the Proposed Action and construction worker commutes would be negligible.

Operation Phase

According to a 2009 traffic analysis conducted within the Fort Irwin cantonment area, major intersections experience minor congestion but do not require upgrades. Major upgrades to the transportation system in the cantonment area would not be required for another 10 to 20 years. The existing paved and graded roadways within the cantonment area adequately serve the needs and mission of the installation (Michael Baker, Jr., 2009).

The 2010 traffic study recommended one intersection improvement to support the relocation of the hospital (Appendix B). This improvement would address potential minor periodic traffic delays that could be associated with the new hospital location and improve traffic flow on nearby roads. The addition of a 100-foo long exclusive southbound left turn lane is recommended on 5th Street at the B Avenue intersection. The turn lane would improve southbound traffic movement on 5th Street during peak morning hours.

A second improvement was also recommended in the 2010 study to improve overall traffic flow in the cantonment area: reconfiguring the Goldstone Road and Outer Loop Road intersection to include an exclusive southbound left turn lane and a shared through and right

turn lane. The reconfiguration would allow north-south traffic to move through the intersection unimpeded. Because of the low projected volume at this intersection, implementation of this improvement is not considered necessary at this time. This improvement is recommended for consideration during any work or improvements planned for the road at that location in the future (CH2M HILL, 2010b).

The operation workforce would be the same as existing. No new staff would be required to operate the new hospital. Vehicle trips would be associated with deliveries to the hospital and transport of waste materials. Such trips would occur on a scheduled basis and would be the same as existing conditions. The proposed new hospital would also be accessible by Outer Loop Road, bypassing the central cantonment area, which tends to be more congested. There would be no impact on overall existing traffic conditions within the cantonment area due to operation of the Proposed Action. However, minor periodic delays at intersections immediately around the new hospital location could occur during changes in work shifts.

4.9.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and current conditions would continue into the future.

4.9.3 Cumulative Impacts

The number of personnel assigned to Fort Irwin would fluctuate throughout the year and with changes in mission. Additions of new, and modifications to existing, facilities and infrastructure are ongoing at Fort Irwin. The transportation infrastructure of the installation is adequate to accommodate these fluctuations and the overlap of multiple changes. Adverse cumulative impacts would not be anticipated.

4.9.4 CEQA Impacts Determination

Would the Proposed Action:

a) *Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?*

b) *Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?*

Less Than Significant Impact - The 2010 traffic study recommended one intersection improvement to support the relocation of the hospital (Appendix B). This improvement would address potential minor periodic traffic delays that could be associated with the new hospital location and improve traffic flow on nearby roads. The addition of a 100-foot long exclusive southbound left turn lane is recommended on 5th Street at the B Avenue intersection. The turn lane would improve southbound traffic movement on 5th Street during peak morning hours.

The operation workforce would be the same as existing. No new staff would be required to operate the new hospital. Vehicle trips would be associated with deliveries to the hospital and transport of waste materials. Such trips would occur on a scheduled basis and would be the same as existing conditions. The proposed new hospital would also be accessible by Outer Loop Road, bypassing the central cantonment area, which tends to be more congested. There would be no impact on overall existing traffic conditions within the cantonment area

due to operation of the Proposed Action. However, minor periodic delays at intersections immediately around the new hospital location could occur during changes in work shifts.

The Proposed Action would not result in a significant adverse impact.

c) *Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?*

d) *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?*

No Impact – The Proposed Action would have no impacts on air traffic patterns and would not increase hazards due to design features or incompatible uses.

e) *Result in inadequate emergency access?*

f) *Result in inadequate parking capacity?*

Less Than Significant Impact – The Proposed Action would not hinder emergency access during construction or operation. Therefore, the Proposed Action would have no impacts related to emergency access.

The construction workers associated with the Proposed Action likely would reside off-post in surrounding communities. Parking along with equipment and materials staging areas would be located adjacent to the proposed site. The operations workforce and patients would utilize the parking area included in the proposed action.. Therefore, the Proposed Action would result in a less than significant impact associated with inadequate parking.

g) *Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?*

No Impact – No existing bus turnouts, bicycle racks, or bicycle lanes are on the Proposed Action site. The Proposed Action would not result in an impact related to alternative transportation.

4.9.5 Mitigation Measures

In the absence of significant impacts such as increased congestion on highways, streets, and at intersections or a decline in performance (level of service), mitigation measures would not required. Implementation of ride-share programs during the construction phase would reduce what traffic impacts might occur.

4.10 Utilities

The proposed hospital would be designed as a silver LEED-certified building. The new hospital would be more efficient than Weed Army Community Hospital. Sustainable features could include high-efficiency lighting controls, window films/shading structures, and high-efficiency chillers. Photo-voltaic solar panels and thermal energy storage are also being considered in the design process. Any sustainable features would be cost effective within a 25-year lifecycle.

4.10.1 Proposed Action

Construction Phase

The on-post construction and demolition landfill has limited space, but the City of Barstow has a construction and demolition landfill, if needed. Non-potable and potable water would be

available at Fort Irwin or the contractor could bring water trucks if required. There would be no impact to utilities during the construction phase.

Operation Phase

The proposed new hospital would replace Weed Army Community Hospital with a newer, more efficient LEED-certified building. The required amount of energy and resources to run the proposed new hospital would be less than that required for the existing hospital. LEED-certified buildings typically use 25 to 30 percent less energy and up to 30 percent less water than standard buildings (Kats, 2003). Estimates show that hospital staff could use up to 15 gpd of water. Patients could use up to 300 gpd (per bed) of water. Based on design estimates, the proposed new hospital would use on average 30,000 gpd of water (Ellerbe Becket and RLF, 2010).

The RO system for potable water has a current average usage of 100,000 to 110,000 gpd with a total capacity of 150,000 gpd. The RO system would provide potable water while the domestic system would provide water for other uses. A new WTP is planned that could supply up to 6.0 mgd of potable water to the cantonment area. Based on water usage estimates, approximately 7,950 gpd of wastewater would be sent to the WWTP. The WWTP has a current maximum average use of 1.31 mgd, with a capacity of 1.5 mgd and up to 2.0 mgd with minor upgrades. Fort Irwin utilities have capacity for the new hospital.

The solid waste generated from construction of the proposed new hospital would be nonhazardous and could be disposed of at a Class III facility. The solid waste landfill on post has approximately 265 years of capacity. There would be negligible impacts to utilities at Fort Irwin due to the Proposed Action.

4.10.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and current conditions would continue into the future. The Fort Irwin water quality goals and drinking water standards would not be achieved. Consequently, in the event of a measurable increase in resident population, adequate potable water might not be available.

4.10.3 Cumulative Impacts

Additions of new, and modifications to existing, facilities and infrastructure are ongoing at Fort Irwin. The utility systems of the installation are adequate to accommodate these fluctuations and the overlap of multiple changes. Adverse cumulative impacts are not anticipated.

4.10.4 CEQA Impacts Determination

Would the Proposed Action:

a) *Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?*

b) *Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?*

No Impact – The Proposed Action would not result in exceedance of the wastewater treatment requirements of the Regional Water Quality Control Board.

The operation of the hospital RO facility would not result in an increase in demand for water or in generation of wastewater. Thus, the Proposed Action would not result in the

construction of new water or wastewater treatment facilities or expansion of existing facilities.

c) *Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?*

d) *Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?*

Less Than Significant Impact - A stormwater protection system has been designed to protect the hospital facility against a 100-year storm event. With these stormwater drainage and protection measures in place, the impacts resulting from the Proposed Action are less than significant.

Construction and operation of the Proposed Action would not require the provision of new water supplies. Water sources currently used would satisfy the input requirements of the proposed new hospital facility.

e) *Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?*

No Impact - The Proposed Action would be consistent with existing and projected wastewater generation at Fort Irwin. Therefore, the Proposed Action would have no impact on the wastewater treatment capacity of the local wastewater treatment provider.

f) *Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?*

Less Than Significant Impact - The solid waste generated from the treatment process at the proposed WTP likely would be nonhazardous and could be disposed of at a Class III facility. Waste from the treatment process would drain to evaporation ponds. Solids would be removed from the ponds on an as-needed basis, and would be taken to the Fort Irwin landfill or transported to an appropriate offsite landfill if the Fort Irwin landfill does not have the capacity to accept the waste.

g) *Comply with federal, state, and local statutes and regulations related to solid waste?*

No Impact – Solid waste produced by the Proposed Action would be disposed of at a properly permitted facility in accordance with federal and state laws.

4.10.5 Mitigation Measures

In the absence of adverse impacts, mitigation measures would not be called for and are not proposed.

4.11 Hazardous and Toxic Substances

Materials that could pose a health risk to humans or a threat to the environment would be associated with activities during construction and operation phases of the Proposed Action.

4.11.1 Proposed Action

Construction Phase

Based upon the findings of the Phase II ECP, any unexploded ordnance identified within the 79-acre project area would be removed prior to construction.

Project construction would require that petroleum, oil, and lubricant materials, and other

potentially hazardous materials be transported to and used in the project area. Equipment servicing and repair activities temporarily could generate oily and hazardous wastes, such as spent solvents, residual fuels, used oils, antifreeze, and filters. Construction activities would be conducted consistent with hazardous waste and pollution regulations, with guidelines dictated in a SWPPP, and uncontrolled releases of hazardous substances to the environment would not be anticipated.

Some materials, while essentially inert under normal conditions, could be hazardous under certain circumstances. Wood and dry concrete could generate airborne particulates while being cut or sanded. To protect against such adverse effects, workers should take appropriate precautions. Wood and other construction materials are flammable; however, mandating that the construction site be a "non-smoking area" would reduce the risk of fire.

BMPs documented in a SWPPP and a project-specific site construction safety plan would be followed to avoid significant risks or health hazards associated with the use of hazardous materials and hazardous waste generation and disposal.

An assessment of the environmental condition of the property is currently being conducted for the proposed site to determine the potential presence of unexploded ordnance. Should any be identified, it would be remediated prior to construction.

Operation Phase

The new hospital would be considered a RCRA large generator once operational. Biohazards and pharmaceutical wastes from hospital operations are disposed of via a contractor hired by the hospital. Chemical waste is handled by the post's existing RCRA permit.

All potentially harmful materials would be stored and used according to manufacturers' specifications. Likewise, applicable federal, state, and locally mandated procedures, which would be detailed in a site-specific health and safety plan, would be followed. In the event of an accidental spill or release of potentially hazardous materials, facility-specific and installation safety procedures would be followed.

There would be no increase in the use of hazardous or toxic substances during operation of the new hospital.

4.11.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented and current conditions would continue into the future.

4.11.3 Cumulative Impacts

The use of hazardous materials associated with additions of new, and modifications to existing, facilities and infrastructure is ongoing at Fort Irwin. However, adverse cumulative impacts are not anticipated.

4.11.4 CEQA Impacts Determination

Would the Proposed Action:

a) *Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?*

b) *Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?*

Less Than Significant Impact – Project construction would require that petroleum, oil, and lubricant materials, as well as other potentially hazardous materials, be transported to and used in the project area. Equipment servicing and repair activities temporarily might generate oily and hazardous wastes such as spent solvents, residual fuels, used oils, antifreeze, and filters. Construction activities would be conducted consistent with hazardous waste and pollution regulations; uncontrolled releases of hazardous substances to the environment are not anticipated.

Some materials, while essentially inert under normal conditions, could be hazardous in specific circumstances. Wood and dry concrete could generate airborne particulate while being cut or sanded. To protect against these adverse effects, workers would take appropriate precautions. Wood and other construction materials are flammable; however, mandating that the construction site be a "nonsmoking area" would reduce the risk of fire.

BMPs and a project-specific site construction safety plan would be followed to avoid significant risks or health hazards associated with the use of hazardous materials and hazardous waste generation and disposal. Therefore, construction of the Proposed Action would result in less than significant impacts related to the transport, use, or disposal of hazardous materials.

The new hospital would be considered a RCRA large generator once operational. Biohazards and pharmaceutical wastes from hospital operations are disposed of via a contractor hired by the hospital. Chemical waste is handled by the post's existing RCRA permit.

All potentially harmful materials would be stored and used according to manufacturers' specifications. Likewise, applicable federal, state, and locally mandated procedures, which would be detailed in a site-specific health and safety plan, would be followed. In the event of an accidental spill or release of potentially hazardous materials, facility-specific and installation safety procedures would be followed.

All potentially harmful materials would be stored and used according to manufacturers' specifications. Likewise, all applicable federal, state, and locally mandated procedures, which would be detailed in a site-specific Health and Safety Plan, would be followed. In the event of an accidental spill or release of potentially hazardous materials, facility-specific and installation safety procedures would be followed. Therefore, operation of the Proposed Action would result in less than significant impacts related to the transport, use, or disposal of hazardous materials.

Construction activities would be conducted consistent with hazardous waste and pollution regulations, and uncontrolled releases of hazardous substances to the environment would not be anticipated. BMPs and a project-specific site construction safety plan would be followed to avoid significant risks or health hazards associated with the use of hazardous materials and hazardous waste generation and disposal. During operation, all potentially harmful materials would be stored and used according to manufacturers' specifications. All applicable federal, state, and locally mandated procedures, which would be detailed in a site-specific Health and Safety Plan, would be followed. In the event of an accidental spill or release of potentially hazardous materials, facility-specific and installation safety procedures would be followed. Therefore, the Proposed Action would not create a significant hazard to the public or environment through reasonably foreseeable upset or accident conditions involving the release of hazardous materials to the environment.

c) *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?*

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

No Impact – The nearest school is more than 1 mile away from the Proposed Action site. Therefore, the Proposed Action would not result in hazards-related impacts to a school within 1 mile of the Proposed Action site.

Fort Irwin is on the Hazardous Waste and Substances Site List (Cortese List) that is maintained by the Department of Toxic Substances Control for contamination associated with abandoned landfill sites. A site investigation and remedial investigation have been conducted at the abandoned landfill sites to characterize potential contamination at the sites. Soil samples from these sites contained detectable concentrations of VOCs, semivolatile organic compounds (SVOCs), pesticides, dioxins/furans, and metals. However, no compounds of potential concern were identified in groundwater from the landfill areas. Additionally, soil and landfill gas sampling confirmed that contamination has not migrated from the abandoned landfill sites. Because the Proposed Action site is outside the abandoned landfill sites and because the contamination is limited to the abandoned landfill sites, the Proposed Action would not result in an impact related to hazardous materials sites.

The Proposed Action site is not within an airport land use plan area and is not within 2 miles of a public airport or public use airport. The Proposed Action would not result in a safety hazard for people residing or working in the project area associated with an airport.

The Proposed Action site is in the vicinity of private airstrips and would not result in a safety hazard for people residing or working in the Proposed Action area related to private airstrips.

During construction of the Proposed Action, roads adjacent to the site would remain open, eliminating any potential impact related to access for emergency vehicles. Therefore, the Proposed Action would not interfere with an adopted emergency response plan or emergency evacuation plan.

The Proposed Action site is within Fort Irwin and would replace an existing facility within a developed area. Additionally, the Proposed Action would not involve construction of residences or habitable structures. Therefore, the construction and operation of the Proposed Action would not be anticipated to have a significant adverse impact related to the exposure of people or structures to a risk of loss, injury, or death involving wildland fires.

4.11.5 Mitigation Measures

In the absence of adverse impacts, mitigation measures are not proposed.

4.12 Mitigation Summary

Measures would be implemented to ensure that adverse environmental impacts of construction and operation of the Preferred Alternative would be avoided or minimized. These measures would be incorporated into the final design, implemented by the construction contractor and/or operations contractor, and included in the contract documents. A summary of the measures is presented in Table 4-6.

TABLE 4-6
Summary of Project Design Measures
New Weed Army Community Hospital, Fort Irwin, California

Resource	Potential Impact	Design Measure
Geology, Soils and Mineral Resources		
	Soil Erosion	Construction Phase: Employ BMPs for control of erosion and sediment Prepare and implement SWPPP
Biological Resources		
	Desert tortoise (no effect)	
		Construction Phase: Within 2 weeks of the onset of construction, 100 percent coverage ground surveys would be conducted of the project site for tortoises, signs of use, or burrows. If no tortoises or active burrows are identified, then construction would proceed without interruption. If active burrows or tortoises are identified, then tortoises would be relocated to areas off the construction area, and burrows collapsed. Tortoise relocation would require a Section 10(a) permit issued by the USFWS under the Federal ESA. During land clearing and construction, a biological monitor would be available to observe construction activities and to verify that no tortoises wander into construction site. If a tortoise is present, construction in the immediate vicinity would be halted while the tortoise is relocated off the construction site. Before construction begins, personnel working on the site would be given a briefing on the desert tortoise, detailing its life history as well as the protocol to follow if a tortoise is encountered.

TABLE 4-6
Summary of Project Design Measures
New Weed Army Community Hospital, Fort Irwin, California

Resource	Potential Impact	Design Measure
	Special-status species (potential disturbance)	Construction Phase: Land and vegetation clearing would occur outside the breeding season for birds of concern, defined as February 15 to August 31, where practicable. If vegetation clearing is required during the breeding season, then preconstruction surveys of breeding birds would be conducted. If active nests are identified, they would be protected from disturbance by a 500-foot nesting buffer, which would remain in place until the young have fledged from the nest, and no new nests would be initiated for the season.
	Pest species	Construction Phase: During construction, all trash and debris would be placed in receptacles for delivery to approved landfill facilities. Site cleanup of trash and debris would be required on a daily basis, including emptying and disposing of trash receptacles. Operation Phase: Proper waste management on the hospital grounds would limit the potential for pest species to occur.
Water Resources		
Surface Water	Soil erosion, runoff, and sedimentation impacts	Construction Phase: Proper BMPs would be implemented before land grading begins. Natural vegetation would be preserved when possible. Erosion, runoff, and sediment control measures would be implemented in case of a stormwater event. Erosion control measures such as compost blankets, mulching, watering, riprap, seeding and sodding, geotextiles, and slope drains could be used to protect exposed soil and minimize erosion. BMPs such as check dams, slope diversions, and temporary diversion dikes could be implemented for runoff control. Sediment control measures that could be implemented include compost filter berms and socks; fiber rolls or berms; sediment basins, rock dams, filters, chambers, or traps; silt fences; storm drain inlet protection; and hay bales. Good housekeeping measures would be practiced during construction. Site-specific stormwater BMPs would be detailed in a construction SWPPP that would be prepared by the contracted construction company prior to breaking ground. Operation Phase: During operation of the Proposed Action, potential impacts on surface waters would be minimized by practicing good housekeeping at the facility to prevent any unwanted materials from being washed away during storm events. Examples of good housekeeping practices could include proper materials storage and maintaining the site free of spills. Post-construction BMPs, consisting of detention ponds, would maintain

TABLE 4-6
Summary of Project Design Measures
New Weed Army Community Hospital, Fort Irwin, California

Resource	Potential Impact	Design Measure
		pre-development runoff flows for 10-year floods and attenuate larger storm events.
Water Supply	Reduction in water usage	Operation Phase: Five acres of xeriscaping are planned for the Proposed Action. Continuing current education and conservation programs could reduce water demand by as much as 5 percent.
Noise		
	Noise impacts during construction	Construction Phase: Construction would only occur during normal daytime working hours.
	Adverse recurring short-term impacts from operation of diesel-powered emergency generator	Operation Phase: Measures that could be implemented include installation of an exhaust silencer and placement of the generator unit in a sound-attenuating enclosure. Exhaust silencers can achieve noise attenuation, up to 52 A-weighted decibels. Placement of the generator inside a building or enclosure could achieve even greater noise attenuation.

6. References and Persons Consulted

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Milford Wayne Donaldson, FAIA, California Historic Preservation Officer

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Appendix A
Cultural Resources Survey and Evaluation Report

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Mr. M. Wayne Donaldson
State Historic Preservation Officer
Office of Historic Preservation
1416 9th Street, Room 1442-7
Sacramento, CA 95814

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Mr. Donaldson:

I am writing today to consult with you on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) to be conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of construction of a new hospital and 11th ACR Headquarters in the northern portion of the cantonment area. In accordance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, 36 CFR 800, Department of Defense Instruction 4715.16 (Cultural Resource Management), and Army Regulation 200-1 (Environmental Protection and Enhancement), Fort Irwin conducted a records search and architectural survey to determine possible effects of the undertaking on historic properties (*see* enclosed report).

Based on the results of our historic property identification efforts, no archaeological sites were previously recorded within the direct and indirect Area of Potential Effects (APE) of this undertaking. There were 10 unevaluated buildings within the indirect APE. None of these structures is eligible for listing in the National Register of Historic Places (NRHP) and we ask your concurrence with this determination.

As there are no NRHP eligible sites or structures within the APE for this project, I conclude that no historic properties affected, is the appropriate finding for this project and request your concurrence with this finding.

If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

CULTURAL RESOURCES SURVEY AND EVALUATION REPORT

PROJECT: WEED ARMY COMMUNITY HOSPITAL AND 11th ACR HEADQUARTERS REPLACEMENT
LOCATION: Fort Irwin, San Bernardino County, CA
SUBMITTED BY: Tiffany L. Newman, M.S., RPA and Scott Solliday, M.A.
DATE: August 2010

INTRODUCTION

This report documents the results of a cultural resources survey at Fort Irwin, a United States Army post located in San Bernardino County, CA where the U.S. Army proposes to construct new facilities in the northern portion of the cantonment. The project area encompasses 95.2 acres (Figure 1) and is bound by 5th Street, North Loop Road, and B Avenue. In accordance with Section 106 of the National Historic Preservation Act (NHPA), the National Environmental Policy Act (NEPA) 36 CFR 800, Department of Defense Instruction (DoDI) 4715.16, and Army Regulation (AR) 200-1, staff of the Fort Irwin Cultural Resources Program conducted a records search and a ground survey to determine potential effects, if any, to historic properties in the Area of Potential Effects (APE).

THE UNDERTAKING AND AREA OF POTENTIAL EFFECTS

The U.S. Army proposes to build a hospital with a parking area, a helipad, and a new 11th Armored Calvary Regiment (ACR) Headquarters building with a parking area (Figures 2 and 3). This undertaking supports the on-going military training mission at Fort Irwin by providing up-to-date facilities for the soldiers and their families. The new hospital will handle emergencies and day-to-day medical care. The current 11th ACR Headquarters is a temporary pre-fabricated building. The proposed 11th ACR Headquarters building will be a permanent structure for the administration of this unit. This undertaking will affect the entirety of the 95.2 acre location (the direct APE) and may affect historic properties, if present within the direct or the indirect APE. The undertaking will require grading and paving for the construction of the parking lots, helipad, and new access routes and buildings. Impacts include activities associated with the maneuvering of heavy machinery and earth moving. The direct APE for the Weed Army Community Hospital (WACH) and 11th ACR Headquarters construction is within an irregular linear tract between 5th Street and North Loop Road. This direct APE totals approximately 385,260.7 m^2 or about 95.2 acres (Figure 1 and 2). The indirect APE measures 1 km beyond the direct APE of the project area.

BACKGROUND

Environmental Setting

The WACH and 11th ACR Headquarters Replacement project area is located on the United States Geological Survey (USGS) 7.5' Fort Irwin quadrangle, Township 13 North, Range 3 East, Section 29. The survey area for this project is situated on alluvial fans or fan remnants with a slight southeastern slope. The general soils type of the project area is of the Arizo-Cavespring-Granite Pass association. More specifically, they are comprised of Arizo Very Gravelly Sandy

Loam with 2 to 4 percent slopes and Cavespring-Crackerjack Eroded-Crackerjack Association with 2 to 8 percent slope. Both of these soils consist of excessively drained very gravely sandy loam formed of alluvium derived from mixed sources. The typical profile for this soil is a very gravelly or cobbly sandy loam or very gravelly or cobbly loamy sand (USDA 2000).

Typical flora found within the project area include white bursage (*Ambrosia dumosa*), creosote bush (*Larrea tridentata*), Mormon tea (*Ephedra californica*), rayless brittlebush (*Encelia frutescens*), and brittlebush (*Encelia farinosa*) (USDA 2000). Field observations also identified desert trumpet (*Eriogonum inflatum)*, saltbush scrub (*Atriplex* spp.), bladder sage (*Salazaria mexicana*), punctured bract (*Mucronea perfoliata*), silver cholla (Opuntia echinocarpa), flat-topped buckwheat (*Eriogonum fasciculatum*), fiddleneck (*Amsinckia tessellate)*, and seasonal desert grasses (Baldwin et al. 2002; Morhardt and Morhardt 2004; Stark 2000).

Typical fauna found within the general project area include black-tailed jackrabbits (*Lepus californicus*), ground squirrels (*Spermophilus tereticaudus*), and a variety of reptile species. Western whiptail (*Aspidoscelis tigris*) and zebra-tailed lizards (*Callisaurus draconoides*) are the most prevalent, but desert iguanas (*Dipsosaurus dorsalis*), desert horned lizards (*Phrynosoma platyrhinos*), and long-nosed leopard lizards (*Gambelia wislizenii*) are present in small numbers. Snake species commonly observed include sidewinder rattle snakes (*Crotalus cerastes),* speckled rattlesnakes (*Crotalus mitchelli*), and gopher snakes (*Pituophis catenifer*) (Hanson and Hanson 1997). Common birds include common nighthawks (*Chordeiles minor*), mourning doves (*Zenaida macroura*), horned larks (*Eremophia alpestris*) ravens (*Corvus corax*), and black-chinned sparrows (*Spizella atrogularis*), most notably in the flat and gently sloping terrain (National Geographic Society 1999).

The area's climate is seasonally varied but very arid and hot in summer. The nearest station for which data are available is Daggett, 30 km to the south. At 1,935 feet (590 m) in elevation, Daggett is comparable in elevation to much of the project area, and the climatic data from the station closely approximates patterns at the National Training Center. Annual precipitation averages 3.9 inches (9.9 cm), most of which falls between November and March. There is a significant, if highly variable contribution by summer rainfall in July and August, following the monsoon pattern familiar in the desert southwest. The January average minimum temperature is 35.9 °F and average maximum temperature is 60.7 °F, while the July average maximum is 104.1°F and average minimum is 73.1 °F (Western Regional Climate Center 2005).

Cultural Setting

The most commonly referenced prehistoric cultural sequence of Fort Irwin, and the Mojave Desert in general, is that developed by Warren (Warren 1984; Warren and Crabtree 1986). This sequence divides prehistoric occupation of the Mojave into five major phases: Lake Mojave, Pinto, Gypsum, Saratoga Springs, and Protohistoric. For alternative approaches, *see* Bettinger and Taylor 1974; Wallace 1962.

Prior to its use as a military training facility in the early 1940s, Fort Irwin was associated with three main activities: homesteading, mining, and its use as a transportation corridor. For general overviews on the historic use of Fort Irwin, *see* Mikkelsen et al. 1988; Quinn 1981; Ramirez de Bryson and Twitty 2009a, 2009b, 2010; Reynolds 1981. For the historic occupation of Fort

Irwin during World War II and during the Cold War Era *see* Science Applications International Corporation 1996 (Appendix A).

RECORDS SEARCH

Methods

Archaeologists conducted a records search to determine if the project area required surveying, to ascertain whether there were any previously recorded cultural resources within a 1 km radius of the project area, and to aid in the development of a field survey strategy. Archaeologists reviewed the Fort Irwin Cultural Resource Management Database (FICRMD), GIS database, curation database, and digital and paper files (e.g., reports, site records, spreadsheets, Real Property Records, etc.). They also consulted databases at the websites for the California Office of the Historic Preservation, California Historical Resources, California Historical Landscapes, California Historical Landmarks, California Points of Historical Interest, California Register of Historical Resources, and the National Register of Historic Places (http://ohp.parks.ca.gov/listed_resources).

Results

The records search revealed that the entire direct APE had been previously surveyed (Fort Irwin Cultural Resources Program 2003). Archaeologists previously completed six additional surveys within the indirect APE (Belcourt 2010b; Belcourt et al. 2010; Belcourt and Sutton 2009; Fort Irwin Cultural Resources Program 2006; McArdle and Belcourt 2010; Yamauchi 2007). No archaeological resources have been found in the direct or indirect APE.

There are a total of 18 structures that are 45-50+-years-old within the indirect APE (Figure 3). Five of these buildings (Buildings 241, 411, 412, 413, and 414) are known as Unaccompanied Personnel Housing (UPH) and are exempt from consultation requirements (Advisory Council on Historic Preservation [ACHP] 2006). Building 241 is a General Administrative Purpose building, but was initially built as a mess hall in 1953. Building 411 is a storage facility and Building 412 is the TT Enlisted Barracks; however, their footprints are the same as the UHP, therefore they are included in the designation of UPH buildings. Buildings 413 and 414 are listed as UPH; as such, they are included in this same designation. In 1996, Buildings 326 and 623 were evaluated and found to be ineligible for listing in the National Register of Historic Places (NRHP); therefore they require no further examination (Science Applications International Corporation 1996; Appendix B and C). Building 237 was evaluated and determined ineligible for listing in the NRHP and requires no further examination (Ramirez de Bryson 2009). Research conducted by Fort Irwin cultural resources staff determined that buildings 139, 149, 143, 308, 312, 319, 452, 322, 614, and 663 required formal evaluation.

SURVEY

Archaeological Survey

Archaeologists conducted no reconnaissance survey for this project because it was previously surveyed for the New Residential project. They noted no cultural resources in their survey (Fort Irwin Cultural Resources Program 2003).

Architectural Survey Methods

The historic context for Fort Irwin during the World War II and Cold War eras was developed in a previous study (Science Applications International Corporation 1996), which is included in Appendix A and is used as the basis for evaluating these properties. Cultural resources staff conducted archival research and survey for the evaluation of buildings 139, 143, 149, 308, 312, 319, 322, 452, 614, and 663 (Figure 5).

The Fort Irwin staff architectural historian conducted research on the historical development of Fort Irwin and reviewed previously completed historic building surveys at the National Training Center 11th Armored Cavalry Regiment Museum and the Cultural Resources Library of the Directorate of Public Works (DPW). Cultural resources staff obtained information from the Real Property Office and the Technical Support Archives of the Engineering Plans and Services Division, DPW on individual buildings.

Fort Irwin cultural resources staff surveyed and photographed 10 buildings and structures for this project. Cultural resources staff noted the architectural elements, construction methods, materials, and evidence of additions and alterations to the buildings. The architectural historian assessed each property, including its architectural style and construction history. He also recorded any known historical data onto California Historic Resources Inventory Forms (Appendix B).

RESULTS

Building 139

Building 139, constructed in 1954, is listed as a Medical Supply Warehouse. It is located on the western end of 2nd Street (Figure 5; Appendix B). This is a one-story building of concrete block construction with a shallow pitched composite shed roof, an offset entry with steel door, and a steel awning window. There is a small steel-walled room on the northwest side. The date of this addition is unknown.

Buildings 143, 149, 319, and 663

Building 143, constructed in 1963, is a water pump that is used to irrigate the softball field to the southwest. It is located on the corner of 2nd Street and Inner Loop Road (Figure 5; Appendix B). It is a 20-foot by 20-foot building of concrete construction with a shallow pitched concrete

cantilevered shed roof, with a central entry steel door, and an electric pump with 8-inch discharge pipe.

Building 149, constructed in 1952, is a water well that is no longer in use. It is located on the corner of 4th Street and B Avenue (Figure 5; Appendix B). This 9-foot by 11-foot building houses a water pump; the well housing is a wood-framed pre-fabricated steel structure with a flat metal roof, an offset entry with steel door, and an electric pump with an 8-inch discharge pipe.

Building 319, constructed in 1944, is a water well that is no longer in use. It is located on the corner of 2nd Street and an unnamed road (Figure 5; Appendix B). This 12-foot by 16-foot building houses a water pump; the structure is a wood-framed pre-fabricated steel structure with a flat wood composite roof, central entry with steel door, and an electric pump with 6-inch discharge pipe.

Building 663, constructed in 1963, houses a well. It is located on the southeastern end of 7th Street (Figure 5; Appendix B). This steel prefabricated building has a low pitched front gable metal roof, offset entry with steel door, and an electric pump with an 8-inch discharge pipe. The main part of the building measures 10-foot by 10-foot, with an 8-foot by 12-foot wing on the back.

Building 308

Building 308, constructed in 1963, houses retail stores, including a rental car office and a United States Post Office. The building is located near the intersection of E Avenue and Langford Lake Road (Figure 5; Appendix B). This single story commercial building has a concrete block construction with a rectilinear plan, a flat composite roof, fixed aluminum frame display windows, and a metal canopy that spans the length of the southwest façade. Contractors made minor alterations to the structure in 1968 and 1983.

Building 312

Building 312, constructed in 1958, is an In/Out Processing Center. It is located between E and F Avenues (Figure 5; Appendix B). This single story building has an irregular plan with a shallow pitched composite roof with intersecting gables, a recessed central entry, and fixed and sliding aluminum windows. The walls are wood framed with stucco. Contractors made additions and modifications to the building, including a new stucco finish circa 1968.

Building 322

Building 322, constructed in 1958, is currently the Memorial Gym; formally it was called Chuckwalla Gym. This building is located on 2nd Street near F Avenue (Figure 5; Appendix B). This 113-foot by 138-foot building is constructed in the Quonset hut-style of asbestos concrete panels with a shallow pitched shed-roof, an offset entry with glass doors and canopy, and several fixed steel sash multi-pane windows of various sizes and configurations. Contractors added wings to this building in 1960, and the doors were replaced in 1969.

Building 452

Building 452, constructed in 1946, is currently the Brigade (BDE) Headquarters, but it was originally built as a religious chapel for the Fort Irwin community. It is located on G Avenue between 2nd and 3rd Streets (Figure 5; Appendix B). This is a single story building with an irregular plan with a low pitched cross-gable roof. It has an offset flat-roofed addition on the front, aluminum sliding windows, and steel doors. The exterior walls are wood that includes both clapboard and vertical shiplap siding. Contractors altered the front façade in 1961 and added a 20-foot by 100-foot rear wing in 1964. In the 1990s, they replaced asbestos concrete siding and an asbestos shingle roof with wood siding and a corrugated metal roof.

Building 614

Building 614, constructed in 1952, is a vehicle maintenance shop. This building is located on 5th Street. This is a Quonset hut-style building with a steel frame covered with corrugated metal siding, steel awning windows, and five bays with steel rolling doors.

The National Register of Historic Places (NRHP) criteria for evaluation require an assessment of significance and integrity (U.S. Department of Interior 1997). Significance may be established by association with notable events or broad patterns of history (Criterion A), association with an important person (Criterion B), distinctive characteristics of design or construction (Criterion C), or potential to yield information important in prehistory or history (Criterion D). For this survey, properties that are associated with the historic context of the World War II and Cold War eras will be significant for their importance to the mission of the U.S. Army at Fort Irwin; their association with an important person or event relating to Fort Irwin, World War II, or the Cold War; or their distinctive design or construction. Integrity refers to the physical characteristics of a property that allow it to show its significance. To be considered an eligible property, a structure must retain its basic form and character-defining features to the degree that it still provides a true and authentic representation of its historic appearance. According to National Register criteria, evaluation of integrity requires analysis of seven key qualities: location, design, setting, materials, workmanship, feeling, and association. All buildings undergo change over time, so it is not essential that all seven attributes have been preserved intact, but an eligible property must still convey a sense of the time during which it attained its significance.

While some of these buildings have undergone modifications over the years, these changes have affected the basic form and character-defining features of only three buildings, 312, 322 and 452. However, none of the 18 buildings designated in this project possess distinctive characteristics of construction, association with notable events or people, or the potential to yield additional information important to the history of Fort Irwin. Therefore, the results of this survey indicate that none of the 10 properties that required evaluation possess sufficient significance to be eligible for the NRHP.

MANAGEMENT CONSIDERATIONS

Section 106 and NEPA Findings

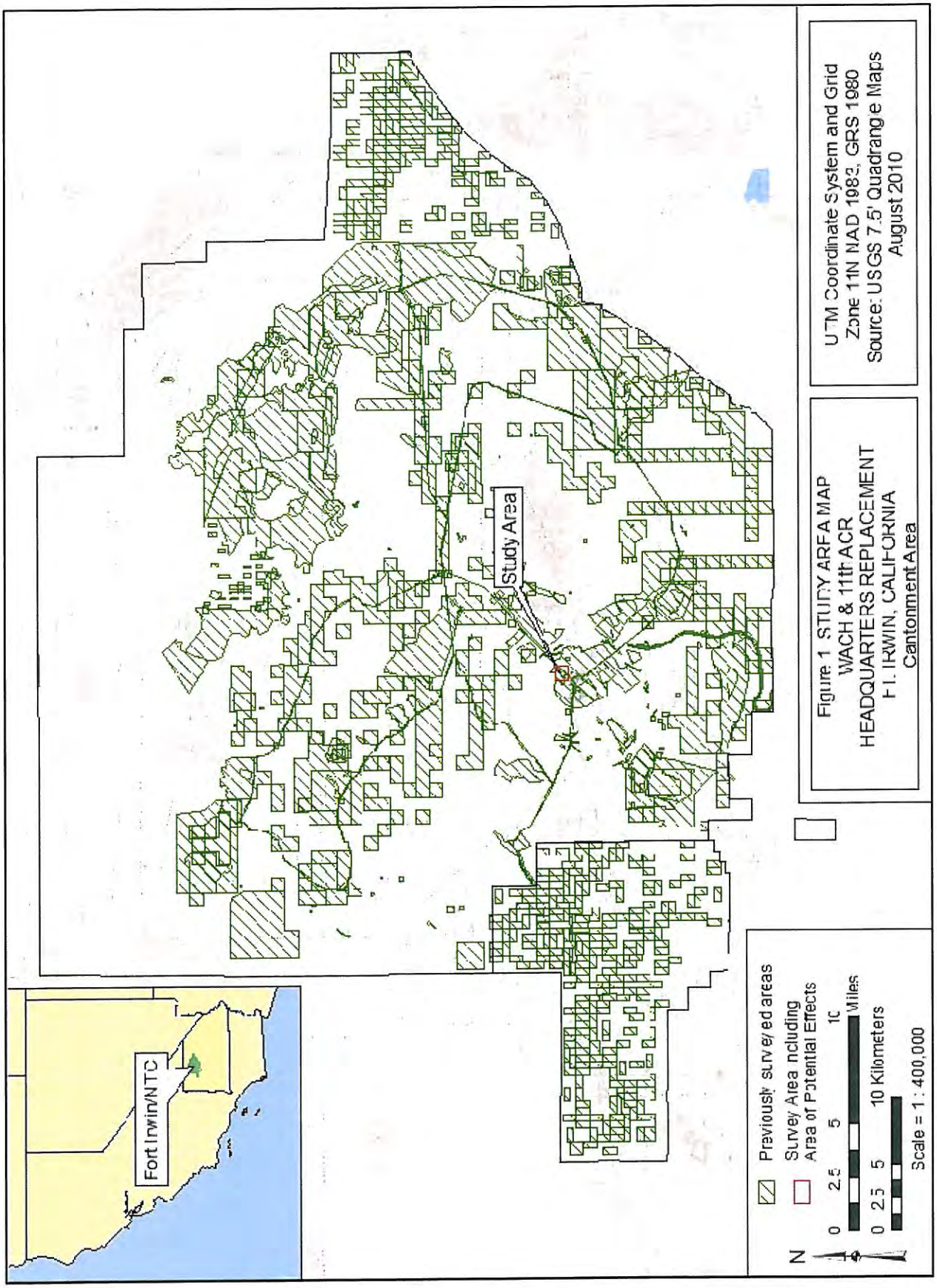
A finding of "No Historic Properties Affected" is appropriate for this undertaking in accordance with 36 CFR 800.4(d)(1), as there are no eligible historic properties present. This project will not impact any known cultural resources. Further research is not required and the proposed construction should proceed.

Native American Consultation

Consultation with the federally recognized Native American tribes recommended by the California Native American Heritage Commission is ongoing (Appendix D). We will revise our inventory results and resubmit this report if the tribal communities express any concern. Archaeologists have identified no properties with traditional, cultural, or religious significance at this time.

Inadvertent Discoveries

If human remains, paleontological specimens, or previously unknown historic and/or prehistoric artifacts or features are unearthed during the project, the construction company should suspend work in the area and notify the Directorate of Public Works Environmental Division, which will evaluate the find.


Fort Irwin/NTC
Study Area
Previously surveyed areas
Survey Area including
Area of Potential Effects
N
0 2.5 5 10 Miles
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Scale = 1 : 400,000
Figure 1 STUDY AREA MAP
WACH & 11th ACR
HEADQUARTERS REPLACEMENT
FT. IRWIN, CALIFORNIA
Cantonment Area
UTM Coordinate System and Grid
Zone 11N NAD 1983, GRS 1980
Source: USGS 7.5' Quadrangle Maps
August 2010

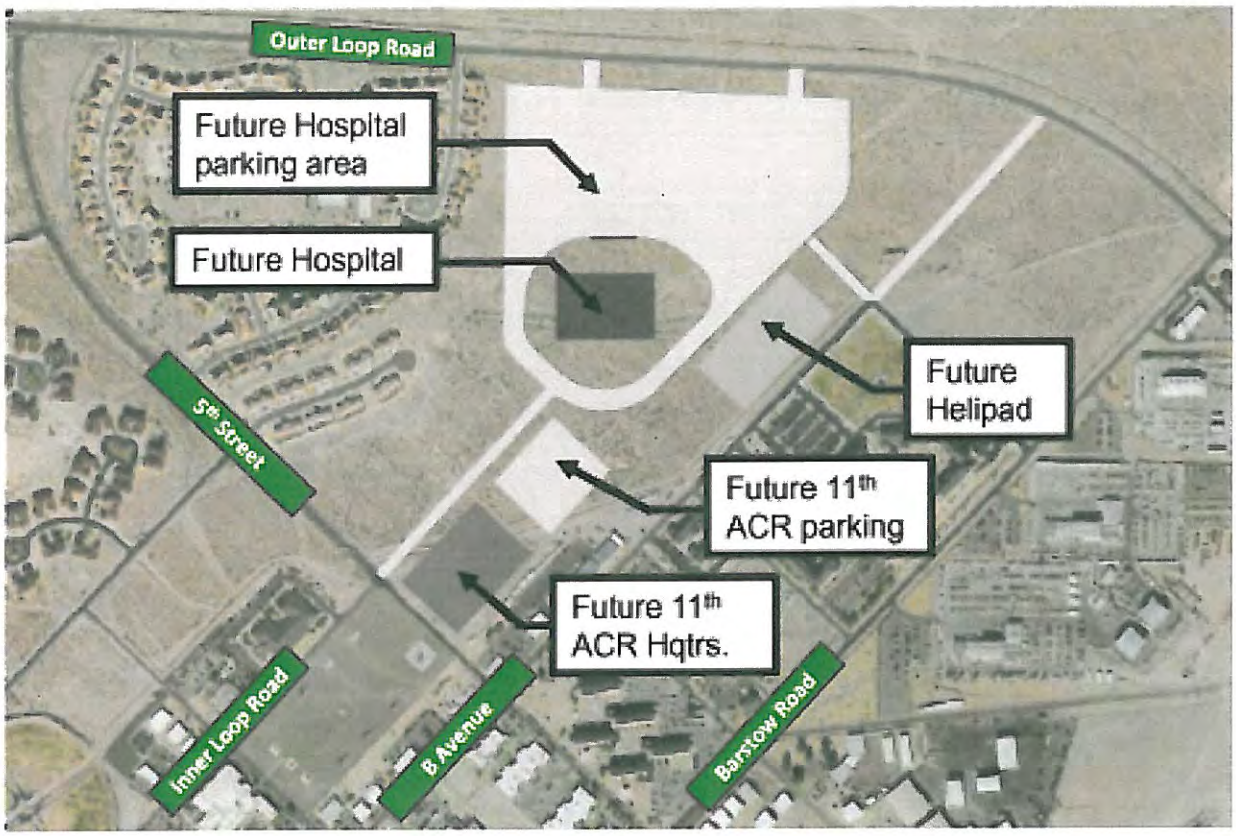

Figure 2. Layout of construction footprint for the WACH and 11th ACR Headquarters

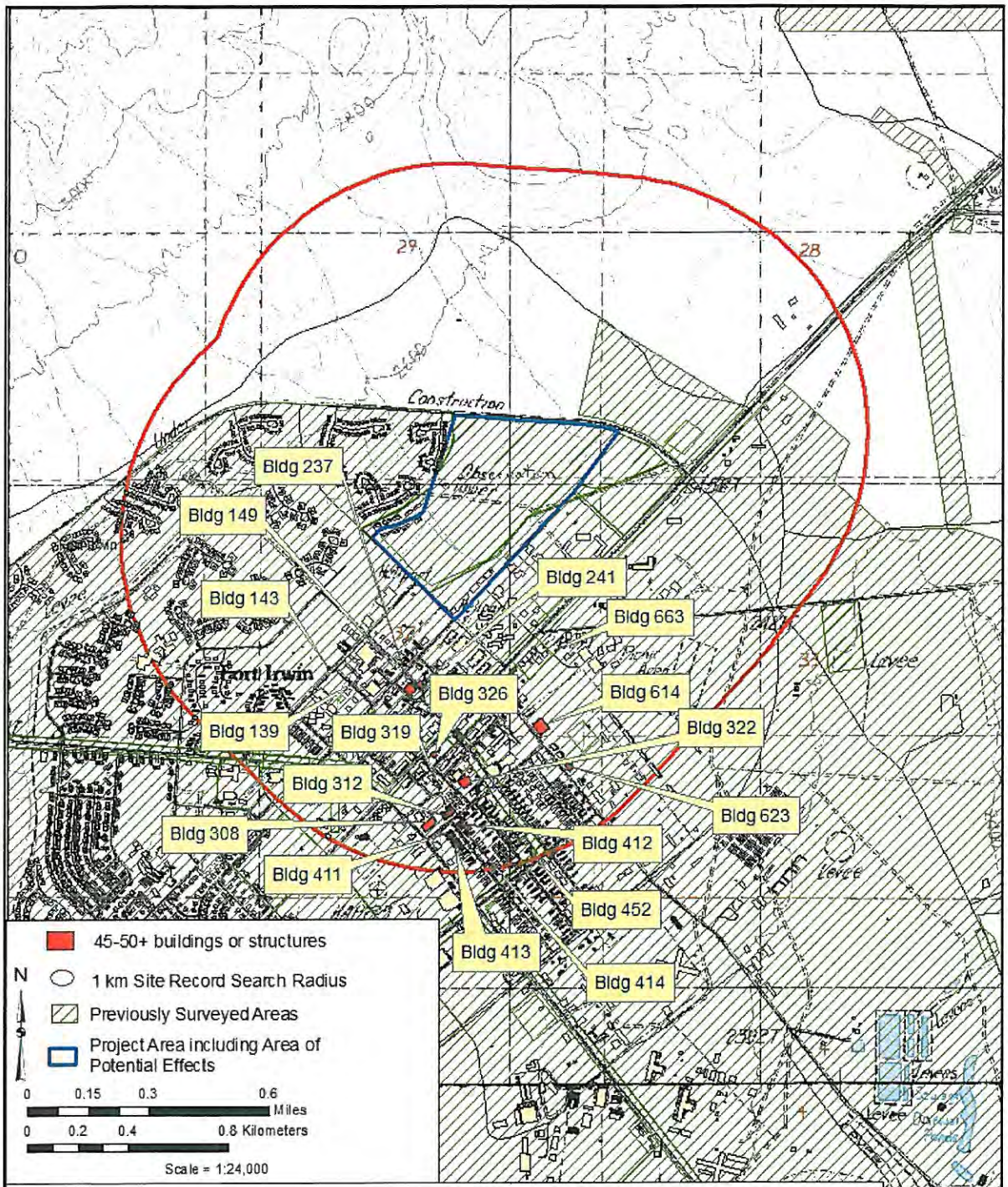

Figure 3. STUDY LOCATION MAP
WACH and 11th ACR Headquarters Replacement
FT. IRWIN, CALIFORNIA

UTM Coordinate System and Grid
Zone 11N, NAD 1983, GRS 1980
Map Source: USGS 7.5' Quadrangle
(Fort Irwin)
T14N, R3E Sec. 29

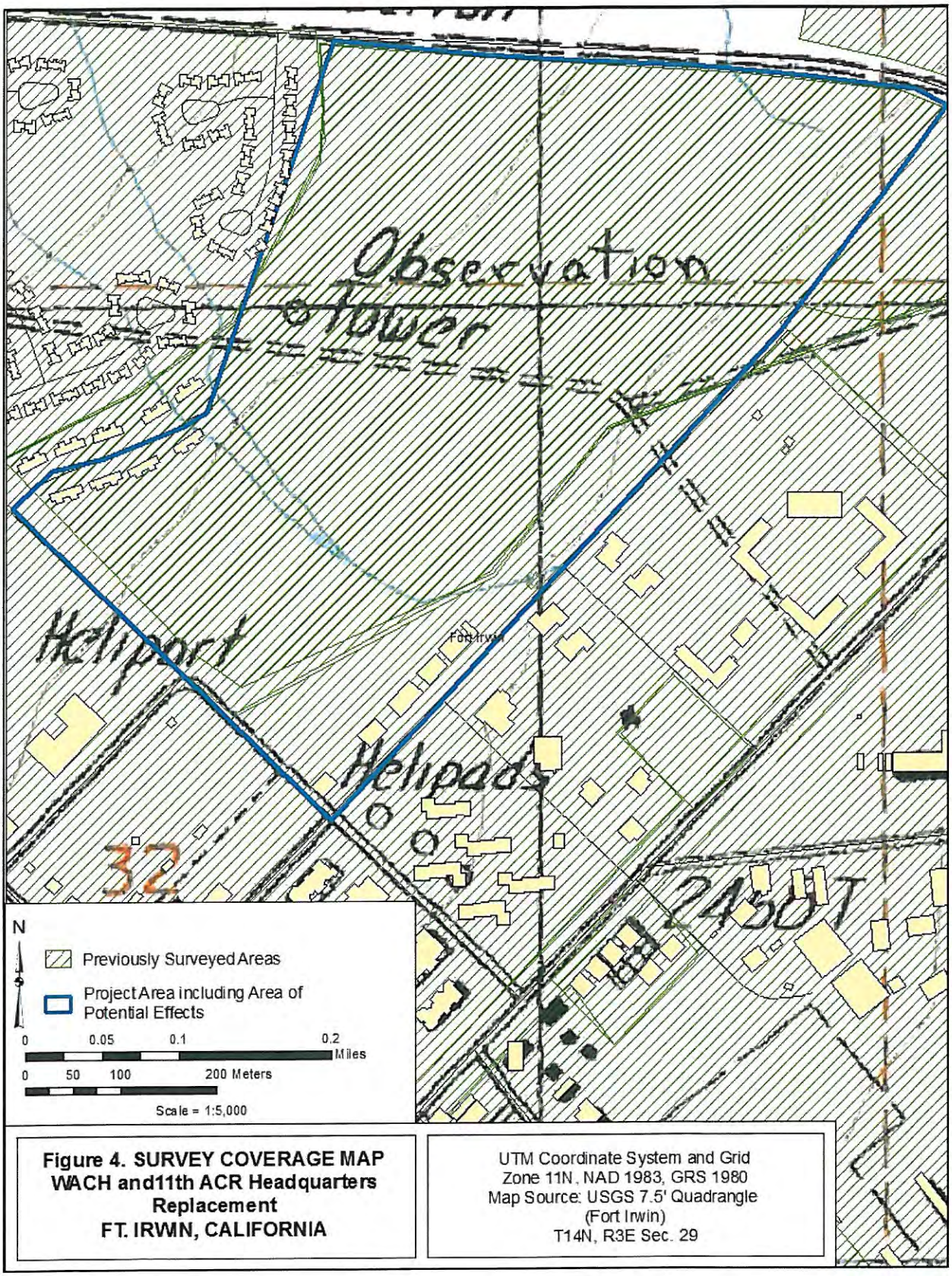

Figure 4. SURVEY COVERAGE MAP WACH and11th ACR Headquarters Replacement FT. IRWIN, CALIFORNIA

UTM Coordinate System and Grid
Zone 11N, NAD 1983, GRS 1980
Map Source: USGS 7.5' Quadrangle
(Fort Irwin)
T14N, R3E Sec. 29

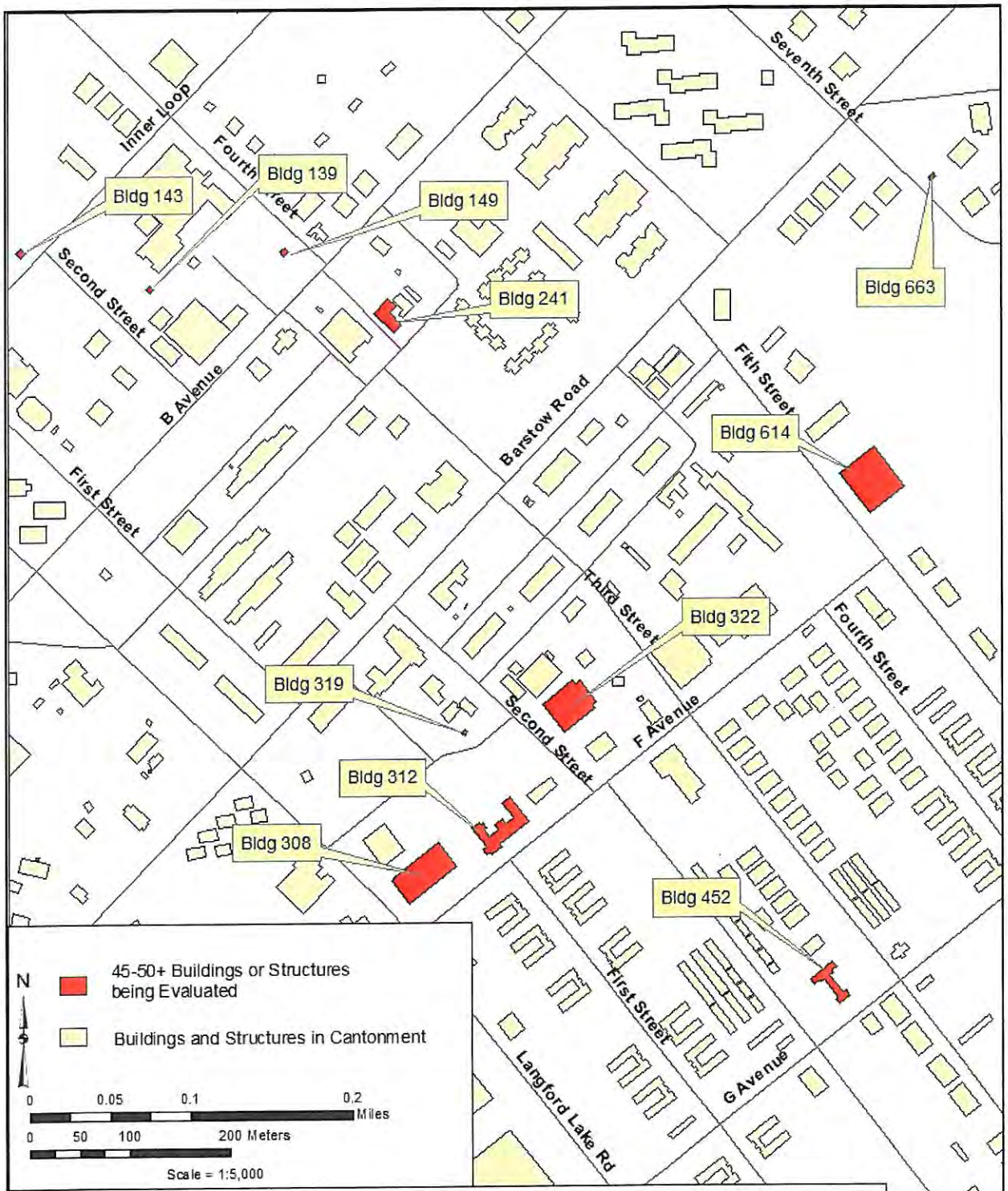

Figure 5. BUILDING LOCATION MAP WACH and11th ACR Headquarters Replacement FT. IRWIN, CALIFORNIA

UTM Coordinate System and Grid
Zone 11N, NAD 1983, GRS 1980
Map Source: USGS 7.5' Quadrangle
(Fort Irwin)
T14N, R3E Sec. 29

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APPENDIX A

HISTORIC CONTEXT FROM SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

FINAL

CULTURAL RESOURCES SURVEY

INVENTORY AND ASSESSMENT OF HISTORICAL RESOURCES

Cantonment Area and Pioneer Deep Space Station Site
Fort Irwin, California

Prepared for:

Commander NTC & Fort Irwin
Directorate of Public Works
Environmental Division (AFZJ-PW-EV)
Building 385
Fort Irwin, California 92310-5097

Prepared by

Science Applications International Corporation
816 State Street, Suite 500
Santa Barbara, California 93101

References:

Contract No. DACA09-94-D-0017
Delivery Order No. 0005

February 1996

Property of NTC-DPW
Cultural Resources Library

Cold War era properties under Army ownership or control that may be of exceptional importance include buildings, structures, objects, sites, and/or districts associated with pivotal and extraordinary historic locations, events, and developments of the Cold War era. (4.d)

The Army will prioritize its focus on the production and combat subsystems of the Army and their associated real property and technology that is of unmistakable and extraordinary importance by virtue of a direct and influential relationship to Cold War tactics, strategy and events. (5.b)

Facilities that previously housed highly significant technological and scientific equipment and objects which have been removed would not be considered significant because their integrity was compromised when the equipment comprising their historic significance was removed. (5.d.1)

Technological and scientific properties should be evaluated for National Register eligibility as whole systems. Remaining components that have been separated from their entire technological system must be carefully examined for integrity levels and would not normally be considered historically significant. Integrity, hence National Register eligibility, is based on how a system operated in its entirety. (5.d.3)

Buildings, structures, districts, sites or objects that clearly are intact and unique, one-of-a-kind examples expressly built as part of the Army's Cold War research and development activities should be evaluated for National Register eligibility under the criteria of exceptional importance pursuant to 36 CFR 60.4 and this policy. (5.d.4)

This draft policy indicates that only those facilities directly associated with nationally significant elements of the Cold War era are to be considered for evaluation at this time.

3.0 HISTORIC CONTEXT

The historic context for Fort Irwin is presented below in two phases: World War II era, and the Cold War era. Additionally, the Pioneer Deep Space Station (DSS 11) was evaluated under the Man in Space Theme Study developed by the National Park Service. NRHP procedures require that general historic contexts be developed within which to evaluate specific historic resources. Such contexts are designed to explain the role of the resources in relationship to historic trends, drawing on specific facts about the resources and their surrounding community. Within this context specific resources are analyzed for significance through a comparison of these resources with other properties of the same period and type (NPS 1991:49).

3.1 WORLD WAR II

When war broke out in Europe in 1939, the U.S. government began preparations for developing a standing army and providing training areas for the various branches of the Army and Navy. As part of this effort, in April 1939 a bill was introduced in Congress to create an anti-aircraft range north of Barstow. Army engineers surveyed the area in June 1939, and in July 1940 President Roosevelt issued Executive Order 8507 establishing the Mojave Anti-Aircraft Range (MAAR) on 641,318 acres in the Mojave Desert 35 miles northwest of Barstow. Earlier that year a team of reserve officers had visited the site and made recommendations for the construction of requisite buildings. A well was drilled on site

in December 1940 and a connecting road built to it from Barstow using WPA funds. Construction began in January 1941 and took approximately a year to finish (Quinn 1981:26-28). Miles of telephone lines for teletype and telephone communication between Riverside and the range and inter-range were strung, as well as electrical wires from Barstow.

The buildings were of temporary construction, built of wood frame in the standard Army design, which was usually rectangular in shape with a gabled roof. However, where many California installations used wood siding, the buildings here were covered with a gypsum sheathing against the wood frame and then with 4' x 8' cement asbestos panels with battens. The types of buildings included mess halls, latrines, infirmaries, storage, warehouses, administration buildings, motor vehicle repair and maintenance buildings, and a cold storage plant. The enlisted men were housed in tents, in a rectangular cantonment, with mess halls, latrines, bathhouses, and infirmaries supplying them (see Figure 3). Across Barstow Road was the commanding officer's house, the officers' club, swimming pool, recreation area, and presumably the tents of the officers. During the first year of operation, 1941, a regimental tent camp was developed to house 2,000 men. The facility was designed ultimately to house 10,000 men, 2000 in hutments and the rest in tents. An emergency landing field was established at Bicycle Lake (War Department 1945).

MAAR was designed as an anti-aircraft training area, affiliated with Camp Haan, an Antiaircraft Artillery Training Center located at March Field near Riverside, California. The mission of the Center was to train Army troops so they could "defend strategic points such as airports and troop concentrations against dive bombers and low-flying level bombers (Van Arsdol 1971). Regiments and battalions would undertake basic training at Camp Haan and then travel from Riverside to MAAR for four weeks of further training. The men would live either in the cantonment area tents or in pyramidical tents pitched out at the ranges.

Five ranges were established at MAAR. Range #1 at Granite Pass was used for 3" AA guns or 90 mm guns. Range #2, centered at Goldstone Lake, included four anti-tank subranges where canvas targets on sleds were towed by trucks traveling between 25 to 35 miles per hour. Range #3, just northeast of the cantonment area, contained subcaliber and normal caliber antitank ranges. Range #4, a 150-target rifle range, was located within walking distance south of the MAAR cantonment, now the Fort Irwin cantonment. Range #5, located north of Range #2, was used for automatic weapon antiaircraft guns. Ranges #1 and #5 used target sleeves towed by airplanes at various altitudes both day and night (see Figure 4) (Nelson 1941: 448-553; Van Arsdol 1971).

MAAR was part of a far larger Desert Training Center (also referred to as the California-Arizona Maneuver Area or CAMA) that was bounded east and west by Pomona, California and Phoenix Arizona, and north and south by Boulder City, Colorado, and Yuma, Arizona. This massive desert area was established in March 1942 as a training area for General George Patton and his 1st Armored Division Tank Corps, assigned to take part in Operation Torch, joining General Montgomery in North Africa against German Field Marshal Rommel. Patton trained troops during the summer of 1942 before leaving for North Africa in October 1942. His base of operations was Camp Young, 28 miles east of Indio (Heald 1960:6,24; Kennedy 1982: 3-13).

In December 1942, per War Department General Order Number 65, MAAR was renamed Camp Irwin in honor of Major General George LeRoy Irwin, Battle Commander of the 57th Field Artillery Brigade in World War I (Quinn 1981:30).

By 1944, Camp Irwin had declined in importance, and was declared surplus to the War Assets Administration. In February of the following year, President Roosevelt returned the Camp to the

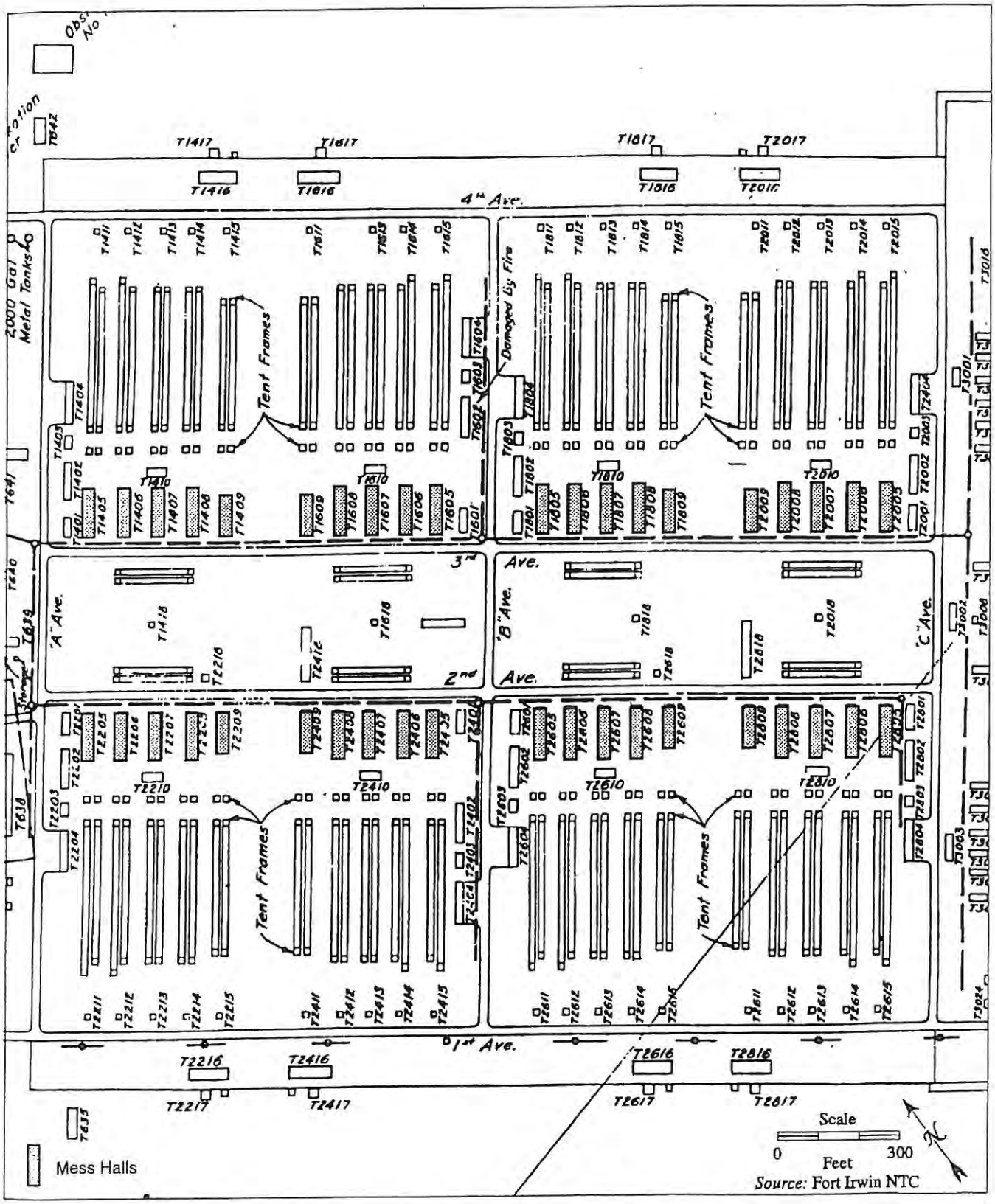
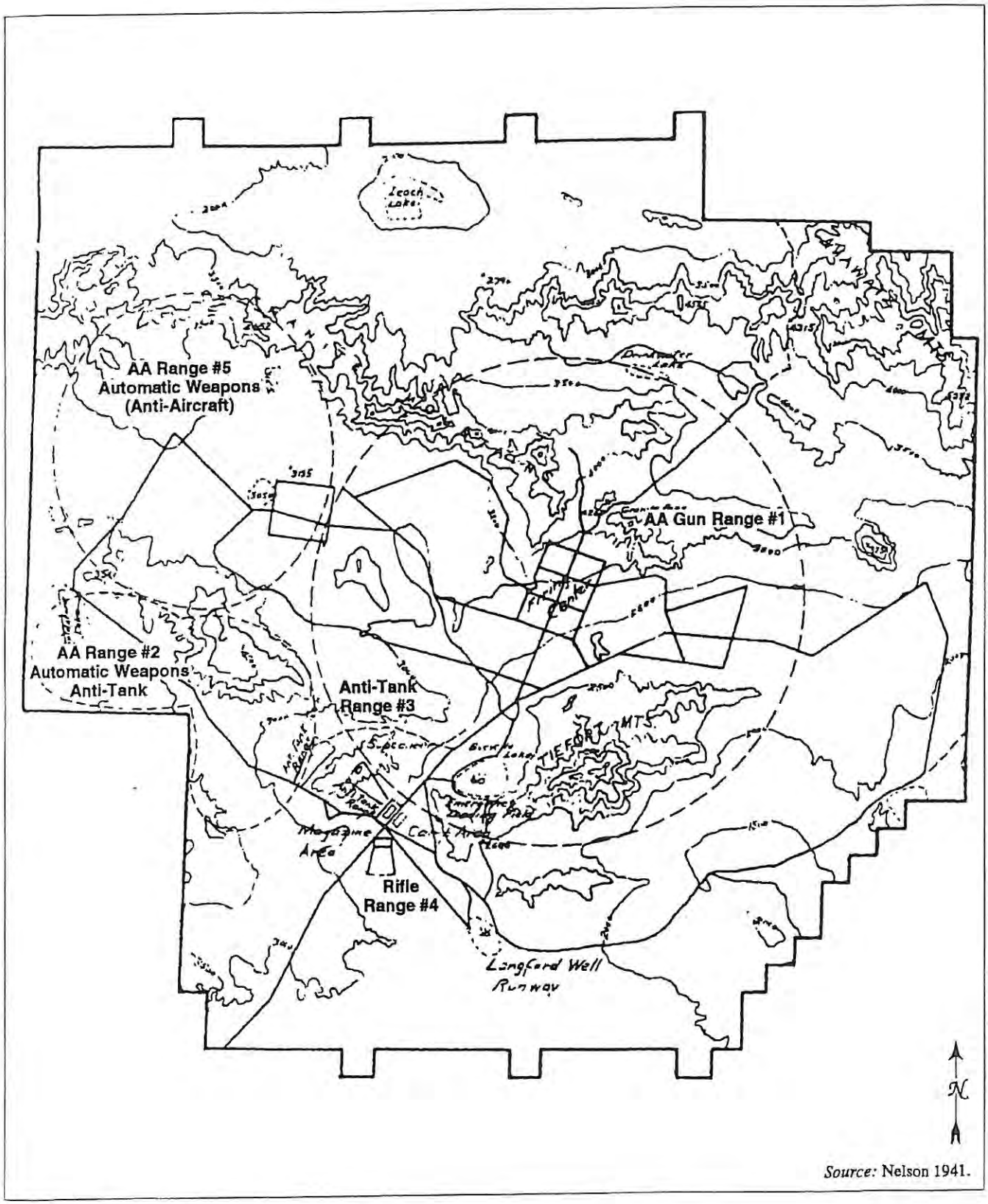


Figure 3. Camp Irwin Layout Plan Detail 1947



Source: Nelson 1941.

Figure 4. Mojave Anti-Aircraft Training Ranges 1941

jurisdiction of the Department of the Interior (Quinn 1981:31). A Post-War Utilization Study of Camp Irwin by the Office of the Chief of Engineers of the War Department, undertaken in September 1945, rejected the site for post-war retention because the majority of the buildings were considered temporary and inadequate, the isolated site had no recreational facilities, laundry, or civilian housing, and there was an inadequate water supply. The report estimated that the $43,000,000 price tag to construct a new sewer system, water distribution system, permanent housing for bachelor officers, and barracks for 19,000 enlisted men was too high (War Department 1945). In August 1948 the Army filed a withdrawal of Surplus Declaration, retained jurisdiction over the Camp, and placed it in inactive status (Nichols 1950).

The Goldstone Lake area was also used during World War II for rocket testing by the California Institute of Technology (Caltech) in Pasadena. Caltech had been working on a defensive rocket-propelled antisubmarine bomb, that would use a forward-fired depth charge. It used the Mousetrap system, from the British Hedgehog launcher, and was designed to give small ships an antisubmarine weapon. The German attack on the U.S.N. destroyer *Greer* in September 1941 prompted the Navy to order that their Navy ships fire on any ship interfering with American vessels. Work by Caltech on its rocket program was brought to the forefront as a result of the Navy's need for better antisubmarine weapons.

Caltech needed an isolated area in which to test fire the rockets and was given permission by the Commanding Officer of Camp Haan to use the MAAR site. Permanent headquarters were established at the Lake site, based on two dilapidated former ranch buildings (Christman 1971:160). After numerous experiments launching rockets from stationary launchers, the first Navy air launch, in a TBF-1, of a forward-firing rocket, a British model, as part of the Caltech program took place on July 14, 1943. In August the first air-firing of the Caltech rocket took place at Goldstone. From this point, the rocket quickly went into production and was placed on aircraft used in the European Theater. Caltech remained at Goldstone, renting facilities and adding more, until the testing program became too large for the facility, which consisted of only one range. Additionally there was a need to use live explosives that could not be done at Goldstone because live duds would contaminate the testing ground and landing field. By the summer of 1943, Caltech was looking elsewhere, ultimately relocating at adjacent China Lake (Christman 1971: 121, 150-62).

3.2 COLD WAR ERA

The Cold War, first coined as a term in 1947, was the phrase used to define the tension between the United States and the Soviet Union that arose following World War II, and turned into a world-wide struggle between democracy and Communism. The battle was played out using nuclear weapons developed after the war. This change in the political climate between the two former allies was triggered by a series of events in the Soviet Union in the late 1940s, such as the detonation of its first atomic bomb, its blockade of Berlin, and its growing influence in neighboring China. The United States came to believe that the Soviets were planning both to claim the world for Communism and to eradicate the United States through a surprise nuclear attack (Clarfield and Wiecek 1984:144). The Unites States in turn established a policy of containment that sought to block the expansion of Soviet influence around the world and provide economic aid to countries that were fighting Communism.

Political tension between the United States and the Soviet Union became heightened in the 1950s. Communism was a real fear, fueled by the Korean War, the investigations of the House Un-American Activities Committee, Senator Joseph McCarthy's hunt for alleged Communists, and the Julius and Ethel Rosenberg atomic espionage trial. Under President Eisenhower, Secretary of State John Foster Dulles developed a dual policy of deterrence through "massive retaliatory power" and containment of Soviet expansion through alliances with non-Communist countries. This policy resulted in the formation by the mid-1950s of the North American Treaty Organization (NATO), the Southeast Asia Treaty Organization

(SEATO), and the Baghdad Pact. This loose association linked allies from whose territory retaliatory attack against the Soviet Union could be made if necessary. In response the Soviet Union organized the eastern European Communist countries into the Warsaw Pact. The years 1956 and 1957 saw the invasion of Hungary by the Soviets and the invasion of Egypt by France and Great Britain with the threat of Soviet counter-invasion there (Weisberger 1984:154-74).

The mission of the Department of Defense during this Cold War era was to deter a general nuclear war through a massive buildup of a nuclear arsenal and reliance upon a nuclear triad of land- and sea-based missiles and manned bombers under the command of the Navy and the Air Force. The policy of deterrence, in which U.S. bombers armed with nuclear warheads were maintained on alert 24 hours a day, maintained essentially a nuclear stalemate.

Additionally, DOD required the maintenance of sufficient troops to fight non-nuclear battles in global hot-spots that were caused by the constant tensions of the United States pushing against Soviet expansion, particularly in the areas that had been divided after World War II, such as China-Taiwan, West Germany-East Germany, and later North and South Korea and North and South Vietnam. DOD determined that it was necessary to be able to fight a "war and a half," one in Europe and one elsewhere (Center for Air Force History 1994: 73-74). Particularly in southeast Asia and Latin America, U.S. policy makers were fearful of the domino effect; if one country in the area were allowed to fall under Communist influence, it would automatically topple the remaining countries into the Communist camp. The United States, therefore, was prepared to send troops to ensure that governments upholding the democratic ideal were maintained in power or in some cases reinstated.

The role of the Army within this larger context was to raise, train, and equip sufficient ground forces and maintain them in combat readiness for non-nuclear response wherever they were needed overseas. Such troops were involved in the Korean War (1950-53), the Berlin crisis (1961), the Cuban Missile crisis (1962), the invasions of the Dominican Republic (1965), the Vietnam conflict (1965-73), and the invasions of Grenada (1983) and Panama (1989) (LaFeber 1991: 197, 205-12).

Camp Irwin fits within this context as one of the sites where troops were trained for such localized conflicts. After being inactive since 1948, it was reactivated in July 1951 for tank training and war games (rather than the anti-aircraft usage of World War II) as a result of the outbreak of the Korean War. Designated an Armored Combat Training Area, the Camp's mission was to operate a training area with the capacity for 4,500 troops. All non-divisional armored troops in the United States were to rotate through the Area for five weeks training, with two battalions training at the same time ("Statement of Mission. 6019th Area Service Unit"). The installation was under the Commanding Officer of the Sixth Army, headquartered at the Presidio in San Francisco. Units that trained here included the 526th Ordnance Company, regimental tank companies of the 43rd Infantry Division based at Camp Pickett, Virginia, the 378th Ordnance Company, and the 53rd Transportation Company (Quinn 1981:31; National Training Center Installation Action Plan 1995:2).

There was little change to the installation to accommodate these trainees. The World War II tent facilities were removed, new streets were cut through the old tent areas, and 42 permanent barracks were constructed, 38 for enlisted men and 4 for officers. Several new buildings were constructed: a service club, recreation building, a hangar, engineer's administration building, transportation administration building, a shop, and storage warehouse. Several storage buildings were relocated, as was the stockade. With these exceptions, the remainder of the base remained the same during the war (see Figure 5).

The U-shaped barracks for enlisted men and the H-shaped barracks for bachelor officers were constructed with asbestos cement siding. The two wings of the buildings, with offset shallow-pitched gable roofs,

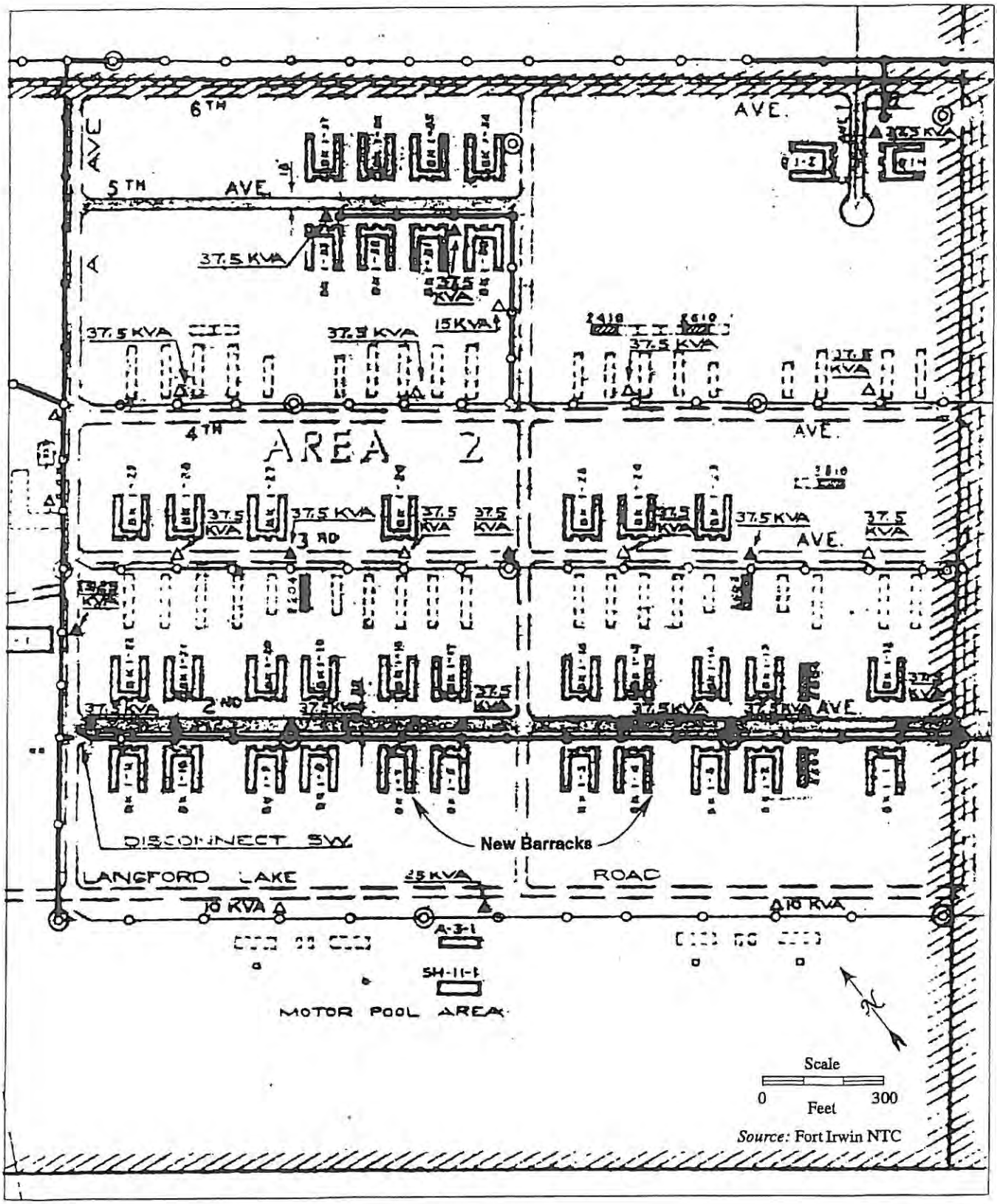


Figure 5. Camp Irwin Layout Plan Detail 1952

contained long open rooms that were joined at the center by concrete block shower and heater rooms. The windows were wood-framed double sliders or double-hung with horizontal muntins. The enlisted men's barracks, designed by Mills & Petticord, Architects and Engineers from Washington, D.C., were Type BK-1 barracks, and designated Emergency Type Construction (engineering drawing dated 5 November 1953).

During the years after the end of the Korean War in 1953, troops continued to train at Camp Irwin's Armored Combat Training Area. Army Reserve and National Guard units used the area for summer training. According to a contemporary newspaper account, in 1958 there was some question whether the Camp would remain. By 1959 the Army had decided to keep the facility, citing it as the "finest tank training area in the whole world." The Secretary of the Army, Wilbur M. Bruckner, visited the installation in 1959 and mentioned that the Army was planning to build 140 Capehart houses on site and possibly to use it for missile activity. He also mentioned the need for the United States to remain ready to defend its interests globally against aggression (Miller 1959).

Camp Irwin became a permanent Class I installation in 1961, and was renamed Fort Irwin Army and Desert Training Center. It served as an armor and artillery firing and desert training center for units of the Army, National Guard, and Army Reserve in the Fifth and Sixth Army areas (Quinn 1981:1). During the Vietnam conflict it was used as well as a pre-deployment center for units called to active service. ("Fort Irwin Armor & Desert Training Center." 1962; Chapman 1992:30).

In January 1971 Fort Irwin once again was inactivated for budgetary reasons and was placed by the Sixth Army in caretaker status, to be used as a training facility for units of the reserves and as a mobilization site (Chapman 1992:31). In 1972 it was transferred to the jurisdiction of the California Army National Guard, who used it on weekends and summer training for unit training ("Real Estate Utilization Inspection Report." 1973; Chapman 1992:28,31).

By 1976 the U.S. Army realized that it needed a national training center where troops could "simulate a modern battlefield" and fight as they would in a real war. The buildup of the Soviet Army, and the lack of U.S. troop strength in Germany because of the Vietnam conflict, coupled with the need to keep the reserve forces well trained, all contributed to the climate in which the idea of a national training center could be realized. Fort Irwin was chosen over 11 other locations for its size and terrain, which could accommodate live fire ranges and two force-on-force training areas. After lengthy environmental review, the National Training Center was approved in 1979, opened in 1980, and officially reactivated as an Army installation in 1981 (Chapman 1992:22-30) (see Figure 6).

Two battalions, the 6th Battalion (Mech) 31st Infantry and the 1st Battalion, 73rd Armor, provide the resident opposing force for rotating battalions that come, 3,500 soldiers at one time, from Army forts all over the United States 14 times a year for 20 days of training. Such training includes force-on-force training at battalion strength using an electronic weapons system (Multiple Integrated Laser Engagement System or MILES), with laser beams simulating kills, and live firing practice on the range ("Units and Tenants"; *Barstow Salutes National Training Center* 1984).

3.3 MAN IN SPACE

The Pioneer Deep Space Station (DSS 11) (see Figure 7), is associated with the Man in Space context established in 1984 by the National Park Service. Designed by the Jet Propulsion Laboratory in Pasadena, it was established in 1958 as part of the U.S. Army mandate to launch a lunar probe. Its origins derive from U.S. Army rocket activity toward the end of World War II when JPL's predecessor, GALCIT (Guggenheim Aeronautical Laboratory. California Institute of Technology), was contracted by

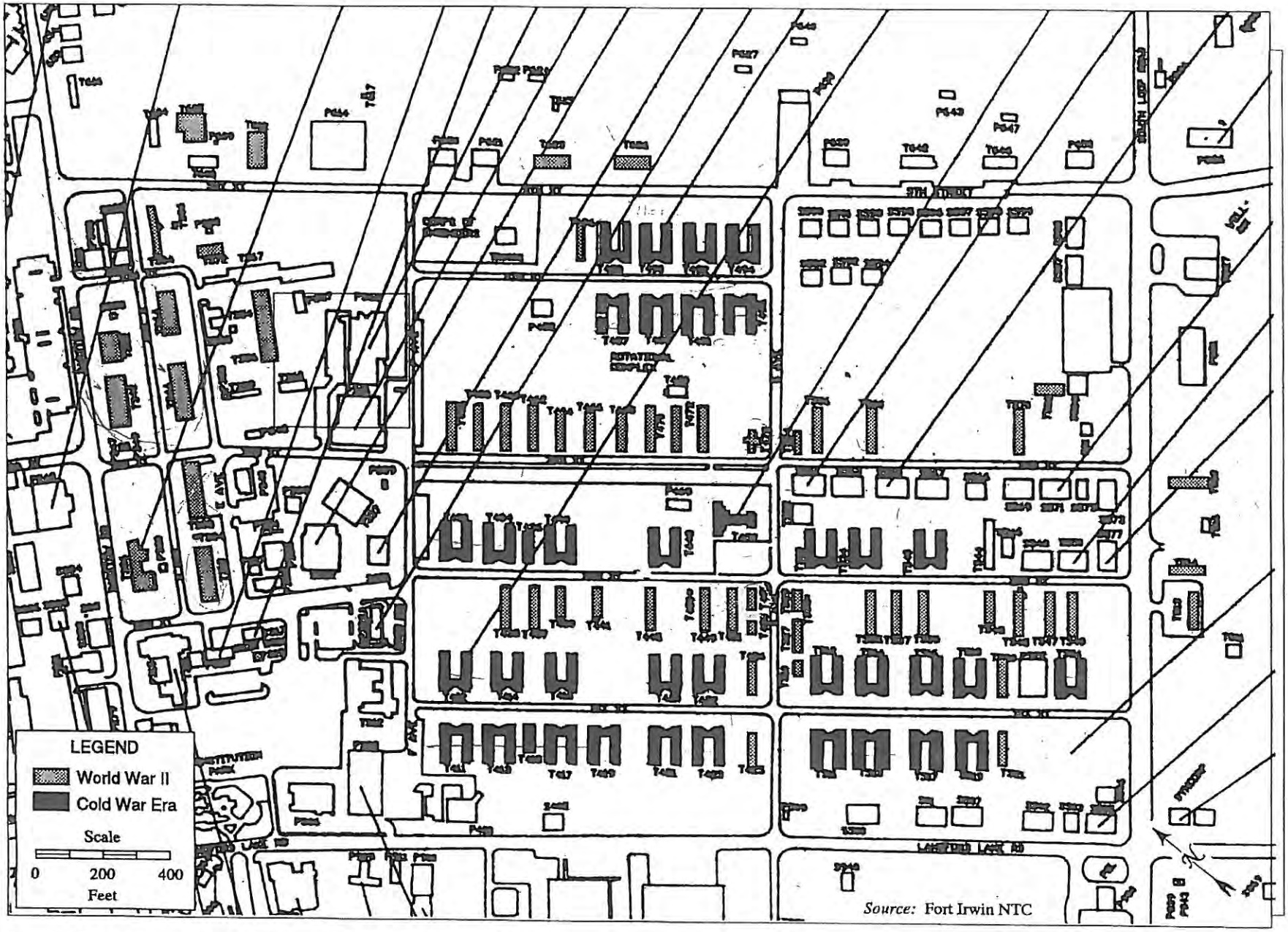
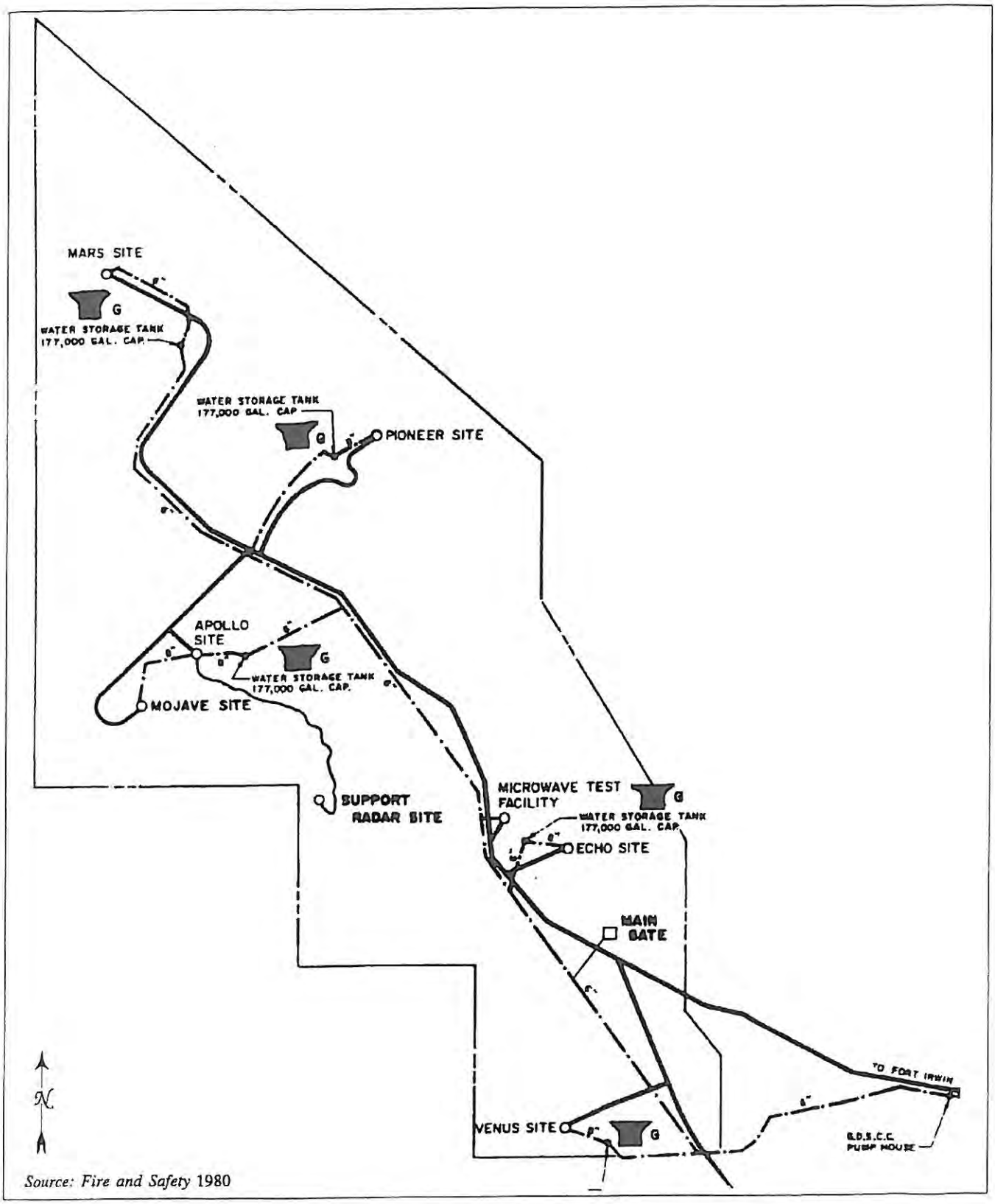


Figure 6. Fort Irwin Layout Plan Detail 1995



Source: Fire and Safety 1980

Figure 7. Goldstone Deep Space Network 1980

the Army to develop surface-to-surface ballistic missiles called Private-Corporal-Sergeant. As part of this program, JPL developed radio guidance ideas that would later be used in the deep space tracking system (Corliss 1976:2).

After World War II the Soviet Union and the United States vied to develop offensive missile systems and to explore outer space for military purposes. The launch by the Soviet Union of Sputnik, the first satellite, in 1957, caused the DOD to sponsor Project Orbiter to launch its first satellite, the Explorer I, for the International Geophysical Year in 1958. Explorer was designed for the Army Ballistic Missile Agency (ARBA) by JPL, who also developed an early telemetry tracking system, Microlock, to track the satellite and receive data from it (Corliss 1976: 1).

Additionally Sputnik triggered President Eisenhower's determination that the United States develop a space program. As a result, in February 1958, DOD established the Advanced Research Projects Agency (ARPA) that in turn funded the Pioneer Program in 1958, a series of lunar probes to travel outside earth's orbit. The Army was given the task to launch two of the five probes, Pioneer 3 and 4. Realizing that such probes would require tracking abilities well beyond existing systems, the Army contracted with JPL to develop not only the probe but tracking and data acquisition facilities as well (Corliss 1976:16). Called TRACE (Tracking and Communication Extra-terrestrial), the system consisted of three stations, at Cape Canaveral, Florida, Mayaguez, Puerto Rico, and Goldstone. It was the first operational deep space network, and the only remnant of the TRACE system today is the Pioneer dish (Corliss 1976:10). To communicate with these lunar probes, JPL developed several technologies including the phase-lock loop, low-noise receivers, and the development of a digital tracking system (Corliss 1976:8).

The Army had an ambitious schedule for launching Pioneer 3, requiring that JPL select a site, build the antenna, and set up the communications system within 8 months. The Goldstone site was chosen for its proximity to JPL, the Army's ownership, its bowl shape that protected the area from man-made radio noise, and JPL familiarity with the site through rocket tests there during World War II. The 26-meter parabolic dish antenna placed there was designed by the Blaw-Knox Company for radio astronomy; although it had been in the development stage for 5 years no antenna had actually been constructed. JPL modified the design by adding a closed loop continuous tracking device, the addition of an electrical feed that could receive the signal for the angle-tracking receiver, and servo control system. Pointing angles were digitized for transmission to the control room in Pasadena. Construction began in June 1958 and the Pioneer 3 probe was launched and tracked on December 6, 1958 (Goldstone Deep Space Communications Complex 5/89:11; Corliss 1976:17). Communications were linked between Goldstone, the launch at Cape Canaveral, and the mobile tracking station in Puerto Rico. Pioneer 4 was launched on March 3, 1959, and Goldstone tracked it 435,000 miles out into space until the probe's batteries ran down (Corliss 1976:23).

As part of the development of a United States space program, simultaneous with the Army's work with JPL on the lunar probe and tracking system, a bill to consolidate all of the U.S. space research under a single organization was signed, and in October 1958 the National Aeronautics and Space Administration (NASA) was formed. Three days before the launch of Pioneer 3, Goldstone, with JPL, was transferred from the Army to NASA. By 1961, in response to the Soviet Union's first manned space flight by Yuri Gagarin, President Kennedy urged the United States, through NASA, to commit itself to land a man on the moon before 1970. Pioneer DSS tracked the various missions resulting from this commitment: unmanned vehicles, including the Ranger lunar TV probes (1961-65), the Surveyor lunar landers (1966-68), the Lunar Orbiter photo surveys for Apollo landing sites (1966-67); and manned vehicles, including Projects Mercury (1961-63), Gemini (1965-66), and Apollo (1968-72) (U.S. Department of the Interior. National Park Service. *Man in Space. Study of Alternatives* June 1987:19; *The Deep Space Network* 1988:10).

Project Apollo required a system to track the manned lunar flights outside the earth's atmosphere and on the moon. A network of three stations with 26-meter antenna were established for this task, near the existing Deep Space Networks at Goldstone, Madrid, Spain, and Woomera, Australia. Because the Apollo telecommunications equipment was similar to DSN equipment, the Apollo program established three back-up telecommunications systems at each of the three DSN sites, connected to the Apollo facilities by microwave. The Apollo 26-meter antenna station was built at Goldstone in 1965, just southwest of DSS 11, by the NASA Goddard Spaceflight Tracking and Data Network. A second control room was built at the existing DSS 11 facility and equipped with the Apollo electronic equipment. The station was known as a "Mutual Station." DSS 11 served as a back-up to the Apollo mission from 1969 to 1972 (Corliss 1976:198; *Goldstone Deep Space Communications Complex* 5/89:15).

In 1959 Echo, a second DSS was constructed, and there are now six deep space stations at the Goldstone DSN, including Pioneer, Echo, Venus, Mars, Uranus, and Apollo. The Bendix Corporation received the contract to manage the Pioneer site in 1962, and operated it until its closure in 1981, with the exception of the years from 1970 to 1978, when the contract was held by Ford Aerospace (Crofoot 1991). During its years of operation, from 1958 to 1981, the Pioneer antenna also tracked such unmanned spacecraft as the Mariner missions to Venus, Mars, and Mercury, Pioneers 6-13 exploring Venus, Mars, Jupiter, Saturn, and the Helios solar orbiters (*The Deep Space Network* 1988:10). The Pioneer station was deactivated in 1981. According to John Jerscheid, a former Pioneer site manager, the site was never expanded and upgraded as were the other sites, because during a JPL geological survey preparatory to installing a 64-meter antenna on the site in the late 1960s, a fault was discovered that ran from the collimation tower, or boresight tower, at the top of the mountain, to the main building. The 64-meter antenna was constructed instead at the DSS 14, at Goldstone, and the Pioneer site became obsolete (personal communication, J. Jerscheid, November 1995). Today the facilities are boarded up and no longer used. The antenna and buildings G-8 and G-19 are encircled by a chain link fence.

4.0 SURVEY RESULTS

A total of 110 facilities were examined during the course of the survey. Fifty-eight were World War II temporary buildings, three were permanent World War II facilities, and 41 were Cold War facilities. Additionally, eight support buildings at the Pioneer Deep Space Station were examined.

Out of a total of 110 facilities evaluated according to NRHP criteria, three of the facilities are eligible for the NRHP, buildings G-1, G-18, and G-19 at the Pioneer site. The results of the evaluation are presented in tables 1, 2, and 3. Further descriptions of the World War II temporary and permanent buildings and the facilities at the Pioneer Site are provided in Appendix C.

4.1 WORLD WAR II FACILITIES

4.1.1 World War II Temporary Buildings

A total of 58 facilities have been classified as temporary wood-frame buildings relating to the World War II period. They are standard building types of the period, with the exception that they are clad in 4' x 8' sheets of asbestos cement over gypsum sheathing, rather than the more usual wood shiplap siding. They have raised concrete foundations with concrete steps, and have vented gable roofs. The roofs are covered with asphalt. Most have aluminum frame double-hung or slider windows, and metal doors, either single or double, plain or with upper glass panes.

According to articles dating from the 1940s, the buildings at Fort Irwin were constructed in 1941-42. However, the dates of construction listed in the Real Property forms indicate 1944 and 1946. It is the

APPENDIX C

EXCERPTS FROM PREVIOUSLY PREPARED CULTURAL RESOURCES SURVEY REPORTS

CULTURAL RESOURCE INVENTORY REPORT

DEPARTMENT OF DPW
CULTURAL RESOURCES
4999 Goldstone Road
Fort Irwin, CA 92310

PROJECT DPW-114
DATE: May 21, 2009

Introduction

A request was submitted to DPW by the Engineering Plans and Service Division requesting permission to do maintenance work on nine different buildings within the Cantonment Area, such as renovation, replacement, additions, and removal of temporary buildings (containers).

Procedures

The cultural resources investigation of the proposed project was conducted on 18 and 19 May 2009 utilizing longstanding Fort Irwin cultural resources management protocols. The Fort Irwin Cultural Resource Management Database (FRMD), the Fort Irwin Cultural Resources Library, and GIS layers associated with the buildings were consulted prior to fieldwork to determine whether the buildings were previously recorded and evaluated.

The Undertaking, as defined by the NHPA of 1966 (as amended), consists of the renovation of two buildings (BD21, BD237), carpet r replacement in another (BD237), repairs to the handicapped accommodations on the parking lot (BD561), and removal of 3 temporary buildings (R 180, R183, and R184 - all trailers). (See Table 1)

The primary concern on this Undertaking is the recordation and evaluation of Building 237. Building 237 is located within the NTC Cantonment Area, and is an existing WWII era structure that was designed to be temporary but has undergone several major renovations from the late 1980s through the early 1990s that have totally altered its form and character by significantly increasing its mass and permanence.

Building 237 is approximately 140 feet long by 116 feet wide, houses 15 offices, 2 conference rooms, and four bathrooms. Building 237 was constructed in 1944 as a temporary wood frame facility related to the WWII period and has since undergone several significant renovations.

The wood framed structure has a raised foundation with a concrete step up to its south end, interior marble floors in the main corridors, wood framed doors throughout, dropped ceilings with popcorn acoustic tile panels, wallboard interior walls, and exterior walls that are stuccoed above a partial brick wall base. The building has a gabled roof with several vents and is served by central heating and air conditioning. Most of the original light-weight aluminum double-hung and/or slider window frames have been replaced with sliding anodized aluminum frames, as were the front and back doors of the building. The original asphalt composition rolled roofing was replaced with individual composition shingles at some point in the recent past. In addition, many of the offices were partitioned to create a greater number of interior offices.

Because of the extensive remodeling that has taken place, Building 237 no longer retains integrity of design, workmanship, and/or materials (Criterion C). Archival research has indicated that this structure is not associated with a significant event (Criterion A) or a significant person (Criterion B). Building 237 is thus not considered eligible for listing on the NRHP and this Undertaking will therefore have no effect on historic properties.

The installation is currently seeking comments from the CA SHPO and affiliated Indian Tribes on this undertaking, particularly as that is related to Building 237. As a result, this part of the project cannot proceed until that consultation has been completed.

The remaining eight buildings 21, 561, 566, 567, 861, R180, R183, and R184 will have no effect on cultural resources; as a result it is okay to proceed with the project.

TABLE 1. Building Maintenance Work

Building NO	Age	Historic Property	Recorded and Evaluated	Task Requested
BD21	1942	YES	Year 1966/ Not eligible	Demolish wall and install wall
237	1944	YES	Year 2009/Not eligible	Seal up side door, put dividing wall, make new door opening for Rom 19, replace carpet in CG conference room and GC room
561	1987	NO	Less than 50 years old	Install additional bar in the ladies room, re-do handicap parking for one additional spot in the front of the building and back, tear out and re-install handicap ramp , replace entry door with ADA compliant door for handicap person
566	1987	NO	Less than 50 years old	Renovation current handicap Ramp
567	1987	NO	Less than 50 years old	Renovation current handicap Ramp
861	1987	NO	Less than 50 years old	Run electrical wire for 10 power poles for new panel furniture
R180	modern	NO	Less than 50 years old	Remove 5th Street Trailers
R183	modern	NO	Less than 50 years old	Remove 5th Street Trailers
R184	modern	NO	Less than 50 years old	Remove 5th Street Trailers

FINAL

CULTURAL RESOURCES SURVEY

INVENTORY AND ASSESSMENT OF HISTORICAL RESOURCES

Cantonment Area and Pioneer Deep Space Station Site
Fort Irwin, California

Prepared for:

Commander NTC & Fort Irwin
Directorate of Public Works
Environmental Division (AFZJ-PW-EV)
Building 385
Fort Irwin, California 92310-5097

Prepared by

Science Applications International Corporation
816 State Street, Suite 500
Santa Barbara, California 93101

References:

Contract No. DACA09-94-D-0017
Delivery Order No. 0005

February 1996

Property of NTC-DPW
Cultural Resources Library

author's belief that these dates refer not to construction but to times when whole groups of buildings were brought into the inventory. For example, a number of buildings dated 1946 fall under Voucher V-349-47, dated December 11, 1946. This may be a time when the War Department, after its initial conditions survey, decided to add the buildings to the Army's inventory formally. There are no early vouchers in the base records, however, to corroborate this conclusion.

Table 1. Temporary World War II Facilities

Building	*Integrity*	*Eligibility*	*Building*	*Integrity*	*Eligibility*
22	No	Not eligible	468	No	Not eligible
24	No	Not eligible	470	No	Not eligible
318	No	Not eligible	472	No	Not eligible
326	No	Not eligible	478	No	Not eligible
333	No	Not eligible	486	No	Not eligible
342	No	Not eligible	510	No	Not eligible
344	No	Not eligible	520	No	Not eligible
352	No	Not eligible	521	No	Not eligible
356	No	Not eligible	529	No	Not eligible
364	No	Not eligible	535	No	Not eligible
367	No	Not eligible	537	No	Not eligible
372	No	Not eligible	539	No	Not eligible
384	No	Not eligible	544	No	Not eligible
425	No	Not eligible	545	No	Not eligible
426	No	Not eligible	547	No	Not eligible
435	No	Not eligible	549	No	Not eligible
437	No	Not eligible	554	No	Not eligible
439	No	Not eligible	556	No	Not eligible
441	No	Not eligible	560	No	Not eligible
445	No	Not eligible	570	No	Not eligible
449	No	Not eligible	580	No	Not eligible
451	No	Not eligible	605	No	Not eligible
453	No	Not eligible	612	No	Not eligible
456	No	Not eligible	623	No	Not eligible
458	No	Not eligible	626	No	Not eligible
460	No	Not eligible	813	No	Not eligible
462	No	Not eligible	814	No	Not eligible
464	No	Not eligible	818	No	Not eligible
466	No	Not eligible	6201	No	Not eligible

Table 2. Permanent World War II Facilities

Building	*Integrity*	*Eligibility*
14	No	Not eligible
17	No	Not eligible
21	No	Not eligible

Bath House (Building 580)

One bathhouse, Type BH-B-T-DE 926/43, remains from the original installation. There originally were four, one to serve each quadrant of troops' quarters.

Motor Vehicle Buildings (Buildings 352, 605, 612, 623, 626).

A number of motor vehicle sheds were clustered near the warehouses and Barstow Road. They were used for motor repair: Type DE 7015/134 (352); Type DE 700/6015 (612); or as motor vehicle shops: Type DE 994/54 (605); and MVS S-B-T DE 926/34 (623, 626).

Hangar (Building 6201)

A single hangar from World War II, Type DE I-137, is located at Bicycle Lake. It was built for use as an emergency repair hangar for aircraft stationed at Daggett Army Air Corps West Coast Bomber Crew School. Aircraft from this airport (P-39s and B-24s) flew from Daggett northwest toward Nelson and Leach Lakes for bombing practice. Planes needing repair landed at Bicycle Lake, where their engines were removed and brought into the hangar for repair. The original hangar had a large open main bay and a narrower maintenance bay to the east. The lean-to the west was added in the 1950s. The building stopped being a hangar when the adjacent hangar (6203) was built in 1953. In 1962 the hangar was remodelled for use as office space (personal communication, Kim Duncan, 1995; "Floor Plan" 6-2-62).

Recreation Building (Building 426)

A single recreation building, Type RB-A-T DE 574/25), remains from the original installation. These buildings were similar to dayrooms where the troops could go for relaxation.

Carpenter's Shop, Lumber Shed (Buildings 356, 367)

Two buildings related to woodworking remain from the original installation, Type DE 51/67 (356), and Type DE 700/6020 (367).

Administration Building (Building 510)

A single administration building, Type DE 926/6, remains from the original installation.

There are five temporary World War II buildings without identified original functions: buildings 22, 24, 326, 384, 425. Building 384 is a Type SPAT DE 700. 425 was moved to its present location, and judging from its dimensions may have been an enlisted men's mess hall for 140 men (Layout Plans 1947, 1952).

Virtually all of the mess halls, infirmaries, administration and recreation buildings, have been remodelled; the original double-hung windows in wood frames were replaced with sliding metal frame windows, wood framed doors were replaced by hollow metal doors, and exterior HVAC systems were added (Engineering Drawing: "Alterations and Repairs. Troop Housing Facilities. Mess Buildings" 1966). The warehouses and motor vehicle buildings have had additions built, and/or have had windows or doors altered. None of these facilities retain integrity of materials, workmanship, feeling or association; therefore they are not eligible for consideration for the NRHP under Criterion C.

Size: 43' x 84'
Context: World War II
Criteria Considerations:
Integrity: Altered with new windows, doors
Category: IV
NR eligible/ineligible: ineligible

BUILDING NO.: 605, 623, 626 (see plates 13 and 14 following)
Location: 5th Street between Barstow Road and G Avenue
Date of Construction: 1946
Original function/Property type: Motor vehicle shops
Size: 64' x 64' (605); 32' x 96' (623, 626)
Context: World War II
Criteria Considerations:
Integrity: Altered with new windows, doors
Category: IV
NR eligible/ineligible: ineligible

BUILDING NO.: 356, 367 (see plates 15 and 16 following)
Location: E Avenue between 3rd and 4th Streets
Date of Construction: 1946
Original function/Property type: Carpenter's shop (367), lumber shed (356)
Size: 24' x 213' (356); 48' x 156' (367)
Context: World War II
Criteria Considerations:
Integrity: Altered with new windows, doors
Category: IV
NR eligible/ineligible: ineligible

BUILDING NO.: 510 (see plate 17 following)
Location: G Avenue at 1st Street
Date of Construction: 1944
Original function/Property type: Administration building
Size: 20' x 36'
Context: World War II
Criteria Considerations:
Integrity: Altered with new windows, doors, siding
Category: IV
NR eligible/ineligible: ineligible

BUILDING NO.: 326 (see plate 18 following)
Location: Barstow Road at 2nd Street
Date of Construction: 1946
Original function/Property type: unknown
Size: 25' x 99'
Context: World War II
Criteria Considerations:
Integrity: Altered with new windows, doors, additions
Category: IV
NR eligible/ineligible: ineligible

Plate 17. Administration, Building 510, facing east. Photo: J. Kosta, 1995.

Plate 18. Building 326, facing east. Photo: J. Kosta, 1995.

STATE OF CALIFORNIA — THE RESOURCES AGENCY

PETE WILSON, *Governor*

OFFICE OF HISTORIC PRESERVATION

'ARTMENT OF PARKS AND RECREATION

3OX 942896

SACRAMENTO 94296-0001

(916) 653-6624

FAX: (916) 653-9824

March 10, 1997

REPLY TO: USA970105A

Commander NTC & Fort Irwin
Directorate of Public Works
Environmental Division (AFZJ-PW-EV)
Building 385
FORT IRWIN CA 92310-5097

ATTN: Dr. Bob Rechtman

RE: CULTURAL RESOURCES SURVEY, INVENTORY, AND ASSESSMENT OF HISTORIC RESOURCES AT CANTONMENT AREA AND PIONEER DEEP SPACE STATION SITE, FORT IRWIN, CALIFORNIA

Thank you for forwarding the above referenced document for my review and comment.

The Army has surveyed and inventoried a total of 110 facilities at Fort Irwin as part of this study, including 58 World War II temporary properties, 3 World War II permanent properties, 41 Cold War properties, and eight support buildings at the Pioneer Deep Space Station. My comments about each of these property categories appear below.

World War II Temporary Properties

I concur with the conclusion reached by the Army that none of the World War II temporary properties included in Table 1 of this study are eligible for inclusion in the National Register of Historic Places. These include building numbers 22, 24, 318, 326, 333, 342, 344, 352, 356, 364, 367, 372, 384, 425, 426, 435, 437, 439, 441, 445, 449, 451, 453, 456, 458, 460, 462, 464, 466, 468, 470, 472, 478, 486, 510, 520, 521, 529, 535, 537, 539, 544, 545, 547, 549, 554, 556, 560, 570, 580, 605, 612, 623, 626, 813, 814, 818, and 6201.

World War II Permanent Properties

I concur with the conclusion reached by the Army that none of the World War II permanent properties included in Table 2 of this study are eligible for inclusion in the National Register of Historic Places. These include building numbers 14, 17, and 21.

Cold War Era Properties

I concur with the conclusion reached by the Army that none of the 41 Cold War Era properties at Fort Irwin meet the requirements of National Register criteria exception G.

Pioneer Deep Space Station Site

The Pioneer Deep Space Station (DSS 11), constructed in 1958-59, includes a 26-meter antenna, plus eight support buildings. The antenna, of course, has already been recognized as a National Historic Landmark by the National Park Service as part of its Man in Space theme study. The Army has recently evaluated the eight buildings which make up the support base for the antenna and which were constructed at the same time as the antenna, using National Register criteria exception G. The Army has concluded that three of the buildings, G-1, G-18, and G-19, constitute a historic district, and that only these three have the requisite exceptional significance. I believe that the Army should re-consider its conclusion. Although the Army has concluded that a historic district exists, it has evaluated each of the eight buildings individually, requiring each to meet the test of National Register exceptional criteria G. I suggest that the Army look at the collection of buildings and structures that comprise the Pioneer Deep Space Station as a district, and consider each of the eight buildings and the antenna as contributors to that district. The eligible property, then, would be the Pioneer Deep Space Station Historic District made up of nine contributors.

I look forward to hearing your views on my comments regarding the Pioneer Deep Space Station at your earliest convenience. If you have questions, please contact Lucinda Woodward of my staff at (916) 653-9116.

Sincerely,

Cherilyn Widell
State Historic Preservation Officer

APPENDIX D

NATIVE AMERICAN CONSULTATION LETTERS

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

James Ramos, Tribal Chairman
San Manuel Band of Serrano Mission Indians
P.O. Box 266
Patton, CA 92369

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Mr. Ramos:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

In accordance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, 36 CFR 800, Department of Defense 4715.16 (Cultural Resource Management), and Army Regulation 200-1 (Environmental Protection and Enhancement), Fort Irwin conducted a preliminary review of cultural and historic properties within the area planned for this project. This review included a search of all information on the buildings and historic uses of this area that is available to us, and a search of our archives of previous archaeological inventories and findings.

Our archive search found 10 unevaluated buildings located within a one kilometer radius of the project area, all of which have been determined to be ineligible for listing in the National Register of Historic Places. There were no previously recorded archaeological sites or other recorded cultural resources within the project area. We request your review of this project and its area of potential effects to insure that we are aware of and consider all potential impacts of this project (*see* attached maps).

If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Anthony Madrigal Jr., Chairman
Cahuilla Band of Mission Indians
P.O. Box 39170
Aanza, CA 92539-1760

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Mr. Madrigal:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Timothy Williams, Chairman
Fort Mojave Indian Tribe
500 Merriman Ave Mojave
Needles, CA 92363

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Mr. Williams:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

David Roosevelt, Chairman
Cabazon Band of Mission Indians
84-245 Indio Springs Parkway
Indio, CA 92203

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Mr. Roosevelt:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Eldred Enas, Chairman
Colorado River Indian Tribes
26600 Mohave Road
Parker, AZ 85344

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Mr. Enas:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

In accordance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, 36 CFR 800, Department of Defense 4715.16 (Cultural Resource Management), and Army Regulation 200-1 (Environmental Protection and Enhancement), Fort Irwin conducted a preliminary review of cultural and historic properties within the area planned for this project. This review included a search of all information on the buildings and historic uses of this area that is available to us, and a search of our archives of previous archaeological inventories and findings.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Charles Wood, Chairman
Chemehuevi Indian Tribe
P.O. Box 1976
Havasu Lake, CA 92362

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Mr. Wood:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Michael Tsosie, Cultural Contact
Colorado River Indian Tribes
26600 Mohave Road
Parker, AZ 85344

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Mr. Tsosie:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

In accordance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, 36 CFR 800, Department of Defense 4715.16 (Cultural Resource Management), and Army Regulation 200-1 (Environmental Protection and Enhancement), Fort Irwin conducted a preliminary review of cultural and historic properties within the area planned for this project. This review included a search of all information on the buildings and historic uses of this area that is available to us, and a search of our archives of previous archaeological inventories and findings.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Linda D. Otero, Director
AhaMaKav Cultural Society
Fort Mojave Indian Tribe
P.O. Box 5990
Mohave Valley, AZ 86440

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Ms. Otero:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

In accordance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, 36 CFR 800, Department of Defense 4715.16 (Cultural Resource Management), and Army Regulation 200-1 (Environmental Protection and Enhancement), Fort Irwin conducted a preliminary review of cultural and historic properties within the area planned for this project. This review included a search of all information on the buildings and historic uses of this area that is available to us, and a search of our archives of previous archaeological inventories and findings.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Robert Martin, Tribal Chairman
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA 92220-2965

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Mr. Martin:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

In accordance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, 36 CFR 800, Department of Defense 4715.16 (Cultural Resource Management), and Army Regulation 200-1 (Environmental Protection and Enhancement), Fort Irwin conducted a preliminary review of cultural and historic properties within the area planned for this project. This review included a search of all information on the buildings and historic uses of this area that is available to us, and a search of our archives of previous archaeological inventories and findings.

Our archive search found 10 unevaluated buildings located within a one kilometer radius of the project area, all of which have been determined to be ineligible for listing in the National Register of Historic Places. There were no previously recorded archaeological sites or other recorded cultural resources within the project area. We request your review of this project and its area of potential effects to insure that we are aware of and consider all potential impacts of this project (*see* attached maps).

If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Virgil Moose, Tribal Chairman
Big Pine Band of Owens Valley Paiute Shoshone Indians
P.O. Box 700
Big Pine, CA 93513

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Mr. Moose:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

In accordance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, 36 CFR 800, Department of Defense 4715.16 (Cultural Resource Management), and Army Regulation 200-1 (Environmental Protection and Enhancement), Fort Irwin conducted a preliminary review of cultural and historic properties within the area planned for this project. This review included a search of all information on the buildings and historic uses of this area that is available to us, and a search of our archives of previous archaeological inventories and findings.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Monty J. Bengochia, Tribal Chairman
Bishop Paiute Tribe
50 Tu Su Lane
Bishop, CA 93514

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Mr. Bengochia:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

In accordance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, 36 CFR 800, Department of Defense 4715.16 (Cultural Resource Management), and Army Regulation 200-1 (Environmental Protection and Enhancement), Fort Irwin conducted a preliminary review of cultural and historic properties within the area planned for this project. This review included a search of all information on the buildings and historic uses of this area that is available to us, and a search of our archives of previous archaeological inventories and findings.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Nora McDowell, Cultural Resources Coordinator
Fort Mohave Indian Tribe
500 Merriman Ave Mojave
Needles, CA 92363

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Ms. McDowell:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

In accordance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, 36 CFR 800, Department of Defense 4715.16 (Cultural Resource Management), and Army Regulation 200-1 (Environmental Protection and Enhancement), Fort Irwin conducted a preliminary review of cultural and historic properties within the area planned for this project. This review included a search of all information on the buildings and historic uses of this area that is available to us, and a search of our archives of previous archaeological inventories and findings.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Michael Contreras, Cultural Heritage Program Coordinator
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA 92220-2965

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Mr. Contreras:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

In accordance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, 36 CFR 800, Department of Defense 4715.16 (Cultural Resource Management), and Army Regulation 200-1 (Environmental Protection and Enhancement), Fort Irwin conducted a preliminary review of cultural and historic properties within the area planned for this project. This review included a search of all information on the buildings and historic uses of this area that is available to us, and a search of our archives of previous archaeological inventories and findings.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Richard Button, Chairman
Lone Pine Paiute Shoshone Reservation
P.O. Box 747
Lone Pine, CA 93545

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Mr. Button:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

In accordance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, 36 CFR 800, Department of Defense 4715.16 (Cultural Resource Management), and Army Regulation 200-1 (Environmental Protection and Enhancement), Fort Irwin conducted a preliminary review of cultural and historic properties within the area planned for this project. This review included a search of all information on the buildings and historic uses of this area that is available to us, and a search of our archives of previous archaeological inventories and findings.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Barbara Durham, Tribal Historic Preservation Officer
Timbisha Shoshone Tribe
P.O. Box 206
Death Valley, CA 92328-0206

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Ms. Durham:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

In accordance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, 36 CFR 800, Department of Defense 4715.16 (Cultural Resource Management), and Army Regulation 200-1 (Environmental Protection and Enhancement), Fort Irwin conducted a preliminary review of cultural and historic properties within the area planned for this project. This review included a search of all information on the buildings and historic uses of this area that is available to us, and a search of our archives of previous archaeological inventories and findings.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Dorothy Buff, Chairperson
Fort Independence Reservation
P.O. Box 67
Independence, CA 93526

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Ms. Buff:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

In accordance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, 36 CFR 800, Department of Defense 4715.16 (Cultural Resource Management), and Army Regulation 200-1 (Environmental Protection and Enhancement), Fort Irwin conducted a preliminary review of cultural and historic properties within the area planned for this project. This review included a search of all information on the buildings and historic uses of this area that is available to us, and a search of our archives of previous archaeological inventories and findings.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Joe Kennedy, Chairman
Timbisha Shoshone Tribe
P.O. Box 206
Death Valley, CA 92328-0206

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Mr. Kennedy:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY GARRISON
FORT IRWIN, CA 92310-5000

REPLY TO
ATTENTION OF:

IMWE-IRW-PW

Theresa A. Stone-Yanez
Bishop Paiute Tribe, Tribal Historic Preservation Officer
50 Tu Su Lane
Bishop, CA 93514

30 September 2010

SUBJECT: WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, California

Dear Ms. Stone-Yanez:

I am writing today to consult on an undertaking as defined by the National Historic Preservation Act of 1966 (as amended) being conducted at Fort Irwin, located in San Bernardino County, California. The proposed undertaking consists of constructing a new hospital (WACH) and 11th ACR Headquarters in the northern portion of cantonment. This construction includes the addition of new parking lots and a helipad.

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If you have any questions, please contact Mr. Brantley Jackson (Fort Irwin Installation Archaeologist) at (760) 380-6438 or at john.brantley.jackson@us.army.mil.

Sincerely,

Lance K. Toyofuku
Director of Public Works
Fort Irwin, California

ENCL

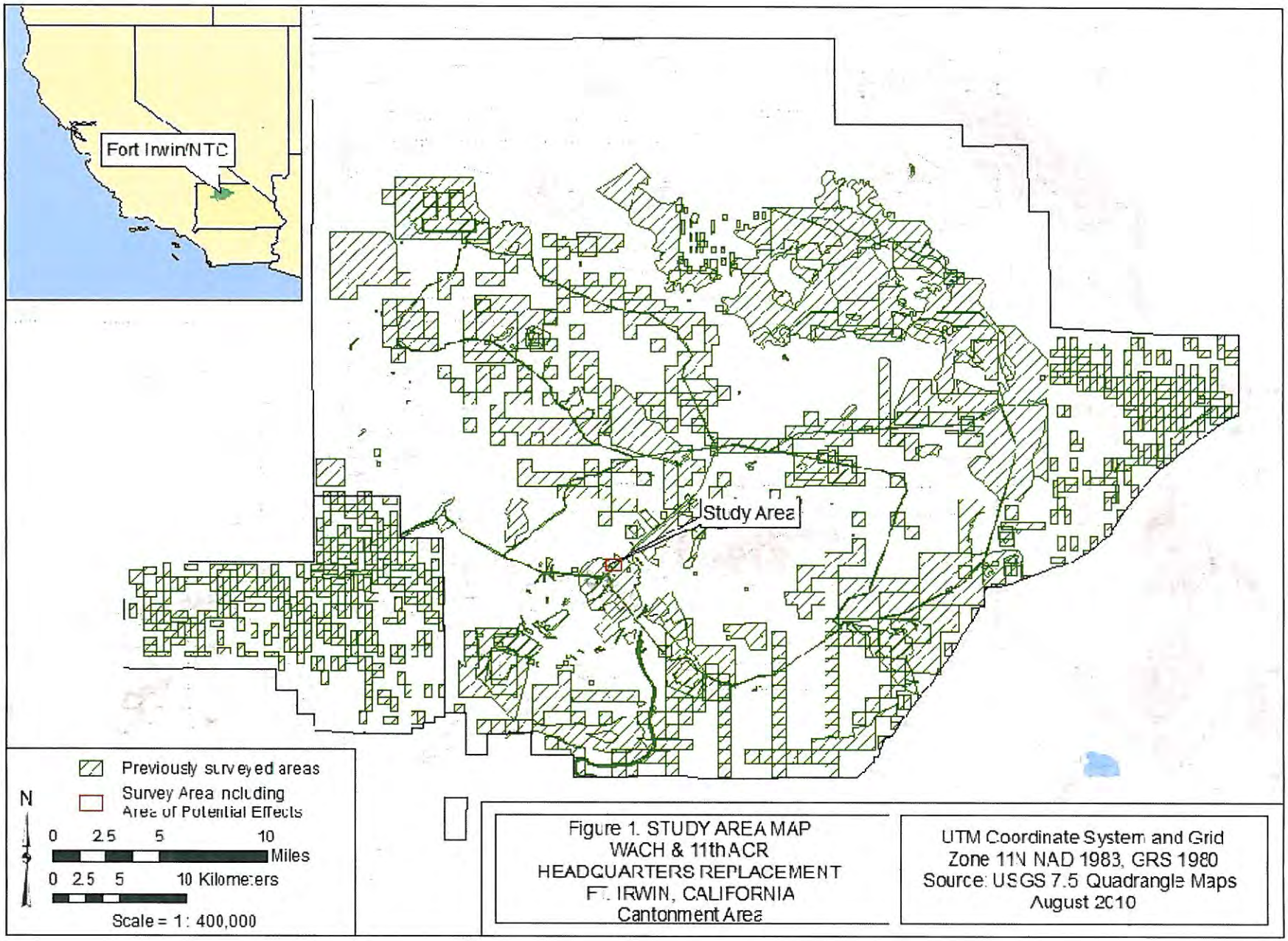

Figure 1. STUDY AREA MAP
WACH & 11th ACR
HEADQUARTERS REPLACEMENT
FT. IRWIN, CALIFORNIA
Cantonment Area

UTM Coordinate System and Grid
Zone 11N NAD 1983, GRS 1980
Source: USGS 7.5 Quadrangle Maps
August 2010

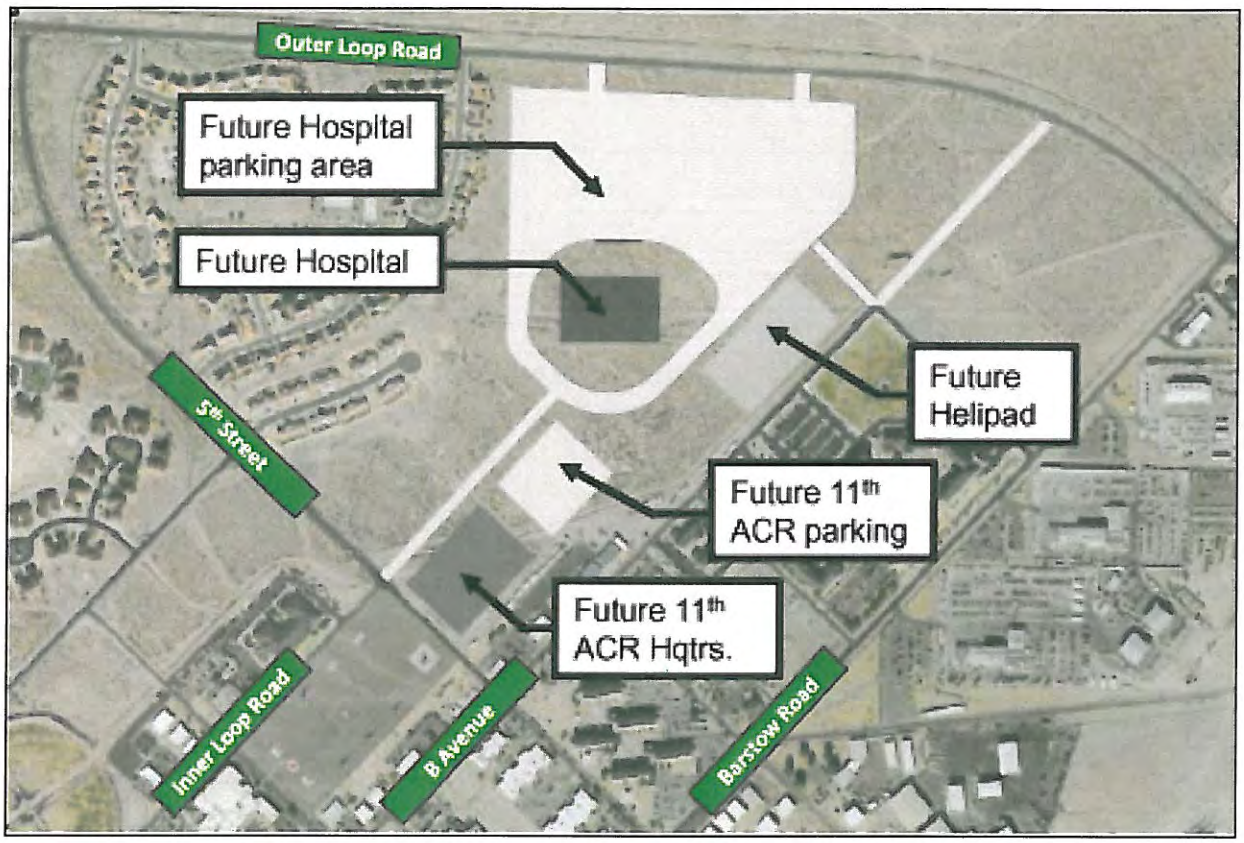

Figure 2. Layout of construction footprint for the WACH and 11th ACR Headquarters

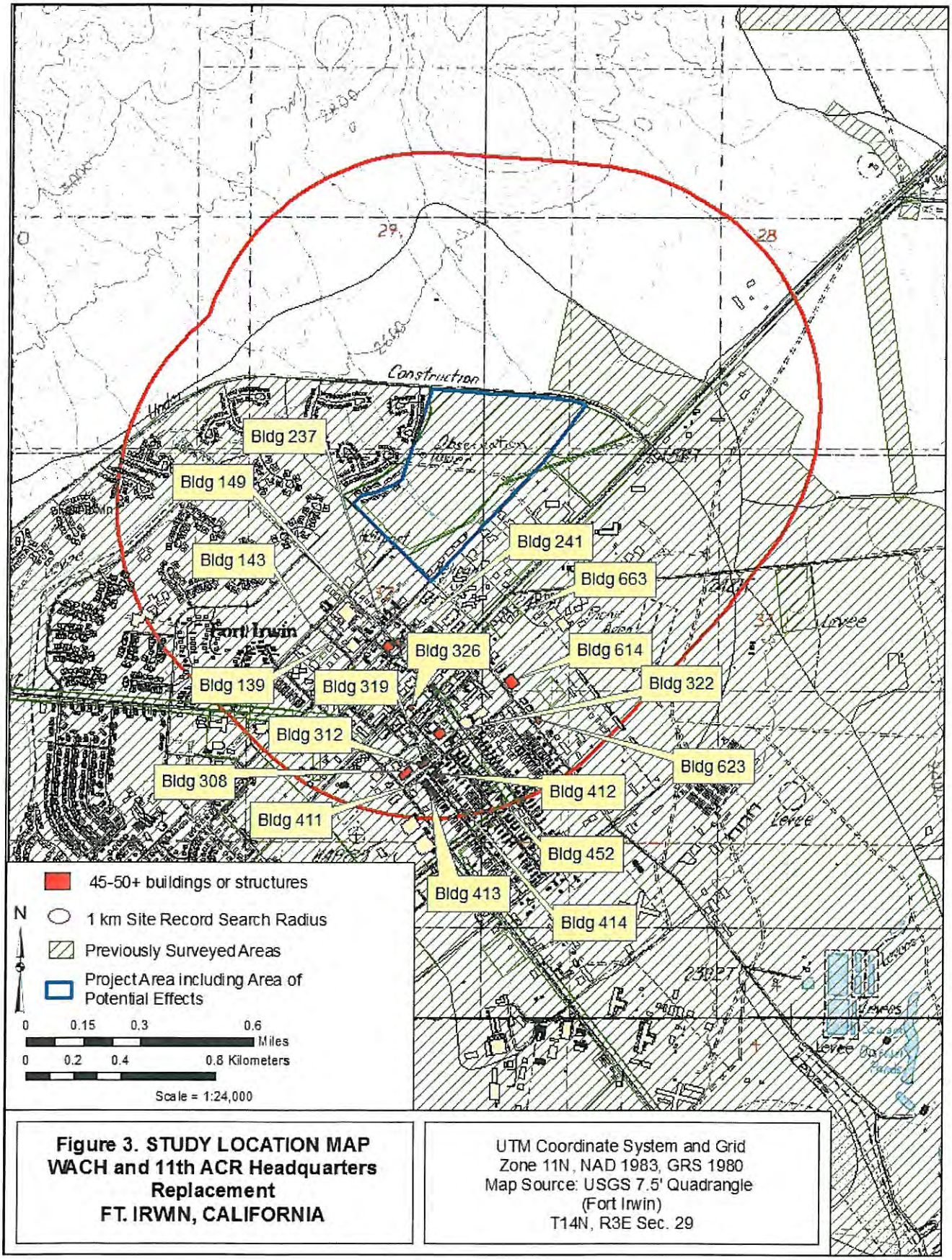

Figure 3. STUDY LOCATION MAP
WACH and 11th ACR Headquarters Replacement
FT. IRWIN, CALIFORNIA

UTM Coordinate System and Grid
Zone 11N, NAD 1983, GRS 1980
Map Source: USGS 7.5' Quadrangle
(Fort Irwin)
T14N, R3E Sec. 29

STATE OF CALIFORNIA – THE RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov
www.ohp.parks.ca.gov

27 October 2010

In reply refer to: USA101006A

Lance K. Toyofuku
Director of Public Works
Department of the Army
Fort Irwin, CA 92310-5000

Re: Section 106 Consultation for WACH and 11th ACR Headquarters Replacement Survey, Fort Irwin, CA

Dear Mr. Toyofuku:

Thank you for your letter of 06 October 2010 requesting my review and comment pursuant to the National Historic Preservation Act of 1966 as amended and the implementing regulations in 36 CFR 800 in regard to the above referenced undertaking. Specifically, you are seeking my concurrence with the US Army's determination finding that the above-mentioned undertaking will result in No Effect on Historic Properties.

As I understand it, the undertaking consists of construction of a new hospital and 11th ACR Headquarters in the northern position of the cantonment area. Construction for the undertaking will also include grading and paving for the construction of the parking lots, helipad, and new access routes for the building.

The Army established the APE as shown in Figures 2 and 3 attached to your letter. I find the APE sufficient pursuant to 36 CFR 800.4(1)(a).

The Army had determined there are no historic properties located in the APE for this project and thus the undertaking will have "No Effect on Historic Properties." Ten buildings and structures are located in the APE for this project and the Army has determined none are eligible for listing in the National Register of Historic Places (NRHP). I concur with this determination. Because there are no historic properties in the APE for this project, the Army has determined no historic properties will be affected by this undertaking. I also concur with this determination.

Thank you for seeking my comments and considering historic properties as part of your project planning. If you have any questions, please contact Amanda Blosser at 916.445.7048 or at email ablosser@parks.ca.gov.

Sincerely,

Susan K Stratton for

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

MWD:ab

Appendix B
Traffic Study

Traffic Study

Construction of a New Weed Army Community Hospital

Prepared for

U.S. Army National Training Center and

U.S. Army Corps of Engineers, Mobile District

November 2010

Prepared by

CH2MHILL

Atlanta, Georgia

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.

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APPENDICES

Appendix A FHWA Vehicle Classification Scheme
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1 GENERAL PROJECT INFORMATION

1.1 Introduction

CH2M HILL, Inc. has been retained by the U.S. Army Corps of Engineers to provide Traffic Analysis services associated with the replacement hospital for the existing Weed Army Community Hospital. The purpose of this project is to conduct a traffic study for the identified roadway corridors surrounding the replacement hospital site at Fort Irwin, California. Fort Irwin is located approximately 150 miles east of the Los Angeles in the Mojave Desert of California. The main cantonment area is approximately 37 miles northeast of Barstow, California, the closest city to the installation. **Figure 1.1** shows the project location map.

1.2 Study Intersections

The scope of work for this project identifies the following intersections for traffic analysis:

1. North Loop Road and Goldstone Road intersection
2. North Loop Road and 5th Street intersection
3. 5th Street and Inner Loop Road intersection
4. 5th Street and B Avenue intersection
5. 5th Street and Fort Irwin Road intersection
6. North Loop Road and Fort Irwin Road intersection
7. South Loop Road and Fort Irwin Road/Barstow Road intersection

Figure 1.2 shows the location of these seven intersections. In addition to the seven intersections, other intersections resulting from the proposed access points to the replacement hospital will also be analyzed. Based on the existing plans for the replacement hospital, the following four access points have been proposed:

- Main Access - Inner Loop Road currently terminates at 5th Street. It is proposed to be extended northward and serve as the main access to the replacement hospital.
- East Access on B Avenue
- West Access on B Avenue
- North Access on North Loop Road

Figure 1.2 shows the above access points to the replacement hospital site and are numbered 8 through 10. The main access connects to intersection number 3.

0 12.5 25 50
Miles

N

FIGURE 1.1
Project Location Map
Weed Army Community Hospital
Fort Irwin, CA

CH2MHILL

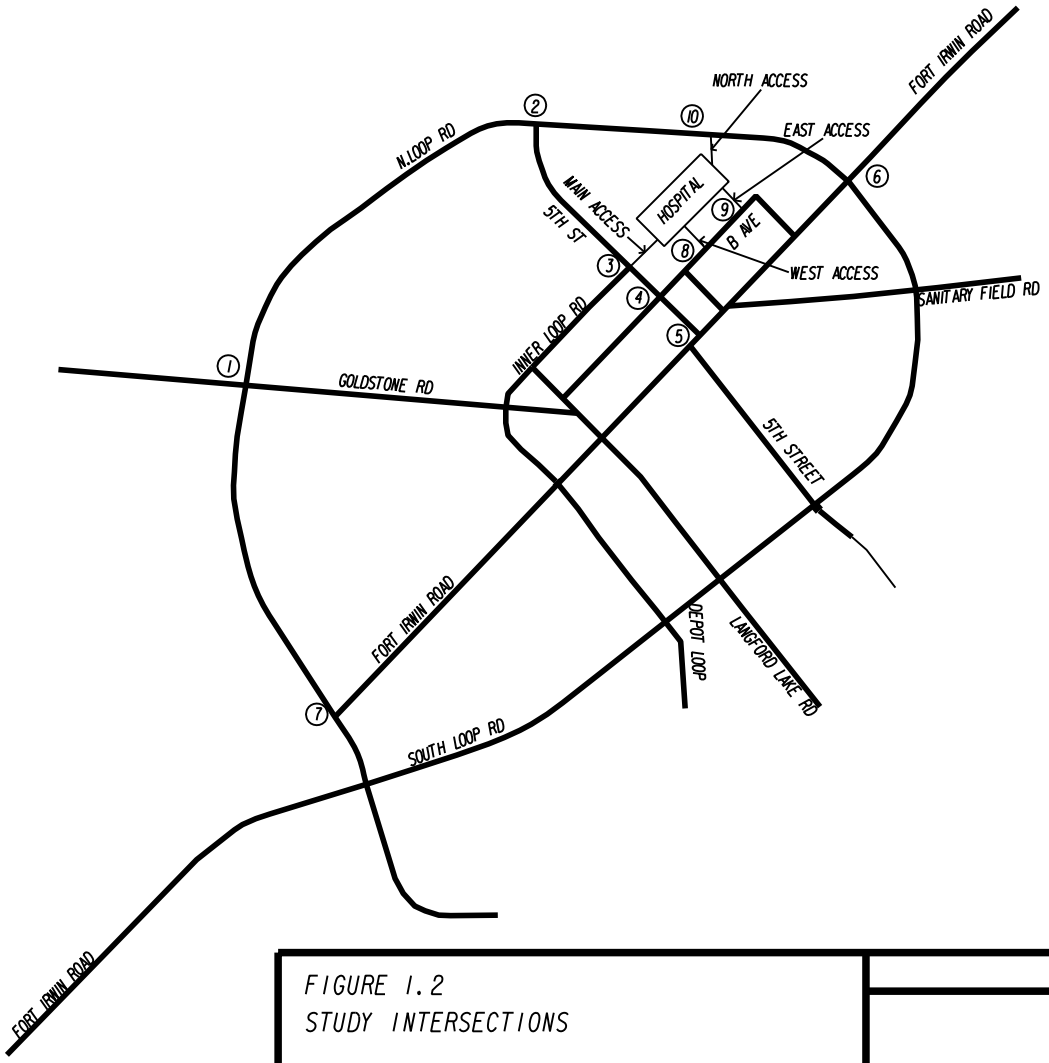

FIGURE 1.2
STUDY INTERSECTIONS

US ARMY NATIONAL TRAINING CENTER
US ARMY CORP OF ENGINEERS

WEED ARMY COMMUNITY HOSPITAL
FORT IRWIN, CA

...\409662_traffic loyouts_v7.dgn 11/24/2010 5:19:20 AM

2 TRAFFIC ANALYSIS

2.1 Data Collection

National Data and Surveying (NDS) Services conducted data collection for this project during the last week of October 2010 and the first week of November 2010. Twenty-four hours directional vehicle classification counts were conducted at all approaches to the seven study intersections identified in the scope of services. The classification counts provide data on different types of vehicles (passenger cars, trucks, buses, tractor-trailers etc) per the Federal Highway Administration (FHWA) Vehicle Classification Scheme which classifies vehicles into 13 categories. The FHWA Vehicle Classification Scheme is included in the appendix. The classification counts were reviewed to determine the morning (AM), mid-day (MD) and afternoon (PM) peak hours for the intersections. Subsequently, intersection Turning Movement Counts (TMC) were conducted at all intersections to include the peak hours identified from the vehicle classification counts. The intersection turning movement counts were conducted from 7:00 AM to 10:00 AM, 11:00 AM to 2:00 PM and 2:00 PM to 6:00 PM. The traffic count reports are provided in the appendix.

The existing lane configuration and traffic controls at the intersections were also noted during the traffic data collection process. The posted speed limits within the study area were obtained from the Transportation Infrastructure Requirements Study (TIRS) conducted in April 2009 for Fort Irwin. Other relevant information and data were also used from this report.

The existing lane configuration, traffic controls and posted speed limits are depicted in **Figure 2.1**. This figure shows that all roadways within the study area are two-lane roadways and all intersections are unsignalized with stop controls. The posted speed limits are 25 mph and 35 mph.

2.2 Existing (2010) Traffic Volumes

The 24-Hour directional approach counts from the 24-Hour vehicle classification counts were multiplied by two to obtain the Average Daily Traffic (ADT) for 2010. The approach ADTs are depicted on **Figure 2.2**. The daily percentage of trucks (Classes 4 though 13) are also depicted on Figure 2.2.

The TMCs included in the appendix also identified the AM, Mid-Day and PM peak hours for the intersections. **Figure 2.3** depicts the AM, Mid-Day, and PM peak hour volumes at the study intersections along with the intersection lane configuration and traffic controls.

2.3 Traffic Analysis Methodology

Seasonal Adjustment of Raw Traffic Data: The TIRS document indicates (page 4-7) that no distinguishable pattern was observed to indicate any increase or decrease in traffic volumes during the Rotation and Non-Rotation time periods. Hence, no seasonal adjustments were made to the traffic data collected for this study.

Smoothing of Traffic Volumes: The smoothing of traffic is the process of adjusting traffic volumes between intersections so that there is no loss or gain of traffic between the upstream and/or downstream intersections. This exercise was not undertaken for this project due to the presence of driveways and other intersections between the study intersections and the variation in the peak hour of the intersections.

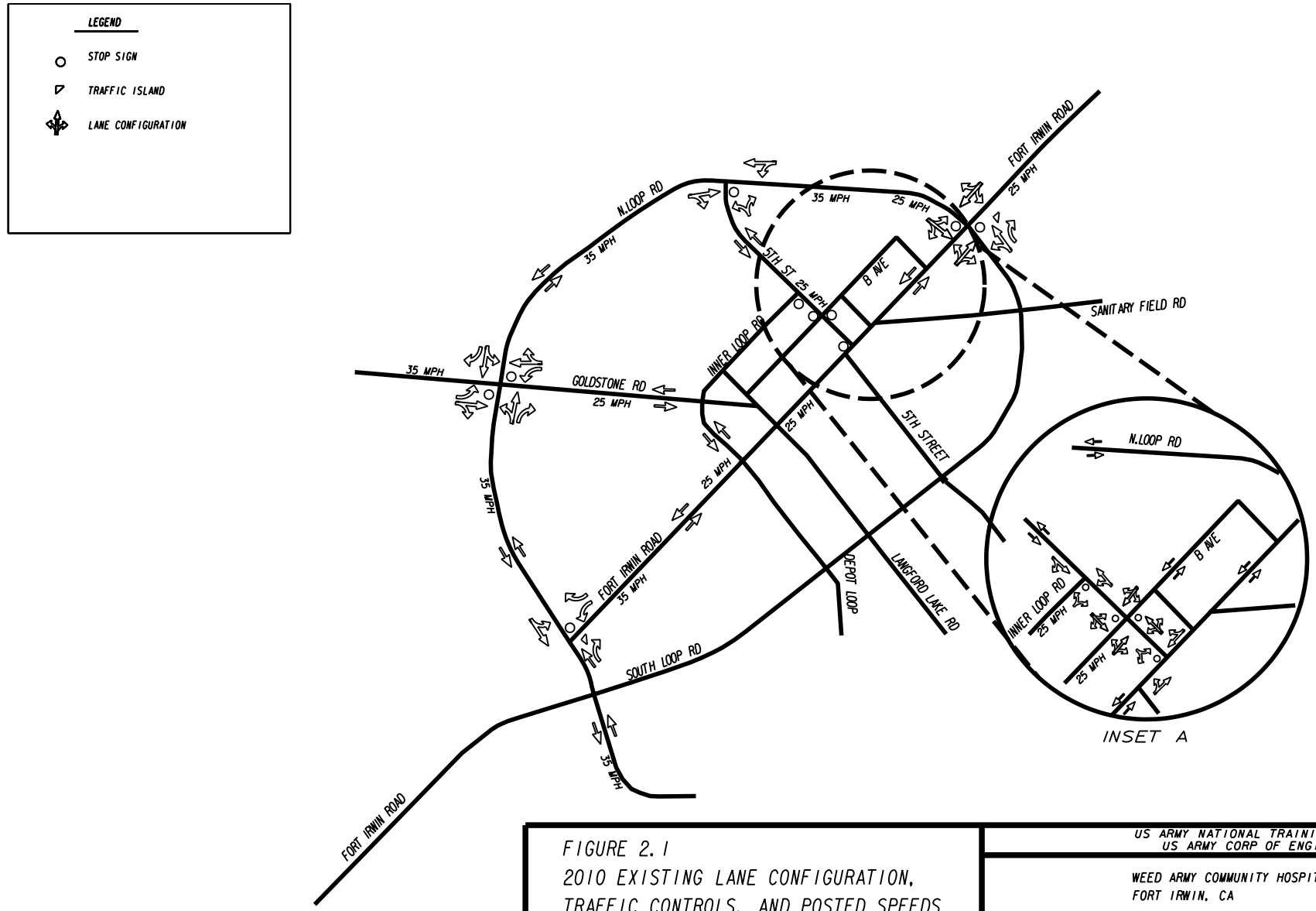

FIGURE 2.1
2010 EXISTING LANE CONFIGURATION, TRAFFIC CONTROLS, AND POSTED SPEEDS

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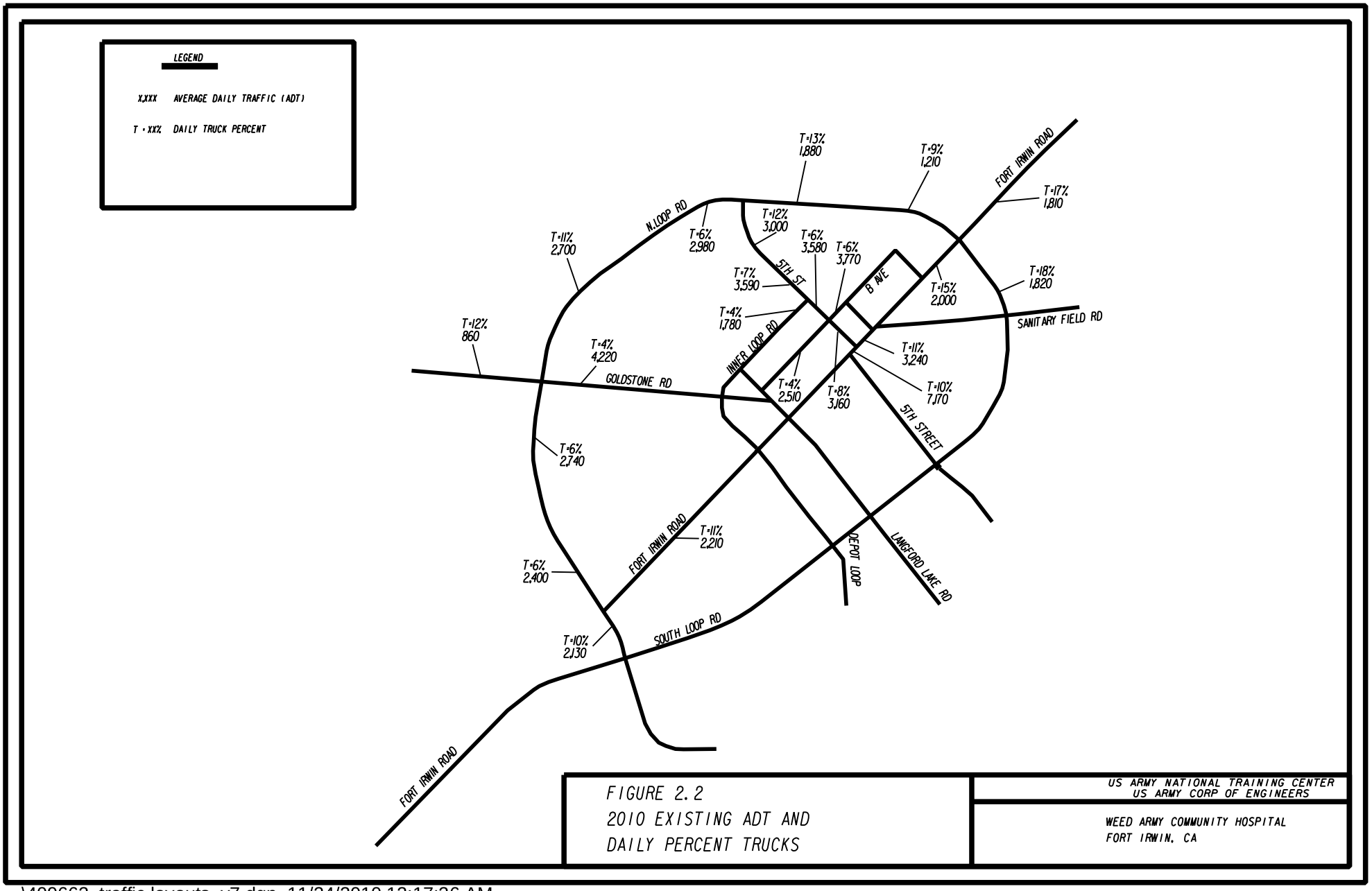

FIGURE 2.2
2010 EXISTING ADT AND
DAILY PERCENT TRUCKS

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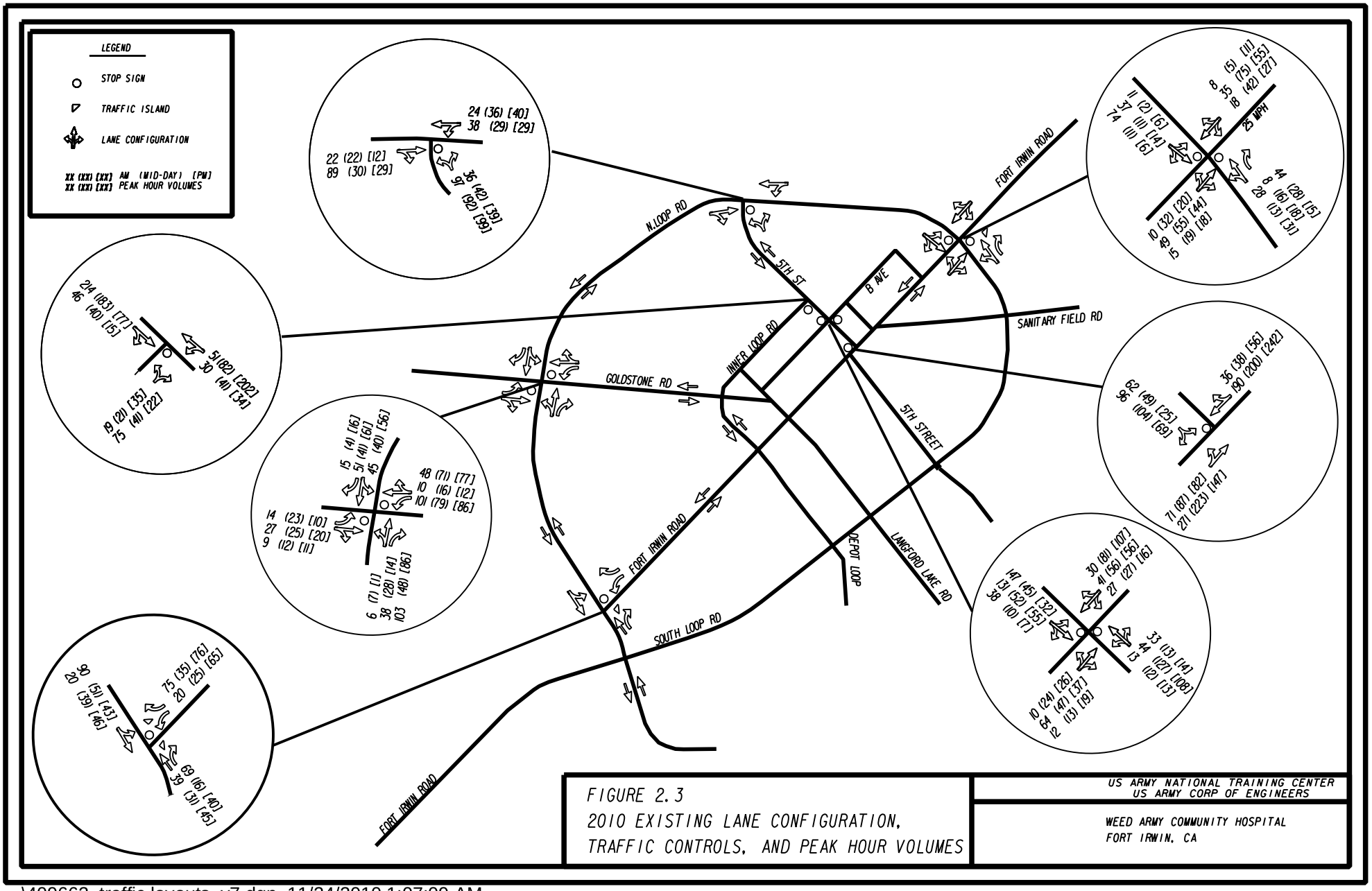

FIGURE 2.3
2010 EXISTING LANE CONFIGURATION, TRAFFIC CONTROLS, AND PEAK HOUR VOLUMES

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Peak Hour Factors (PHFs): Peak Hour Factors are used to account for the variation in traffic flow within the peak hour of an intersection. The hourly volume is divided by 4 times the highest 15-minute interval traffic volume. For existing conditions analysis, the intersection PHFs were used from the intersection TMCs. The future 2011 analysis was also conducted using the existing PHFs as these factors are expected to remain the same in 2011. However, for 2031 analysis, per the Highway Capacity Manual (HCM) a peak hour factor of 0.92 was used uniformly for all intersections.

Peak Hour Truck Factors: The peak hour truck percentages are typically half of the daily truck percentages. Therefore, the peak hour truck factors for the intersection analysis were obtained by dividing the daily approach truck percentages by two. The existing truck factors were also used for future analysis.

Measures of Effectiveness (MOEs): The intersections were evaluated using Synchro Version 7 capacity analysis software. The HCM Unsignalized Intersection output from Synchro was used to summarize the MOEs.

Background Growth Rate for Traffic Forecast: The scope of services identifies years 2011 and 2031 for traffic analysis. Page 5-5 of the TIRS document indicates a 1.5% compound annual growth rate for the study area over the next twenty years. Hence, this growth rate was used to develop the 2011 and 2031 background traffic volumes for the study intersections.

No-Build and Build Traffic Forecast: In order to be conservative, the 2011 and 2031 No-Build background traffic volumes for the intersections were not reduced to account for the removal of the existing hospital. For the Build scenario, the trip generation from the replacement hospital was assigned to the hospital access points and corresponding adjustments were made for the main street traffic. The TMCs were adjusted for intersection numbers 3 and 4. No adjustments were made to the remaining intersections since the 2011 and 2031 background traffic already accounts for the growth within the study area.

Trip Generation and Trip Assignment for the Hospital: The ITE Trip Generation 8th Edition was used to estimate the trip generation from the 231,000 gross floor area replacement Hospital. The inbound and outbound trips were assigned to the access points in proportion to the main street daily volumes.

2.4 2010 Existing Traffic Analysis

Intersection analyses were conducted to determine the existing operating conditions at the seven study intersections. The intersection analyses were conducted using Synchro Version 7 capacity analysis software and the HCM output was used to summarize the results. The Synchro output sheets are provided in the Appendix. **Table 2.1** provides a summary of the existing (2010) AM, Mid-Day and PM peak hour levels of service and delays for the movements, approaches, and the intersections. The levels of service for the unsignalized intersections depicted in **Figure 2.4** reflect the minor street worst level of service. The analysis shows that all minor street movements are operating at LOS C or better.

TABLE 2.1
2010 Existing - Intersection Analysis Summary

	Movt.	Lane Config (1)	Storage Length (2)	AM Peak					MID-DAY Peak					PM Peak				
				Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS	
			(ft)	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App
North Loop Road @ Goldstone Road (Unsignalized) - Synchro Node 1																		
EB	EBL	1	130	14	11.7	11.6	B	B	23	11.7	10.9	B	B	10	11.6	10.9	B	B
	EBT	1>	Full	27	11.6		B		25	10.5		B		20	10.6		B	
	EBR			9	11.6		B		12	10.5		B		11	10.6		B	
WB	WBL	1	100	101	12.5	11.3	B	B	79	11.3	10.2	B	B	86	11.3	10.2	B	B
	WBT	1>	Full	10	9.3		A		16	9.3		A		12	9.1		A	
	WBR			48	9.3		A		71	9.3		A		77	9.1		A	
NB	NBL			6	1.0	0.3	A	A	7	1.5	0.6	A	A	1	0.5	0.1	A	A
	NBT	<1	Full	38	1.0		A		28	1.5		A		14	0.5		A	
	NBR	1	100	103	0.0		A		48	0.0		A		86	0.0		A	
SB	SBL			45	3.8	3.3	A	A	40	3.8	3.7	A	A	56	3.8	3.4	A	A
	SBT	<1	Full	51	3.8		A		41	3.8		A		61	3.8		A	
	SBR	1	50	15	0.0		A		4	0.0		A		16	0.0		A	
Intersection				**467**	**6.0**		**A**		**394**	**6.9**		**A**		**450**	**6.0**		**A**	
North Loop Road @ 5th Street (Unsignalized) - Synchro Node 2																		
EB	EBL			-	-	0.0	-	A	-	-	0.0	-	A	-	-	0.0	-	A
	EBT	1>	Full	22	0.0		A		22	0.0		A		12	0.0		A	
	EBR			89	0.0		A		30	0.0		A		29	0.0		A	
WB	WBL			38	4.8	4.8	A	A	29	3.5	3.5	A	A	29	3.2	3.2	A	A
	WBT	<1	Full	24	4.8		A		36	3.5		A		40	3.2		A	
	WBR			-	-		-		-	-		-		-	-		-	
NB	NBL			97	11.3	11.3	B	B	92	10.6	10.6	B	B	99	9.9	9.9	A	A
	NBT	<1>	Full	-	-		-		-	-		-		-	-		-	
	NBR			36	11.3		B		42	10.6		B		39	9.9		A	
SB	SBL			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SBT			-	-		-		-	-		-		-	-		-	
	SBR			-	-		-		-	-		-		-	-		-	
Intersection				**306**	**5.9**		**A**		**251**	**6.5**		**A**		**248**	**6.4**		**A**	
5th Street @ Inner Loop Road (Unsignalized) - Synchro Node 3																		
EB	EBL			19	11.5	11.5	B	B	21	11.6	11.6	B	B	35	10.6	10.6	B	B
	EBT	<1>	Full	-	-		-		-	-		-		-	-		-	
	EBR			75	11.5		B		41	11.6		B		22	10.6		B	
WB	WBL			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	WBT			-	-		-		-	-		-		-	-		-	
	WBR			-	-		-		-	-		-		-	-		-	
NB	NBL			30	3.2	3.2	A	A	41	3.0	3.0	A	A	34	1.3	1.3	A	A
	NBT	<1	Full	51	3.2		A		82	3.0		A		202	1.3		A	
	NBR			-	-		-		-	-		-		-	-		-	
SB	SBL			-	-	0.0	-	A	-	-	0.0	-	A	-	-	0.0	-	A
	SBT	1>	Full	214	0.0		A		183	0.0		A		77	0.0		A	
	SBR			46	0.0		A		40	0.0		A		15	0.0		A	
Intersection				**435**	**3.1**		**A**		**408**	**2.7**		**A**		**385**	**2.3**		**A**	
5th Street @ B Avenue (Unsignalized) - Synchro Node 4																		
EB	EBL			10	0.9	0.9	A	A	24	2.3	2.3	A	A	26	2.5	2.5	A	A
	EBT	<1>	Full	64	0.9		A		47	2.3		A		37	2.5		A	
	EBR			12	0.9		A		13	2.3		A		19	2.5		A	
WB	WBL			27	2.2	2.2	A	A	27	1.4	1.4	A	A	16	0.7	0.7	A	A
	WBT	<1>	Full	41	2.2		A		56	1.4		A		56	0.7		A	
	WBR			30	2.2		A		81	1.4		A		107	0.7		A	
NB	NBL			13	12.1	12.1	B	B	12	15.9	15.9	C	C	13	13.0	13.0	B	B
	NBT	<1>	Full	44	12.1		B		127	15.9		C		108	13.0		B	
	NBR			33	12.1		B		13	15.9		C		14	13.0		B	
SB	SBL			147	27.0	27.0	D	D	45	16.2	16.2	C	C	32	12.7	12.7	B	B
	SBT	<1>	Full	131	27.0		D		52	16.2		C		55	12.7		B	
	SBR			38	27.0		D		10	16.2		C		7	12.7		B	
Intersection				**590**	**16.8**		**C**		**507**	**9.0**		**A**		**490**	**6.7**		**A**	

TABLE 2.1
2010 Existing - Intersection Analysis Summary

	Movt.	Lane Config (1)	Storage Length (2)	AM Peak					MID-DAY Peak					PM Peak				
				Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS	
			(ft)	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App
5th Street @ Fort Irwin Road (Unsignalized) - Synchro Node 5																		
EB	EBL			71	2.2		A		87	2.9		A		82	3.4		A	
	EBT	<1	Full	271	2.2	2.2	A	A	223	2.9	2.9	A	A	147	3.4	3.4	A	A
	EBR			-	-		-		-	-		-		-	-		-	
WB	WBL			-	-		-		-	-		-		-	-		-	
	WBT	1>	Full	190	0.0	0.0	A	A	200	0.0	0.0	A	A	242	0.0	0.0	A	A
	WBR			36	0.0		A		38	0.0		A		56	0.0		A	
NB	NBL			-	-		-		-	-		-		-	-		-	
	NBT			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NBR			-	-		-		-	-		-		-	-		-	
SB	SBL			62	16.3		C		49	15.5		C		25	12.5		B	
	SBT	<1>	Full	-	-	16.3	-	C	-	-	15.5	-	C	-	-	12.5	-	B
	SBR			96	16.3		C		104	15.5		C		69	12.5		B	
Intersection				**726**	**4.6**		**A**		**701**	**4.7**		**A**		**621**	**3.2**		**A**	
North Loop Road @ Fort Irwin Road (North Unsignalized intersection) - Synchro Node 6																		
EB	EBL			10	1.0		A		32	2.4		A		20	1.9		A	
	EBT	<1>	Full	49	1.0	1.0	A	A	55	2.4	2.4	A	A	44	1.9	1.9	A	A
	EBR			15	1.0		A		19	2.4		A		18	1.9		A	
WB	WBL			18	2.3		A		42	2.8		A		27	2.3		A	
	WBT	<1>	Full	35	2.3	2.3	A	A	75	2.8	2.8	A	A	55	2.3	2.3	A	A
	WBR			8	2.3		A		5	2.8		A		11	2.3		A	
NB	NBL			28	10.1		B		13	10.6		B		31	10.7		B	
	NBT	<1	Full	8	10.1	10.1	B	B	16	10.6	10.6	B	B	18	10.7	10.7	B	B
	NBR	1	75	44	0.0		A		28	0.0		A		15	0.0		A	
SB	SBL			11	10.0		B		2	10.7		B		6	10.5		B	
	SBT	<1>	Full	37	10.0	10.0	B	B	11	10.7	10.7	B	B	14	10.5	10.5	B	B
	SBR			74	10.0		B		11	10.7		B		6	10.5		B	
Intersection				**337**	**6.7**		**A**		**309**	**4.7**		**A**		**265**	**5.0**		**A**	
North Loop Road @ Fort Irwin Road (South Unsignalized intersection) - Synchro Node 7																		
EB	EBL			-	-		-		-	-		-		-	-		-	
	EBT			-	-		-	-	-	-		-	-	-	-		-	-
	EBR			-	-		-		-	-		-		-	-		-	
WB	WBL	1	50	20	10.8		B		25	10.3		B		65	10.3		B	
	WBT			-	-	9.3	-	A	-	-	9.4	-	A	-	-	9.6	-	A
	WBR	1	Full	75	8.9		A		35	8.7		A		76	8.9		A	
NB	NBL			-	-		-		-	-		-		-	-		-	
	NBT	1	Full	39	0.0	0.0	A	A	31	0.0	0.0	A	A	45	0.0	0.0	A	A
	NBR	1	400	69	0.0		A		16	0.0		A		40	0.0		A	
SB	SBL			90	6.2		A		51	4.3		A		43	3.7		A	
	SBT	<1	Full	20	6.2	6.2	A	A	39	4.3	4.3	A	A	46	3.7	3.7	A	A
	SBR			-	-		-		-	-		-		-	-		-	
Intersection				**313**	**5.0**		**A**		**197**	**4.8**		**A**		**315**	**5.3**		**A**	

(1) Shared Left and Through lanes are shown as "<" and Shared Right and Through lanes are shown as ">".

(2) Full storage length indicates full lane(s) from an upstream node/intersection.

(3) Delay of 999 indicates delays exceeding 999 seconds.

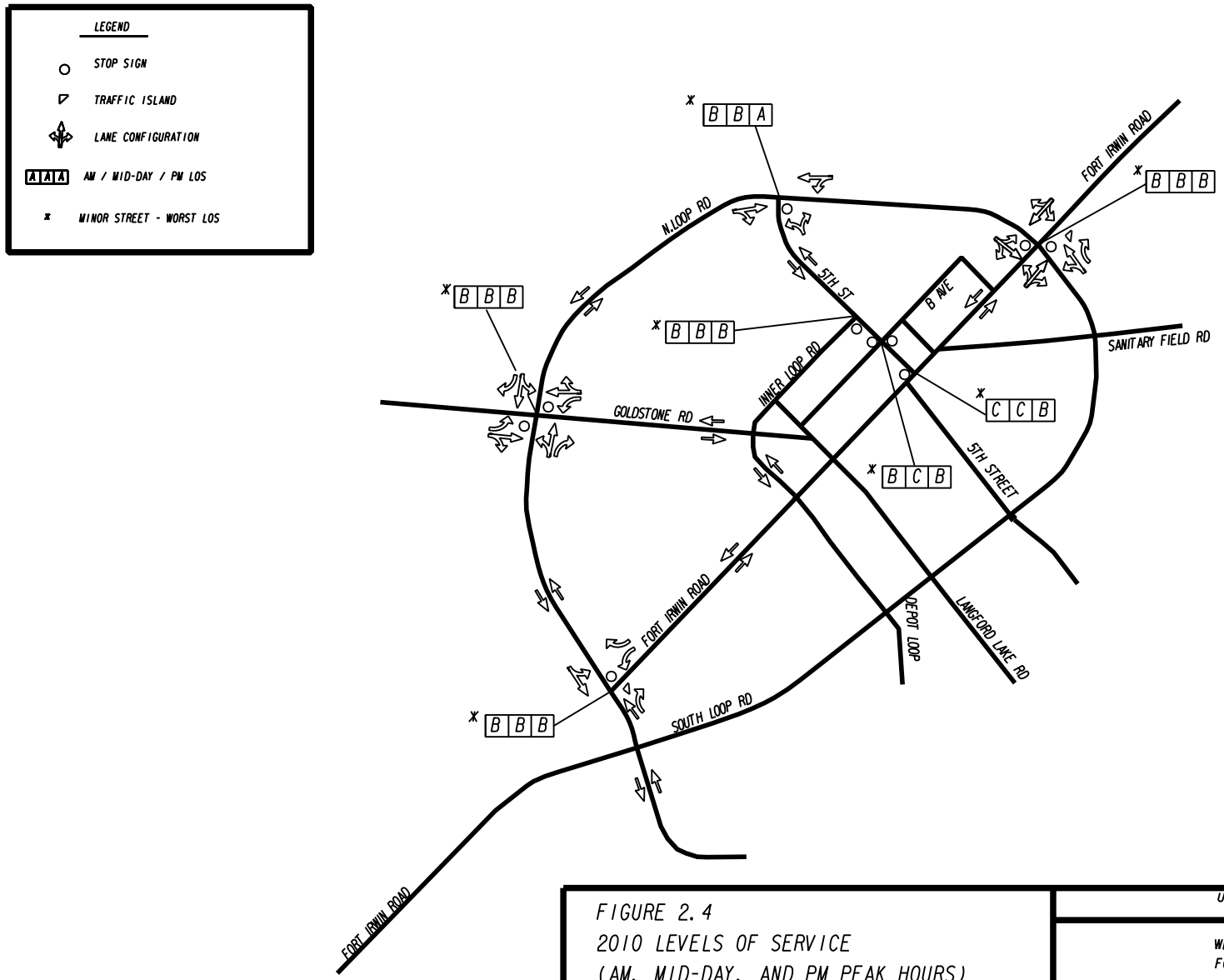

FIGURE 2.4
2010 LEVELS OF SERVICE
(AM, MID-DAY, AND PM PEAK HOURS)

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2.5 Future Analysis

The following sections describe the future conditions analysis for 2011 and 2031 for the No-Build and Build conditions. The future background traffic volumes were developed assuming a growth rate of 1.5% compounded annually. **Figures 2.5** and **2.6** depict the Annual Average Daily Traffic and the daily truck percentages for 2011 and 2031, respectively.

2.5.1 No-Build Analysis

The No-Build condition assumes no changes in the intersection geometry or traffic controls at the intersections. Intersection turning movement volumes were developed using the 1.5% growth rate compounded annually. **Figures 2.7** and **2.8** depict the intersection lane configuration, traffic controls and peak hour volumes for 2011 and 2031, respectively. The intersection analysis was conducted using these volumes and the results are summarized in **Tables 2.2** and **2.3** for 2011 and 2031, respectively. **Figures 2.9** and **2.10** depict the intersection levels of service for 2011 and 2031, respectively.

The analysis shows that all minor street movements would operate at LOS D or better in 2011. In 2031, with the exception of the 5th Street southbound movement at the intersection of B Avenue (intersection #4), which will operate at LOS E during the 2031 AM peak hour, all minor street movements are projected to operate at LOS C or better.

Intersection number 4 (5th Street @ B Avenue) was evaluated to determine necessary improvements to achieve better level of service for the southbound movements. An exclusive southbound left turn lane will improve the approach level of service from LOS E to LOS B and the southbound left turn movement will operate at LOS C.

2.5.2 Build Analysis

The Build scenario includes four access points to the proposed replacement hospital and results in the following three additional intersections within the study area (Figure 1.2):

- Intersection #8-B Avenue and West Access
- Intersection #9 – B Avenue and East Access
- Intersection #10 – North Loop Road and North Access

The Inner Loop Road currently terminates at 5th Street. Under the Build scenario, this road will be extended to provide the main access to the replacement hospital. The existing three-legged intersection of 5th Street and Inner Loop Road (Intersection #3) will be converted to a four-legged intersection. **Figure 2.11** shows the lane configuration, traffic controls, and posted speed limits at all intersections under the Build scenario.

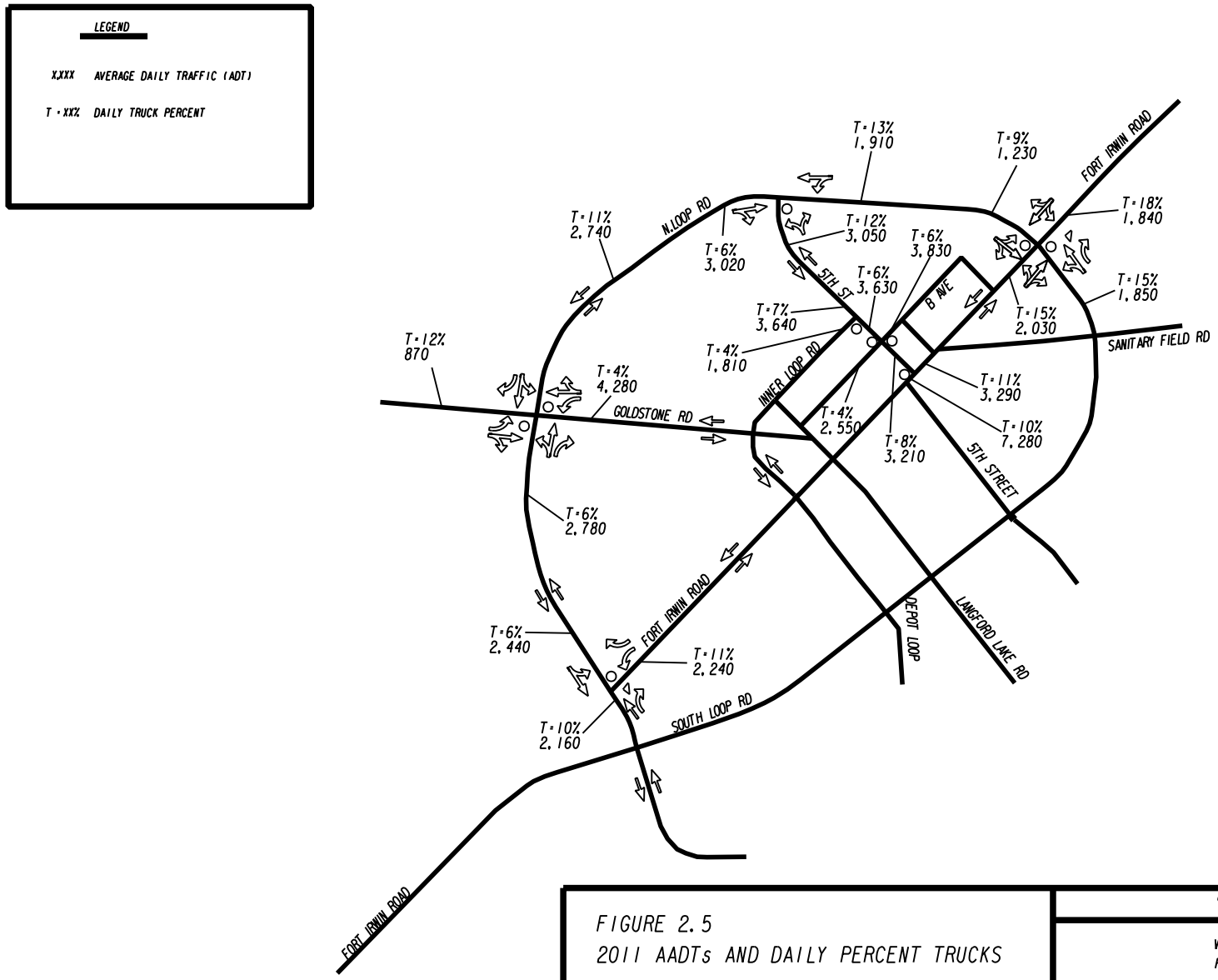

FIGURE 2.5
2011 AADTs AND DAILY PERCENT TRUCKS

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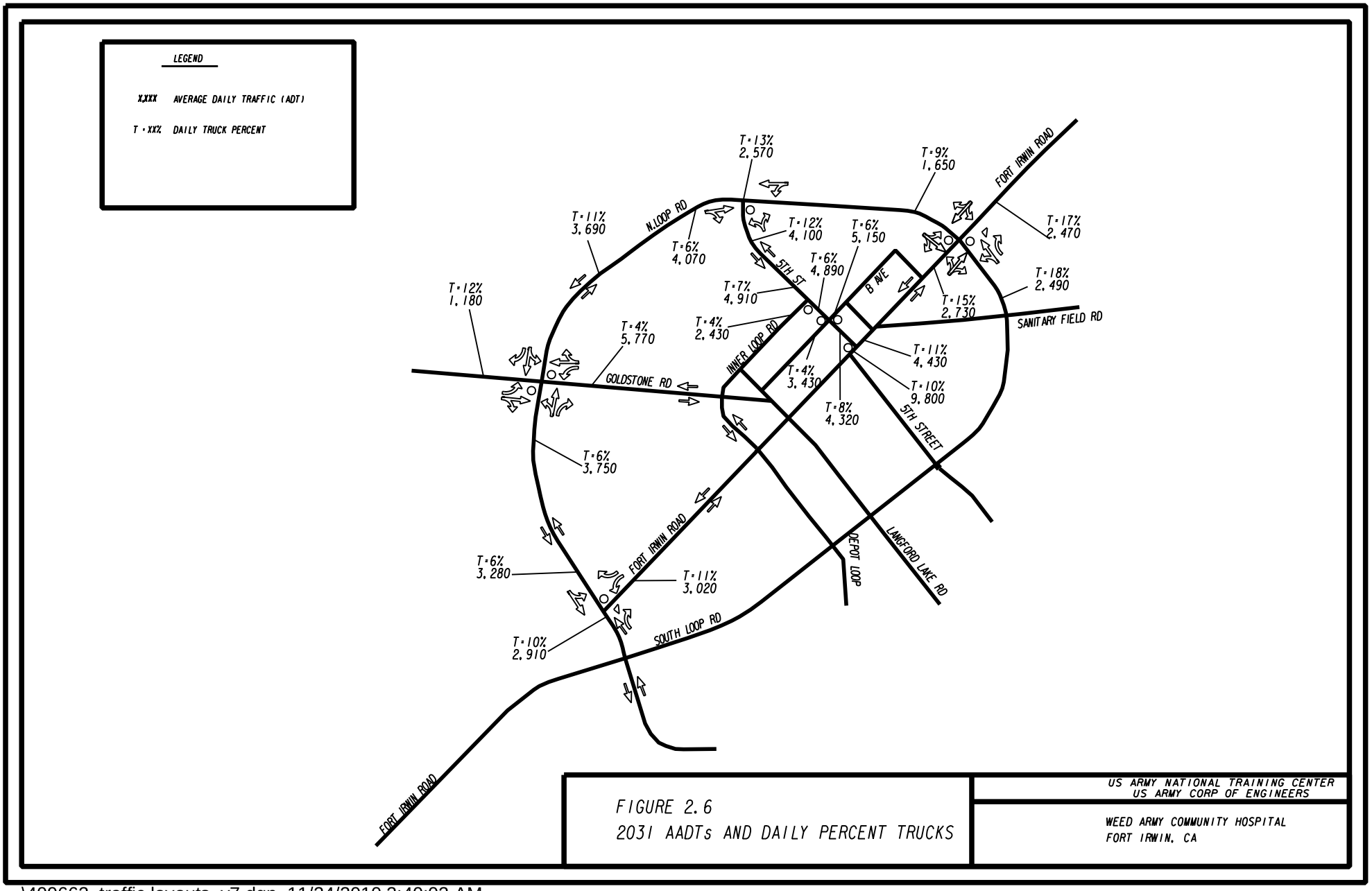

FIGURE 2.6
2031 AADTs AND DAILY PERCENT TRUCKS

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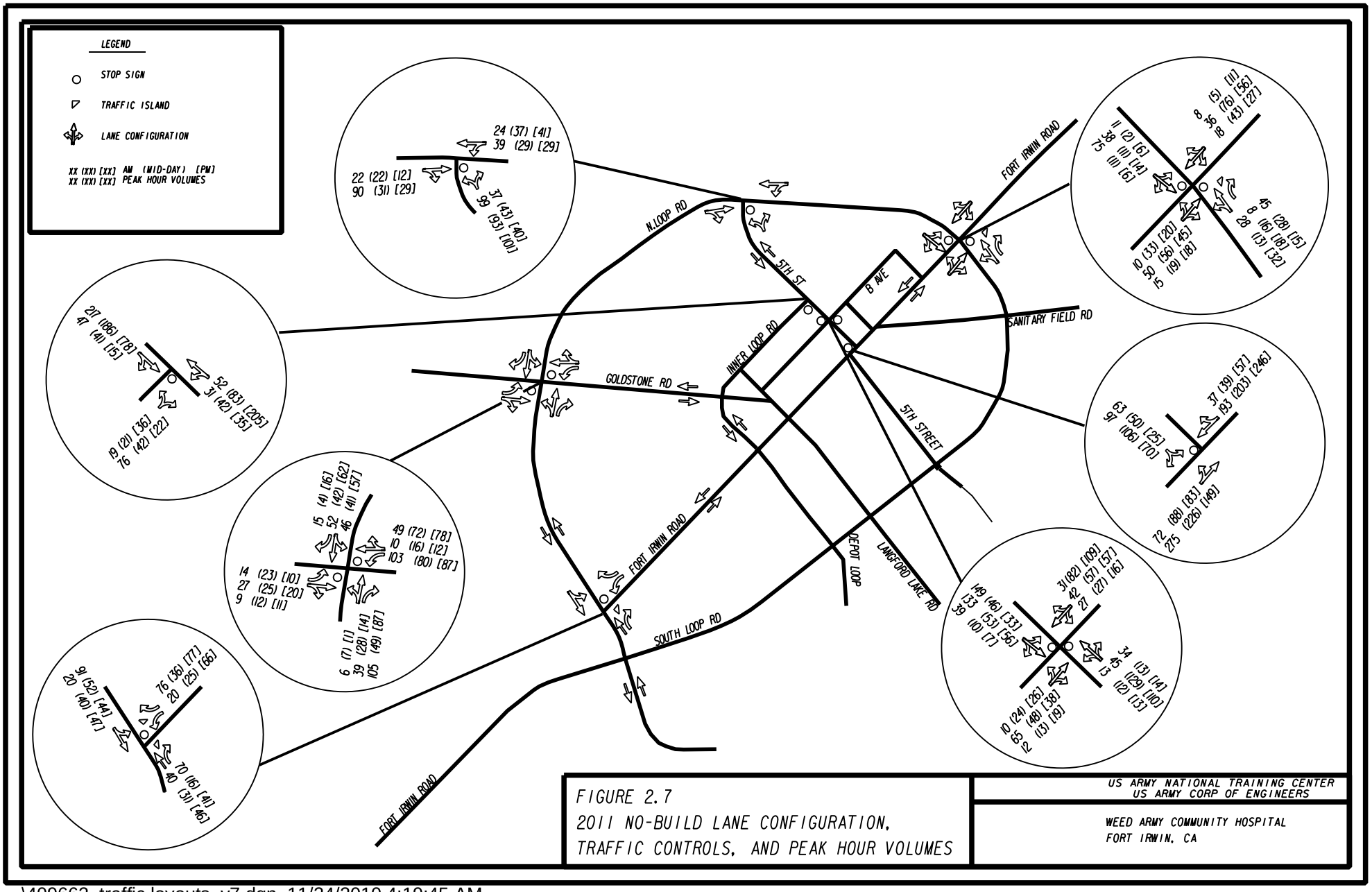

FIGURE 2.7
2011 NO-BUILD LANE CONFIGURATION, TRAFFIC CONTROLS, AND PEAK HOUR VOLUMES

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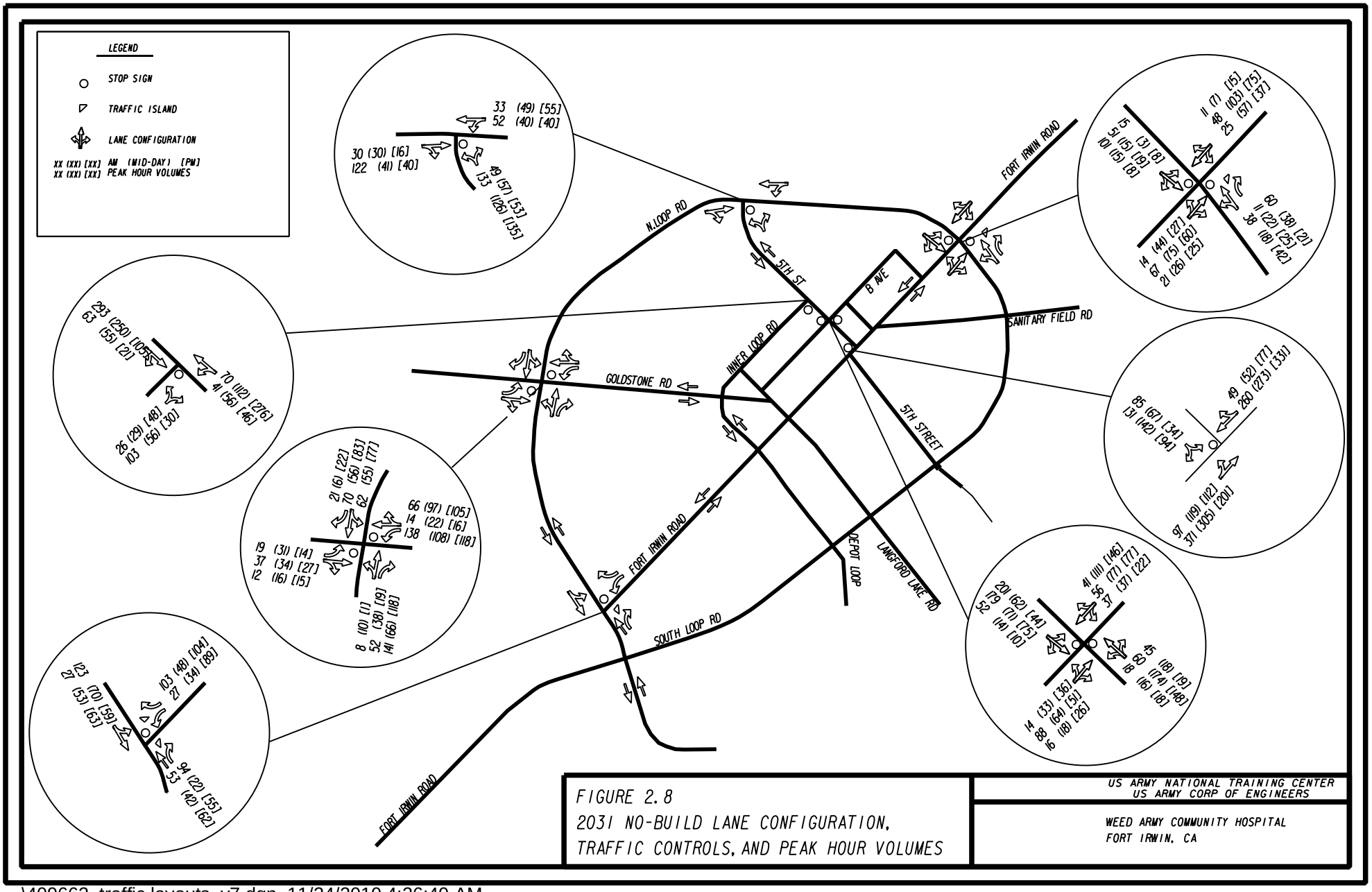

FIGURE 2.8
2031 NO-BUILD LANE CONFIGURATION, TRAFFIC CONTROLS, AND PEAK HOUR VOLUMES

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TABLE 2.2
2011 No-Build - Intersection Analysis Summary

	Movt.	Lane Config (1)	Storage Length (2)	AM Peak					MID-DAY Peak					PM Peak				
				Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS	
			(ft)	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App
North Loop Road @ Goldstone Road (Unsignalized) - Synchro Node 1																		
EB	EBL	1	130	14	11.7	11.7	B	B	23	11.8	11.0	B	B	10	11.6	10.9	B	B
	EBT	1>	Full	27	11.7		B		25	10.5		B		20	10.7		B	
	EBR			9	11.7		B		12	10.5		B		11	10.7		B	
WB	WBL	1	100	103	12.6	11.4	B	B	80	11.3	10.3	B	B	87	11.4	10.2	B	B
	WBT	1>	Full	10	9.3		A		16	9.3		A		12	9.1		A	
	WBR			49	9.3		A		72	9.3		A		78	9.1		A	
NB	NBL			6	1.0	0.3	A	A	7	1.5	0.6	A	A	1	0.5	0.1	A	A
	NBT	<1	Full	39	1.0		A		28	1.5		A		14	0.5		A	
	NBR	1	100	105	0.0		A		49	0.0		A		87	0.0		A	
SB	SBL			46	3.8	3.3	A	A	41	3.9	3.7	A	A	57	3.8	3.4	A	A
	SBT	<1	Full	52	3.8		A		42	3.9		A		62	3.8		A	
	SBR	1	50	15	0.0		A		4	0.0		A		16	0.0		A	
Intersection				**474**	**6.0**		**A**		**400**	**6.9**		**A**		**457**	**6.0**		**A**	
North Loop Road @ 5th Street (Unsignalized) - Synchro Node 2																		
EB	EBL			-	-	0.0	-	A	-	-	0.0	-	A	-	-	0.0	-	A
	EBT	1>	Full	22	0.0		A		22	0.0		A		12	0.0		A	
	EBR			90	0.0		A		31	0.0		A		29	0.0		A	
WB	WBL			39	4.9	4.9	A	A	29	3.4	3.4	A	A	29	3.2	3.2	A	A
	WBT	<1	Full	24	4.9		A		37	3.4		A		41	3.2		A	
	WBR			-	-		-		-	-		-		-	-		-	
NB	NBL			99	11.3	11.3	B	B	93	10.6	10.6	B	B	101	10.0	10.0	B	B
	NBT	<1>	Full	-	-		-		-	-		-		-	-		-	
	NBR			37	11.3		B		43	10.6		B		40	10.0		B	
SB	SBL			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SBT			-	-		-		-	-		-		-	-		-	
	SBR			-	-		-		-	-		-		-	-		-	
Intersection				**311**	**5.9**		**A**		**255**	**6.5**		**A**		**252**	**6.5**		**A**	
5th Street @ Inner Loop Road (Unsignalized) - Synchro Node 3																		
EB	EBL			19	11.6	11.6	B	B	21	11.7	11.7	B	B	36	10.6	10.6	B	B
	EBT	<1>	Full	-	-		-		-	-		-		-	-		-	
	EBR			76	11.6		B		42	11.7		B		22	10.6		B	
WB	WBL			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	WBT			-	-		-		-	-		-		-	-		-	
	WBR			-	-		-		-	-		-		-	-		-	
NB	NBL			31	3.2	3.2	A	A	42	3.0	3.0	A	A	35	1.3	1.3	A	A
	NBT	<1	Full	52	3.2		A		83	3.0		A		205	1.3		A	
	NBR			-	-		-		-	-		-		-	-		-	
SB	SBL			-	-	0.0	-	A	-	-	0.0	-	A	-	-	0.0	-	A
	SBT	1>	Full	217	0.0		A		186	0.0		A		78	0.0		A	
	SBR			47	0.0		A		41	0.0		A		15	0.0		A	
Intersection				**442**	**3.1**		**A**		**414**	**2.7**		**A**		**391**	**2.4**		**A**	
5th Street @ B Avenue (Unsignalized) - Synchro Node 4																		
EB	EBL			10	0.9	0.9	A	A	24	2.3	2.3	A	A	26	2.5	2.5	A	A
	EBT	<1>	Full	65	0.9		A		48	2.3		A		38	2.5		A	
	EBR			12	0.9		A		13	2.3		A		19	2.5		A	
WB	WBL			27	2.2	2.2	A	A	27	1.4	1.4	A	A	16	0.7	0.7	A	A
	WBT	<1>	Full	42	2.2		A		57	1.4		A		57	0.7		A	
	WBR			31	2.2		A		82	1.4		A		109	0.7		A	
NB	NBL			13	12.2	12.2	B	B	12	16.1	16.1	C	C	13	13.1	13.1	B	B
	NBT	<1>	Full	45	12.2		B		129	16.1		C		110	13.1		B	
	NBR			34	12.2		B		13	16.1		C		14	13.1		B	
SB	SBL			149	28.5	28.5	D	D	46	16.5	16.5	C	C	33	12.8	12.8	B	B
	SBT	<1>	Full	133	28.5		D		53	16.5		C		56	12.8		B	
	SBR			39	28.5		D		10	16.5		C		7	12.8		B	
Intersection				**600**	**17.6**		**C**		**515**	**9.2**		**A**		**498**	**6.8**		**A**	

TABLE 2.2
2011 No-Build - Intersection Analysis Summary

	Movt.	Lane Config (1)	Storage Length (2)	AM Peak					MID-DAY Peak					PM Peak				
				Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS	
			(ft)	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App
5th Street @ Fort Irwin Road (Unsignalized) - Synchro Node 5																		
EB	EBL			72	2.3		A		88	2.9		A		83	3.4		A	
	EBT	<1	Full	275	2.3	2.3	A	A	226	2.9	2.9	A	A	149	3.4	3.4	A	A
	EBR			-	-		-		-	-		-		-	-		-	
WB	WBL			-	-		-		-	-		-		-	-		-	
	WBT	1>	Full	193	0.0	0.0	A	A	203	0.0	0.0	A	A	246	0.0	0.0	A	A
	WBR			37	0.0		A		39	0.0		A		57	0.0		A	
NB	NBL			-	-		-		-	-		-		-	-		-	
	NBT			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NBR			-	-		-		-	-		-		-	-		-	
SB	SBL			63	16.7		C		50	15.8		C		25	12.6		B	
	SBT	<1>	Full	-	-	16.7	-	C	-	-	15.8	-	C	-	-	12.6	-	B
	SBR			97	16.7		C		106	15.8		C		70	12.6		B	
Intersection				**737**	**4.7**		**A**		**712**	**4.8**		**A**		**630**	**3.2**		**A**	
North Loop Road @ Fort Irwin Road (North Unsignalized intersection) - Synchro Node 6																		
EB	EBL			10	1.0		A		33	2.5		A		20	1.9		A	
	EBT	<1>	Full	50	1.0	1.0	A	A	56	2.5	2.5	A	A	45	1.9	1.9	A	A
	EBR			15	1.0		A		19	2.5		A		18	1.9		A	
WB	WBL			18	2.2		A		43	2.8		A		27	2.3		A	
	WBT	<1>	Full	36	2.2	2.2	A	A	76	2.8	2.8	A	A	56	2.3	2.3	A	A
	WBR			8	2.2		A		5	2.8		A		11	2.3		A	
NB	NBL			28	10.1		B		13	10.7		B		32	10.7		B	
	NBT	<1	Full	8	10.1	10.1	B	B	16	10.7	10.7	B	B	18	10.7	10.7	B	B
	NBR	1	75	45	0.0		A		28	0.0		A		15	0.0		A	
SB	SBL			11	10.1		B		2	10.7		B		6	10.5		B	
	SBT	<1>	Full	38	10.1	10.1	B	B	11	10.7	10.7	B	B	14	10.5	10.5	B	B
	SBR			75	10.1		B		11	10.7		B		6	10.5		B	
Intersection				**342**	**6.7**		**A**		**314**	**4.7**		**A**		**270**	**5.0**		**A**	
North Loop Road @ Fort Irwin Road (South Unsignalized intersection) - Synchro Node 7																		
EB	EBL			-	-		-		-	-		-		-	-		-	
	EBT			-	-		-	-	-	-		-	-	-	-		-	-
	EBR			-	-		-		-	-		-		-	-		-	
WB	WBL	1	50	20	10.9		B		25	10.3		B		66	10.3		B	
	WBT			-	-	9.3	-	A	-	-	9.4	-	A	-	-	9.6	-	A
	WBR	1	Full	76	8.9		A		36	8.7		A		77	8.9		A	
NB	NBL			-	-		-		-	-		-		-	-		-	
	NBT	1	Full	40	0.0	0.0	A	A	31	0.0	0.0	A	A	46	0.0	0.0	A	A
	NBR	1	400	70	0.0		A		16	0.0		A		41	0.0		A	
SB	SBL			91	6.2		A		52	4.3		A		44	3.7		A	
	SBT	<1	Full	20	6.2	6.2	A	A	40	4.3	4.3	A	A	47	3.7	3.7	A	A
	SBR			-	-		-		-	-		-		-	-		-	
Intersection				**318**	**5.0**		**A**		**200**	**4.9**		**A**		**320**	**5.3**		**A**	

(1) Shared Left and Through lanes are shown as "<" and Shared Right and Through lanes are shown as ">".

(2) Full storage length indicates full lane(s) from an upstream node/intersection.

(3) Delay of 999 indicates delays exceeding 999 seconds.

TABLE 2.3
2031 No-Build - Intersection Analysis Summary

	Movt.	Lane Config (1)	Storage Length (2)	AM Peak					MID-DAY Peak					PM Peak				
				Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS	
			(ft)	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App
North Loop Road @ Goldstone Road (Unsignalized) - Synchro Node 1																		
EB	EBL	1	130	19	12.4	12.3	B	B	31	12.8	11.7	B	B	14	13.1	11.9	B	B
	EBT	1>	Full	37	12.3		B		34	11.0		B		27	11.5		B	
	EBR			12	12.3		B		16	11.0		B		15	11.5		B	
WB	WBL	1	100	138	13.7	12.2	B	B	108	12.4	10.9	B	B	118	13.1	11.2	B	B
	WBT	1>	Full	14	9.5		A		22	9.6		A		16	9.4		A	
	WBR			66	9.5		A		97	9.6		A		105	9.4		A	
NB	NBL			8	1.0	0.3	A	A	10	1.6	0.7	A	A	1	0.4	0.1	A	A
	NBT	<1	Full	52	1.0		A		38	1.6		A		19	0.4		A	
	NBR	1	100	141	0.0		A		66	0.0		A		118	0.0		A	
SB	SBL			62	3.9	3.4	A	A	55	3.9	3.7	A	A	77	4.0	3.5	A	A
	SBT	<1	Full	70	3.9		A		56	3.9		A		83	4.0		A	
	SBR	1	50	21	0.0		A		6	0.0		A		22	0.0		A	
Intersection				**638**	**6.4**		**A**		**539**	**7.3**		**A**		**615**	**6.5**		**A**	
North Loop Road @ 5th Street (Unsignalized) - Synchro Node 2																		
EB	EBL			-	-	0.0	-	A	-	-	0.0	-	A	-	-	0.0	-	A
	EBT	1>	Full	30	0.0		A		30	0.0		A		16	0.0		A	
	EBR			122	0.0		A		41	0.0		A		40	0.0		A	
WB	WBL			52	4.8	4.8	A	A	40	3.5	3.5	A	A	40	3.3	3.3	A	A
	WBT	<1	Full	33	4.8		A		49	3.5		A		55	3.3		A	
	WBR			-	-		-		-	-		-		-	-		-	
NB	NBL			133	11.5	11.5	B	B	126	10.8	10.8	B	B	135	10.8	10.8	B	B
	NBT	<1>	Full	-	-		-		-	-		-		-	-		-	
	NBR			49	11.5		B		57	10.8		B		53	10.8		B	
SB	SBL			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SBT			-	-		-		-	-		-		-	-		-	
	SBR			-	-		-		-	-		-		-	-		-	
Intersection				**418**	**6.0**		**A**		**343**	**6.6**		**A**		**339**	**6.9**		**A**	
5th Street @ Inner Loop Road (Unsignalized) - Synchro Node 3																		
EB	EBL			26	12.2	12.2	B	B	29	11.8	11.8	B	B	48	11.9	11.9	B	B
	EBT	<1>	Full	-	-		-		-	-		-		-	-		-	
	EBR			103	12.2		B		56	11.8		B		30	11.9		B	
WB	WBL			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	WBT			-	-		-		-	-		-		-	-		-	
	WBR			-	-		-		-	-		-		-	-		-	
NB	NBL			41	3.2	3.2	A	A	56	3.0	3.0	A	A	46	1.4	1.4	A	A
	NBT	<1	Full	70	3.2		A		112	3.0		A		276	1.4		A	
	NBR			-	-		-		-	-		-		-	-		-	
SB	SBL			-	-	0.0	-	A	-	-	0.0	-	A	-	-	0.0	-	A
	SBT	1>	Full	293	0.0		A		250	0.0		A		105	0.0		A	
	SBR			63	0.0		A		55	0.0		A		21	0.0		A	
Intersection				**595**	**3.2**		**A**		**558**	**2.7**		**A**		**526**	**2.6**		**A**	
5th Street @ B Avenue (Unsignalized) - Synchro Node 4																		
EB	EBL			14	1.0	1.0	A	A	33	2.4	2.4	A	A	36	2.7	2.7	A	A
	EBT	<1>	Full	88	1.0		A		64	2.4		A		51	2.7		A	
	EBR			16	1.0		A		18	2.4		A		26	2.7		A	
WB	WBL			37	2.2	2.2	A	A	37	1.4	1.4	A	A	22	0.8	0.8	A	A
	WBT	<1>	Full	56	2.2		A		77	1.4		A		77	0.8		A	
	WBR			41	2.2		A		111	1.4		A		146	0.8		A	
NB	NBL			18	12.7	12.7	B	B	16	17.9	17.9	C	C	18	16.6	16.6	C	C
	NBT	<1>	Full	60	12.7		B		174	17.9		C		148	16.6		C	
	NBR			45	12.7		B		18	17.9		C		19	16.6		C	
SB	SBL			201	37.7	37.7	E	E	62	18.6	18.6	C	C	44	16.0	16.0	C	C
	SBT	<1>	Full	179	37.7		E		71	18.6		C		75	16.0		C	
	SBR			52	37.7		E		14	18.6		C		10	16.0		C	
Intersection				**807**	**22.6**		**C**		**693**	**10.1**		**B**		**670**	**8.4**		**A**	

TABLE 2.3
2031 No-Build - Intersection Analysis Summary

	Movt.	Lane Config (1)	Storage Length (2)	AM Peak					MID-DAY Peak					PM Peak				
				Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS	
			(ft)	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App
5th Street @ Fort Irwin Road (Unsignalized) - Synchro Node 5																		
EB	EBL			97	2.5	2.5	A	A	119	3.2	3.2	A	A	112	3.8	3.8	A	A
	EBT	<1	Full	371	2.5		A		305	3.2		A		201	3.8		A	
	EBR			-	-		-		-	-		-		-	-		-	
WB	WBL			-	-	0.0	-	A	-	-	0.0	-	A	-	-	0.0	-	A
	WBT	1>	Full	260	0.0		A		273	0.0		A		331	0.0		A	
	WBR			49	0.0		A		52	0.0		A		77	0.0		A	
NB	NBL			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NBT			-	-		-		-	-		-		-	-		-	
	NBR			-	-		-		-	-		-		-	-		-	
SB	SBL			85	22.4	22.4	C	C	67	19.9	19.9	C	C	34	15.4	15.4	C	C
	SBT	<1>	Full	-	-		-		-	-		-		-	-		-	
	SBR			131	22.4		C		142	19.9		C		94	15.4		C	
Intersection				**993**	**6.0**		**A**		**958**	**5.8**		**A**		**849**	**3.7**		**A**	
North Loop Road @ Fort Irwin Road (North Unsignalized intersection) - Synchro Node 6																		
EB	EBL			14	1.1	1.1	A	A	44	2.5	2.5	A	A	27	1.9	1.9	A	A
	EBT	<1>	Full	67	1.1		A		75	2.5		A		60	1.9		A	
	EBR			21	1.1		A		26	2.5		A		25	1.9		A	
WB	WBL			25	2.3	2.3	A	A	57	2.8	2.8	A	A	37	2.4	2.4	A	A
	WBT	<1>	Full	48	2.3		A		103	2.8		A		75	2.4		A	
	WBR			11	2.3		A		7	2.8		A		15	2.4		A	
NB	NBL			38	10.8	10.8	B	B	18	11.4	11.4	B	B	42	11.5	11.5	B	B
	NBT	<1	Full	11	10.8		B		22	11.4		B		25	11.5		B	
	NBR	1	75	60	0.0		A		38	0.0		A		21	0.0		A	
SB	SBL			15	10.7	10.7	B	B	3	11.4	11.4	B	B	8	11.2	11.2	B	B
	SBT	<1>	Full	51	10.7		B		15	11.4		B		19	11.2		B	
	SBR			101	10.7		B		15	11.4		B		8	11.2		B	
Intersection				**461**	**7.1**		**A**		**422**	**5.0**		**A**		**362**	**5.3**		**A**	
North Loop Road @ Fort Irwin Road (South Unsignalized intersection) - Synchro Node 7																		
EB	EBL			-	-		-	-	-	-		-	-	-	-		-	-
	EBT			-	-		-		-	-		-		-	-		-	
	EBR			-	-		-		-	-		-		-	-		-	
WB	WBL	1	50	27	11.5	9.6	B	A	34	10.5	9.5	B	A	89	11.1	10.0	B	B
	WBT			-	-		-		-	-		-		-	-		-	
	WBR	1	Full	103	9.1		A		48	8.7		A		104	9.1		A	
NB	NBL			-	-	0.0	-	A	-	-	0.0	-	A	-	-	0.0	-	A
	NBT	1	Full	53	0.0		A		42	0.0		A		62	0.0		A	
	NBR	1	400	94	0.0		A		22	0.0		A		55	0.0		A	
SB	SBL			123	6.3	6.3	A	A	70	4.4	4.4	A	A	59	3.8	3.8	A	A
	SBT	<1	Full	27	6.3		A		53	4.4		A		63	3.8		A	
	SBR			-	-		-		-	-		-		-	-		-	
Intersection				**428**	**5.1**		**A**		**269**	**4.9**		**A**		**431**	**5.6**		**A**	

(1) Shared Left and Through lanes are shown as "<" and Shared Right and Through lanes are shown as ">".

(2) Full storage length indicates full lane(s) from an upstream node/intersection.

(3) Delay of 999 indicates delays exceeding 999 seconds.

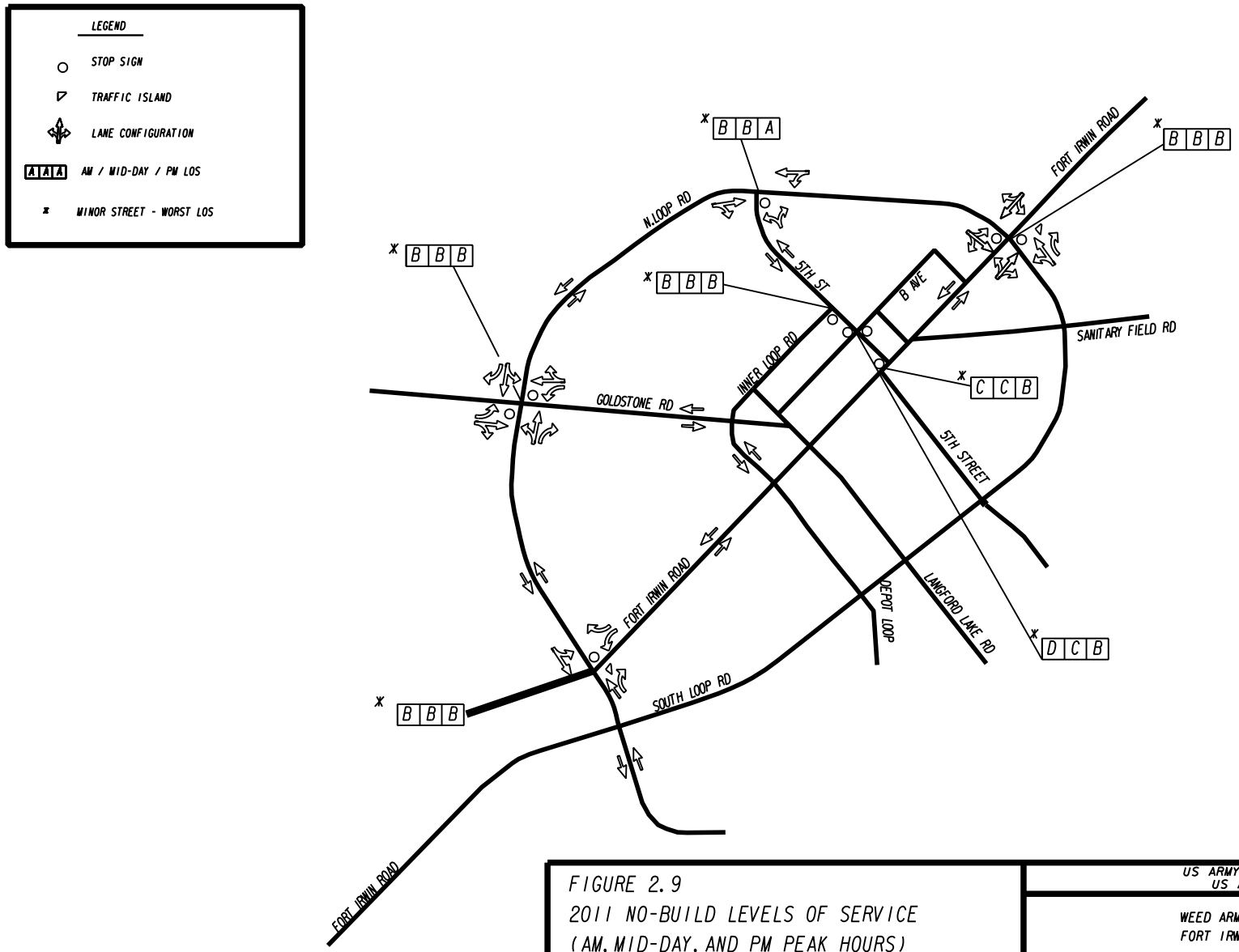

FIGURE 2.9
2011 NO-BUILD LEVELS OF SERVICE
(AM, MID-DAY, AND PM PEAK HOURS)

US ARMY NATIONAL TRAINING CENTER
US ARMY CORP OF ENGINEERS

WEED ARMY COMMUNITY HOSPITAL
FORT IRWIN, CA

...\409662_traffic loyouts_v7.dgn 11/24/2010 2:25:10 AM

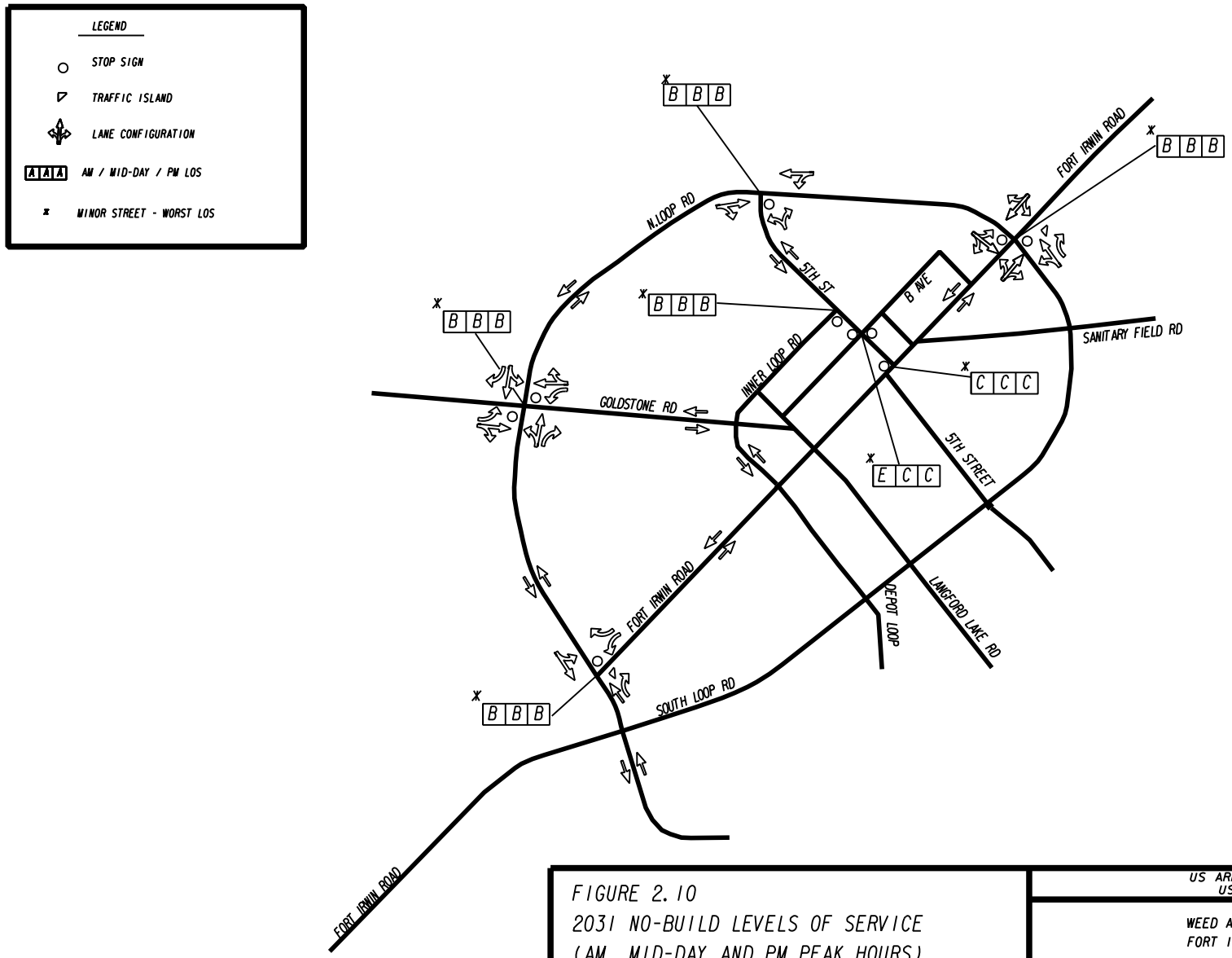

FIGURE 2.10
2031 NO-BUILD LEVELS OF SERVICE
(AM, MID-DAY, AND PM PEAK HOURS)

US ARMY NATIONAL TRAINING CENTER
US ARMY CORP OF ENGINEERS

WEED ARMY COMMUNITY HOSPITAL
FORT IRWIN, CA

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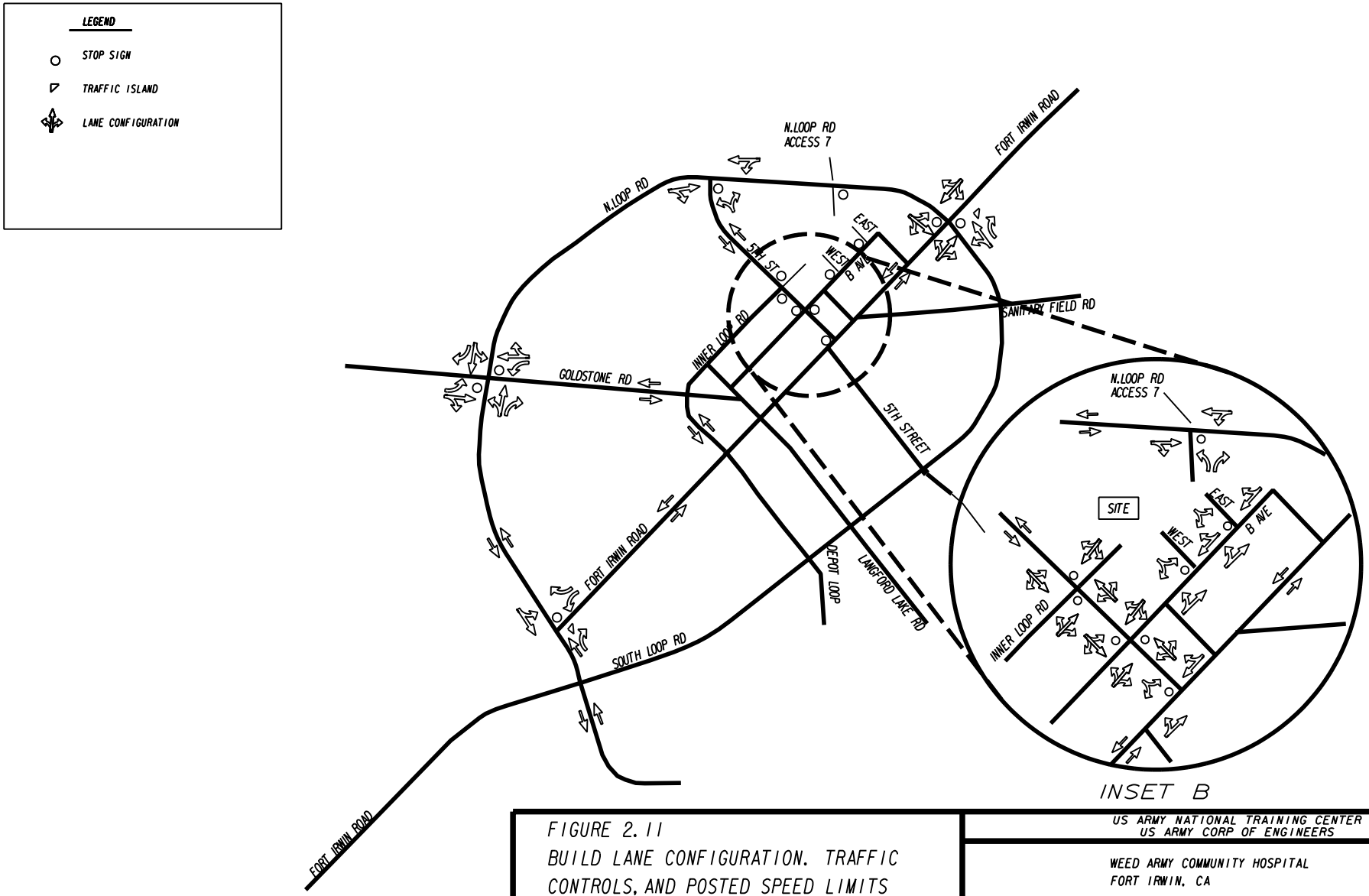

FIGURE 2.11
BUILD LANE CONFIGURATION. TRAFFIC CONTROLS, AND POSTED SPEED LIMITS

US ARMY NATIONAL TRAINING CENTER
US ARMY CORP OF ENGINEERS

WEED ARMY COMMUNITY HOSPITAL
FORT IRWIN, CA

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The Build scenario includes the 231,000 square feet of replacement hospital north of 5th Street and west of B Avenue. The trip generation from this facility was estimated using the Institute of Transportation Engineers (ITE) Trip Generation 8th Edition. The average trip generation rates for Land Use Code 610 were used for estimating trips for the AM and PM peak hours. Since no mid-day trip rates are available from ITE, the PM peak hour rate was assumed for the mid-day traffic analysis. The trip generation for the replacement hospital is summarized in **Table 2.4**.

Table 2.4: ITE Trip Generation for the Replacement Hospital

Area (Sq.Ft.)	Peak	Avg Rate	Trip Gen	Trip Distribution		Trips	
				Inbound	Outbound	Inbound	Outbound
231,000	AM	1.12	259	59%	41%	153	106
231,000	MID-DAY	1.14	263	42%	58%	111	152
231,000	PM	1.14	263	42%	58%	111	152

Based on the trip distribution, the trips were assigned to the access points in proportion to the main street daily traffic. This assignment is depicted on **Figure 2.12**. The trips summarized in Table 2.4 and depicted on Figure 2.12 were added to the 2031 No-Build peak hour volumes. The resulting traffic volumes are shown in **Figure 2.13**.

The 2011 No-Build analysis did not show any operational deficiencies at the intersections. Hence, the Build scenario was analyzed only for the 2031 conditions. The 2031 intersection analysis results are summarized in **Table 2.5** and depicted on **Figure 2.14**.

Similar to the No-Build analysis, the Build analysis shows that in 2031, all minor street movements are projected to operate at LOS C or better with the exception of the 5th Street southbound movement at the intersection of B Avenue (intersection #4). This movement is projected to operate at LOS E during the 2031 AM peak hour.

Intersection number 4 (5th Street @ B Avenue) was evaluated to determine necessary improvements to achieve better level of service for the southbound movements. An exclusive southbound left turn lane will improve the approach level of service from LOS E to LOS B and the southbound left turn movement will operate at LOS C. The analysis output sheets are provided in the Appendix.

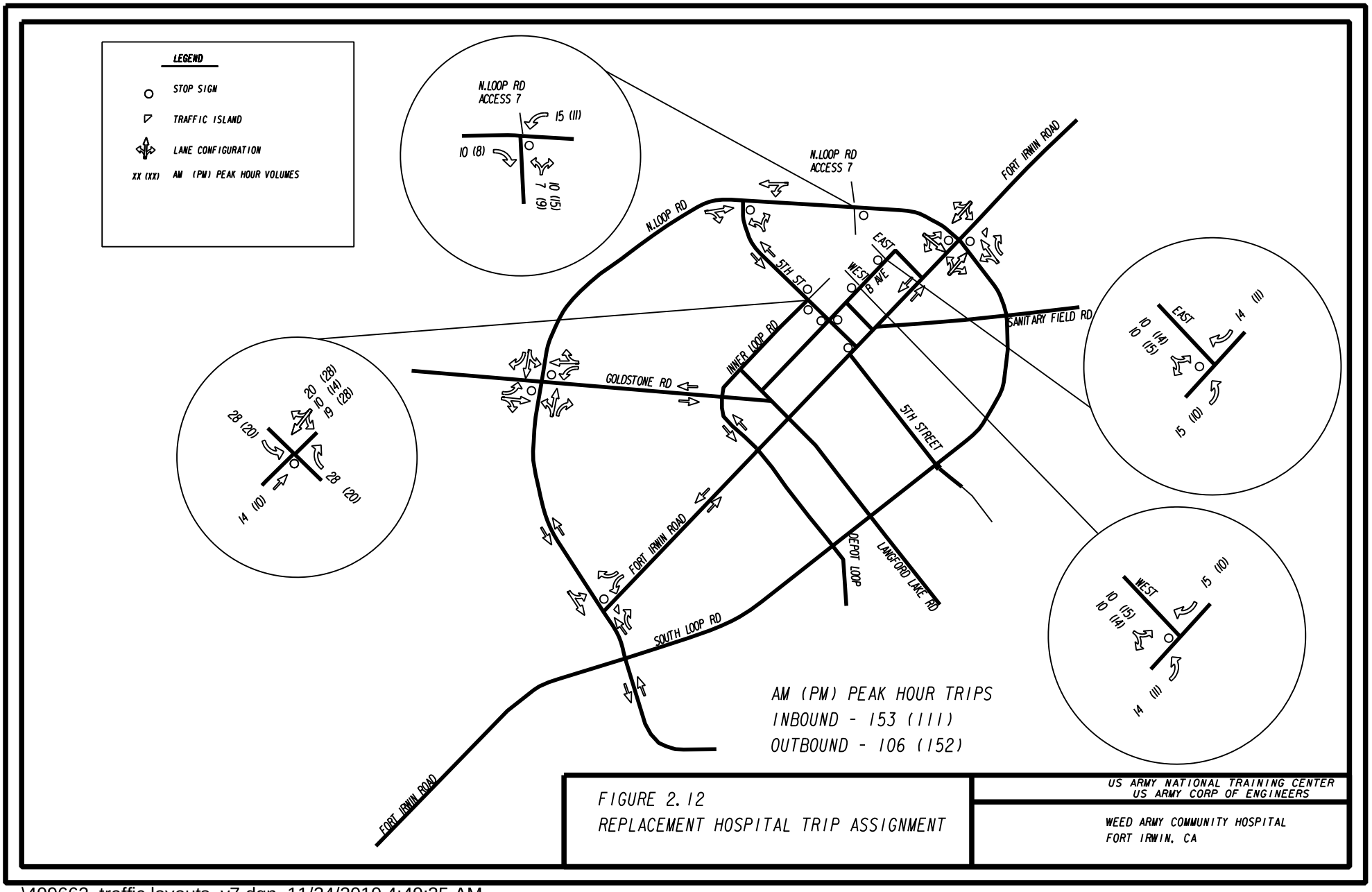

FIGURE 2.12
REPLACEMENT HOSPITAL TRIP ASSIGNMENT

US ARMY NATIONAL TRAINING CENTER
US ARMY CORP OF ENGINEERS

WEED ARMY COMMUNITY HOSPITAL
FORT IRWIN, CA

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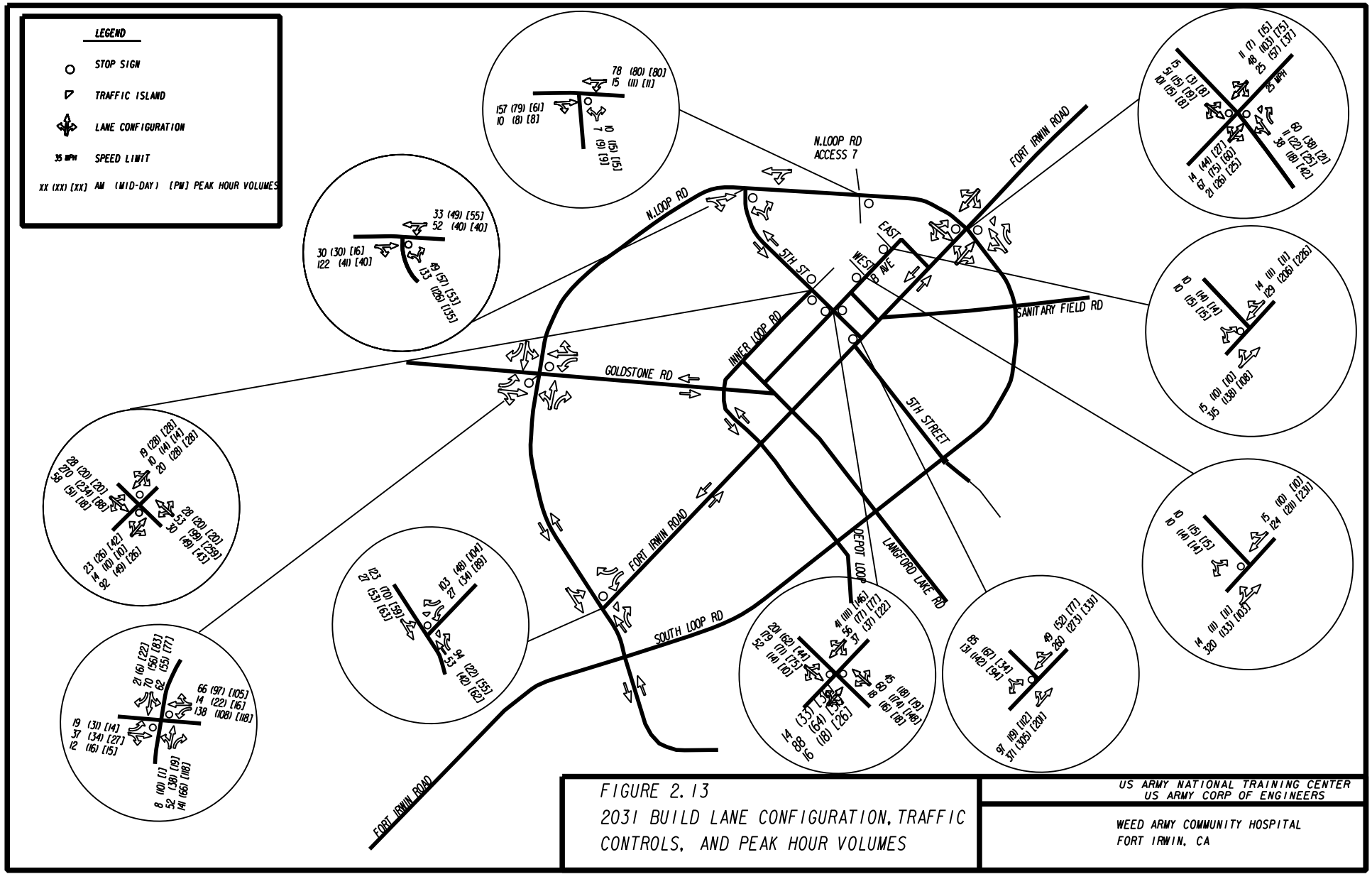

FIGURE 2.13
2031 BUILD LANE CONFIGURATION, TRAFFIC CONTROLS, AND PEAK HOUR VOLUMES

US ARMY NATIONAL TRAINING CENTER
US ARMY CORP OF ENGINEERS

WEED ARMY COMMUNITY HOSPITAL
FORT IRWIN, CA

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TABLE 2.5
2031 Build - Intersection Analysis Summary

	Movt.	Lane (1) Config	Storage Length (2)	AM Peak					MID-DAY Peak					PM Peak				
				Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS	
			(ft)	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App
North Loop Road @ Goldstone Road (Unsignalized) - Synchro Node 1																		
EB	EBL	1	130	19	12.4	12.3	B	B	31	12.8	11.7	B	B	14	13.1	11.9	B	B
	EBT	1>	Full	37	12.3		B		34	11.0		B		27	11.5		B	
	EBR			12	12.3		B		16	11.0		B		15	11.5		B	
WB	WBL	1	100	138	13.7	12.2	B	B	108	12.4	10.9	B	B	118	13.1	11.2	B	B
	WBT	1>	Full	14	9.5		A		22	9.6		A		16	9.4		A	
	WBR			66	9.5		A		97	9.6		A		105	9.4		A	
NB	NBL			8	1.0	0.3	A	A	10	1.6	0.7	A	A	1	0.4	0.1	A	A
	NBT	<1	Full	52	1.0		A		38	1.6		A		19	0.4		A	
	NBR	1	100	141	0.0		A		66	0.0		A		118	0.0		A	
SB	SBL			62	3.9	3.4	A	A	55	3.9	3.7	A	A	77	4.0	3.5	A	A
	SBT	<1	Full	70	3.9		A		56	3.9		A		83	4.0		A	
	SBR	1	50	21	0.0		A		6	0.0		A		22	0.0		A	
Intersection				**638**	**6.4**		**A**		**539**	**7.3**		**A**		**615**	**6.5**		**A**	
North Loop Road @ 5th Street (Unsignalized) - Synchro Node 2																		
EB	EBL			-	-	0.0	-	A	-	-	0.0	-	A	-	-	0.0	-	A
	EBT	1>	Full	30	0.0		A		30	0.0		A		16	0.0		A	
	EBR			122	0.0		A		41	0.0		A		40	0.0		A	
WB	WBL			52	4.8	4.8	A	A	40	3.5	3.5	A	A	40	3.3	3.3	A	A
	WBT	<1	Full	33	4.8		A		49	3.5		A		55	3.3		A	
	WBR			-	-		-		-	-		-		-	-		-	
NB	NBL			133	11.5	11.5	B	B	126	10.8	10.8	B	B	135	10.8	10.8	B	B
	NBT	<1>	Full	-	-		-		-	-		-		-	-		-	
	NBR			49	11.5		B		57	10.8		B		53	10.8		B	
SB	SBL			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SBT			-	-		-		-	-		-		-	-		-	
	SBR			-	-		-		-	-		-		-	-		-	
Intersection				**418**	**6.0**		**A**		**343**	**6.6**		**A**		**339**	**6.9**		**A**	
5th Street @ Inner Loop Road (Unsignalized) - Synchro Node 3																		
EB	EBL			23	12.9	12.9	B	B	26	13.1	13.1	B	B	42	13.9	13.9	B	B
	EBT	<1>	Full	14	12.9		B		10	13.1		B		10	13.9		B	
	EBR			92	12.9		B		49	13.1		B		26	13.9		B	
WB	WBL			20	13.8	13.8	B	B	28	13.8	13.8	B	B	28	13.6	13.6	B	B
	WBT	<1>	Full	10	13.8		B		14	13.8		B		14	13.6		B	
	WBR			19	13.8		B		28	13.8		B		28	13.6		B	
NB	NBL			30	2.4	2.4	A	A	49	2.6	2.6	A	A	43	1.3	1.3	A	A
	NBT	<1>	Full	53	2.4		A		99	2.6		A		259	1.3		A	
	NBR			28	2.4		A		20	2.6		A		20	1.3		A	
SB	SBL			28	0.8	0.8	A	A	20	0.6	0.6	A	A	20	1.4	1.4	A	A
	SBT	<1>	Full	270	0.8		A		234	0.6		A		88	1.4		A	
	SBR			58	0.8		A		51	0.6		A		18	1.4		A	
Intersection				**645**	**4.5**		**A**		**628**	**4.3**		**A**		**596**	**2.6**		**A**	
5th Street @ B Avenue (Unsignalized) - Synchro Node 4																		
EB	EBL			14	1.0	1.0	A	A	33	2.4	2.4	A	A	36	2.7	2.7	A	A
	EBT	<1>	Full	88	1.0		A		64	2.4		A		51	2.7		A	
	EBR			16	1.0		A		18	2.4		A		26	2.7		A	
WB	WBL			37	2.2	2.2	A	A	37	1.4	1.4	A	A	22	0.8	0.8	A	A
	WBT	<1>	Full	56	2.2		A		77	1.4		A		77	0.8		A	
	WBR			41	2.2		A		111	1.4		A		146	0.8		A	
NB	NBL			18	12.7	12.7	B	B	16	17.9	17.9	C	C	18	16.6	16.6	C	C
	NBT	<1>	Full	60	12.7		B		174	17.9		C		148	16.6		C	
	NBR			45	12.7		B		18	17.9		C		19	16.6		C	
SB	SBL			201	37.7	37.7	E	E	62	18.6	18.6	C	C	44	16.0	16.0	C	C
	SBT	<1>	Full	179	37.7		E		71	18.6		C		75	16.0		C	
	SBR			52	37.7		E		14	18.6		C		10	16.0		C	
Intersection				**807**	**22.6**		**C**		**693**	**10.1**		**B**		**670**	**8.4**		**A**	
5th Street @ Fort Irwin Road (Unsignalized) - Synchro Node 5																		
EB	EBL			97	2.5	2.5	A	A	119	3.2	3.2	A	A	112	3.8	3.8	A	A
	EBT	<1	Full	371	2.5		A		305	3.2		A		201	3.8		A	
	EBR			-	-		-		-	-		-		-	-		-	
WB	WBL			-	-	0.0	-	A	-	-	0.0	-	A	-	-	0.0	-	A
	WBT	1>	Full	260	0.0		A		273	0.0		A		331	0.0		A	
	WBR			49	0.0		A		52	0.0		A		77	0.0		A	
NB	NBL			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NBT			-	-		-		-	-		-		-	-		-	
	NBR			-	-		-		-	-		-		-	-		-	
SB	SBL			85	22.4	22.4	C	C	67	19.9	19.9	C	C	34	15.4	15.4	C	C
	SBT	<1>	Full	-	-		-		-	-		-		-	-		-	
	SBR			131	22.4		C		142	19.9		C		94	15.4		C	
Intersection				**993**	**6.0**		**A**		**958**	**5.8**		**A**		**849**	**3.7**		**A**	

TABLE 2.5
2031 Build - Intersection Analysis Summary

	Movt.	Lane (1) Config	Storage Length (2)	AM Peak					MID-DAY Peak					PM Peak				
				Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS		Vol	Delay (sec/veh) (3)		LOS	
			(ft)	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App	(vph)	Movt	App	Movt	App
North Loop Road @ Fort Irwin Road (North Unsignalized intersection) - Synchro Node 6																		
EB	EBL			14	1.1		A		44	2.5		A		27	1.9		A	
	EBT	<1>	Full	67	1.1	1.1	A	A	75	2.5	2.5	A	A	60	1.9	1.9	A	A
	EBR			21	1.1		A		26	2.5		A		25	1.9		A	
WB	WBL			25	2.3		A		57	2.8		A		37	2.4		A	
	WBT	<1>	Full	48	2.3	2.3	A	A	103	2.8	2.8	A	A	75	2.4	2.4	A	A
	WBR			11	2.3		A		7	2.8		A		15	2.4		A	
NB	NBL			38	10.8		B		18	11.4		B		42	11.5		B	
	NBT	<1	Full	11	10.8	10.8	B	B	22	11.4	11.4	B	B	25	11.5	11.5	B	B
	NBR	1	75	60	0.0		A		38	0.0		A		21	0.0		A	
SB	SBL			15	10.7		B		3	11.4		B		8	11.2		B	
	SBT	<1>	Full	51	10.7	10.7	B	B	15	11.4	11.4	B	B	19	11.2	11.2	B	B
	SBR			101	10.7		B		15	11.4		B		8	11.2		B	
Intersection				**461**	**7.1**		**A**		**422**	**5.0**		**A**		**362**	**5.3**		**A**	
North Loop Road @ Fort Irwin Road (South Unsignalized intersection) - Synchro Node 7																		
EB	EBL			-	-		-		-	-		-		-	-		-	
	EBT			-	-		-	-	-	-		-	-	-	-		-	-
	EBR			-	-		-		-	-		-		-	-		-	
WB	WBL	1	50	27	11.5		B		34	10.5		B		89	11.1		B	
	WBT			-	-	9.6	-	A	-	-	9.5	-	A	-	-	10.0	-	B
	WBR	1	Full	103	9.1		A		48	8.7		A		104	9.1		A	
NB	NBL			-	-		-		-	-		-		-	-		-	
	NBT	1	Full	53	0.0	0.0	A	A	42	0.0	0.0	A	A	62	0.0	0.0	A	A
	NBR	1	400	94	0.0		A		22	0.0		A		55	0.0		A	
SB	SBL			123	6.3		A		70	4.4		A		59	3.8		A	
	SBT	<1	Full	27	6.3	6.3	A	A	53	4.4	4.4	A	A	63	3.8	3.8	A	A
	SBR			-	-		-		-	-		-		-	-		-	
Intersection				**428**	**5.1**		**A**		**269**	**4.9**		**A**		**431**	**5.6**		**A**	
B Avenue @ West Access (Unsignalized) - Synchro Node 8																		
EB	EBL			14	0.4		A		11	0.7		A		11	0.8		A	
	EBT	<1	Full	320	0.4	0.4	A	A	133	0.7	0.7	A	A	103	0.8	0.8	A	A
	EBR			-	-		-		-	-		-		-	-		-	
WB	WBL			-	-		-		-	-		-		-	-		-	
	WBT	1>	Full	124	0.0	0.0	A	A	211	0.0	0.0	A	A	231	0.0	0.0	A	A
	WBR			15	0.0		A		10	0.0		A		10	0.0		A	
NB	NBL			-	-		-		-	-		-		-	-		-	
	NBT			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NBR			-	-		-		-	-		-		-	-		-	
SB	SBL			10	10.7		B		15	10.5		B		15	10.6		B	
	SBT	<1>	Full	-	-	10.7	-	B	-	-	10.5	-	B	-	-	10.6	-	B
	SBR			10	10.7		B		14	10.5		B		14	10.6		B	
Intersection				**493**	**0.7**		**A**		**394**	**1.0**		**A**		**384**	**1.0**		**A**	
B Avenue @ East Access (Unsignalized) - Synchro Node 9																		
EB	EBL			15	0.4		A		10	0.6		A		10	0.7		A	
	EBT	<1	Full	315	0.4	0.4	A	A	138	0.6	0.6	A	A	108	0.7	0.7	A	A
	EBR			-	-		-		-	-		-		-	-		-	
WB	WBL			-	-		-		-	-		-		-	-		-	
	WBT	1>	Full	129	0.0	0.0	A	A	206	0.0	0.0	A	A	226	0.0	0.0	A	A
	WBR			14	0.0		A		11	0.0		A		11	0.0		A	
NB	NBL			-	-		-		-	-		-		-	-		-	
	NBT			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NBR			-	-		-		-	-		-		-	-		-	
SB	SBL			10	10.8		B		14	10.5		B		14	10.5		B	
	SBT	<1>	Full	-	-	10.8	-	B	-	-	10.5	-	B	-	-	10.5	-	B
	SBR			10	10.8		B		15	10.5		B		15	10.5		B	
Intersection				**493**	**0.7**		**A**		**394**	**1.0**		**A**		**384**	**1.0**		**A**	
North Loop Road @ N Loop Road Access (Unsignalized) - Synchro Node 10																		
EB	EBL			-	-		-		-	-		-		-	-		-	
	EBT	1>	Full	157	0.0	0.0	A	A	79	0.0	0.0	A	A	61	0.0	0.0	A	A
	EBR			10	0.0		A		8	0.0		A		8	0.0		A	
WB	WBL			15	1.3		A		11	1.0		A		11	1.0		A	
	WBT	<1	Full	78	1.3	1.3	A	A	80	1.0	1.0	A	A	80	1.0	1.0	A	A
	WBR			-	-		-		-	-		-		-	-		-	
NB	NBL			7	9.7		A		9	9.2		A		9	9.1		A	
	NBT	<1>	Full	-	-	9.7	-	A	-	-	9.2	-	A	-	-	9.1	-	A
	NBR			10	9.7		A		15	9.2		A		15	9.1		A	
SB	SBL			-	-		-		-	-		-		-	-		-	
	SBT			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SBR			-	-		-		-	-		-		-	-		-	
Intersection				**277**	**1.0**		**A**		**202**	**1.5**		**A**		**184**	**1.7**		**A**	

(1) Shared Left and Through lanes are shown as "<" and Shared Right and Through lanes are shown as ">".

(2) Full storage length indicates full lane(s) from an upstream node/intersection.

(3) Delay of 999 indicates delays exceeding 999 seconds.

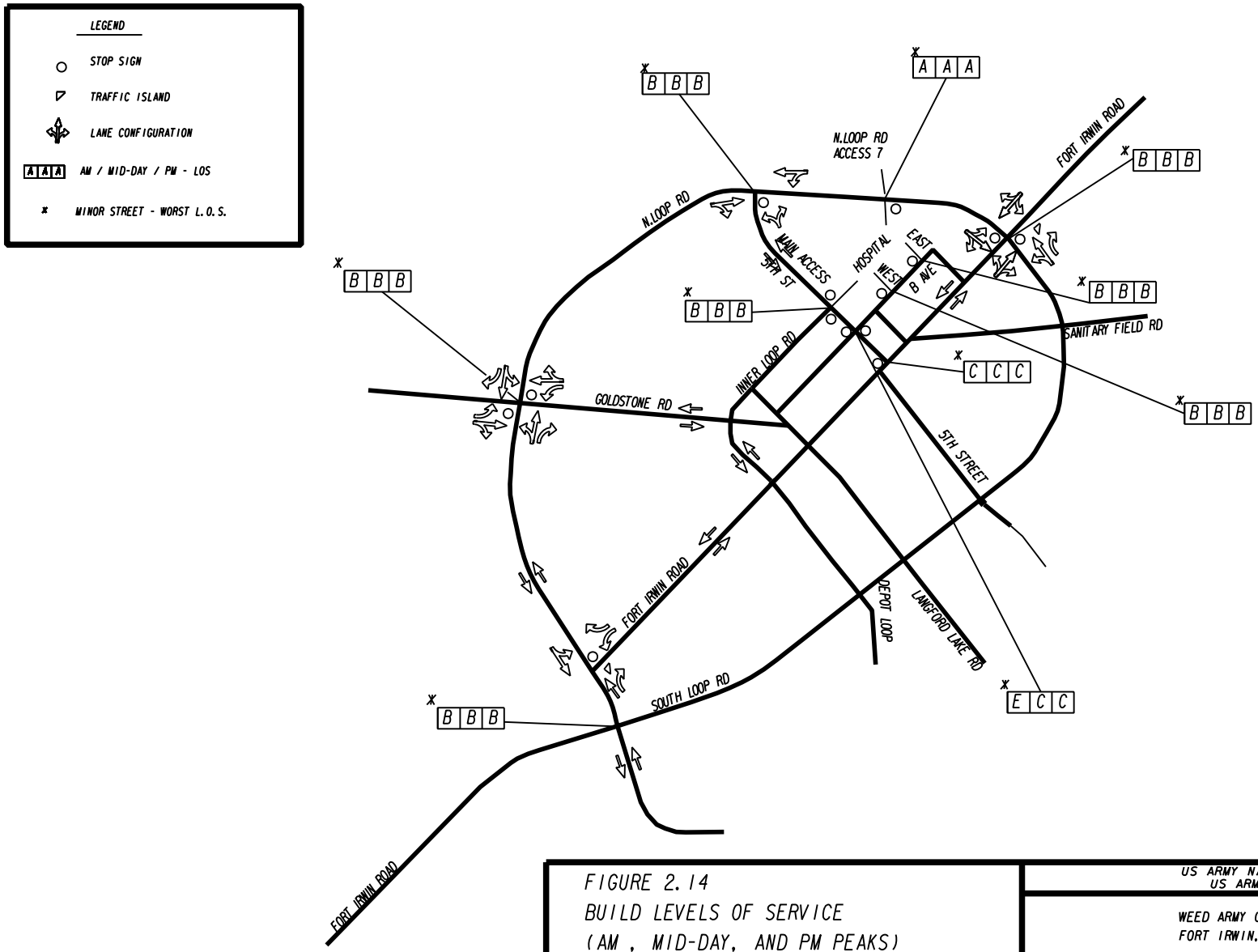

FIGURE 2.14
BUILD LEVELS OF SERVICE
(AM , MID-DAY, AND PM PEAKS)

US ARMY NATIONAL TRAINING CENTER
US ARMY CORP OF ENGINEERS

WEED ARMY COMMUNITY HOSPITAL
FORT IRWIN, CA

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3 CONCLUSIONS & RECOMMENDATIONS

3.1 Conclusions

No-Build: Under the No-Build scenario, all minor street movements at the study intersections are projected to operate at LOS D or better in the Build-Out year 2031 with the exception of the southbound 5th Street movement at B Avenue. This movement will operate at LOS E during the 2031 AM peak hour. No other operational deficiencies were identified.

Build: Under the Build scenario, the access points to the replacement hospital would operate at LOS B or better under unsignalized conditions. Similar to the No-Build conditions, all minor street movements are projected to operate at LOS D or better in the Build-Out year 2031 with the exception of the southbound 5th Street movement at B Avenue. This movement will operate at LOS E during the 2031 AM peak hour.

3.2 Recommendations

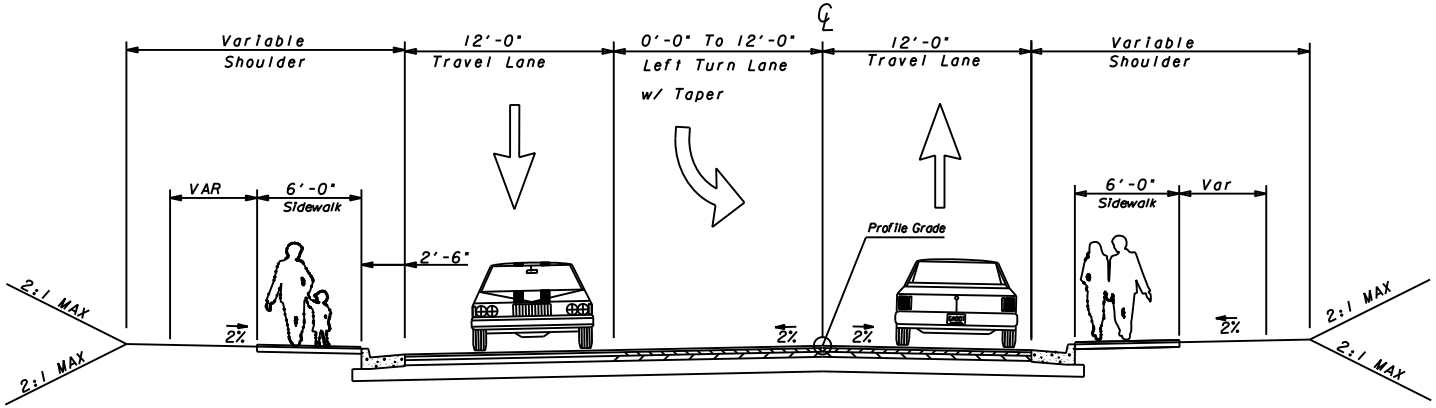
The specific recommendations are made based only on the traffic operations. These recommendations do not account for other considerations such as environmental impacts, right-of-way constraints and other engineering considerations.

1. Provide a 100 foot long exclusive SB left turn lane on 5th Street at the intersection of B Avenue. The typical section for this improvement is depicted on **Figure 3.1**. The southbound exclusive left turn lane will improve the southbound movement from 5th Street from LOS E to LOS C during the 2031 AM peak hour. However, at this time, this improvement may not be cost beneficial considering that the 5th Street southbound approach is projected to operate at LOS E only during the AM peak hour in 2031. This approach would otherwise provide LOS C or better for all other peak periods. This approach should be monitored to determine the need for an exclusive SB left turn lane.

2. The southbound approach at the intersection of Goldstone Road and North Loop Road should be realigned. The existing southbound right turn lane and the shared through and left turn lane should be reconfigured to provide for an exclusive southbound left turn lane and a shared through and right turn lane. The southbound left turn volume is three times more than the southbound right turn volume during the PM peak hour and the probability of the southbound left turn vehicle blocking the southbound through movement is much higher. The north-south through movements at this intersection should be allowed to flow with as little disruption as possible. The suggested improvement is likely to improve the operations at this intersection. However, the projected low volume at this intersection does not warrant the suggested improvement at this time.

3. The minor street lane configuration at unsignalized intersections should be carefully considered. The existing eastbound and westbound lane configuration such as the one at the intersection of Goldstone Road and North Loop Road should be avoided. The exclusive eastbound and westbound left turn lanes and the eastbound and westbound shared through and right turn lanes have the potential to create operational problems. Such configuration results in four lanes of minor street traffic (two exclusive left turn lanes and two through lanes) competing for the same gap in the major street traffic. This creates confusion for the drivers. This confusion may not be evident at lower volumes but can be significant at higher volumes. The intersection of Goldstone Road and North Loop Road is projected to operate at LOS B or better and therefore does not warrant any geometric changes at this time.

However, any future roadway project at this intersection should consider modifying the lane geometry for efficient traffic operations.



5TH STREET (SOUTHBOUND)

FIGURE 3.1
ROADWAY TYPICAL SECTION FOR RECOMMENDED IMPROVEMENT
5TH STREET @ B AVENUE

US ARMY NATIONAL TRAINING CENTER
US ARMY CORP OF ENGINEERS

WEED ARMY COMMUNITY HOSPITAL
FORT IRWIN, CA

...\409662_traffic loyouts_REV.dgn 11/24/2010 1:39:37 PM

Appendix A
FHWA Vehicle Classification Scheme

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FHWA Vehicle Classes with Definitions

1. ***Motorcycles*** -- All two or three-wheeled motorized vehicles. Typical vehicles in this category have saddle type seats and are steered by handlebars rather than steering wheels. This category includes motorcycles, motor scooters, mopeds, motor-powered bicycles, and three-wheel motorcycles. This vehicle type may be reported at the option of the State.

2. ***Passenger Cars*** -- All sedans, coupes, and station wagons manufactured primarily for the purpose of carrying passengers and including those passenger cars pulling recreational or other light trailers.

3. ***Other Two-Axle, Four-Tire Single Unit Vehicles*** -- All two-axle, four-tire, vehicles, other than passenger cars. Included in this classification are pickups, panels, vans, and other vehicles such as campers, motor homes, ambulances, hearses, carryalls, and minibuses. Other two-axle, four-tire single-unit vehicles pulling recreational or other light trailers are included in this classification. *Because automatic vehicle classifiers have difficulty distinguishing class 3 from class 2, these two classes may be combined into class 2.*

4. ***Buses*** -- All vehicles manufactured as traditional passenger-carrying buses with two axles and six tires or three or more axles. This category includes only traditional buses (including school buses) functioning as passenger-carrying vehicles. Modified buses should be considered to be a truck and should be appropriately classified.

   NOTE: In reporting information on trucks the following criteria should be used:

   a. Truck tractor units traveling without a trailer will be considered single-unit trucks.

   b. A truck tractor unit pulling other such units in a "saddle mount" configuration will be considered one single-unit truck and will be defined only by the axles on the pulling unit.

   c. Vehicles are defined by the number of axles in contact with the road. Therefore, "floating" axles are counted only when in the down position.

   d. The term "trailer" includes both semi- and full trailers.

5. ***Two-Axle, Six-Tire, Single-Unit Trucks*** -- All vehicles on a single frame including trucks, camping and recreational vehicles, motor homes, etc., with two axles and dual rear wheels.

6. ***Three-Axle Single-Unit Trucks*** -- All vehicles on a single frame including trucks, camping and recreational vehicles, motor homes, etc., with three axles.

7. ***Four or More Axle Single-Unit Trucks*** -- All trucks on a single frame with four or more axles.

8. ***Four or Fewer Axle Single-Trailer Trucks*** -- All vehicles with four or fewer axles consisting of two units, one of which is a tractor or straight truck power unit.

9. ***Five-Axle Single-Trailer Trucks*** -- All five-axle vehicles consisting of two units, one of which is a tractor or straight truck power unit.

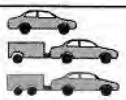
10. ***Six or More Axle Single-Trailer Trucks*** -- All vehicles with six or more axles consisting of two units, one of which is a tractor or straight truck power unit.

11. ***Five or fewer Axle Multi-Trailer Trucks*** -- All vehicles with five or fewer axles consisting of three or more units, one of which is a tractor or straight truck power unit.

12. ***Six-Axle Multi-Trailer Trucks*** -- All six-axle vehicles consisting of three or more units, one of which is a tractor or straight truck power unit.

13. ***Seven or More Axle Multi-Trailer Trucks*** -- All vehicles with seven or more axles consisting of three or more units, one of which is a tractor or straight truck power unit.

FHWA CLASSIFICATION SCHEME "F"

CLASS GROUP		DESCRIPTION	NO. OF AXLES
1		MOTORCYCLES	2
2		ALL CARS CARS W/ 1-AXLE TRAILER CARS W/ 2-AXLE TRAILER	2 3 4
3		PICK-UPS & VANS 1 & 2 AXLE TRAILERS	2, 3, & 4
4		BUSES	2 & 3
5		2-AXLE, SINGLE UNIT	2
6		3-AXLE, SINGLE UNIT	3
7		4-AXLE, SINGLE UNIT	4
8	 	2-AXLE, TRACTOR, 1-AXLE TRAILER (2S1) 2-AXLE, TRACTOR, 2-AXLE TRAILER (2S2) 3-AXLE, TRACTOR, 1-AXLE TRAILER (3S1)	3 4 4
9	 	3-AXLE, TRACTOR, 2-AXLE TRAILER (3S2) 3-AXLE, TRUCK, W/ 2-AXLE TRAILER	5 5
10		TRACTOR W/ SINGLE TRAILER	6 & 7
11		5-AXLE MULTI-TRAILER	5
12		6-AXLE MULTI-TRAILER	6
13	ANY 7 OR MORE AXLE		7 or more
14	NOT USED		
15	UNKNOWN VEHICLE TYPE		

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Appendix B
2010 Traffic Counts

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Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: N Loop Rd & Goldstone Rd

City: Fort Irwin
Project #: 10-6106-001

SUMMARY

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	17	10	0	2	0	0	0	0	0	0	0	0	29
01:00	0	4	7	0	0	0	0	0	0	0	0	0	0	11
02:00	0	7	3	0	0	0	0	0	0	0	0	0	0	10
03:00	0	4	0	0	1	0	0	0	0	0	0	0	0	5
04:00	0	15	3	0	0	0	0	0	0	0	0	0	0	18
05:00	0	124	33	2	10	0	0	0	0	0	0	0	0	169
06:00	0	239	59	2	15	0	0	0	0	0	0	0	0	315
07:00	0	316	72	4	17	0	0	0	0	0	0	0	0	409
08:00	3	322	111	8	22	2	0	4	1	0	0	0	0	473
09:00	2	119	58	3	11	6	0	3	1	0	0	0	0	203
10:00	2	128	57	0	13	6	0	6	0	0	0	0	0	212
11:00	3	295	99	2	23	1	0	2	0	0	0	0	0	425
12:00 PM	5	273	91	2	21	2	0	6	1	0	0	0	0	401
13:00	5	181	64	9	15	6	0	2	0	0	0	0	0	282
14:00	1	200	74	1	20	3	0	2	0	0	0	0	0	301
15:00	0	218	77	8	24	0	0	5	0	0	0	0	0	332
16:00	9	291	69	1	20	0	0	4	1	0	0	0	0	395
17:00	6	340	79	1	19	0	0	4	0	0	0	0	0	449
18:00	5	249	47	0	9	0	0	6	0	0	0	0	0	316
19:00	1	138	37	1	8	0	0	1	0	0	0	0	0	186
20:00	0	94	34	0	4	0	0	0	0	0	0	0	0	132
21:00	0	77	31	0	4	0	0	0	0	0	0	0	0	112
22:00	0	41	15	0	0	0	0	0	0	0	0	0	0	56
23:00	0	14	8	0	0	0	0	0	0	0	0	0	0	22
Totals	**42**	**3706**	**1138**	**44**	**258**	**26**		**45**	**4**					**5263**
% of Totals	1%	70%	22%	1%	5%	0%		1%	0%					100%
	10	1590	512	21	114	15	0	15	2	0	0	0	0	2279
% AM	0%	30%	10%	0%	2%	0%		0%	0%					43%
AM Peak Hour	08:00	08:00	08:00	08:00	11:00	09:00		10:00	08:00					08:00
Volume	3	322	111	8	23	6		6	1					473
	32	2116	626	23	144	11	0	30	2	0	0	0	0	2984
% PM	1%	40%	12%	0%	3%	0%		1%	0%					57%
PM Peak Hour	16:00	17:00	12:00	13:00	15:00	13:00		12:00	12:00					17:00
Volume	9	340	91	9	24	6		6	1					449

Peak Period Totals	AM 7-9			NOON 11-1			PM 4-6			Off Peak Volumes		
	Volume		%	Volume		%	Volume		%	Volume		%
	882	⟷	17%	826	⟷	16%	844	⟷	16%	2711	⟷	52%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: N Loop Rd & Goldstone Rd

City: Fort Irwin
Project #: 10-6106-001n

North Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	5	2	0	0	0	0	0	0	0	0	0	0	7
01:00	0	3	6	0	0	0	0	0	0	0	0	0	0	9
02:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
03:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
04:00	0	6	1	0	0	0	0	0	0	0	0	0	0	7
05:00	0	51	13	2	3	0	0	0	0	0	0	0	0	69
06:00	0	88	22	1	5	0	0	0	0	0	0	0	0	116
07:00	0	86	11	2	2	0	0	0	0	0	0	0	0	101
08:00	1	102	28	3	5	0	0	1	1	0	0	0	0	141
09:00	0	33	11	2	2	1	0	0	1	0	0	0	0	50
10:00	0	34	18	0	0	0	0	0	0	0	0	0	0	52
11:00	2	66	23	1	3	0	0	0	0	0	0	0	0	95
12:00 PM	0	77	23	1	7	1	0	1	1	0	0	0	0	111
13:00	0	46	21	5	4	0	0	0	0	0	0	0	0	76
14:00	0	50	20	1	4	0	0	0	0	0	0	0	0	75
15:00	0	54	18	5	6	0	0	1	0	0	0	0	0	84
16:00	2	58	12	0	4	0	0	0	0	0	0	0	0	76
17:00	0	76	12	1	1	0	0	0	0	0	0	0	0	90
18:00	1	53	13	0	1	0	0	0	0	0	0	0	0	68
19:00	0	30	6	0	3	0	0	0	0	0	0	0	0	39
20:00	0	26	9	0	1	0	0	0	0	0	0	0	0	36
21:00	0	25	9	0	0	0	0	0	0	0	0	0	0	34
22:00	0	14	9	0	0	0	0	0	0	0	0	0	0	23
23:00	0	6	1	0	0	0	0	0	0	0	0	0	0	7
Totals	**6**	**995**	**288**	**24**	**51**	**2**		**3**	**3**					**1372**
% of Totals	0%	73%	21%	2%	4%	0%		0%	0%					100%
	3	480	135	11	20	1	0	1	2	0	0	0	0	653
% AM	0%	35%	10%	1%	1%	0%		0%	0%					48%
AM Peak Hour	11:00	08:00	08:00	08:00	06:00	09:00		08:00	08:00					08:00
Volume	2	102	28	3	5	1		1	1					141
	3	515	153	13	31	1	0	2	1	0	0	0	0	719
% PM	0%	38%	11%	1%	2%	0%		0%	0%					52%
PM Peak Hour	16:00	12:00	12:00	13:00	12:00	12:00		12:00	12:00					12:00
Volume	2	77	23	5	7	1		1	1					111

Directional Peak Periods	AM 7-9		NOON 11-1		PM 4-6		Off Peak Volumes	
All Classes	Volume	%	Volume	%	Volume	%	Volume	%
	242 ⟷	18%	206 ⟷	15%	166 ⟷	12%	758 ⟷	55%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: N Loop Rd & Goldstone Rd

City: Fort Irwin
Project #: 10-6106-001s

South Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	3	2	0	0	0	0	0	0	0	0	0	0	5
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	6	0	0	0	0	0	0	0	0	0	0	0	6
05:00	0	41	11	0	4	0	0	0	0	0	0	0	0	56
06:00	0	40	9	0	5	0	0	0	0	0	0	0	0	54
07:00	0	74	18	0	4	0	0	0	0	0	0	0	0	96
08:00	2	99	39	3	12	0	0	2	0	0	0	0	0	157
09:00	0	28	15	1	4	2	0	2	0	0	0	0	0	52
10:00	0	29	19	0	9	2	0	3	0	0	0	0	0	62
11:00	0	63	24	0	8	0	0	2	0	0	0	0	0	97
12:00 PM	2	83	24	0	10	0	0	5	0	0	0	0	0	124
13:00	1	53	11	2	5	1	0	2	0	0	0	0	0	75
14:00	0	45	11	0	8	1	0	1	0	0	0	0	0	66
15:00	0	53	18	0	7	0	0	3	0	0	0	0	0	81
16:00	4	71	21	0	9	0	0	3	0	0	0	0	0	108
17:00	1	90	23	0	7	0	0	4	0	0	0	0	0	125
18:00	1	60	14	0	4	0	0	5	0	0	0	0	0	84
19:00	1	28	11	0	1	0	0	1	0	0	0	0	0	42
20:00	0	18	5	0	1	0	0	0	0	0	0	0	0	24
21:00	0	11	5	0	3	0	0	0	0	0	0	0	0	19
22:00	0	10	3	0	0	0	0	0	0	0	0	0	0	13
23:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Totals	**12**	**908**	**284**	**6**	**101**	**6**		**33**						**1350**
% of Totals	1%	67%	21%	0%	7%	0%		2%						100%
	2	384	138	4	46	4	0	9	0	0	0	0	0	587
% AM	0%	28%	10%	0%	3%	0%		1%						43%
AM Peak Hour	08:00	08:00	08:00	08:00	08:00	09:00		10:00						08:00
Volume	2	99	39	3	12	2		3						157
	10	524	146	2	55	2	0	24	0	0	0	0	0	763
% PM	1%	39%	11%	0%	4%	0%		2%						57%
PM Peak Hour	16:00	17:00	12:00	13:00	12:00	13:00		12:00						17:00
Volume	4	90	24	2	10	1		5						125

Directional Peak Periods	AM 7-9			NOON 11-1			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	253	⟷	19%	221	⟷	16%	233	⟷	17%	643	⟷	48%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: N Loop Rd & Goldstone Rd

City: Fort Irwin
Project #: 10-6106-001e

East Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	2	4	0	2	0	0	0	0	0	0	0	0	8
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	2	0	0	0	0	0	0	0	0	0	0	2
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	1	2	0	0	0	0	0	0	0	0	0	0	3
05:00	0	5	6	0	2	0	0	0	0	0	0	0	0	13
06:00	0	28	9	0	3	0	0	0	0	0	0	0	0	40
07:00	0	33	14	0	5	0	0	0	0	0	0	0	0	52
08:00	0	19	8	0	4	2	0	1	0	0	0	0	0	34
09:00	0	13	14	0	3	2	0	1	0	0	0	0	0	33
10:00	1	8	4	0	3	2	0	2	0	0	0	0	0	20
11:00	0	17	15	0	4	1	0	0	0	0	0	0	0	37
12:00 PM	2	11	8	0	1	0	0	0	0	0	0	0	0	22
13:00	2	9	2	0	3	2	0	0	0	0	0	0	0	18
14:00	0	11	16	0	3	1	0	0	0	0	0	0	0	31
15:00	0	13	8	0	4	0	0	0	0	0	0	0	0	25
16:00	0	10	9	0	4	0	0	0	0	0	0	0	0	23
17:00	2	12	11	0	2	0	0	0	0	0	0	0	0	27
18:00	0	10	4	0	1	0	0	0	0	0	0	0	0	15
19:00	0	1	2	0	2	0	0	0	0	0	0	0	0	5
20:00	0	4	6	0	0	0	0	0	0	0	0	0	0	10
21:00	0	1	3	0	0	0	0	0	0	0	0	0	0	4
22:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
23:00	0	1	5	0	0	0	0	0	0	0	0	0	0	6
Totals	**7**	**212**	**152**		**46**	**10**		**4**						**431**
% of Totals	2%	49%	35%		11%	2%		1%						100%
	1	127	78	0	26	7	0	4	0	0	0	0	0	243
% AM	0%	29%	18%		6%	2%		1%						56%
AM Peak Hour	10:00	07:00	11:00		07:00	08:00		10:00						07:00
Volume	1	33	15		5	2		2						52
	6	85	74	0	20	3	0	0	0	0	0	0	0	188
% PM	1%	20%	17%		5%	1%								44%
PM Peak Hour	12:00	15:00	14:00		15:00	13:00								14:00
Volume	2	13	16		4	2								31

Directional Peak Periods	AM 7-9		NOON 11-1		PM 4-6		Off Peak Volumes	
All Classes	Volume	%	Volume	%	Volume	%	Volume	%
	86 ⟷	20%	59 ⟷	14%	50 ⟷	12%	236 ⟷	55%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: N Loop Rd & Goldstone Rd

City: Fort Irwin
Project #: 10-6106-001w

West Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	7	2	0	0	0	0	0	0	0	0	0	0	9
01:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
02:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
03:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1
04:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
05:00	0	27	3	0	1	0	0	0	0	0	0	0	0	31
06:00	0	83	19	1	2	0	0	0	0	0	0	0	0	105
07:00	0	123	29	2	6	0	0	0	0	0	0	0	0	160
08:00	0	102	36	2	1	0	0	0	0	0	0	0	0	141
09:00	2	45	18	0	2	1	0	0	0	0	0	0	0	68
10:00	1	57	16	0	1	2	0	1	0	0	0	0	0	78
11:00	1	149	37	1	8	0	0	0	0	0	0	0	0	196
12:00 PM	1	102	36	1	3	1	0	0	0	0	0	0	0	144
13:00	2	73	30	2	3	3	0	0	0	0	0	0	0	113
14:00	1	94	27	0	5	1	0	1	0	0	0	0	0	129
15:00	0	98	33	3	7	0	0	1	0	0	0	0	0	142
16:00	3	152	27	1	3	0	0	1	1	0	0	0	0	188
17:00	3	162	33	0	9	0	0	0	0	0	0	0	0	207
18:00	3	126	16	0	3	0	0	1	0	0	0	0	0	149
19:00	0	79	18	1	2	0	0	0	0	0	0	0	0	100
20:00	0	46	14	0	2	0	0	0	0	0	0	0	0	62
21:00	0	40	14	0	1	0	0	0	0	0	0	0	0	55
22:00	0	15	3	0	0	0	0	0	0	0	0	0	0	18
23:00	0	5	2	0	0	0	0	0	0	0	0	0	0	7
Totals	**17**	**1591**	**414**	**14**	**60**	**8**		**5**	**1**					**2110**
% of Totals	1%	75%	20%	1%	3%	0%		0%	0%					100%
	4	599	161	6	22	3	0	1	0	0	0	0	0	796
% AM	0%	28%	8%	0%	1%	0%		0%						38%
AM Peak Hour	09:00	11:00	11:00	07:00	11:00	10:00		10:00						11:00
Volume	2	149	37	2	8	2		1						196
	13	992	253	8	38	5	0	4	1	0	0	0	0	1314
% PM	1%	47%	12%	0%	2%	0%		0%	0%					62%
PM Peak Hour	16:00	17:00	12:00	15:00	17:00	13:00		14:00	16:00					17:00
Volume	3	162	36	3	9	3		1	1					207

Directional Peak Periods	AM 7-9			NOON 11-1			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	301	⟷	14%	340	⟷	16%	395	⟷	19%	1074	⟷	51%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: N Loop Rd & 5th St

City: Fort Irwin
Project #: 10-6106-002

SUMMARY

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	7	1	0	0	0	0	0	0	0	0	0	0	8
01:00	1	1	0	0	0	0	0	0	0	0	0	0	0	2
02:00	0	3	2	0	0	0	0	0	0	0	0	0	0	5
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	8	3	0	0	0	0	0	0	0	0	0	0	11
05:00	0	157	39	0	10	0	0	0	0	0	0	0	0	206
06:00	0	212	39	1	9	0	0	0	0	0	0	0	0	261
07:00	1	288	72	4	23	0	0	0	0	0	0	0	0	388
08:00	3	325	86	2	24	0	0	2	1	0	0	0	0	443
09:00	1	106	40	0	20	6	0	2	1	0	0	0	0	176
10:00	0	63	41	0	21	5	0	7	0	0	0	0	0	137
11:00	3	235	93	2	37	0	0	5	0	0	0	0	0	375
12:00 PM	3	261	89	2	26	1	0	6	0	0	0	0	0	388
13:00	5	123	30	7	7	5	0	4	0	0	0	0	0	181
14:00	1	117	46	0	19	3	0	2	0	0	0	0	0	188
15:00	4	107	41	0	9	1	0	2	0	0	0	0	0	164
16:00	5	163	55	0	29	0	0	5	0	0	0	0	0	257
17:00	2	190	49	0	27	0	0	6	0	0	0	0	0	274
18:00	5	125	39	0	10	0	0	12	0	0	0	0	0	191
19:00	1	62	20	0	7	0	0	2	0	0	0	0	0	92
20:00	0	67	16	0	8	0	0	0	0	0	0	0	0	91
21:00	0	33	6	0	5	0	0	0	0	0	0	0	0	44
22:00	0	26	5	0	0	0	0	0	0	0	0	0	0	31
23:00	0	14	2	0	1	0	0	0	0	0	0	0	0	17
Totals	**35**	**2694**	**814**	**18**	**292**	**21**		**55**	**2**					**3931**
% of Totals	1%	69%	21%	0%	7%	1%		1%	0%					100%
	9	1406	416	9	144	11	0	16	2	0	0	0	0	2013
% AM	0%	36%	11%	0%	4%	0%		0%	0%					51%
AM Peak Hour	08:00	08:00	11:00	07:00	11:00	09:00		10:00	08:00					08:00
Volume	3	325	93	4	37	6		7	1					443
	26	1288	398	9	148	10	0	39	0	0	0	0	0	1918
% PM	1%	33%	10%	0%	4%	0%		1%						49%
PM Peak Hour	13:00	12:00	12:00	13:00	16:00	13:00		18:00						12:00
Volume	5	261	89	7	29	5		12						388

Peak Period Totals	AM 7-9			NOON 11-1			PM 4-6			Off Peak Volumes		
	Volume		%	Volume		%	Volume		%	Volume		%
	831	⟷	21%	763	⟷	19%	531	⟷	14%	1806	⟷	46%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: N Loop Rd & 5th St

City: Fort Irwin
Project #: 10-6106-002n

North Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	2
01:00	1	1	0	0	0	0	0	0	0	0	0	0	0	2
02:00	0	2	2	0	0	0	0	0	0	0	0	0	0	4
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
05:00	0	20	5	0	3	0	0	0	0	0	0	0	0	28
06:00	0	36	11	0	2	0	0	0	0	0	0	0	0	49
07:00	0	121	35	0	18	0	0	0	0	0	0	0	0	174
08:00	0	83	25	1	9	0	0	0	0	0	0	0	0	118
09:00	0	35	13	0	11	1	0	0	0	0	0	0	0	60
10:00	0	26	18	0	13	0	0	0	0	0	0	0	0	57
11:00	2	122	47	0	23	0	0	0	0	0	0	0	0	194
12:00 PM	0	74	27	0	12	0	0	0	0	0	0	0	0	113
13:00	2	44	14	1	3	0	0	0	0	0	0	0	0	64
14:00	0	46	21	0	14	1	0	0	0	0	0	0	0	82
15:00	2	43	14	0	5	0	0	0	0	0	0	0	0	64
16:00	2	79	29	0	21	0	0	0	0	0	0	0	0	131
17:00	1	88	28	0	20	0	0	0	0	0	0	0	0	137
18:00	2	60	20	0	7	0	0	0	0	0	0	0	0	89
19:00	0	26	8	0	7	0	0	0	0	0	0	0	0	41
20:00	0	30	9	0	5	0	0	0	0	0	0	0	0	44
21:00	0	19	0	0	4	0	0	0	0	0	0	0	0	23
22:00	0	13	3	0	0	0	0	0	0	0	0	0	0	16
23:00	0	4	1	0	1	0	0	0	0	0	0	0	0	6
Totals	**12**	**975**	**330**	**2**	**178**	**2**								**1499**
% of Totals	1%	65%	22%	0%	12%	0%								100%
	3	449	156	1	79	1	0	0	0	0	0	0	0	689
% AM	0%	30%	10%	0%	5%	0%								46%
AM Peak Hour	11:00	11:00	11:00	08:00	11:00	09:00								11:00
Volume	2	122	47	1	23	1								194
	9	526	174	1	99	1	0	0	0	0	0	0	0	810
% PM	1%	35%	12%	0%	7%	0%								54%
PM Peak Hour	13:00	17:00	16:00	13:00	16:00	14:00								17:00
Volume	2	88	29	1	21	1								137

Directional Peak Periods	AM 7-9			NOON 11-1			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	292	⟷	19%	307	⟷	20%	268	⟷	18%	632	⟷	42%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: N Loop Rd & 5th St

City: Fort Irwin
Project #: 10-6106-002e

East Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	4	0	0	0	0	0	0	0	0	0	0	0	4
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	5	2	0	0	0	0	0	0	0	0	0	0	7
05:00	0	108	26	0	4	0	0	0	0	0	0	0	0	138
06:00	0	123	15	1	1	0	0	0	0	0	0	0	0	140
07:00	1	83	15	2	2	0	0	0	0	0	0	0	0	103
08:00	3	196	44	0	7	0	0	0	1	0	0	0	0	251
09:00	1	47	16	0	2	4	0	0	1	0	0	0	0	71
10:00	0	22	8	0	0	3	0	3	0	0	0	0	0	36
11:00	0	50	15	1	4	0	0	2	0	0	0	0	0	72
12:00 PM	3	149	40	1	7	1	0	4	0	0	0	0	0	205
13:00	2	56	8	5	1	4	0	2	0	0	0	0	0	78
14:00	1	45	14	0	1	2	0	0	0	0	0	0	0	63
15:00	1	39	12	0	2	0	0	1	0	0	0	0	0	55
16:00	1	48	12	0	2	0	0	3	0	0	0	0	0	66
17:00	0	50	6	0	1	0	0	2	0	0	0	0	0	59
18:00	2	35	6	0	0	0	0	7	0	0	0	0	0	50
19:00	0	22	9	0	0	0	0	1	0	0	0	0	0	32
20:00	0	24	3	0	1	0	0	0	0	0	0	0	0	28
21:00	0	11	4	0	0	0	0	0	0	0	0	0	0	15
22:00	0	7	1	0	0	0	0	0	0	0	0	0	0	8
23:00	0	7	1	0	0	0	0	0	0	0	0	0	0	8
Totals	**15**	**1133**	**257**	**10**	**35**	**14**		**25**	**2**					**1491**
% of Totals	1%	76%	17%	1%	2%	1%		2%	0%					100%
	5	640	141	4	20	7	0	5	2	0	0	0	0	824
% AM	0%	43%	9%	0%	1%	0%		0%	0%					55%
AM Peak Hour	08:00	08:00	08:00	07:00	08:00	09:00		10:00	08:00					08:00
Volume	3	196	44	2	7	4		3	1					251
	10	493	116	6	15	7	0	20	0	0	0	0	0	667
% PM	1%	33%	8%	0%	1%	0%		1%						45%
PM Peak Hour	12:00	12:00	12:00	13:00	12:00	13:00		18:00						12:00
Volume	3	149	40	5	7	4		7						205

Directional Peak Periods	AM 7-9			NOON 11-1			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	354	⟷	24%	277	⟷	19%	125	⟷	8%	735	⟷	49%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: N Loop Rd & 5th St

City: Fort Irwin
Project #: 10-6106-002w

West Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	1	1	0	0	0	0	0	0	0	0	0	0	2
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
05:00	0	29	8	0	3	0	0	0	0	0	0	0	0	40
06:00	0	53	13	0	6	0	0	0	0	0	0	0	0	72
07:00	0	84	22	2	3	0	0	0	0	0	0	0	0	111
08:00	0	46	17	1	8	0	0	2	0	0	0	0	0	74
09:00	0	24	11	0	7	1	0	2	0	0	0	0	0	45
10:00	0	15	15	0	8	2	0	4	0	0	0	0	0	44
11:00	1	63	31	1	10	0	0	3	0	0	0	0	0	109
12:00 PM	0	38	22	1	7	0	0	2	0	0	0	0	0	70
13:00	1	23	8	1	3	1	0	2	0	0	0	0	0	39
14:00	0	26	11	0	4	0	0	2	0	0	0	0	0	43
15:00	1	25	15	0	2	1	0	1	0	0	0	0	0	45
16:00	2	36	14	0	6	0	0	2	0	0	0	0	0	60
17:00	1	52	15	0	6	0	0	4	0	0	0	0	0	78
18:00	1	30	13	0	3	0	0	5	0	0	0	0	0	52
19:00	1	14	3	0	0	0	0	1	0	0	0	0	0	19
20:00	0	13	4	0	2	0	0	0	0	0	0	0	0	19
21:00	0	3	2	0	1	0	0	0	0	0	0	0	0	6
22:00	0	6	1	0	0	0	0	0	0	0	0	0	0	7
23:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
Totals	**8**	**586**	**227**	**6**	**79**	**5**		**30**						**941**
% of Totals	1%	62%	24%	1%	8%	1%		3%						100%
	1	317	119	4	45	3	0	11	0	0	0	0	0	500
% AM	0%	34%	13%	0%	5%	0%		1%						53%
AM Peak Hour	11:00	07:00	11:00	07:00	11:00	10:00		10:00						07:00
Volume	1	84	31	2	10	2		4						111
	7	269	108	2	34	2	0	19	0	0	0	0	0	441
% PM	1%	29%	11%	0%	4%	0%		2%						47%
PM Peak Hour	16:00	17:00	12:00	12:00	12:00	13:00		18:00						17:00
Volume	2	52	22	1	7	1		5						78

Directional Peak Periods	AM 7-9			NOON 11-1			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	185	⟷	20%	179	⟷	19%	138	⟷	15%	439	⟷	47%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: 5th St & Inner Loop

City: Fort Irwin
Project #: 10-6106-003

SUMMARY

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	15	5	0	1	0	0	0	0	0	0	0	0	21
01:00	0	9	0	0	0	0	0	0	0	0	0	0	0	9
02:00	0	5	1	0	0	0	0	0	0	0	0	0	0	6
03:00	0	13	1	0	3	0	0	0	0	0	0	0	0	17
04:00	0	25	6	0	1	0	0	0	0	0	0	0	0	32
05:00	0	128	32	0	12	0	0	1	0	0	0	0	0	173
06:00	0	210	53	1	11	0	0	1	0	0	0	0	0	276
07:00	1	262	58	0	11	0	0	1	0	0	0	0	0	333
08:00	2	307	63	0	23	0	0	0	0	0	0	0	0	395
09:00	2	201	40	1	11	0	0	0	0	0	0	0	0	255
10:00	0	155	57	1	18	1	0	0	0	0	0	0	0	232
11:00	0	335	67	1	16	2	0	1	0	0	0	0	0	422
12:00 PM	3	301	62	0	18	0	0	0	0	0	0	0	0	384
13:00	4	209	49	0	13	1	0	0	0	0	0	0	0	276
14:00	1	153	49	1	5	0	0	0	0	0	0	0	0	209
15:00	0	170	38	0	14	0	0	0	0	0	0	0	0	222
16:00	1	238	46	0	9	0	0	0	0	0	0	0	0	294
17:00	6	230	70	0	15	1	0	0	0	0	0	0	0	322
18:00	1	168	41	0	7	1	0	0	0	0	0	0	0	218
19:00	0	116	22	0	6	0	0	0	0	0	0	0	0	144
20:00	1	80	7	0	4	0	0	0	0	0	0	0	0	92
21:00	1	54	11	0	2	0	0	0	0	0	0	0	0	68
22:00	0	27	0	0	1	0	0	0	0	0	0	0	0	28
23:00	0	17	3	0	1	0	0	0	0	0	0	0	0	21
Totals	**23**	**3428**	**781**	**5**	**202**	**6**		**4**						**4449**
% of Totals	1%	77%	18%	0%	5%	0%		0%						100%
	5	1665	383	4	107	3	0	4	0	0	0	0	0	2171
% AM	0%	37%	9%	0%	2%	0%		0%						49%
AM Peak Hour	08:00	11:00	11:00	06:00	08:00	11:00		05:00						11:00
Volume	2	335	67	1	23	2		1						422
	18	1763	398	1	95	3	0	0	0	0	0	0	0	2278
% PM	0%	40%	9%	0%	2%	0%								51%
PM Peak Hour	17:00	12:00	17:00	14:00	12:00	13:00								12:00
Volume	6	301	70	1	18	1								384

Peak Period Totals	AM 7-9			NOON 12-2			PM 4-6			Off Peak Volumes		
	Volume		%	Volume		%	Volume		%	Volume		%
	728	⟷	16%	660	⟷	15%	616	⟷	14%	2445	⟷	55%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: 5th St & Inner Loop

City: Fort Irwin
Project #: 10-6106-003n

North Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	5	2	0	0	0	0	0	0	0	0	0	0	7
01:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
02:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
03:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
04:00	0	4	1	0	0	0	0	0	0	0	0	0	0	5
05:00	0	23	4	0	2	0	0	1	0	0	0	0	0	30
06:00	0	26	11	0	2	0	0	0	0	0	0	0	0	39
07:00	1	127	29	0	3	0	0	1	0	0	0	0	0	161
08:00	0	60	12	0	2	0	0	0	0	0	0	0	0	74
09:00	1	79	14	0	1	0	0	0	0	0	0	0	0	95
10:00	0	66	25	0	6	0	0	0	0	0	0	0	0	97
11:00	0	197	35	1	7	1	0	1	0	0	0	0	0	242
12:00 PM	3	93	20	0	3	0	0	0	0	0	0	0	0	119
13:00	2	67	15	0	2	1	0	0	0	0	0	0	0	87
14:00	0	64	19	0	1	0	0	0	0	0	0	0	0	84
15:00	0	77	18	0	4	0	0	0	0	0	0	0	0	99
16:00	1	130	27	0	2	0	0	0	0	0	0	0	0	160
17:00	3	125	40	0	5	0	0	0	0	0	0	0	0	173
18:00	0	85	24	0	3	1	0	0	0	0	0	0	0	113
19:00	0	61	9	0	1	0	0	0	0	0	0	0	0	71
20:00	1	42	4	0	1	0	0	0	0	0	0	0	0	48
21:00	1	24	3	0	1	0	0	0	0	0	0	0	0	29
22:00	0	13	0	0	0	0	0	0	0	0	0	0	0	13
23:00	0	8	2	0	0	0	0	0	0	0	0	0	0	10
Totals	**13**	**1383**	**314**	**1**	**46**	**3**		**3**						**1763**
% of Totals	1%	78%	18%	0%	3%	0%		0%						100%
	2	594	133	1	23	1	0	3	0	0	0	0	0	757
% AM	0%	34%	8%	0%	1%	0%		0%						43%
AM Peak Hour	07:00	11:00	11:00	11:00	11:00	11:00		05:00						11:00
Volume	1	197	35	1	7	1		1						242
	11	789	181	0	23	2	0	0	0	0	0	0	0	1006
% PM	1%	45%	10%		1%	0%								57%
PM Peak Hour	12:00	16:00	17:00		17:00	13:00								17:00
Volume	3	130	40		5	1								173

Directional Peak Periods	AM 7-9			NOON 12-2			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	235	⟷	13%	206	⟷	12%	333	⟷	19%	989	⟷	56%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: 5th St & Inner Loop

City: Fort Irwin
Project #: 10-6106-003s

South Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	4	1	0	1	0	0	0	0	0	0	0	0	6
01:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
02:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
03:00	0	10	1	0	1	0	0	0	0	0	0	0	0	12
04:00	0	18	4	0	1	0	0	0	0	0	0	0	0	23
05:00	0	90	26	0	10	0	0	0	0	0	0	0	0	126
06:00	0	153	35	1	7	0	0	1	0	0	0	0	0	197
07:00	0	85	16	0	6	0	0	0	0	0	0	0	0	107
08:00	2	184	36	0	18	0	0	0	0	0	0	0	0	240
09:00	1	75	16	0	9	0	0	0	0	0	0	0	0	101
10:00	0	42	11	0	10	1	0	0	0	0	0	0	0	64
11:00	0	79	13	0	5	1	0	0	0	0	0	0	0	98
12:00 PM	0	156	31	0	12	0	0	0	0	0	0	0	0	199
13:00	2	95	26	0	8	0	0	0	0	0	0	0	0	131
14:00	0	54	13	1	4	0	0	0	0	0	0	0	0	72
15:00	0	55	13	0	7	0	0	0	0	0	0	0	0	75
16:00	0	58	13	0	4	0	0	0	0	0	0	0	0	75
17:00	3	76	17	0	9	1	0	0	0	0	0	0	0	106
18:00	0	49	8	0	2	0	0	0	0	0	0	0	0	59
19:00	0	29	7	0	3	0	0	0	0	0	0	0	0	39
20:00	0	24	1	0	2	0	0	0	0	0	0	0	0	27
21:00	0	18	0	0	1	0	0	0	0	0	0	0	0	19
22:00	0	6	0	0	0	0	0	0	0	0	0	0	0	6
23:00	0	7	1	0	1	0	0	0	0	0	0	0	0	9
Totals	**8**	**1372**	**289**	**2**	**121**	**3**		**1**						**1796**
% of Totals	0%	76%	16%	0%	7%	0%		0%						100%
	3	745	159	1	68	2	0	1	0	0	0	0	0	979
% AM	0%	41%	9%	0%	4%	0%		0%						55%
AM Peak Hour	08:00	08:00	08:00	06:00	08:00	10:00		06:00						08:00
Volume	2	184	36	1	18	1		1						240
	5	627	130	1	53	1	0	0	0	0	0	0	0	817
% PM	0%	35%	7%	0%	3%	0%								45%
PM Peak Hour	17:00	12:00	12:00	14:00	12:00	17:00								12:00
Volume	3	156	31	1	12	1								199

Directional Peak Periods	AM 7-9			NOON 12-2			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	347	⟷	19%	330	⟷	18%	181	⟷	10%	938	⟷	52%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: 5th St & Inner Loop

City: Fort Irwin
Project #: 10-6106-003e

East Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	6	2	0	0	0	0	0	0	0	0	0	0	8
01:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
02:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
03:00	0	1	0	0	2	0	0	0	0	0	0	0	0	3
04:00	0	3	1	0	0	0	0	0	0	0	0	0	0	4
05:00	0	15	2	0	0	0	0	0	0	0	0	0	0	17
06:00	0	31	7	0	2	0	0	0	0	0	0	0	0	40
07:00	0	50	13	0	2	0	0	0	0	0	0	0	0	65
08:00	0	63	15	0	3	0	0	0	0	0	0	0	0	81
09:00	0	47	10	1	1	0	0	0	0	0	0	0	0	59
10:00	0	47	21	1	2	0	0	0	0	0	0	0	0	71
11:00	0	59	19	0	4	0	0	0	0	0	0	0	0	82
12:00 PM	0	52	11	0	3	0	0	0	0	0	0	0	0	66
13:00	0	47	8	0	3	0	0	0	0	0	0	0	0	58
14:00	1	35	17	0	0	0	0	0	0	0	0	0	0	53
15:00	0	38	7	0	3	0	0	0	0	0	0	0	0	48
16:00	0	50	6	0	3	0	0	0	0	0	0	0	0	59
17:00	0	29	13	0	1	0	0	0	0	0	0	0	0	43
18:00	1	34	9	0	2	0	0	0	0	0	0	0	0	46
19:00	0	26	6	0	2	0	0	0	0	0	0	0	0	34
20:00	0	14	2	0	1	0	0	0	0	0	0	0	0	17
21:00	0	12	8	0	0	0	0	0	0	0	0	0	0	20
22:00	0	8	0	0	1	0	0	0	0	0	0	0	0	9
23:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Totals	**2**	**673**	**178**	**2**	**35**									**890**
% of Totals	0%	76%	20%	0%	4%									100%
	0	326	91	2	16	0	0	0	0	0	0	0	0	435
% AM		37%	10%	0%	2%									49%
AM Peak Hour		08:00	10:00	09:00	11:00									11:00
Volume		63	21	1	4									82
	2	347	87	0	19	0	0	0	0	0	0	0	0	455
% PM	0%	39%	10%		2%									51%
PM Peak Hour	14:00	12:00	14:00		12:00									12:00
Volume	1	52	17		3									66

Directional Peak Periods	AM 7-9			NOON 12-2			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	146	⟷	16%	124	⟷	14%	102	⟷	11%	518	⟷	58%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: 5th & B Ave

City: Fort Irwin
Project #: 10-6106-004

SUMMARY

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	12	5	0	0	0	0	0	0	0	0	0	0	17
01:00	0	7	3	0	0	0	0	0	0	0	0	0	0	10
02:00	0	8	4	0	0	0	0	0	0	0	0	0	0	12
03:00	0	8	1	0	0	0	0	0	0	0	0	0	0	9
04:00	1	24	4	0	1	0	0	0	0	0	0	0	0	30
05:00	0	242	77	4	17	0	0	0	1	0	0	0	0	341
06:00	0	171	36	11	4	0	0	7	0	0	0	0	0	229
07:00	1	197	44	1	9	0	0	2	0	0	0	0	0	254
08:00	11	404	104	3	29	1	0	10	0	0	0	0	0	562
09:00	7	354	101	0	29	4	0	2	1	0	0	0	0	498
10:00	9	331	81	0	26	0	0	1	0	0	0	0	0	448
11:00	2	436	115	5	35	3	0	3	3	0	0	0	0	602
12:00 PM	5	376	97	6	32	1	0	7	0	0	0	0	0	524
13:00	7	364	87	2	22	0	0	4	0	0	0	0	0	486
14:00	6	357	69	0	26	2	0	6	0	0	0	0	0	466
15:00	11	303	78	0	30	0	0	3	0	0	0	0	0	425
16:00	9	395	108	0	28	0	0	2	1	0	0	0	0	543
17:00	6	408	99	2	19	0	0	1	0	0	0	0	0	535
18:00	1	199	40	0	17	0	0	0	0	0	0	0	0	257
19:00	0	102	29	0	8	0	0	0	0	0	0	0	0	139
20:00	0	87	12	0	3	0	0	0	0	0	0	0	0	102
21:00	1	59	10	0	6	0	0	0	0	0	0	0	0	76
22:00	0	38	3	0	1	0	0	0	0	0	0	0	0	42
23:00	0	21	5	0	0	0	0	0	0	0	0	0	0	26
Totals	**77**	**4903**	**1212**	**34**	**342**	**11**		**48**	**6**					**6633**
% of Totals	1%	74%	18%	1%	5%	0%		1%	0%					100%
	31	2194	575	24	150	8	0	25	5	0	0	0	0	3012
% AM	0%	33%	9%	0%	2%	0%		0%	0%					45%
AM Peak Hour	08:00	11:00	11:00	06:00	11:00	09:00		08:00	11:00					11:00
Volume	11	436	115	11	35	4		10	3					602
	46	2709	637	10	192	3	0	23	1	0	0	0	0	3621
% PM	1%	41%	10%	0%	3%	0%		0%	0%					55%
PM Peak Hour	15:00	17:00	16:00	12:00	12:00	14:00		12:00	16:00					16:00
Volume	11	408	108	6	32	2		7	1					543

Peak Period Totals	AM 8-10			NOON 11-1			PM 4-6			Off Peak Volumes		
	Volume		%	Volume		%	Volume		%	Volume		%
	1060	⟷	16%	1126	⟷	17%	1078	⟷	16%	3369	⟷	51%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: 5th & B Ave

City: Fort Irwin
Project #: 10-6106-004n

North Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
03:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
04:00	0	5	0	0	1	0	0	0	0	0	0	0	0	6
05:00	0	31	6	0	1	0	0	0	0	0	0	0	0	38
06:00	0	33	8	0	1	0	0	0	0	0	0	0	0	42
07:00	0	44	15	0	2	0	0	2	0	0	0	0	0	63
08:00	1	73	21	0	10	0	0	1	0	0	0	0	0	106
09:00	3	84	27	0	11	1	0	0	0	0	0	0	0	126
10:00	0	89	27	0	10	0	0	0	0	0	0	0	0	126
11:00	2	133	35	0	10	0	0	1	1	0	0	0	0	182
12:00 PM	1	81	27	0	9	0	0	0	0	0	0	0	0	118
13:00	3	88	19	0	5	0	0	0	0	0	0	0	0	115
14:00	1	79	18	0	10	1	0	3	0	0	0	0	0	112
15:00	7	76	29	0	11	0	0	2	0	0	0	0	0	125
16:00	0	125	40	0	12	0	0	1	0	0	0	0	0	178
17:00	3	124	36	1	5	0	0	1	0	0	0	0	0	170
18:00	0	49	11	0	8	0	0	0	0	0	0	0	0	68
19:00	0	26	8	0	3	0	0	0	0	0	0	0	0	37
20:00	0	22	2	0	1	0	0	0	0	0	0	0	0	25
21:00	1	17	1	0	4	0	0	0	0	0	0	0	0	23
22:00	0	5	0	0	0	0	0	0	0	0	0	0	0	5
23:00	0	0	3	0	0	0	0	0	0	0	0	0	0	3
Totals	**22**	**1188**	**336**	**1**	**114**	**2**		**11**	**1**					**1675**
% of Totals	1%	71%	20%	0%	7%	0%		1%	0%					100%
	6	496	142	0	46	1	0	4	1	0	0	0	0	696
% AM	0%	30%	8%		3%	0%		0%	0%					42%
AM Peak Hour	09:00	11:00	11:00		09:00	09:00		07:00	11:00					11:00
Volume	3	133	35		11	1		2	1					182
	16	692	194	1	68	1	0	7	0	0	0	0	0	979
% PM	1%	41%	12%	0%	4%	0%		0%						58%
PM Peak Hour	15:00	16:00	16:00	17:00	16:00	14:00		14:00						16:00
Volume	7	125	40	1	12	1		3						178

Directional Peak Periods	AM 8-10			NOON 11-1			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	232	⟷	14%	300	⟷	18%	348	⟷	21%	795	⟷	47%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: 5th & B Ave

City: Fort Irwin
Project #: 10-6106-004s

South Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	5	2	0	0	0	0	0	0	0	0	0	0	7
01:00	0	5	1	0	0	0	0	0	0	0	0	0	0	6
02:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	1	11	3	0	0	0	0	0	0	0	0	0	0	15
05:00	0	165	48	3	15	0	0	0	1	0	0	0	0	232
06:00	0	72	13	10	1	0	0	7	0	0	0	0	0	103
07:00	0	37	10	0	3	0	0	0	0	0	0	0	0	50
08:00	3	98	29	3	10	1	0	6	0	0	0	0	0	150
09:00	1	92	30	0	11	1	0	2	0	0	0	0	0	137
10:00	3	80	19	0	4	0	0	0	0	0	0	0	0	106
11:00	0	95	26	0	12	1	0	0	0	0	0	0	0	134
12:00 PM	2	84	23	6	8	1	0	7	0	0	0	0	0	131
13:00	3	87	15	2	7	0	0	3	0	0	0	0	0	117
14:00	1	102	20	0	4	1	0	2	0	0	0	0	0	130
15:00	3	72	15	0	7	0	0	1	0	0	0	0	0	98
16:00	4	81	13	0	3	0	0	0	0	0	0	0	0	101
17:00	0	82	18	0	8	0	0	0	0	0	0	0	0	108
18:00	1	49	8	0	3	0	0	0	0	0	0	0	0	61
19:00	0	28	9	0	3	0	0	0	0	0	0	0	0	40
20:00	0	31	3	0	1	0	0	0	0	0	0	0	0	35
21:00	0	18	3	0	1	0	0	0	0	0	0	0	0	22
22:00	0	17	1	0	1	0	0	0	0	0	0	0	0	19
23:00	0	8	1	0	0	0	0	0	0	0	0	0	0	9
Totals	**22**	**1322**	**310**	**24**	**102**	**5**		**28**	**1**					**1814**
% of Totals	1%	73%	17%	1%	6%	0%		2%	0%					100%
	8	663	181	16	56	3	0	15	1	0	0	0	0	943
% AM	0%	37%	10%	1%	3%	0%		1%	0%					52%
AM Peak Hour	08:00	05:00	05:00	06:00	05:00	08:00		06:00	05:00					05:00
Volume	3	165	48	10	15	1		7	1					232
	14	659	129	8	46	2	0	13	0	0	0	0	0	871
% PM	1%	36%	7%	0%	3%	0%		1%						48%
PM Peak Hour	16:00	14:00	12:00	12:00	12:00	12:00		12:00						12:00
Volume	4	102	23	6	8	1		7						131

Directional Peak Periods	AM 8-10			NOON 11-1			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	287	⟷	16%	265	⟷	15%	209	⟷	12%	1053	⟷	58%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: 5th & B Ave

City: Fort Irwin
Project #: 10-6106-004e

East Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	3	2	0	0	0	0	0	0	0	0	0	0	5
01:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	2	0	0	0	0	0	0	0	0	0	0	2
03:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
04:00	0	5	1	0	0	0	0	0	0	0	0	0	0	6
05:00	0	22	11	1	0	0	0	0	0	0	0	0	0	34
06:00	0	35	8	0	0	0	0	0	0	0	0	0	0	43
07:00	0	53	8	0	2	0	0	0	0	0	0	0	0	63
08:00	3	113	20	0	3	0	0	3	0	0	0	0	0	142
09:00	1	76	17	0	1	0	0	0	1	0	0	0	0	96
10:00	2	71	17	0	3	0	0	0	0	0	0	0	0	93
11:00	0	74	22	0	5	1	0	0	0	0	0	0	0	102
12:00 PM	2	103	21	0	6	0	0	0	0	0	0	0	0	132
13:00	0	66	24	0	5	0	0	0	0	0	0	0	0	95
14:00	2	57	12	0	3	0	0	1	0	0	0	0	0	75
15:00	1	59	17	0	6	0	0	0	0	0	0	0	0	83
16:00	2	68	22	0	3	0	0	1	0	0	0	0	0	96
17:00	0	52	16	0	1	0	0	0	0	0	0	0	0	69
18:00	0	37	9	0	1	0	0	0	0	0	0	0	0	47
19:00	0	16	5	0	0	0	0	0	0	0	0	0	0	21
20:00	0	14	4	0	0	0	0	0	0	0	0	0	0	18
21:00	0	10	4	0	1	0	0	0	0	0	0	0	0	15
22:00	0	9	1	0	0	0	0	0	0	0	0	0	0	10
23:00	0	7	0	0	0	0	0	0	0	0	0	0	0	7
Totals	**13**	**952**	**244**	**1**	**40**	**1**		**5**	**1**					**1257**
% of Totals	1%	76%	19%	0%	3%	0%		0%	0%					100%
	6	454	109	1	14	1	0	3	1	0	0	0	0	589
% AM	0%	36%	9%	0%	1%	0%		0%	0%					47%
AM Peak Hour	08:00	08:00	11:00	05:00	11:00	11:00		08:00	09:00					08:00
Volume	3	113	22	1	5	1		3	1					142
	7	498	135	0	26	0	0	2	0	0	0	0	0	668
% PM	1%	40%	11%		2%			0%						53%
PM Peak Hour	12:00	12:00	13:00		12:00			14:00						12:00
Volume	2	103	24		6			1						132

Directional Peak Periods	AM 8-10			NOON 11-1			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	238	⟷	19%	234	⟷	19%	165	⟷	13%	620	⟷	49%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: 5th & B Ave

City: Fort Irwin
Project #: 10-6106-004w

West Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	4	0	0	0	0	0	0	0	0	0	0	0	4
01:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
02:00	0	4	1	0	0	0	0	0	0	0	0	0	0	5
03:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
04:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
05:00	0	24	12	0	1	0	0	0	0	0	0	0	0	37
06:00	0	31	7	1	2	0	0	0	0	0	0	0	0	41
07:00	1	63	11	1	2	0	0	0	0	0	0	0	0	78
08:00	4	120	34	0	6	0	0	0	0	0	0	0	0	164
09:00	2	102	27	0	6	2	0	0	0	0	0	0	0	139
10:00	4	91	18	0	9	0	0	1	0	0	0	0	0	123
11:00	0	134	32	5	8	1	0	2	2	0	0	0	0	184
12:00 PM	0	108	26	0	9	0	0	0	0	0	0	0	0	143
13:00	1	123	29	0	5	0	0	1	0	0	0	0	0	159
14:00	2	119	19	0	9	0	0	0	0	0	0	0	0	149
15:00	0	96	17	0	6	0	0	0	0	0	0	0	0	119
16:00	3	121	33	0	10	0	0	0	1	0	0	0	0	168
17:00	3	150	29	1	5	0	0	0	0	0	0	0	0	188
18:00	0	64	12	0	5	0	0	0	0	0	0	0	0	81
19:00	0	32	7	0	2	0	0	0	0	0	0	0	0	41
20:00	0	20	3	0	1	0	0	0	0	0	0	0	0	24
21:00	0	14	2	0	0	0	0	0	0	0	0	0	0	16
22:00	0	7	1	0	0	0	0	0	0	0	0	0	0	8
23:00	0	6	1	0	0	0	0	0	0	0	0	0	0	7
Totals	**20**	**1441**	**322**	**8**	**86**	**3**		**4**	**3**					**1887**
% of Totals	1%	76%	17%	0%	5%	0%		0%	0%					100%
	11	581	143	7	34	3	0	3	2	0	0	0	0	784
% AM	1%	31%	8%	0%	2%	0%		0%	0%					42%
AM Peak Hour	08:00	11:00	08:00	11:00	10:00	09:00		11:00	11:00					11:00
Volume	4	134	34	5	9	2		2	2					184
	9	860	179	1	52	0	0	1	1	0	0	0	0	1103
% PM	0%	46%	9%	0%	3%			0%	0%					58%
PM Peak Hour	16:00	17:00	16:00	17:00	16:00			13:00	16:00					17:00
Volume	3	150	33	1	10			1	1					188

Directional Peak Periods	AM 8-10			NOON 11-1			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	303	⟷	16%	327	⟷	17%	356	⟷	19%	901	⟷	48%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: 5th St & Ft Irwin Rd

City: Fort Irwin
Project #: 10-6106-005

SUMMARY

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	13	7	0	0	0	0	0	0	0	0	0	0	20
01:00	0	8	0	0	0	0	0	0	0	0	0	0	0	8
02:00	0	4	1	0	0	0	0	0	0	0	0	0	0	5
03:00	0	7	3	0	0	0	0	0	0	0	0	0	0	10
04:00	0	22	5	0	1	0	0	0	0	0	0	0	0	28
05:00	1	197	70	3	20	0	0	0	1	0	0	0	0	292
06:00	0	169	44	2	12	0	0	1	0	0	0	0	0	228
07:00	0	110	37	3	12	0	0	3	0	0	0	0	0	165
08:00	17	447	144	1	54	4	0	6	1	0	0	0	0	674
09:00	6	421	157	3	73	4	0	4	0	0	0	0	0	668
10:00	7	346	146	3	54	4	0	2	2	0	0	0	0	564
11:00	5	433	156	7	69	2	0	6	1	0	0	0	0	679
12:00 PM	7	534	196	5	80	3	0	12	0	0	0	0	0	837
13:00	8	458	159	2	61	5	0	3	0	0	0	0	0	696
14:00	14	369	133	0	54	4	0	1	0	0	0	0	0	575
15:00	10	359	143	3	43	6	0	5	1	0	0	0	0	570
16:00	11	395	130	3	40	1	0	0	1	0	0	0	0	581
17:00	7	431	133	5	40	0	0	3	0	0	0	0	0	619
18:00	16	331	75	2	33	0	0	0	0	0	0	0	0	457
19:00	3	160	49	0	12	0	0	0	0	0	0	0	0	224
20:00	0	104	16	0	5	0	0	0	0	0	0	0	0	125
21:00	0	60	12	1	9	0	0	0	0	0	0	0	0	82
22:00	1	43	11	0	1	0	0	0	0	0	0	0	0	56
23:00	0	20	8	0	0	0	0	0	0	0	0	0	0	28
Totals	**113**	**5441**	**1835**	**43**	**673**	**33**		**46**	**7**					**8191**
% of Totals	1%	66%	22%	1%	8%	0%		1%	0%					100%
	36	2177	770	22	295	14	0	22	5	0	0	0	0	3341
% AM	0%	27%	9%	0%	4%	0%		0%	0%					41%
AM Peak Hour	08:00	08:00	09:00	11:00	09:00	08:00		08:00	10:00					11:00
Volume	17	447	157	7	73	4		6	2					679
	77	3264	1065	21	378	19	0	24	2	0	0	0	0	4850
% PM	1%	40%	13%	0%	5%	0%		0%	0%					59%
PM Peak Hour	18:00	12:00	12:00	12:00	12:00	15:00		12:00	15:00					12:00
Volume	16	534	196	5	80	6		12	1					837

Peak Period Totals	AM 8-10			NOON 12-2			PM 4-6			Off Peak Volumes		
	Volume		%	Volume		%	Volume		%	Volume		%
	1342	⟷	16%	1533	⟷	19%	1200	⟷	15%	4116	⟷	50%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: 5th St & Ft Irwin Rd

City: Fort Irwin
Project #: 10-6106-005s

South Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	2	1	0	0	0	0	0	0	0	0	0	0	3
01:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	4	3	0	0	0	0	0	0	0	0	0	0	7
05:00	0	82	25	1	8	0	0	0	1	0	0	0	0	117
06:00	0	43	8	0	2	0	0	0	0	0	0	0	0	53
07:00	0	24	8	0	2	0	0	0	0	0	0	0	0	34
08:00	6	116	33	0	7	1	0	2	1	0	0	0	0	166
09:00	2	87	28	0	9	1	0	1	0	0	0	0	0	128
10:00	4	60	18	0	5	0	0	0	0	0	0	0	0	87
11:00	0	62	23	0	9	1	0	0	0	0	0	0	0	95
12:00 PM	4	110	33	0	11	0	0	1	0	0	0	0	0	159
13:00	2	76	24	0	10	0	0	1	0	0	0	0	0	113
14:00	4	89	26	0	4	1	0	0	0	0	0	0	0	124
15:00	2	63	22	0	6	0	0	1	0	0	0	0	0	94
16:00	2	67	22	0	3	0	0	0	1	0	0	0	0	95
17:00	1	69	16	0	7	0	0	0	0	0	0	0	0	93
18:00	1	37	9	0	2	0	0	0	0	0	0	0	0	49
19:00	0	13	6	0	2	0	0	0	0	0	0	0	0	21
20:00	0	14	2	0	1	0	0	0	0	0	0	0	0	17
21:00	0	7	3	0	2	0	0	0	0	0	0	0	0	12
22:00	0	8	2	0	1	0	0	0	0	0	0	0	0	11
23:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Totals	**28**	**1040**	**313**	**1**	**91**	**4**		**6**	**3**					**1486**
% of Totals	2%	70%	21%	0%	6%	0%		0%	0%					100%
	12	486	147	1	42	3	0	3	2	0	0	0	0	696
% AM	1%	33%	10%	0%	3%	0%		0%	0%					47%
AM Peak Hour	08:00	08:00	08:00	05:00	09:00	08:00		08:00	05:00					08:00
Volume	6	116	33	1	9	1		2	1					166
	16	554	166	0	49	1	0	3	1	0	0	0	0	790
% PM	1%	37%	11%		3%	0%		0%	0%					53%
PM Peak Hour	12:00	12:00	12:00		12:00	14:00		12:00	16:00					12:00
Volume	4	110	33		11	1		1	1					159

Directional Peak Periods	AM 8-10			NOON 12-2			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	294	⟷	20%	272	⟷	18%	188	⟷	13%	732	⟷	49%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: 5th St & Ft Irwin Rd

City: Fort Irwin
Project #: 10-6106-005e

East Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	6	2	0	0	0	0	0	0	0	0	0	0	8
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	3	1	0	0	0	0	0	0	0	0	0	0	4
03:00	0	5	2	0	0	0	0	0	0	0	0	0	0	7
04:00	0	17	2	0	1	0	0	0	0	0	0	0	0	20
05:00	1	107	45	2	12	0	0	0	0	0	0	0	0	167
06:00	0	96	21	2	8	0	0	1	0	0	0	0	0	128
07:00	0	45	16	3	6	0	0	3	0	0	0	0	0	73
08:00	10	223	86	1	37	1	0	4	0	0	0	0	0	362
09:00	3	208	86	2	35	2	0	1	0	0	0	0	0	337
10:00	1	147	69	3	27	0	0	2	2	0	0	0	0	251
11:00	3	223	73	7	30	0	0	4	0	0	0	0	0	340
12:00 PM	2	238	93	2	34	3	0	6	0	0	0	0	0	378
13:00	4	212	71	0	24	2	0	2	0	0	0	0	0	315
14:00	6	124	56	0	22	2	0	1	0	0	0	0	0	211
15:00	4	162	55	3	16	1	0	1	1	0	0	0	0	243
16:00	2	161	54	3	16	0	0	0	0	0	0	0	0	236
17:00	2	162	43	4	6	0	0	2	0	0	0	0	0	219
18:00	9	64	10	0	6	0	0	0	0	0	0	0	0	89
19:00	0	55	13	0	3	0	0	0	0	0	0	0	0	71
20:00	0	50	5	0	1	0	0	0	0	0	0	0	0	56
21:00	0	34	5	0	4	0	0	0	0	0	0	0	0	43
22:00	0	17	4	0	0	0	0	0	0	0	0	0	0	21
23:00	0	2	4	0	0	0	0	0	0	0	0	0	0	6
Totals	**47**	**2362**	**816**	**32**	**288**	**11**		**27**	**3**					**3586**
% of Totals	1%	66%	23%	1%	8%	0%		1%	0%					100%
	18	1081	403	20	156	3	0	15	2	0	0	0	0	1698
% AM	1%	30%	11%	1%	4%	0%		0%	0%					47%
AM Peak Hour	08:00	08:00	08:00	11:00	08:00	09:00		08:00	10:00					08:00
Volume	10	223	86	7	37	2		4	2					362
	29	1281	413	12	132	8	0	12	1	0	0	0	0	1888
% PM	1%	36%	12%	0%	4%	0%		0%	0%					53%
PM Peak Hour	18:00	12:00	12:00	17:00	12:00	12:00		12:00	15:00					12:00
Volume	9	238	93	4	34	3		6	1					378

Directional Peak Periods	AM 8-10			NOON 12-2			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	699	⟷	19%	693	⟷	19%	455	⟷	13%	1739	⟷	48%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: 5th St & Ft Irwin Rd

City: Fort Irwin
Project #: 10-6106-005w

West Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	5	4	0	0	0	0	0	0	0	0	0	0	9
01:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
04:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
05:00	0	8	0	0	0	0	0	0	0	0	0	0	0	8
06:00	0	30	15	0	2	0	0	0	0	0	0	0	0	47
07:00	0	41	13	0	4	0	0	0	0	0	0	0	0	58
08:00	1	108	25	0	10	2	0	0	0	0	0	0	0	146
09:00	1	126	43	1	29	1	0	2	0	0	0	0	0	203
10:00	2	139	59	0	22	4	0	0	0	0	0	0	0	226
11:00	2	148	60	0	30	1	0	2	1	0	0	0	0	244
12:00 PM	1	186	70	3	35	0	0	5	0	0	0	0	0	300
13:00	2	170	64	2	27	3	0	0	0	0	0	0	0	268
14:00	4	156	51	0	28	1	0	0	0	0	0	0	0	240
15:00	4	134	66	0	21	5	0	3	0	0	0	0	0	233
16:00	7	167	54	0	21	1	0	0	0	0	0	0	0	250
17:00	4	200	74	1	27	0	0	1	0	0	0	0	0	307
18:00	6	230	56	2	25	0	0	0	0	0	0	0	0	319
19:00	3	92	30	0	7	0	0	0	0	0	0	0	0	132
20:00	0	40	9	0	3	0	0	0	0	0	0	0	0	52
21:00	0	19	4	1	3	0	0	0	0	0	0	0	0	27
22:00	1	18	5	0	0	0	0	0	0	0	0	0	0	24
23:00	0	17	3	0	0	0	0	0	0	0	0	0	0	20
Totals	**38**	**2039**	**706**	**10**	**294**	**18**		**13**	**1**					**3119**
% of Totals	1%	65%	23%	0%	9%	1%		0%	0%					100%
	6	610	220	1	97	8	0	4	1	0	0	0	0	947
% AM	0%	20%	7%	0%	3%	0%		0%	0%					30%
AM Peak Hour	10:00	11:00	11:00	09:00	11:00	10:00		09:00	11:00					11:00
Volume	2	148	60	1	30	4		2	1					244
	32	1429	486	9	197	10	0	9	0	0	0	0	0	2172
% PM	1%	46%	16%	0%	6%	0%		0%						70%
PM Peak Hour	16:00	18:00	17:00	12:00	12:00	15:00		12:00						18:00
Volume	7	230	74	3	35	5		5						319

Directional Peak Periods	AM 8-10			NOON 12-2			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	349	⟷	11%	568	⟷	18%	557	⟷	18%	1645	⟷	53%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: N Loop Rd & Ft Irwin Rd

City: Fort Irwin
Project #: 10-6106-006

SUMMARY

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	2	2	0	0	0	0	0	0	0	0	0	0	4
01:00	0	3	1	0	2	1	0	0	0	0	0	0	0	7
02:00	0	5	1	0	1	0	0	1	0	0	0	0	0	8
03:00	0	6	1	0	0	0	0	1	0	0	0	0	0	8
04:00	0	16	3	0	0	1	0	2	0	0	0	0	0	22
05:00	1	56	21	0	10	2	0	1	0	0	0	0	0	91
06:00	0	189	43	2	20	0	0	1	1	0	0	0	0	256
07:00	1	157	53	2	19	5	0	2	0	0	0	0	0	239
08:00	6	221	78	2	37	6	0	5	3	0	0	0	0	358
09:00	4	128	69	1	29	8	0	1	2	0	0	0	0	242
10:00	1	116	51	2	28	5	0	6	4	0	0	0	0	213
11:00	4	177	91	0	39	2	0	3	2	0	0	0	0	318
12:00 PM	8	183	83	1	29	7	0	8	2	0	0	0	0	321
13:00	16	153	65	0	32	7	0	5	3	0	0	0	0	281
14:00	5	136	52	1	30	5	0	4	0	0	0	0	0	233
15:00	5	136	53	1	31	0	0	4	1	0	0	0	0	231
16:00	8	115	43	1	21	3	0	7	1	0	0	0	0	199
17:00	13	130	50	2	16	1	0	4	2	0	0	0	0	218
18:00	4	35	22	0	6	0	0	9	1	0	0	0	0	77
19:00	0	15	1	2	2	1	0	0	2	0	0	0	0	23
20:00	0	17	8	1	4	0	0	0	0	0	0	0	0	30
21:00	1	4	7	0	1	0	0	0	0	0	0	0	0	13
22:00	0	10	2	0	0	0	0	0	0	0	0	0	0	12
23:00	0	10	4	0	0	0	0	0	0	0	0	0	0	14
Totals	**77**	**2020**	**804**	**18**	**357**	**54**		**64**	**24**					**3418**
% of Totals	2%	59%	24%	1%	10%	2%		2%	1%					100%
	17	1076	414	9	185	30	0	23	12	0	0	0	0	1766
% AM	0%	31%	12%	0%	5%	1%		1%	0%					52%
AM Peak Hour	08:00	08:00	11:00	06:00	11:00	09:00		10:00	10:00					08:00
Volume	6	221	91	2	39	8		6	4					358
	60	944	390	9	172	24	0	41	12	0	0	0	0	1652
% PM	2%	28%	11%	0%	5%	1%		1%	0%					48%
PM Peak Hour	13:00	12:00	12:00	17:00	13:00	12:00		18:00	13:00					12:00
Volume	16	183	83	2	32	7		9	3					321

Peak Period Totals	AM 8-10			NOON 11-1			PM 2-4			Off Peak Volumes		
	Volume		%	Volume		%	Volume		%	Volume		%
	600	⟷	18%	639	⟷	19%	464	⟷	14%	1715	⟷	50%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: N Loop Rd & Ft Irwin Rd

City: Fort Irwin
Project #: 10-6106-006n

North Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	0	2	0	0	0	0	0	0	0	0	0	0	2
01:00	0	3	1	0	2	1	0	0	0	0	0	0	0	7
02:00	0	4	0	0	1	0	0	1	0	0	0	0	0	6
03:00	0	4	0	0	0	0	0	1	0	0	0	0	0	5
04:00	0	5	2	0	0	0	0	2	0	0	0	0	0	9
05:00	0	19	8	0	5	0	0	1	0	0	0	0	0	33
06:00	0	90	27	2	18	0	0	1	1	0	0	0	0	139
07:00	0	58	24	1	8	3	0	2	0	0	0	0	0	96
08:00	0	40	19	2	8	2	0	1	2	0	0	0	0	74
09:00	0	31	14	0	9	4	0	1	1	0	0	0	0	60
10:00	0	28	13	0	5	2	0	2	2	0	0	0	0	52
11:00	0	54	30	0	7	1	0	1	0	0	0	0	0	93
12:00 PM	3	25	15	1	7	4	0	2	1	0	0	0	0	58
13:00	6	31	16	0	5	0	0	1	2	0	0	0	0	61
14:00	0	40	14	1	9	2	0	1	0	0	0	0	0	67
15:00	0	32	13	1	8	0	0	1	1	0	0	0	0	56
16:00	2	23	6	0	4	1	0	1	1	0	0	0	0	38
17:00	0	20	4	0	3	0	0	0	0	0	0	0	0	27
18:00	0	6	2	0	0	0	0	2	0	0	0	0	0	10
19:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
20:00	0	4	1	0	2	0	0	0	0	0	0	0	0	7
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
23:00	0	7	0	0	0	0	0	0	0	0	0	0	0	7
Totals	**11**	**528**	**212**	**8**	**101**	**20**		**21**	**11**					**912**
% of Totals	1%	58%	23%	1%	11%	2%		2%	1%					100%
	0	336	140	5	63	13	0	13	6	0	0	0	0	576
% AM		37%	15%	1%	7%	1%		1%	1%					63%
AM Peak Hour		06:00	11:00	06:00	06:00	09:00		04:00	08:00					06:00
Volume		90	30	2	18	4		2	2					139
	11	192	72	3	38	7	0	8	5	0	0	0	0	336
% PM	1%	21%	8%	0%	4%	1%		1%	1%					37%
PM Peak Hour	13:00	14:00	13:00	12:00	14:00	12:00		12:00	13:00					14:00
Volume	6	40	16	1	9	4		2	2					67

Directional Peak Periods	AM 8-10		NOON 11-1		PM 2-4		Off Peak Volumes	
All Classes	Volume	%	Volume	%	Volume	%	Volume	%
	134 ⟷	15%	151 ⟷	17%	123 ⟷	13%	504 ⟷	55%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: N Loop Rd & Ft Irwin Rd

City: Fort Irwin
Project #: 10-6106-006s

South Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
05:00	0	24	8	0	2	0	0	0	0	0	0	0	0	34
06:00	0	72	9	0	0	0	0	0	0	0	0	0	0	81
07:00	0	20	4	0	1	0	0	0	0	0	0	0	0	25
08:00	4	99	24	0	4	0	0	1	0	0	0	0	0	132
09:00	0	19	8	0	0	3	0	0	1	0	0	0	0	31
10:00	0	11	4	0	0	2	0	3	0	0	0	0	0	20
11:00	0	12	9	0	4	0	0	2	0	0	0	0	0	27
12:00 PM	2	72	20	0	2	1	0	4	0	0	0	0	0	101
13:00	1	21	12	0	0	3	0	2	0	0	0	0	0	39
14:00	1	11	7	0	0	0	0	0	0	0	0	0	0	19
15:00	0	16	10	0	1	0	0	1	0	0	0	0	0	28
16:00	0	8	5	0	0	0	0	6	0	0	0	0	0	19
17:00	0	8	6	0	0	0	0	2	0	0	0	0	0	16
18:00	0	5	0	0	0	0	0	7	0	0	0	0	0	12
19:00	0	5	0	0	0	0	0	0	0	0	0	0	0	5
20:00	0	5	0	0	0	0	0	0	0	0	0	0	0	5
21:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
22:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
23:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Totals	**8**	**416**	**128**		**14**	**9**		**28**	**1**					**604**
% of Totals	1%	69%	21%		2%	1%		5%	0%					100%
	4	258	67	0	11	5	0	6	1	0	0	0	0	352
% AM	1%	43%	11%		2%	1%		1%	0%					58%
AM Peak Hour	08:00	08:00	08:00		08:00	09:00		10:00	09:00					08:00
Volume	4	99	24		4	3		3	1					132
	4	158	61	0	3	4	0	22	0	0	0	0	0	252
% PM	1%	26%	10%		0%	1%		4%						42%
PM Peak Hour	12:00	12:00	12:00		12:00	13:00		18:00						12:00
Volume	2	72	20		2	3		7						101

Directional Peak Periods	AM 8-10			NOON 11-1			PM 2-4			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	163	⟷	27%	128	⟷	21%	47	⟷	8%	266	⟷	44%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: N Loop Rd & Ft Irwin Rd

City: Fort Irwin
Project #: 10-6106-006e

East Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	2
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
03:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
04:00	0	8	0	0	0	0	0	0	0	0	0	0	0	8
05:00	1	10	3	0	3	1	0	0	0	0	0	0	0	18
06:00	0	12	4	0	0	0	0	0	0	0	0	0	0	16
07:00	0	57	16	0	6	1	0	0	0	0	0	0	0	80
08:00	1	47	22	0	17	3	0	1	1	0	0	0	0	92
09:00	0	47	34	1	13	1	0	0	0	0	0	0	0	96
10:00	1	36	20	1	17	1	0	0	0	0	0	0	0	76
11:00	4	61	37	0	16	0	0	0	1	0	0	0	0	119
12:00 PM	2	41	33	0	9	1	0	0	1	0	0	0	0	87
13:00	8	53	24	0	13	3	0	1	0	0	0	0	0	102
14:00	4	33	16	0	6	3	0	0	0	0	0	0	0	62
15:00	1	42	14	0	13	0	0	0	0	0	0	0	0	70
16:00	4	34	11	0	5	1	0	0	0	0	0	0	0	55
17:00	4	41	14	0	4	0	0	0	0	0	0	0	0	63
18:00	2	11	11	0	1	0	0	0	0	0	0	0	0	25
19:00	0	5	0	0	1	0	0	0	0	0	0	0	0	6
20:00	0	5	1	0	0	0	0	0	0	0	0	0	0	6
21:00	0	1	5	0	1	0	0	0	0	0	0	0	0	7
22:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
23:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Totals	**32**	**551**	**268**	**2**	**125**	**15**		**2**	**3**					**998**
% of Totals	3%	55%	27%	0%	13%	2%		0%	0%					100%
	7	282	138	2	72	7	0	1	2	0	0	0	0	511
% AM	1%	28%	14%	0%	7%	1%		0%	0%					51%
AM Peak Hour	11:00	11:00	11:00	09:00	08:00	08:00		08:00	08:00					11:00
Volume	4	61	37	1	17	3		1	1					119
	25	269	130	0	53	8	0	1	1	0	0	0	0	487
% PM	3%	27%	13%		5%	1%		0%	0%					49%
PM Peak Hour	13:00	13:00	12:00		13:00	13:00		13:00	12:00					13:00
Volume	8	53	33		13	3		1	1					102

Directional Peak Periods	AM 8-10			NOON 11-1			PM 2-4			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	188	⟷	19%	206	⟷	21%	132	⟷	13%	472	⟷	47%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: N Loop Rd & Ft Irwin Rd

City: Fort Irwin
Project #: 10-6106-006w

West Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	2	0	0	0	1	0	0	0	0	0	0	0	3
05:00	0	3	2	0	0	1	0	0	0	0	0	0	0	6
06:00	0	15	3	0	2	0	0	0	0	0	0	0	0	20
07:00	1	22	9	1	4	1	0	0	0	0	0	0	0	38
08:00	1	35	13	0	8	1	0	2	0	0	0	0	0	60
09:00	4	31	13	0	7	0	0	0	0	0	0	0	0	55
10:00	0	41	14	1	6	0	0	1	2	0	0	0	0	65
11:00	0	50	15	0	12	1	0	0	1	0	0	0	0	79
12:00 PM	1	45	15	0	11	1	0	2	0	0	0	0	0	75
13:00	1	48	13	0	14	1	0	1	1	0	0	0	0	79
14:00	0	52	15	0	15	0	0	3	0	0	0	0	0	85
15:00	4	46	16	0	9	0	0	2	0	0	0	0	0	77
16:00	2	50	21	1	12	1	0	0	0	0	0	0	0	87
17:00	9	61	26	2	9	1	0	2	2	0	0	0	0	112
18:00	2	13	9	0	5	0	0	0	1	0	0	0	0	30
19:00	0	2	1	2	1	1	0	0	2	0	0	0	0	9
20:00	0	3	6	1	2	0	0	0	0	0	0	0	0	12
21:00	1	1	1	0	0	0	0	0	0	0	0	0	0	3
22:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
23:00	0	2	3	0	0	0	0	0	0	0	0	0	0	5
Totals	**26**	**525**	**196**	**8**	**117**	**10**		**13**	**9**					**904**
% of Totals	3%	58%	22%	1%	13%	1%		1%	1%					100%
	6	200	69	2	39	5	0	3	3	0	0	0	0	327
% AM	1%	22%	8%	0%	4%	1%		0%	0%					36%
AM Peak Hour	09:00	11:00	11:00	07:00	11:00	04:00		08:00	10:00					11:00
Volume	4	50	15	1	12	1		2	2					79
	20	325	127	6	78	5	0	10	6	0	0	0	0	577
% PM	2%	36%	14%	1%	9%	1%		1%	1%					64%
PM Peak Hour	17:00	17:00	17:00	17:00	14:00	12:00		14:00	17:00					17:00
Volume	9	61	26	2	15	1		3	2					112

Directional Peak Periods	AM 8-10			NOON 11-1			PM 2-4			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	115	⟷	13%	154	⟷	17%	162	⟷	18%	473	⟷	52%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: S Loop Rd & Ft Irwin Rd

City: Fort Irwin
Project #: 10-6106-007

SUMMARY

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	8	5	0	0	0	0	0	0	0	0	0	0	13
01:00	0	7	5	0	0	0	0	0	0	0	0	0	0	12
02:00	1	4	1	0	0	0	0	0	0	0	0	0	0	6
03:00	0	3	0	0	1	0	0	0	0	0	0	0	0	4
04:00	0	14	5	0	0	0	0	0	0	0	0	0	0	19
05:00	0	78	36	4	6	0	0	0	0	0	0	0	0	124
06:00	1	146	40	9	17	0	0	1	0	0	0	0	0	214
07:00	1	212	47	3	14	4	0	1	0	0	0	0	0	282
08:00	4	235	62	8	14	5	0	2	8	0	0	0	0	338
09:00	2	88	30	5	5	2	0	0	2	0	0	0	0	134
10:00	2	94	28	3	5	2	0	0	1	0	0	0	0	135
11:00	5	160	39	2	18	2	0	0	4	0	0	0	0	230
12:00 PM	6	195	47	3	18	2	0	6	1	0	0	0	0	278
13:00	3	134	39	16	6	0	0	4	0	0	0	0	0	202
14:00	2	113	41	1	7	1	0	1	2	0	0	0	0	168
15:00	0	152	21	2	18	1	0	0	2	0	0	0	0	196
16:00	4	198	51	1	11	0	0	0	0	0	0	0	0	265
17:00	2	231	43	2	16	0	0	0	1	0	0	0	0	295
18:00	0	131	28	1	15	0	0	0	0	0	0	0	0	175
19:00	1	71	14	1	8	0	0	0	0	0	0	0	0	95
20:00	0	55	17	0	2	0	0	0	0	0	0	0	0	74
21:00	0	44	11	0	0	0	0	0	0	0	0	0	0	55
22:00	0	27	11	0	0	0	0	0	0	0	0	0	0	38
23:00	0	13	6	0	0	0	0	0	0	0	0	0	0	19
Totals	**34**	**2413**	**627**	**61**	**181**	**19**		**15**	**21**					**3371**
% of Totals	1%	72%	19%	2%	5%	1%		0%	1%					100%
	16	1049	298	34	80	15	0	4	15	0	0	0	0	1511
% AM	0%	31%	9%	1%	2%	0%		0%	0%					45%
AM Peak Hour	11:00	08:00	08:00	06:00	11:00	08:00		08:00	08:00					08:00
Volume	5	235	62	9	18	5		2	8					338
	18	1364	329	27	101	4	0	11	6	0	0	0	0	1860
% PM	1%	40%	10%	1%	3%	0%		0%	0%					55%
PM Peak Hour	12:00	17:00	16:00	13:00	12:00	12:00		12:00	14:00					17:00
Volume	6	231	51	16	18	2		6	2					295

Peak Period Totals	AM 7-9			NOON 11-1			PM 4-6			Off Peak Volumes		
	Volume		%	Volume		%	Volume		%	Volume		%
	620	↔	18%	508	↔	15%	560	↔	17%	1683	↔	50%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: S Loop Rd & Ft Irwin Rd

City: Fort Irwin
Project #: 10-6106-007n

North Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	6	1	0	0	0	0	0	0	0	0	0	0	7
01:00	0	4	5	0	0	0	0	0	0	0	0	0	0	9
02:00	1	3	0	0	0	0	0	0	0	0	0	0	0	4
03:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:00	0	7	3	0	0	0	0	0	0	0	0	0	0	10
05:00	0	30	16	4	6	0	0	0	0	0	0	0	0	56
06:00	1	80	32	4	15	0	0	0	0	0	0	0	0	132
07:00	1	101	19	1	6	0	0	1	0	0	0	0	0	129
08:00	0	32	10	4	6	0	0	1	5	0	0	0	0	58
09:00	0	18	9	2	4	0	0	0	2	0	0	0	0	35
10:00	0	19	12	2	3	0	0	0	0	0	0	0	0	36
11:00	2	63	12	0	6	0	0	0	4	0	0	0	0	87
12:00 PM	1	35	4	1	3	0	0	2	0	0	0	0	0	46
13:00	1	22	14	5	0	0	0	1	0	0	0	0	0	43
14:00	1	30	11	1	3	0	0	0	1	0	0	0	0	47
15:00	0	37	5	1	5	0	0	0	0	0	0	0	0	48
16:00	2	60	10	1	3	0	0	0	0	0	0	0	0	76
17:00	2	56	15	1	2	0	0	0	0	0	0	0	0	76
18:00	0	36	8	1	0	0	0	0	0	0	0	0	0	45
19:00	0	27	3	0	1	0	0	0	0	0	0	0	0	31
20:00	0	24	5	0	0	0	0	0	0	0	0	0	0	29
21:00	0	23	9	0	0	0	0	0	0	0	0	0	0	32
22:00	0	12	9	0	0	0	0	0	0	0	0	0	0	21
23:00	0	8	1	0	0	0	0	0	0	0	0	0	0	9
Totals	**12**	**734**	**213**	**28**	**63**			**5**	**12**					**1067**
% of Totals	1%	69%	20%	3%	6%			0%	1%					100%
	5	364	119	17	46	0	0	2	11	0	0	0	0	564
% AM	0%	34%	11%	2%	4%			0%	1%					53%
AM Peak Hour	11:00	07:00	06:00	05:00	06:00			07:00	08:00					06:00
Volume	2	101	32	4	15			1	5					132
	7	370	94	11	17	0	0	3	1	0	0	0	0	503
% PM	1%	35%	9%	1%	2%			0%	0%					47%
PM Peak Hour	16:00	16:00	17:00	13:00	15:00			12:00	14:00					16:00
Volume	2	60	15	5	5			2	1					76

Directional Peak Periods	AM 7-9			NOON 11-1			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	187	⟷	18%	133	⟷	12%	152	⟷	14%	595	⟷	56%

South Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	2	4	0	0	0	0	0	0	0	0	0	0	6
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
03:00	0	2	0	0	1	0	0	0	0	0	0	0	0	3
04:00	0	4	2	0	0	0	0	0	0	0	0	0	0	6
05:00	0	39	18	0	0	0	0	0	0	0	0	0	0	57
06:00	0	46	4	2	2	0	0	1	0	0	0	0	0	55
07:00	0	48	9	0	3	0	0	0	0	0	0	0	0	60
08:00	4	147	35	3	2	2	0	1	0	0	0	0	0	194
09:00	1	40	10	1	0	0	0	0	0	0	0	0	0	52
10:00	2	28	6	0	1	1	0	0	0	0	0	0	0	38
11:00	1	45	15	0	5	1	0	0	0	0	0	0	0	67
12:00 PM	4	104	27	1	7	0	0	2	0	0	0	0	0	145
13:00	2	58	12	3	2	0	0	1	0	0	0	0	0	78
14:00	0	44	19	0	1	0	0	0	0	0	0	0	0	64
15:00	0	52	11	0	7	0	0	0	0	0	0	0	0	70
16:00	0	63	15	0	3	0	0	0	0	0	0	0	0	81
17:00	0	77	6	0	5	0	0	0	1	0	0	0	0	89
18:00	0	40	12	0	5	0	0	0	0	0	0	0	0	57
19:00	1	22	4	1	1	0	0	0	0	0	0	0	0	29
20:00	0	8	7	0	1	0	0	0	0	0	0	0	0	16
21:00	0	12	0	0	0	0	0	0	0	0	0	0	0	12
22:00	0	8	1	0	0	0	0	0	0	0	0	0	0	9
23:00	0	4	5	0	0	0	0	0	0	0	0	0	0	9
Totals	**15**	**894**	**223**	**11**	**46**	**4**		**5**	**1**					**1199**
% of Totals	1%	75%	19%	1%	4%	0%		0%	0%					100%
	8	402	104	6	14	4	0	2	0	0	0	0	0	540
% AM	1%	34%	9%	1%	1%	0%		0%						45%
AM Peak Hour	08:00	08:00	08:00	08:00	11:00	08:00		06:00						08:00
Volume	4	147	35	3	5	2		1						194
	7	492	119	5	32	0	0	3	1	0	0	0	0	659
% PM	1%	41%	10%	0%	3%			0%	0%					55%
PM Peak Hour	12:00	12:00	12:00	13:00	12:00			12:00	17:00					12:00
Volume	4	104	27	3	7			2	1					145

Directional Peak Periods	AM 7-9			NOON 11-1			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	254	⟷	21%	212	⟷	18%	170	⟷	14%	563	⟷	47%

Day: WEDNESDAY
Date: 10/27/10

Classification Report / Prepared by: National Data & Surveying Services
Location: S Loop Rd & Ft Irwin Rd

City: Fort Irwin
Project #: 10-6106-007w

West Bound

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
05:00	0	9	2	0	0	0	0	0	0	0	0	0	0	11
06:00	0	20	4	3	0	0	0	0	0	0	0	0	0	27
07:00	0	63	19	2	5	4	0	0	0	0	0	0	0	93
08:00	0	56	17	1	6	3	0	0	3	0	0	0	0	86
09:00	1	30	11	2	1	2	0	0	0	0	0	0	0	47
10:00	0	47	10	1	1	1	0	0	1	0	0	0	0	61
11:00	2	52	12	2	7	1	0	0	0	0	0	0	0	76
12:00 PM	1	56	16	1	8	2	0	2	1	0	0	0	0	87
13:00	0	54	13	8	4	0	0	2	0	0	0	0	0	81
14:00	1	39	11	0	3	1	0	1	1	0	0	0	0	57
15:00	0	63	5	1	6	1	0	0	2	0	0	0	0	78
16:00	2	75	26	0	5	0	0	0	0	0	0	0	0	108
17:00	0	98	22	1	9	0	0	0	0	0	0	0	0	130
18:00	0	55	8	0	10	0	0	0	0	0	0	0	0	73
19:00	0	22	7	0	6	0	0	0	0	0	0	0	0	35
20:00	0	23	5	0	1	0	0	0	0	0	0	0	0	29
21:00	0	9	2	0	0	0	0	0	0	0	0	0	0	11
22:00	0	7	1	0	0	0	0	0	0	0	0	0	0	8
23:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Totals	**7**	**785**	**191**	**22**	**72**	**15**		**5**	**8**					**1105**
% of Totals	1%	71%	17%	2%	7%	1%		0%	1%					100%
	3	283	75	11	20	11	0	0	4	0	0	0	0	407
% AM	0%	26%	7%	1%	2%	1%			0%					37%
AM Peak Hour	11:00	07:00	07:00	06:00	11:00	07:00			08:00					07:00
Volume	2	63	19	3	7	4			3					93
	4	502	116	11	52	4	0	5	4	0	0	0	0	698
% PM	0%	45%	10%	1%	5%	0%		0%	0%					63%
PM Peak Hour	16:00	17:00	16:00	13:00	18:00	12:00		12:00	15:00					17:00
Volume	2	98	26	8	10	2		2	2					130

Directional Peak Periods	AM 7-9			NOON 11-1			PM 4-6			Off Peak Volumes		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	179	⟷	16%	163	⟷	15%	238	⟷	22%	525	⟷	48%

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

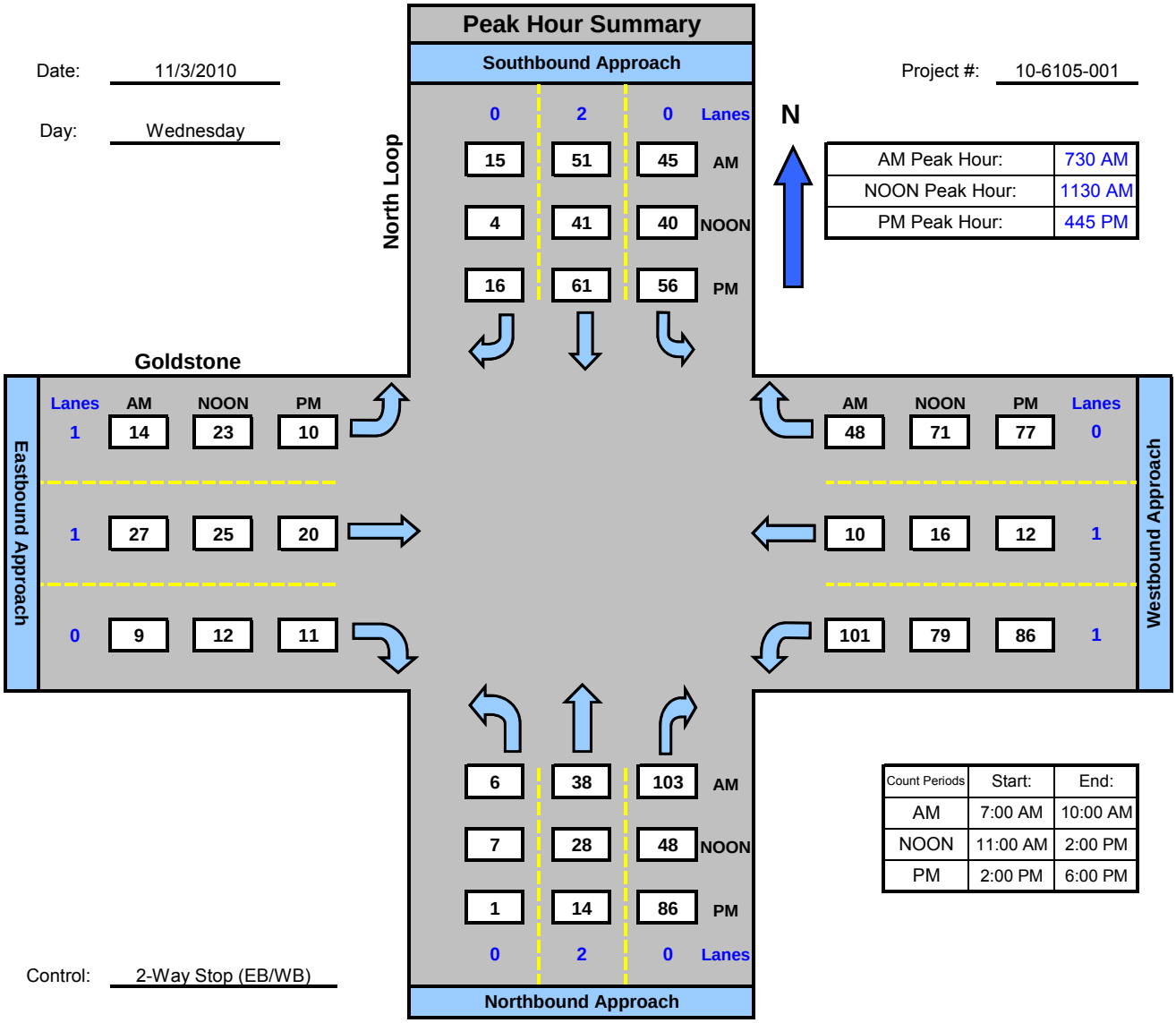
North Loop and Goldstone , City of Fort Irwin

Date: 11/3/2010

Day: Wednesday

Project #: 10-6105-001

AM Peak Hour:	730 AM
NOON Peak Hour:	1130 AM
PM Peak Hour:	445 PM



Count Periods	Start:	End:
AM	7:00 AM	10:00 AM
NOON	11:00 AM	2:00 PM
PM	2:00 PM	6:00 PM

Control: 2-Way Stop (EB/WB)

Intersection Turning Movement

Prepared by:

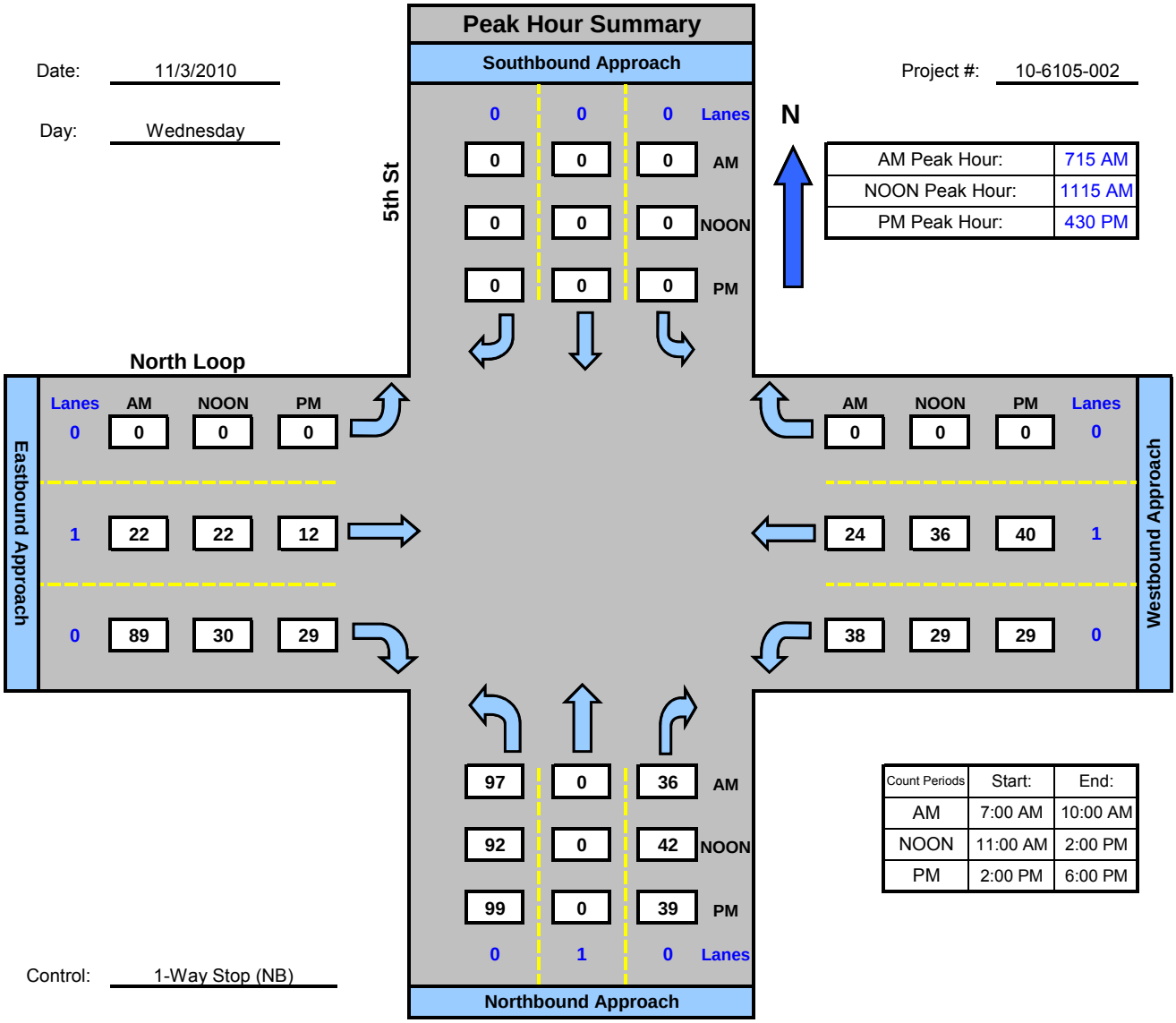
National Data & Surveying Services

5th St and North Loop , City of Fort Irwin

Date: 11/3/2010

Day: Wednesday

Project #: 10-6105-002



AM Peak Hour:	715 AM
NOON Peak Hour:	1115 AM
PM Peak Hour:	430 PM

Count Periods	Start:	End:
AM	7:00 AM	10:00 AM
NOON	11:00 AM	2:00 PM
PM	2:00 PM	6:00 PM

Control: 1-Way Stop (NB)

Intersection Turning Movement

Prepared by:

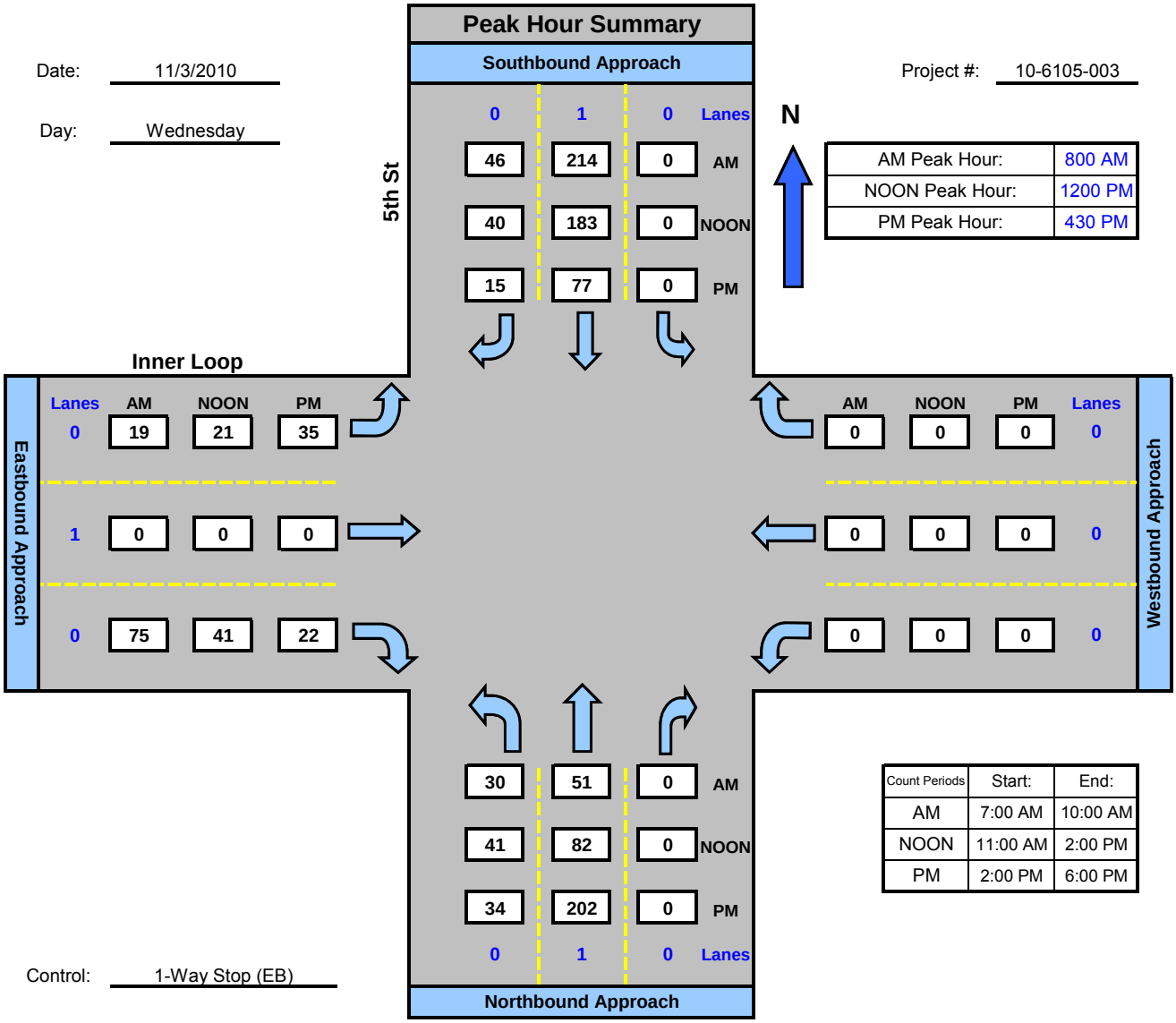
National Data & Surveying Services

5th St and Inner Loop , City of Fort Irwin

Date: 11/3/2010

Day: Wednesday

Project #: 10-6105-003



AM Peak Hour:	800 AM
NOON Peak Hour:	1200 PM
PM Peak Hour:	430 PM

Count Periods	Start:	End:
AM	7:00 AM	10:00 AM
NOON	11:00 AM	2:00 PM
PM	2:00 PM	6:00 PM

Control: 1-Way Stop (EB)

Intersection Turning Movement

Prepared by:

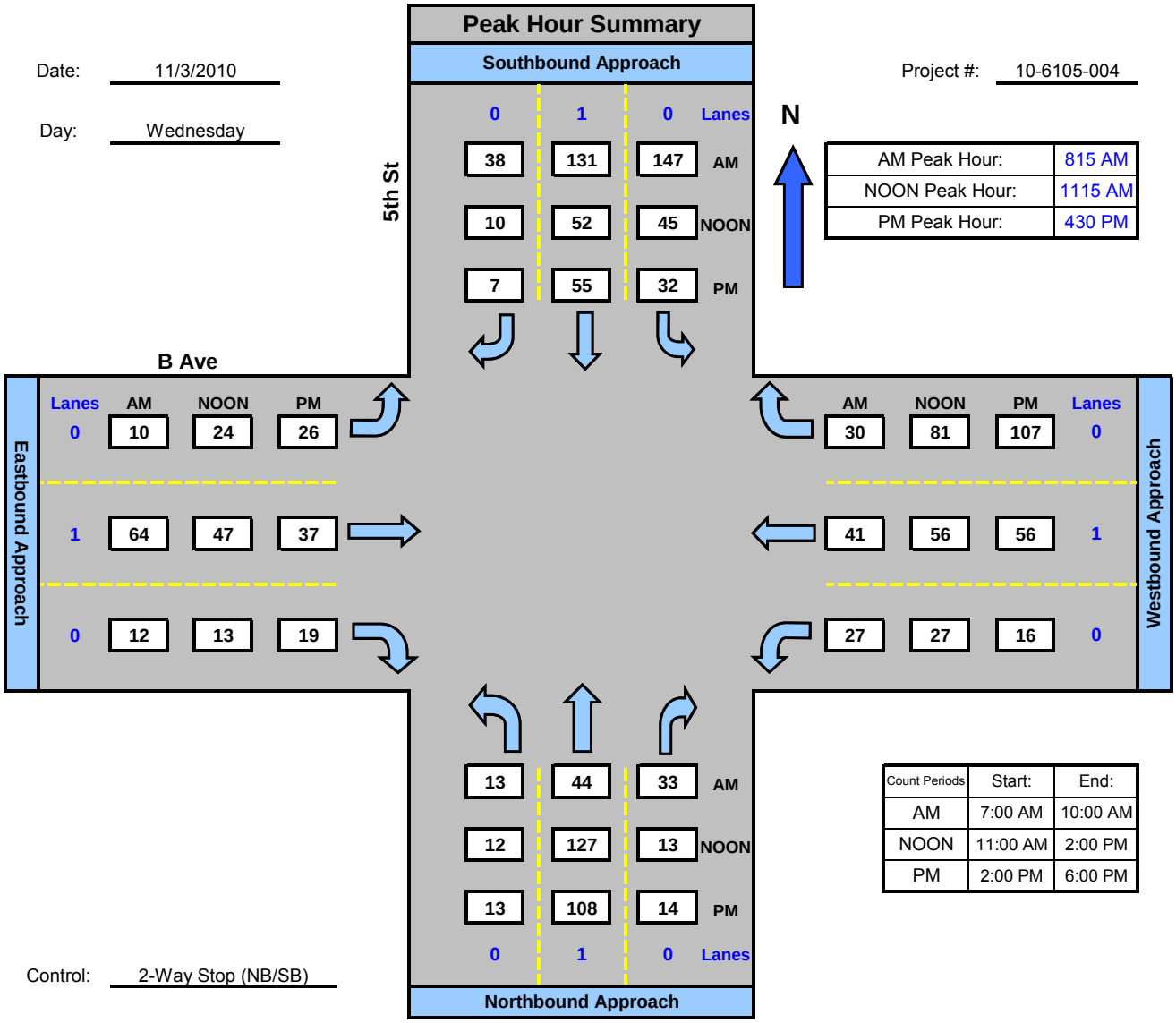
National Data & Surveying Services

5th St and B Ave , City of Fort Irwin

Date: 11/3/2010

Day: Wednesday

Project #: 10-6105-004



AM Peak Hour:	815 AM
NOON Peak Hour:	1115 AM
PM Peak Hour:	430 PM

Count Periods	Start:	End:
AM	7:00 AM	10:00 AM
NOON	11:00 AM	2:00 PM
PM	2:00 PM	6:00 PM

Control: 2-Way Stop (NB/SB)

Intersection Turning Movement

Prepared by:

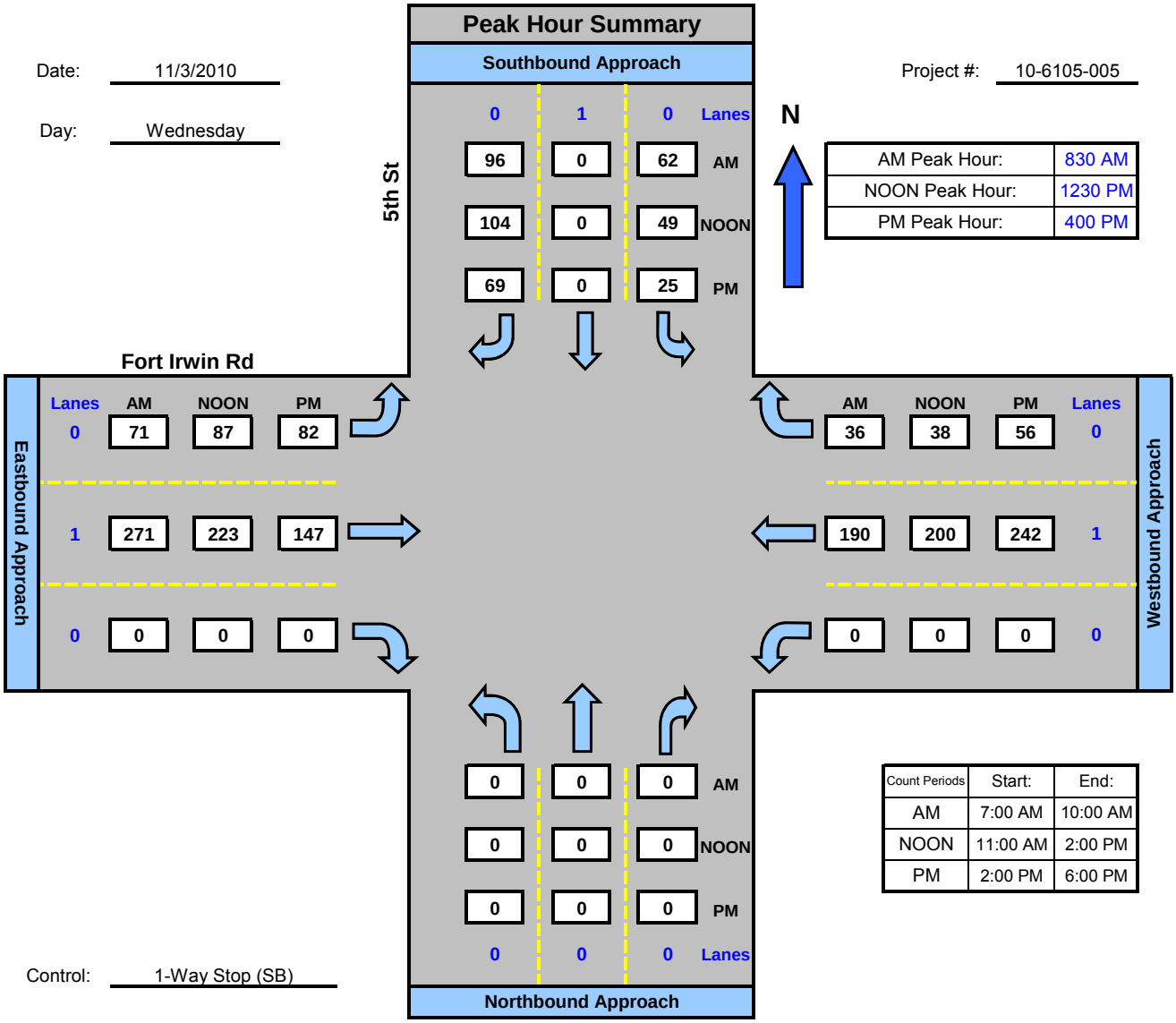
National Data & Surveying Services

5th St and Fort Irwin Rd , City of Fort Irwin

Date: 11/3/2010

Day: Wednesday

Project #: 10-6105-005



AM Peak Hour:	830 AM
NOON Peak Hour:	1230 PM
PM Peak Hour:	400 PM

Count Periods	Start:	End:
AM	7:00 AM	10:00 AM
NOON	11:00 AM	2:00 PM
PM	2:00 PM	6:00 PM

Control: 1-Way Stop (SB)

Intersection Turning Movement

Prepared by:

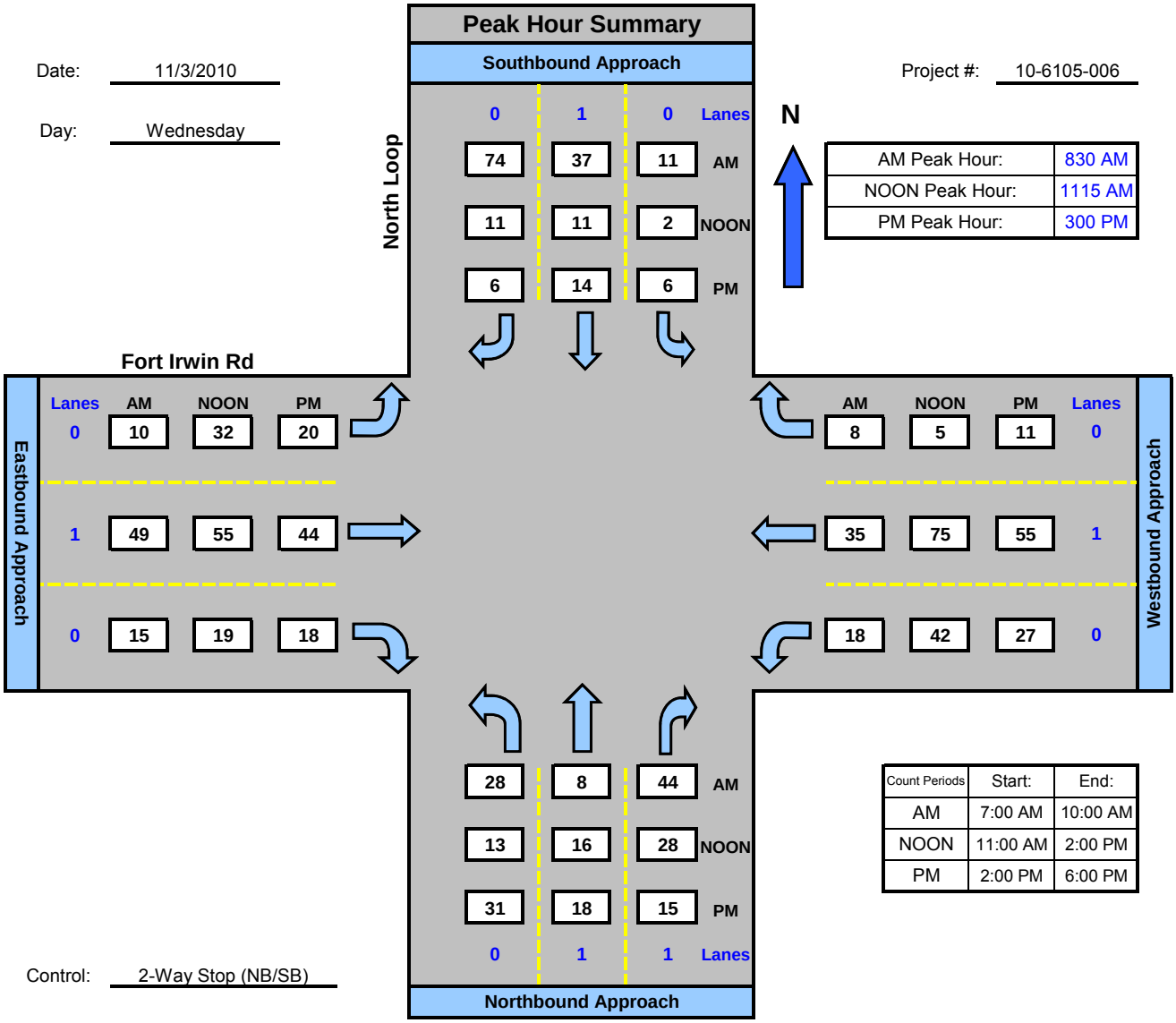
National Data & Surveying Services

North Loop and Fort Irwin Rd , City of Fort Irwin

Date: 11/3/2010

Day: Wednesday

Project #: 10-6105-006



AM Peak Hour:	830 AM
NOON Peak Hour:	1115 AM
PM Peak Hour:	300 PM

Count Periods	Start:	End:
AM	7:00 AM	10:00 AM
NOON	11:00 AM	2:00 PM
PM	2:00 PM	6:00 PM

Control: 2-Way Stop (NB/SB)

Intersection Turning Movement

Prepared by:

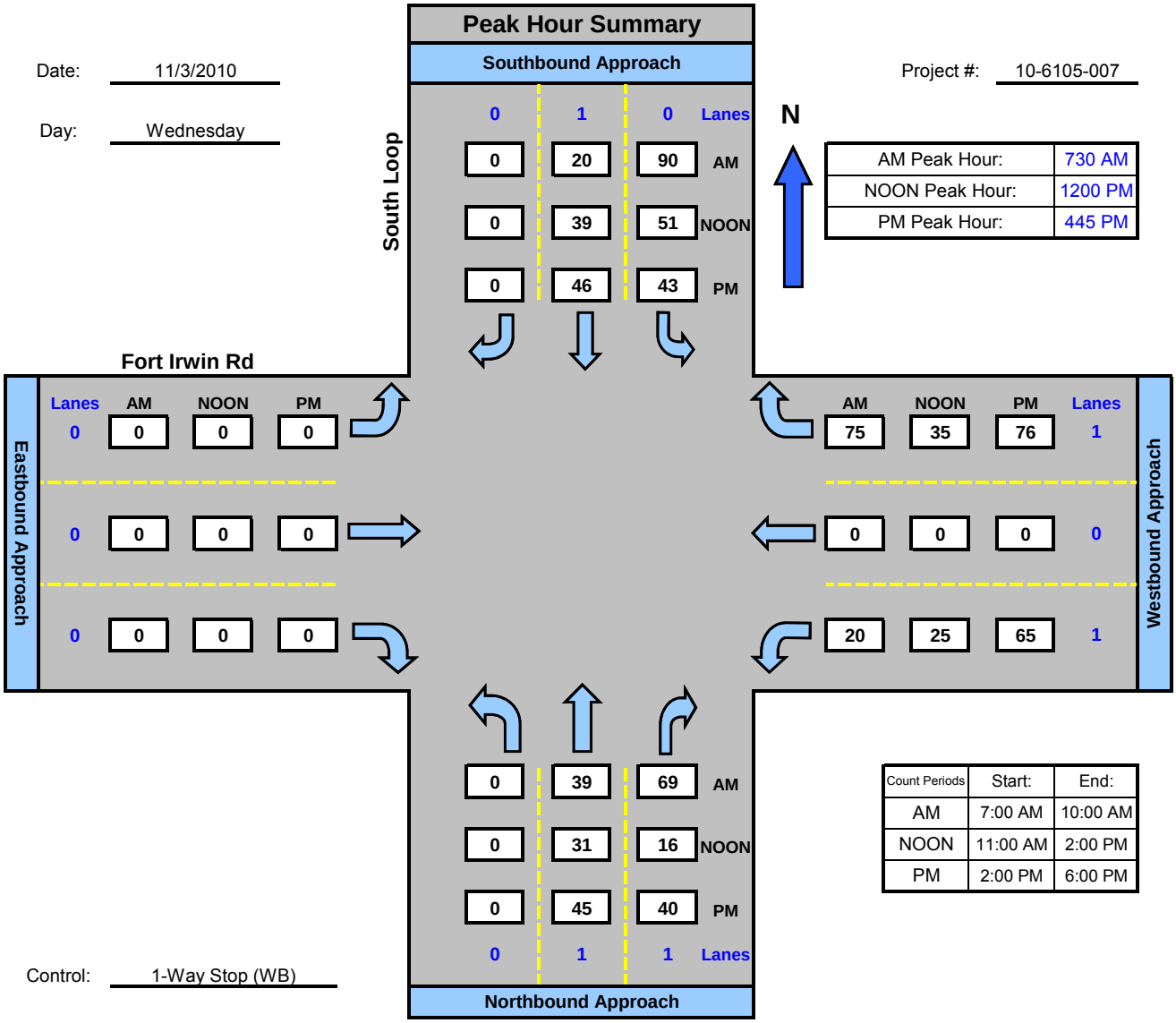
National Data & Surveying Services

South Loop and Fort Irwin Rd , City of Fort Irwin

Date: 11/3/2010

Day: Wednesday

Project #: 10-6105-007



AM Peak Hour:	730 AM
NOON Peak Hour:	1200 PM
PM Peak Hour:	445 PM

Count Periods	Start:	End:
AM	7:00 AM	10:00 AM
NOON	11:00 AM	2:00 PM
PM	2:00 PM	6:00 PM

Control: 1-Way Stop (WB)

Appendix C
2010 Existing: Intersection Analysis Output Sheets

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N Loop Rd
Outer Loop Rd
N Loop Rd
N Loop Rd
5th St
5th St
5th St
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
N Loop Rd
N Loop Rd
N Loop Rd
N Loop Rd
Goldstone Rd
Goldstone Rd
Inner Loop Ct
B Ave
B Ave
North Loop
Fort Irwin
Fort Irwin, CA 92310

1: Goldstone Rd & N Loop Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	27	9	101	10	48	6	38	103	45	51	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	18	35	12	131	13	62	8	49	134	58	66	19
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	317	382	66	277	268	49	86			183		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	317	382	66	277	268	49	86			183		
tC, single (s)	7.2	6.6	6.3	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	97	93	99	78	98	94	99			96		
cM capacity (veh/h)	559	519	986	610	608	1019	1504			1368		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	18	47	131	75	57	134	125	19
Volume Left	18	0	131	0	8	0	58	0
Volume Right	0	12	0	62	0	134	0	19
cSH	559	589	610	913	1504	1700	1368	1700
Volume to Capacity	0.03	0.08	0.22	0.08	0.01	0.08	0.04	0.01
Queue Length 95th (ft)	3	6	20	7	0	0	3	0
Control Delay (s)	11.7	11.6	12.5	9.3	1.0	0.0	3.8	0.0
Lane LOS	B	B	B	A	A		A	
Approach Delay (s)	11.6		11.3		0.3		3.3	
Approach LOS	B		B					

Intersection Summary				
Average Delay		6.0		
Intersection Capacity Utilization		30.8%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	22	89	38	24	97	36
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	31	127	54	34	139	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			159		238	95
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			159		238	95
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			96		81	95
cM capacity (veh/h)			1391		713	951

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	159	89	190
Volume Left	0	54	139
Volume Right	127	0	51
cSH	1700	1391	765
Volume to Capacity	0.09	0.04	0.25
Queue Length 95th (ft)	0	3	24
Control Delay (s)	0.0	4.8	11.3
Lane LOS		A	B
Approach Delay (s)	0.0	4.8	11.3
Approach LOS			B

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	19	75	30	51	214	46
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	25	100	40	68	285	61
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	464	316	347			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	464	316	347			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	86	97			
cM capacity (veh/h)	538	724	1212			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	125	108	347
Volume Left	25	40	0
Volume Right	100	0	61
cSH	677	1212	1700
Volume to Capacity	0.19	0.03	0.20
Queue Length 95th (ft)	17	3	0
Control Delay (s)	11.5	3.2	0.0
Lane LOS	B	A	
Approach Delay (s)	11.5	3.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	64	12	27	41	30	13	44	33	147	131	38
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	14	88	16	37	56	41	18	60	45	201	179	52
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	97			104			416	295	96	349	282	77
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	97			104			416	295	96	349	282	77
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			95	90	95	61	70	95
cM capacity (veh/h)	1496			1481			386	593	955	513	600	976

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	118	134	123	433
Volume Left	14	37	18	201
Volume Right	16	41	45	52
cSH	1496	1481	632	581
Volume to Capacity	0.01	0.02	0.20	0.74
Queue Length 95th (ft)	1	2	18	162
Control Delay (s)	0.9	2.2	12.1	27.0
Lane LOS	A	A	B	D
Approach Delay (s)	0.9	2.2	12.1	27.0
Approach LOS			B	D

Intersection Summary				
Average Delay			16.8	
Intersection Capacity Utilization			41.3%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	71	271	190	36	62	96
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	89	339	238	45	78	120
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	282				776	260
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	282				776	260
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				77	84
cM capacity (veh/h)	1263				337	774

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	428	282	198
Volume Left	89	0	78
Volume Right	0	45	120
cSH	1263	1700	513
Volume to Capacity	0.07	0.17	0.38
Queue Length 95th (ft)	6	0	45
Control Delay (s)	2.2	0.0	16.3
Lane LOS	A		C
Approach Delay (s)	2.2	0.0	16.3
Approach LOS			C

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	49	15	18	35	8	28	8	44	11	37	74
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	12	57	17	21	41	9	33	9	51	13	43	86
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									3			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	50			74			284	181	66	181	185	45
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	50			74			284	181	66	181	185	45
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	99			99			94	99	95	98	94	92
cM capacity (veh/h)	1519			1482			561	686	979	714	689	1016

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	86	71	93	142
Volume Left	12	21	33	13
Volume Right	17	9	51	86
cSH	1519	1482	1309	859
Volume to Capacity	0.01	0.01	0.07	0.17
Queue Length 95th (ft)	1	1	6	15
Control Delay (s)	1.0	2.3	10.1	10.0
Lane LOS	A	A	B	B
Approach Delay (s)	1.0	2.3	10.1	10.0
Approach LOS			B	B

Intersection Summary				
Average Delay			6.7	
Intersection Capacity Utilization			26.7%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	20	75	39	69	90	20
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	24	91	48	84	110	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	291	48			48	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	291	48			48	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	96	91			93	
cM capacity (veh/h)	642	1010			1553	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	24	91	48	84	134
Volume Left	24	0	0	0	110
Volume Right	0	91	0	84	0
cSH	642	1010	1700	1700	1553
Volume to Capacity	0.04	0.09	0.03	0.05	0.07
Queue Length 95th (ft)	3	7	0	0	6
Control Delay (s)	10.8	8.9	0.0	0.0	6.2
Lane LOS	B	A			A
Approach Delay (s)	9.3		0.0		6.2
Approach LOS	A				

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	22.7%	ICU Level of Service	A
Analysis Period (min)	15		

N Loop Rd
Outer Loop Rd
N Loop Rd
5th St
5th St
5th
B Ave
Inner Loop
B Ave
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
N Loop Rd
Goldstone Rd
Goldstone Rd
N Loop Rd
N Loop Rd
North Loop
N Loop Rd
N Loop Rd
Fort Irwin
Fort Irwin, CA 92310

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	23	25	12	79	16	71	7	28	48	40	41	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	28	30	15	96	20	87	9	34	59	49	50	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	295	257	50	229	204	34	55			93		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	295	257	50	229	204	34	55			93		
tC, single (s)	7.2	6.6	6.3	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	95	95	99	86	97	92	99			97		
cM capacity (veh/h)	565	615	1007	669	666	1039	1544			1477		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	28	45	96	106	43	59	99	5
Volume Left	28	0	96	0	9	0	49	0
Volume Right	0	15	0	87	0	59	0	5
cSH	565	704	669	942	1544	1700	1477	1700
Volume to Capacity	0.05	0.06	0.14	0.11	0.01	0.03	0.03	0.00
Queue Length 95th (ft)	4	5	13	9	0	0	3	0
Control Delay (s)	11.7	10.5	11.3	9.3	1.5	0.0	3.8	0.0
Lane LOS	B	B	B	A	A		A	
Approach Delay (s)	10.9		10.2		0.6		3.7	
Approach LOS	B		B					

Intersection Summary				
Average Delay	6.9			
Intersection Capacity Utilization	28.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	22	30	29	36	92	42
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71	0.71
Hourly flow rate (vph)	31	42	41	51	130	59
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			73		185	52
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			73		185	52
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			97		83	94
cM capacity (veh/h)			1495		774	1004

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	73	92	189
Volume Left	0	41	130
Volume Right	42	0	59
cSH	1700	1495	834
Volume to Capacity	0.04	0.03	0.23
Queue Length 95th (ft)	0	2	22
Control Delay (s)	0.0	3.5	10.6
Lane LOS		A	B
Approach Delay (s)	0.0	3.5	10.6
Approach LOS			B

Intersection Summary			
Average Delay	6.5		
Intersection Capacity Utilization	24.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	21	41	41	82	183	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	30	59	59	117	261	57
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	524	290	319			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	524	290	319			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	92	95			
cM capacity (veh/h)	489	749	1241			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	89	176	319
Volume Left	30	59	0
Volume Right	59	0	57
cSH	635	1241	1700
Volume to Capacity	0.14	0.05	0.19
Queue Length 95th (ft)	12	4	0
Control Delay (s)	11.6	3.0	0.0
Lane LOS	B	A	
Approach Delay (s)	11.6	3.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	24	47	13	27	56	81	12	127	13	45	52	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Hourly flow rate (vph)	32	64	18	36	76	109	16	172	18	61	70	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	185			81			389	395	72	444	349	130
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	185			81			389	395	72	444	349	130
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			97	67	98	83	87	99
cM capacity (veh/h)	1389			1510			485	513	984	365	543	911

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	114	222	205	145
Volume Left	32	36	16	61
Volume Right	18	109	18	14
cSH	1389	1510	533	465
Volume to Capacity	0.02	0.02	0.39	0.31
Queue Length 95th (ft)	2	2	45	33
Control Delay (s)	2.3	1.4	15.9	16.2
Lane LOS	A	A	C	C
Approach Delay (s)	2.3	1.4	15.9	16.2
Approach LOS			C	C

Intersection Summary				
Average Delay			9.0	
Intersection Capacity Utilization			34.8%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	87	223	200	38	49	104
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	110	282	253	48	62	132
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	301				780	277
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	301				780	277
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				81	83
cM capacity (veh/h)	1243				329	757

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	392	301	194
Volume Left	110	0	62
Volume Right	0	48	132
cSH	1243	1700	534
Volume to Capacity	0.09	0.18	0.36
Queue Length 95th (ft)	7	0	41
Control Delay (s)	2.9	0.0	15.5
Lane LOS	A		C
Approach Delay (s)	2.9	0.0	15.5
Approach LOS			C

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	32	55	19	42	75	5	13	16	28	2	11	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	39	66	23	51	90	6	16	19	34	2	13	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									3			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	96			89			369	352	78	359	361	93
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	96			89			369	352	78	359	361	93
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	97			97			97	96	97	100	97	99
cM capacity (veh/h)	1460			1463			530	528	964	529	528	955

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	128	147	69	29
Volume Left	39	51	16	2
Volume Right	23	6	34	13
cSH	1460	1463	1039	664
Volume to Capacity	0.03	0.03	0.07	0.04
Queue Length 95th (ft)	2	3	5	3
Control Delay (s)	2.4	2.8	10.6	10.7
Lane LOS	A	A	B	B
Approach Delay (s)	2.4	2.8	10.6	10.7
Approach LOS			B	B

Intersection Summary				
Average Delay			4.7	
Intersection Capacity Utilization			22.5%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	25	35	31	16	51	39
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74
Hourly flow rate (vph)	34	47	42	22	69	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	232	42			42	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	232	42			42	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	95	95			96	
cM capacity (veh/h)	714	1018			1561	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	34	47	42	22	122
Volume Left	34	0	0	0	69
Volume Right	0	47	0	22	0
cSH	714	1018	1700	1700	1561
Volume to Capacity	0.05	0.05	0.02	0.01	0.04
Queue Length 95th (ft)	4	4	0	0	3
Control Delay (s)	10.3	8.7	0.0	0.0	4.3
Lane LOS	B	A			A
Approach Delay (s)	9.4		0.0		4.3
Approach LOS	A				

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	21.5%	ICU Level of Service	A
Analysis Period (min)	15		

N Loop Rd
Outer Loop Rd
N Loop Rd
N Loop Rd
5th St
5th St
5th St
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
B Ave
B Ave
Inner Loop Cir
N Loop Rd
N Loop Rd
N Loop Rd
N Loop Rd
Goldstone Rd
Goldstone Rd
North Loop
S Loop Rd
Fort Irwin
Fort Irwin, CA 92310

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	20	11	86	12	77	1	14	86	56	61	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	11	22	12	97	13	87	1	16	97	63	69	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	306	309	69	236	230	16	87			112		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	306	309	69	236	230	16	87			112		
tC, single (s)	7.2	6.6	6.3	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	98	96	99	85	98	92	100			96		
cM capacity (veh/h)	558	572	983	665	640	1064	1503			1453		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	11	35	97	100	17	97	131	18
Volume Left	11	0	97	0	1	0	63	0
Volume Right	0	12	0	87	0	97	0	18
cSH	558	672	665	976	1503	1700	1453	1700
Volume to Capacity	0.02	0.05	0.15	0.10	0.00	0.06	0.04	0.01
Queue Length 95th (ft)	2	4	13	9	0	0	3	0
Control Delay (s)	11.6	10.6	11.3	9.1	0.5	0.0	3.8	0.0
Lane LOS	B	B	B	A	A		A	
Approach Delay (s)	10.9		10.2		0.1		3.4	
Approach LOS	B		B					

Intersection Summary				
Average Delay	6.0			
Intersection Capacity Utilization	31.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	12	29	29	40	99	39
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	13	32	32	44	109	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			45		137	29
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			45		137	29
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			98		87	96
cM capacity (veh/h)			1531		830	1034

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	45	76	152
Volume Left	0	32	109
Volume Right	32	0	43
cSH	1700	1531	879
Volume to Capacity	0.03	0.02	0.17
Queue Length 95th (ft)	0	2	16
Control Delay (s)	0.0	3.2	9.9
Lane LOS		A	A
Approach Delay (s)	0.0	3.2	9.9
Approach LOS			A

Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	24.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	35	22	34	202	77	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	38	24	37	217	83	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	381	91	99			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	381	91	99			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	98	98			
cM capacity (veh/h)	606	967	1494			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	61	254	99
Volume Left	38	37	0
Volume Right	24	0	16
cSH	708	1494	1700
Volume to Capacity	0.09	0.02	0.06
Queue Length 95th (ft)	7	2	0
Control Delay (s)	10.6	1.3	0.0
Lane LOS	B	A	
Approach Delay (s)	10.6	1.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	26	37	19	16	56	107	13	108	14	32	55	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	29	41	21	18	62	119	14	120	16	36	61	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	181			62			305	326	52	342	277	122
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	181			62			305	326	52	342	277	122
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			97	79	98	93	90	99
cM capacity (veh/h)	1394			1534			575	570	1011	488	605	921

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	91	199	150	104
Volume Left	29	18	14	36
Volume Right	21	119	16	8
cSH	1394	1534	597	573
Volume to Capacity	0.02	0.01	0.25	0.18
Queue Length 95th (ft)	2	1	25	17
Control Delay (s)	2.5	0.7	13.0	12.7
Lane LOS	A	A	B	B
Approach Delay (s)	2.5	0.7	13.0	12.7
Approach LOS			B	B

Intersection Summary				
Average Delay			6.7	
Intersection Capacity Utilization			30.1%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	82	147	242	56	25	69
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	94	169	278	64	29	79
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	343				668	310
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	343				668	310
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				93	89
cM capacity (veh/h)	1200				387	725

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	263	343	108
Volume Left	94	0	29
Volume Right	0	64	79
cSH	1200	1700	589
Volume to Capacity	0.08	0.20	0.18
Queue Length 95th (ft)	6	0	17
Control Delay (s)	3.4	0.0	12.5
Lane LOS	A		B
Approach Delay (s)	3.4	0.0	12.5
Approach LOS			B

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	44	18	27	55	11	31	18	15	6	14	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	24	52	21	32	65	13	36	21	18	7	16	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									3			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	78			73			259	251	62	255	255	71
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	78			73			259	251	62	255	255	71
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	98			98			94	97	98	99	97	99
cM capacity (veh/h)	1484			1484			642	617	983	644	620	983

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	96	109	75	31
Volume Left	24	32	36	7
Volume Right	21	13	18	7
cSH	1484	1484	827	684
Volume to Capacity	0.02	0.02	0.09	0.04
Queue Length 95th (ft)	1	2	7	4
Control Delay (s)	1.9	2.3	10.7	10.5
Lane LOS	A	A	B	B
Approach Delay (s)	1.9	2.3	10.7	10.5
Approach LOS			B	B

Intersection Summary				
Average Delay			5.0	
Intersection Capacity Utilization			21.2%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	65	76	45	40	43	46
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	74	86	51	45	49	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	201	51			51	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	201	51			51	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	90	91			97	
cM capacity (veh/h)	754	1006			1549	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	74	86	51	45	101
Volume Left	74	0	0	0	49
Volume Right	0	86	0	45	0
cSH	754	1006	1700	1700	1549
Volume to Capacity	0.10	0.09	0.03	0.03	0.03
Queue Length 95th (ft)	8	7	0	0	2
Control Delay (s)	10.3	8.9	0.0	0.0	3.7
Lane LOS	B	A			A
Approach Delay (s)	9.6		0.0		3.7
Approach LOS	A				

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	21.7%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D
2011 No-Build: Intersection Analysis Output Sheets

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N Loop Rd
Outer Loop Rd
N Loop Rd
N Loop Rd
5th St
5th St
5th St
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
V Loop Rd
B Ave
Inner Loop Cl
B Ave
Ft Irwin Rd
Ft Irwin Rd
Goldstone Rd
Goldstone Rd
N Loop Rd
N Loop Rd
Ft Irwin Rd
Ft
N Loop Rd
N Loop Rd
Fort Irwin
Fort Irwin, CA 92310

1: Goldstone Rd & N Loop Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	27	9	103	10	49	6	39	105	46	52	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	18	35	12	134	13	64	8	51	136	60	68	19
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	323	390	68	282	273	51	87			187		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	323	390	68	282	273	51	87			187		
tC, single (s)	7.2	6.6	6.3	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	97	93	99	78	98	94	99			96		
cM capacity (veh/h)	552	513	985	604	603	1017	1503			1364		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	18	47	134	77	58	136	127	19
Volume Left	18	0	134	0	8	0	60	0
Volume Right	0	12	0	64	0	136	0	19
cSH	552	583	604	911	1503	1700	1364	1700
Volume to Capacity	0.03	0.08	0.22	0.08	0.01	0.08	0.04	0.01
Queue Length 95th (ft)	3	7	21	7	0	0	3	0
Control Delay (s)	11.7	11.7	12.6	9.3	1.0	0.0	3.8	0.0
Lane LOS	B	B	B	A	A		A	
Approach Delay (s)	11.7		11.4		0.3		3.3	
Approach LOS	B		B					

Intersection Summary				
Average Delay		6.0		
Intersection Capacity Utilization		31.0%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	22	90	39	24	99	37
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	31	129	56	34	141	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			160		241	96
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			160		241	96
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			96		80	94
cM capacity (veh/h)			1389		709	950

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	160	90	194
Volume Left	0	56	141
Volume Right	129	0	53
cSH	1700	1389	761
Volume to Capacity	0.09	0.04	0.26
Queue Length 95th (ft)	0	3	25
Control Delay (s)	0.0	4.9	11.3
Lane LOS		A	B
Approach Delay (s)	0.0	4.9	11.3
Approach LOS			B

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	24.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	19	76	31	52	217	47
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	25	101	41	69	289	63
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	473	321	352			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	473	321	352			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	86	97			
cM capacity (veh/h)	531	720	1207			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	127	111	352
Volume Left	25	41	0
Volume Right	101	0	63
cSH	672	1207	1700
Volume to Capacity	0.19	0.03	0.21
Queue Length 95th (ft)	17	3	0
Control Delay (s)	11.6	3.2	0.0
Lane LOS	B	A	
Approach Delay (s)	11.6	3.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	65	12	27	42	31	13	45	34	149	133	39
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	14	89	16	37	58	42	18	62	47	204	182	53
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	100			105			422	299	97	355	286	79
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	100			105			422	299	97	355	286	79
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			95	90	95	60	70	95
cM capacity (veh/h)	1493			1480			379	589	953	507	598	973

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	119	137	126	440
Volume Left	14	37	18	204
Volume Right	16	42	47	53
cSH	1493	1480	629	577
Volume to Capacity	0.01	0.02	0.20	0.76
Queue Length 95th (ft)	1	2	19	172
Control Delay (s)	0.9	2.2	12.2	28.5
Lane LOS	A	A	B	D
Approach Delay (s)	0.9	2.2	12.2	28.5
Approach LOS			B	D

Intersection Summary				
Average Delay			17.6	
Intersection Capacity Utilization			41.7%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	72	275	193	37	63	97
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	90	344	241	46	79	121
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	288				788	264
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	288				788	264
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				76	84
cM capacity (veh/h)	1257				332	769

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	434	288	200
Volume Left	90	0	79
Volume Right	0	46	121
cSH	1257	1700	506
Volume to Capacity	0.07	0.17	0.40
Queue Length 95th (ft)	6	0	47
Control Delay (s)	2.3	0.0	16.7
Lane LOS	A		C
Approach Delay (s)	2.3	0.0	16.7
Approach LOS			C

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	50	15	18	36	8	28	8	45	11	38	75
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	12	58	17	21	42	9	33	9	52	13	44	87
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									3			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	51			76			288	183	67	183	187	47
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	51			76			288	183	67	183	187	47
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	99			99			94	99	95	98	94	91
cM capacity (veh/h)	1517			1480			556	683	977	711	687	1014

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	87	72	94	144
Volume Left	12	21	33	13
Volume Right	17	9	52	87
cSH	1517	1480	1315	857
Volume to Capacity	0.01	0.01	0.07	0.17
Queue Length 95th (ft)	1	1	6	15
Control Delay (s)	1.0	2.2	10.1	10.1
Lane LOS	A	A	B	B
Approach Delay (s)	1.0	2.2	10.1	10.1
Approach LOS			B	B

Intersection Summary				
Average Delay			6.7	
Intersection Capacity Utilization			26.9%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	20	76	40	70	91	20
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	24	93	49	85	111	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	295	49			49	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	295	49			49	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	96	91			93	
cM capacity (veh/h)	638	1009			1552	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	24	93	49	85	135
Volume Left	24	0	0	0	111
Volume Right	0	93	0	85	0
cSH	638	1009	1700	1700	1552
Volume to Capacity	0.04	0.09	0.03	0.05	0.07
Queue Length 95th (ft)	3	8	0	0	6
Control Delay (s)	10.9	8.9	0.0	0.0	6.2
Lane LOS	B	A			A
Approach Delay (s)	9.3		0.0		6.2
Approach LOS	A				

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		

N Loop Rd
Outer Loop Rd
N Loop Rd
N Loop Rd
N Loop Rd
5th St
5th St
5th St
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
V Loop Rd
B Ave
B Ave
Inner Loop Cir
Goldstone Rd
Goldstone Rd
N Loop Rd
N Loop Rd
N Loop Rd
N Loop Rd
Fort Irwin
Fort Irwin, CA 92310

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	23	25	12	80	16	72	7	28	49	41	42	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	28	30	15	98	20	88	9	34	60	50	51	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	300	262	51	232	207	34	56			94		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	300	262	51	232	207	34	56			94		
tC, single (s)	7.2	6.6	6.3	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	95	95	99	85	97	92	99			97		
cM capacity (veh/h)	560	611	1005	664	662	1039	1542			1475		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	28	45	98	107	43	60	101	5
Volume Left	28	0	98	0	9	0	50	0
Volume Right	0	15	0	88	0	60	0	5
cSH	560	700	664	942	1542	1700	1475	1700
Volume to Capacity	0.05	0.06	0.15	0.11	0.01	0.04	0.03	0.00
Queue Length 95th (ft)	4	5	13	10	0	0	3	0
Control Delay (s)	11.8	10.5	11.3	9.3	1.5	0.0	3.9	0.0
Lane LOS	B	B	B	A	A		A	
Approach Delay (s)	11.0		10.3		0.6		3.7	
Approach LOS	B		B					

Intersection Summary				
Average Delay	6.9			
Intersection Capacity Utilization	28.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	22	31	29	37	93	43
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71	0.71
Hourly flow rate (vph)	31	44	41	52	131	61
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			75		187	53
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			75		187	53
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			97		83	94
cM capacity (veh/h)			1494		772	1003

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	75	93	192
Volume Left	0	41	131
Volume Right	44	0	61
cSH	1700	1494	833
Volume to Capacity	0.04	0.03	0.23
Queue Length 95th (ft)	0	2	22
Control Delay (s)	0.0	3.4	10.6
Lane LOS		A	B
Approach Delay (s)	0.0	3.4	10.6
Approach LOS			B

Intersection Summary			
Average Delay	6.5		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	21	42	42	83	186	41
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	30	60	60	119	266	59
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	534	295	324			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	534	295	324			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	92	95			
cM capacity (veh/h)	482	744	1235			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	90	179	324
Volume Left	30	60	0
Volume Right	60	0	59
cSH	630	1235	1700
Volume to Capacity	0.14	0.05	0.19
Queue Length 95th (ft)	12	4	0
Control Delay (s)	11.7	3.0	0.0
Lane LOS	B	A	
Approach Delay (s)	11.7	3.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	24	48	13	27	57	82	12	129	13	46	53	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Hourly flow rate (vph)	32	65	18	36	77	111	16	174	18	62	72	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	188			82			393	399	74	449	353	132
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	188			82			393	399	74	449	353	132
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			97	66	98	83	87	99
cM capacity (veh/h)	1386			1508			481	510	983	359	541	909

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	115	224	208	147
Volume Left	32	36	16	62
Volume Right	18	111	18	14
cSH	1386	1508	529	460
Volume to Capacity	0.02	0.02	0.39	0.32
Queue Length 95th (ft)	2	2	46	34
Control Delay (s)	2.3	1.4	16.1	16.5
Lane LOS	A	A	C	C
Approach Delay (s)	2.3	1.4	16.1	16.5
Approach LOS			C	C

Intersection Summary				
Average Delay			9.2	
Intersection Capacity Utilization			35.1%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	88	226	203	39	50	106
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	111	286	257	49	63	134
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	306				791	282
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	306				791	282
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				80	82
cM capacity (veh/h)	1238				324	752

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	397	306	197
Volume Left	111	0	63
Volume Right	0	49	134
cSH	1238	1700	528
Volume to Capacity	0.09	0.18	0.37
Queue Length 95th (ft)	7	0	43
Control Delay (s)	2.9	0.0	15.8
Lane LOS	A		C
Approach Delay (s)	2.9	0.0	15.8
Approach LOS			C

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	33	56	19	43	76	5	13	16	28	2	11	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	40	67	23	52	92	6	16	19	34	2	13	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									3			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	98			90			377	360	79	366	368	95
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	98			90			377	360	79	366	368	95
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	97			96			97	96	96	100	97	99
cM capacity (veh/h)	1459			1462			524	522	962	522	522	954

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	130	149	69	29
Volume Left	40	52	16	2
Volume Right	23	6	34	13
cSH	1459	1462	1027	659
Volume to Capacity	0.03	0.04	0.07	0.04
Queue Length 95th (ft)	2	3	5	3
Control Delay (s)	2.5	2.8	10.7	10.7
Lane LOS	A	A	B	B
Approach Delay (s)	2.5	2.8	10.7	10.7
Approach LOS			B	B

Intersection Summary				
Average Delay			4.7	
Intersection Capacity Utilization			22.6%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	25	36	31	16	52	40
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74
Hourly flow rate (vph)	34	49	42	22	70	54
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	236	42			42	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	236	42			42	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	95	95			95	
cM capacity (veh/h)	710	1018			1561	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	34	49	42	22	124
Volume Left	34	0	0	0	70
Volume Right	0	49	0	22	0
cSH	710	1018	1700	1700	1561
Volume to Capacity	0.05	0.05	0.02	0.01	0.05
Queue Length 95th (ft)	4	4	0	0	4
Control Delay (s)	10.3	8.7	0.0	0.0	4.3
Lane LOS	B	A			A
Approach Delay (s)	9.4		0.0		4.3
Approach LOS	A				

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	21.6%	ICU Level of Service	A
Analysis Period (min)	15		

N Loop Rd
Outer Loop Rd
N Loop Rd
N Loop Rd
5th St
6th St
6th St
Inner Loop Cir
B Ave
B Ave
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
V Loop Rd
Goldstone Rd
Goldstone Rd
N Loop Rd
N Loop Rd
N Loop Rd
North Loop
N Loop Rd
Fort Irwin
Fort Irwin, CA 92310

1: Goldstone Rd & N Loop Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	20	11	87	12	78	1	14	87	57	62	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	11	22	12	98	13	88	1	16	98	64	70	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	310	313	70	239	234	16	88			113		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	310	313	70	239	234	16	88			113		
tC, single (s)	7.2	6.6	6.3	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	98	96	99	85	98	92	100			96		
cM capacity (veh/h)	553	569	982	661	637	1064	1502			1451		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	11	35	98	101	17	98	134	18
Volume Left	11	0	98	0	1	0	64	0
Volume Right	0	12	0	88	0	98	0	18
cSH	553	668	661	976	1502	1700	1451	1700
Volume to Capacity	0.02	0.05	0.15	0.10	0.00	0.06	0.04	0.01
Queue Length 95th (ft)	2	4	13	9	0	0	3	0
Control Delay (s)	11.6	10.7	11.4	9.1	0.5	0.0	3.8	0.0
Lane LOS	B	B	B	A	A		A	
Approach Delay (s)	10.9		10.2		0.1		3.4	
Approach LOS	B		B					

Intersection Summary				
Average Delay	6.0			
Intersection Capacity Utilization	31.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	12	29	29	41	101	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	13	32	32	45	111	44
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			45		138	29
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			45		138	29
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			98		87	96
cM capacity (veh/h)			1531		828	1034

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	45	77	155
Volume Left	0	32	111
Volume Right	32	0	44
cSH	1700	1531	878
Volume to Capacity	0.03	0.02	0.18
Queue Length 95th (ft)	0	2	16
Control Delay (s)	0.0	3.2	10.0
Lane LOS		A	A
Approach Delay (s)	0.0	3.2	10.0
Approach LOS			A

Intersection Summary			
Average Delay	6.5		
Intersection Capacity Utilization	25.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	36	22	35	205	78	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	39	24	38	220	84	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	388	92	100			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	388	92	100			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	98	97			
cM capacity (veh/h)	600	965	1493			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	62	258	100
Volume Left	39	38	0
Volume Right	24	0	16
cSH	701	1493	1700
Volume to Capacity	0.09	0.03	0.06
Queue Length 95th (ft)	7	2	0
Control Delay (s)	10.6	1.3	0.0
Lane LOS	B	A	
Approach Delay (s)	10.6	1.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	26	38	19	16	57	109	13	110	14	33	56	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	29	42	21	18	63	121	14	122	16	37	62	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	184			63			309	331	53	347	281	124
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	184			63			309	331	53	347	281	124
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			97	78	98	92	90	99
cM capacity (veh/h)	1390			1533			570	567	1009	483	603	919

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	92	202	152	107
Volume Left	29	18	14	37
Volume Right	21	121	16	8
cSH	1390	1533	594	568
Volume to Capacity	0.02	0.01	0.26	0.19
Queue Length 95th (ft)	2	1	25	17
Control Delay (s)	2.5	0.7	13.1	12.8
Lane LOS	A	A	B	B
Approach Delay (s)	2.5	0.7	13.1	12.8
Approach LOS			B	B

Intersection Summary				
Average Delay			6.8	
Intersection Capacity Utilization			30.7%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	83	149	246	57	25	70
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	95	171	283	66	29	80
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	348				678	316
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	348				678	316
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				92	89
cM capacity (veh/h)	1194				382	720

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	267	348	109
Volume Left	95	0	29
Volume Right	0	66	80
cSH	1194	1700	584
Volume to Capacity	0.08	0.20	0.19
Queue Length 95th (ft)	7	0	17
Control Delay (s)	3.4	0.0	12.6
Lane LOS	A		B
Approach Delay (s)	3.4	0.0	12.6
Approach LOS			B

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	45	18	27	56	11	32	18	15	6	14	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	24	53	21	32	66	13	38	21	18	7	16	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									3			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	79			74			262	253	64	257	257	72
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	79			74			262	253	64	257	257	72
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	98			98			94	97	98	99	97	99
cM capacity (veh/h)	1482			1482			640	615	982	641	618	981

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	98	111	76	31
Volume Left	24	32	38	7
Volume Right	21	13	18	7
cSH	1482	1482	820	682
Volume to Capacity	0.02	0.02	0.09	0.04
Queue Length 95th (ft)	1	2	8	4
Control Delay (s)	1.9	2.3	10.7	10.5
Lane LOS	A	A	B	B
Approach Delay (s)	1.9	2.3	10.7	10.5
Approach LOS			B	B

Intersection Summary				
Average Delay			5.0	
Intersection Capacity Utilization			21.2%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	66	77	46	41	44	47
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	75	88	52	47	50	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	206	52			52	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	206	52			52	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	90	91			97	
cM capacity (veh/h)	749	1004			1547	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	75	88	52	47	103
Volume Left	75	0	0	0	50
Volume Right	0	88	0	47	0
cSH	749	1004	1700	1700	1547
Volume to Capacity	0.10	0.09	0.03	0.03	0.03
Queue Length 95th (ft)	8	7	0	0	3
Control Delay (s)	10.3	8.9	0.0	0.0	3.7
Lane LOS	B	A			A
Approach Delay (s)	9.6		0.0		3.7
Approach LOS	A				

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	21.9%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix E
2031 No-Build: Intersection Analysis Output Sheets

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N Loop Rd
Outer Loop Rd
N Loop Rd
N Loop Rd
5th St
5th St
5th St
B Ave
B Ave
Inner Loop Cir
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Ft Irwin Rd
Goldstone Rd
Goldstone Rd
N Loop Rd
N Loop Rd
N Loop Rd
N Loop Rd
Fort Irwin
Fort Irwin, CA 92310

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	19	37	12	138	14	66	8	52	141	62	70	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	40	13	150	15	72	9	57	153	67	76	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	364	438	76	318	308	57	99			210		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	364	438	76	318	308	57	99			210		
tC, single (s)	7.2	6.6	6.3	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	96	92	99	73	97	93	99			95		
cM capacity (veh/h)	509	478	974	561	572	1010	1488			1337		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	21	53	150	87	65	153	143	23
Volume Left	21	0	150	0	9	0	67	0
Volume Right	0	13	0	72	0	153	0	23
cSH	509	546	561	891	1488	1700	1337	1700
Volume to Capacity	0.04	0.10	0.27	0.10	0.01	0.09	0.05	0.01
Queue Length 95th (ft)	3	8	27	8	0	0	4	0
Control Delay (s)	12.4	12.3	13.7	9.5	1.0	0.0	3.9	0.0
Lane LOS	B	B	B	A	A		A	
Approach Delay (s)	12.3		12.2		0.3		3.4	
Approach LOS	B		B					

Intersection Summary				
Average Delay	6.4			
Intersection Capacity Utilization	34.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	30	122	52	33	133	49
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	133	57	36	145	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			165		248	99
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			165		248	99
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			96		79	94
cM capacity (veh/h)			1383		702	946

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	165	92	198
Volume Left	0	57	145
Volume Right	133	0	53
cSH	1700	1383	754
Volume to Capacity	0.10	0.04	0.26
Queue Length 95th (ft)	0	3	26
Control Delay (s)	0.0	4.8	11.5
Lane LOS		A	B
Approach Delay (s)	0.0	4.8	11.5
Approach LOS			B

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	26	103	41	70	293	63
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	112	45	76	318	68
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	518	353	387			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	518	353	387			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	84	96			
cM capacity (veh/h)	498	691	1172			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	140	121	387
Volume Left	28	45	0
Volume Right	112	0	68
cSH	641	1172	1700
Volume to Capacity	0.22	0.04	0.23
Queue Length 95th (ft)	21	3	0
Control Delay (s)	12.2	3.2	0.0
Lane LOS	B	A	
Approach Delay (s)	12.2	3.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	88	16	37	56	41	18	60	45	201	179	52
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	96	17	40	61	45	20	65	49	218	195	57
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	105			113			452	321	104	380	307	83
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	105			113			452	321	104	380	307	83
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			94	89	95	55	66	94
cM capacity (veh/h)	1486			1470			349	571	945	481	579	968

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	128	146	134	470
Volume Left	15	40	20	218
Volume Right	17	45	49	57
cSH	1486	1470	602	554
Volume to Capacity	0.01	0.03	0.22	0.85
Queue Length 95th (ft)	1	2	21	225
Control Delay (s)	1.0	2.2	12.7	37.7
Lane LOS	A	A	B	E
Approach Delay (s)	1.0	2.2	12.7	37.7
Approach LOS			B	E

Intersection Summary				
Average Delay			22.6	
Intersection Capacity Utilization			51.2%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	97	371	260	49	85	131
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	105	403	283	53	92	142
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	336				923	309
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	336				923	309
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				66	80
cM capacity (veh/h)	1207				271	726

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	509	336	235
Volume Left	105	0	92
Volume Right	0	53	142
cSH	1207	1700	437
Volume to Capacity	0.09	0.20	0.54
Queue Length 95th (ft)	7	0	78
Control Delay (s)	2.5	0.0	22.4
Lane LOS	A		C
Approach Delay (s)	2.5	0.0	22.4
Approach LOS			C

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	67	21	25	48	11	38	11	60	15	51	101
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	73	23	27	52	12	41	12	65	16	55	110
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									3			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	64			96			365	233	84	233	239	58
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			96			365	233	84	233	239	58
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	99			98			91	98	93	97	91	89
cM capacity (veh/h)	1501			1455			470	636	956	643	638	999

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	111	91	118	182
Volume Left	15	27	41	16
Volume Right	23	12	65	110
cSH	1501	1455	1129	818
Volume to Capacity	0.01	0.02	0.10	0.22
Queue Length 95th (ft)	1	1	9	21
Control Delay (s)	1.1	2.3	10.8	10.7
Lane LOS	A	A	B	B
Approach Delay (s)	1.1	2.3	10.8	10.7
Approach LOS			B	B

Intersection Summary				
Average Delay			7.1	
Intersection Capacity Utilization			31.6%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	27	103	53	94	123	27
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	112	58	102	134	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	354	58			58	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354	58			58	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	95	89			91	
cM capacity (veh/h)	580	997			1540	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	29	112	58	102	163
Volume Left	29	0	0	0	134
Volume Right	0	112	0	102	0
cSH	580	997	1700	1700	1540
Volume to Capacity	0.05	0.11	0.03	0.06	0.09
Queue Length 95th (ft)	4	9	0	0	7
Control Delay (s)	11.5	9.1	0.0	0.0	6.3
Lane LOS	B	A			A
Approach Delay (s)	9.6		0.0		6.3
Approach LOS	A				

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	24.9%	ICU Level of Service	A
Analysis Period (min)	15		

N Loop Rd
Outer Loop Rd
N Loop Rd
N Loop Rd
Ft Irwin Rd
5th St
5th St
5th St
Ft Irwin Rd
N Loop Rd
Ft Irwin Rd
B Ave
Inner Loop Cir
B Ave
Ft Irwin Rd
Ft Irwin Rd
Goldstone Rd
Goldstone Rd
N Loop Rd
N Loop Rd
Ft Irwin Rd
Fort Irwin
Fort Irwin, CA 92310
N Loop Rd
North Loop
N Loop Rd
Ft
N Loop Rd
S Loop Rd

1: Goldstone Rd & N Loop Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	31	34	16	108	22	97	10	38	66	55	56	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	37	17	117	24	105	11	41	72	60	61	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	361	315	61	279	250	41	67			113		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	361	315	61	279	250	41	67			113		
tC, single (s)	7.2	6.6	6.3	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	93	93	98	81	96	90	99			96		
cM capacity (veh/h)	493	565	993	605	622	1030	1528			1452		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	34	54	117	129	52	72	121	7
Volume Left	34	0	117	0	11	0	60	0
Volume Right	0	17	0	105	0	72	0	7
cSH	493	656	605	918	1528	1700	1452	1700
Volume to Capacity	0.07	0.08	0.19	0.14	0.01	0.04	0.04	0.00
Queue Length 95th (ft)	5	7	18	12	1	0	3	0
Control Delay (s)	12.8	11.0	12.4	9.6	1.6	0.0	3.9	0.0
Lane LOS	B	B	B	A	A		A	
Approach Delay (s)	11.7		10.9		0.7		3.7	
Approach LOS	B		B					

Intersection Summary				
Average Delay	7.3			
Intersection Capacity Utilization	32.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	30	41	40	49	126	57
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	45	43	53	137	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			77		195	55
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			77		195	55
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			97		82	94
cM capacity (veh/h)			1490		762	1001

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	77	97	199
Volume Left	0	43	137
Volume Right	45	0	62
cSH	1700	1490	823
Volume to Capacity	0.05	0.03	0.24
Queue Length 95th (ft)	0	2	24
Control Delay (s)	0.0	3.5	10.8
Lane LOS		A	B
Approach Delay (s)	0.0	3.5	10.8
Approach LOS			B

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	29	56	56	112	250	55
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	61	61	122	272	60
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	545	302	332			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	545	302	332			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	92	95			
cM capacity (veh/h)	475	738	1228			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	92	183	332
Volume Left	32	61	0
Volume Right	61	0	60
cSH	620	1228	1700
Volume to Capacity	0.15	0.05	0.20
Queue Length 95th (ft)	13	4	0
Control Delay (s)	11.8	3.0	0.0
Lane LOS	B	A	
Approach Delay (s)	11.8	3.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	33	64	18	37	77	111	16	174	18	62	71	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	70	20	40	84	121	17	189	20	67	77	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	204			89			429	436	79	490	385	144
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	204			89			429	436	79	490	385	144
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			97			96	61	98	79	85	98
cM capacity (veh/h)	1367			1500			445	484	975	318	515	895

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	125	245	226	160
Volume Left	36	40	17	67
Volume Right	20	121	20	15
cSH	1367	1500	503	422
Volume to Capacity	0.03	0.03	0.45	0.38
Queue Length 95th (ft)	2	2	57	43
Control Delay (s)	2.4	1.4	17.9	18.6
Lane LOS	A	A	C	C
Approach Delay (s)	2.4	1.4	17.9	18.6
Approach LOS			C	C

Intersection Summary				
Average Delay			10.1	
Intersection Capacity Utilization			44.0%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	119	305	273	52	67	142
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	129	332	297	57	73	154
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	353				915	325
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	353				915	325
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				73	78
cM capacity (veh/h)	1189				268	712

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	461	353	227
Volume Left	129	0	73
Volume Right	0	57	154
cSH	1189	1700	464
Volume to Capacity	0.11	0.21	0.49
Queue Length 95th (ft)	9	0	66
Control Delay (s)	3.2	0.0	19.9
Lane LOS	A		C
Approach Delay (s)	3.2	0.0	19.9
Approach LOS			C

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	44	75	26	57	103	7	18	22	38	3	15	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	82	28	62	112	8	20	24	41	3	16	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									3			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	120			110			455	435	96	443	445	116
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	120			110			455	435	96	443	445	116
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	97			96			96	95	96	99	96	98
cM capacity (veh/h)	1432			1438			454	466	942	450	465	928

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	158	182	85	36
Volume Left	48	62	20	3
Volume Right	28	8	41	16
cSH	1432	1438	898	600
Volume to Capacity	0.03	0.04	0.09	0.06
Queue Length 95th (ft)	3	3	8	5
Control Delay (s)	2.5	2.8	11.4	11.4
Lane LOS	A	A	B	B
Approach Delay (s)	2.5	2.8	11.4	11.4
Approach LOS			B	B

Intersection Summary				
Average Delay			5.0	
Intersection Capacity Utilization			25.9%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	34	48	42	22	70	53
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	37	52	46	24	76	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	255	46			46	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	255	46			46	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	95	95			95	
cM capacity (veh/h)	689	1013			1556	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	37	52	46	24	134
Volume Left	37	0	0	0	76
Volume Right	0	52	0	24	0
cSH	689	1013	1700	1700	1556
Volume to Capacity	0.05	0.05	0.03	0.01	0.05
Queue Length 95th (ft)	4	4	0	0	4
Control Delay (s)	10.5	8.7	0.0	0.0	4.4
Lane LOS	B	A			A
Approach Delay (s)	9.5		0.0		4.4
Approach LOS	A				

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	23.3%	ICU Level of Service	A
Analysis Period (min)	15		

N Loop Rd
Outer Loop Rd
N Loop Rd
N Loop Rd
5th St
5th St
5th
Ft Irwin Rd
V Loop Rd
Ft Irwin Rd
Ft Irwin Rd
B Ave
Inner Loop Cir
B Ave
Ft Irwin Rd
Goldstone Rd
Goldstone Rd
N Loop Rd
N Loop Rd
Fort Irwin
Fort Irwin, CA 92310
Ft Irwin Rd
N Loop Rd
N Loop Rd
S Loop Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	27	15	118	16	105	1	19	118	77	83	22
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	29	16	128	17	114	1	21	128	84	90	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	403	409	90	311	304	21	114			149		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	403	409	90	311	304	21	114			149		
tC, single (s)	7.2	6.6	6.3	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	97	94	98	78	97	89	100			94		
cM capacity (veh/h)	458	495	957	574	572	1057	1469			1408		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	15	46	128	132	22	128	174	24
Volume Left	15	0	128	0	1	0	84	0
Volume Right	0	16	0	114	0	128	0	24
cSH	458	598	574	951	1469	1700	1408	1700
Volume to Capacity	0.03	0.08	0.22	0.14	0.00	0.08	0.06	0.01
Queue Length 95th (ft)	3	6	21	12	0	0	5	0
Control Delay (s)	13.1	11.5	13.1	9.4	0.4	0.0	4.0	0.0
Lane LOS	B	B	B	A	A		A	
Approach Delay (s)	11.9		11.2		0.1		3.5	
Approach LOS	B		B					

Intersection Summary				
Average Delay	6.5			
Intersection Capacity Utilization	35.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	16	40	40	55	135	53
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	43	43	60	147	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			61		186	39
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			61		186	39
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			97		81	94
cM capacity (veh/h)			1511		771	1021

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	61	103	204
Volume Left	0	43	147
Volume Right	43	0	58
cSH	1700	1511	829
Volume to Capacity	0.04	0.03	0.25
Queue Length 95th (ft)	0	2	24
Control Delay (s)	0.0	3.3	10.8
Lane LOS		A	B
Approach Delay (s)	0.0	3.3	10.8
Approach LOS			B

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	48	30	46	276	105	21
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	52	33	50	300	114	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	526	126	137			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	526	126	137			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	96	97			
cM capacity (veh/h)	495	925	1447			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	85	350	137
Volume Left	52	50	0
Volume Right	33	0	23
cSH	603	1447	1700
Volume to Capacity	0.14	0.03	0.08
Queue Length 95th (ft)	12	3	0
Control Delay (s)	11.9	1.4	0.0
Lane LOS	B	A	
Approach Delay (s)	11.9	1.4	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	36	51	26	22	77	146	18	148	19	44	75	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	55	28	24	84	159	20	161	21	48	82	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	242			84			410	438	70	460	373	163
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	242			84			410	438	70	460	373	163
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			96	67	98	87	85	99
cM capacity (veh/h)	1324			1507			461	486	988	357	528	874

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	123	266	201	140
Volume Left	39	24	20	48
Volume Right	28	159	21	11
cSH	1324	1507	510	466
Volume to Capacity	0.03	0.02	0.39	0.30
Queue Length 95th (ft)	2	1	47	31
Control Delay (s)	2.7	0.8	16.6	16.0
Lane LOS	A	A	C	C
Approach Delay (s)	2.7	0.8	16.6	16.0
Approach LOS			C	C

Intersection Summary				
Average Delay			8.4	
Intersection Capacity Utilization			38.7%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	112	201	331	77	34	94
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	122	218	360	84	37	102
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	443				864	402
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	443				864	402
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				87	84
cM capacity (veh/h)	1101				287	644

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	340	443	139
Volume Left	122	0	37
Volume Right	0	84	102
cSH	1101	1700	484
Volume to Capacity	0.11	0.26	0.29
Queue Length 95th (ft)	9	0	29
Control Delay (s)	3.8	0.0	15.4
Lane LOS	A		C
Approach Delay (s)	3.8	0.0	15.4
Approach LOS			C

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	27	60	25	37	75	15	42	25	21	8	19	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	65	27	40	82	16	46	27	23	9	21	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									3			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	98			92			327	316	79	321	321	90
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	98			92			327	316	79	321	321	90
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	98			97			92	95	98	98	96	99
cM capacity (veh/h)	1458			1459			570	561	963	567	563	960

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	122	138	96	38
Volume Left	29	40	46	9
Volume Right	27	16	23	9
cSH	1458	1459	744	623
Volume to Capacity	0.02	0.03	0.13	0.06
Queue Length 95th (ft)	2	2	11	5
Control Delay (s)	1.9	2.4	11.5	11.2
Lane LOS	A	A	B	B
Approach Delay (s)	1.9	2.4	11.5	11.2
Approach LOS			B	B

Intersection Summary				
Average Delay			5.3	
Intersection Capacity Utilization			25.2%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	89	104	62	55	59	63
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	97	113	67	60	64	68
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	264	67			67	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	264	67			67	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	86	89			96	
cM capacity (veh/h)	686	985			1528	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	97	113	67	60	133
Volume Left	97	0	0	0	64
Volume Right	0	113	0	60	0
cSH	686	985	1700	1700	1528
Volume to Capacity	0.14	0.11	0.04	0.04	0.04
Queue Length 95th (ft)	12	10	0	0	3
Control Delay (s)	11.1	9.1	0.0	0.0	3.8
Lane LOS	B	A			A
Approach Delay (s)	10.0		0.0		3.8
Approach LOS	B				

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	24.8%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix F
2031 Build: Intersection Analysis Output Sheets

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Outer Loop Rd
N Loop Rd
Inner Loop Cir
Goldstone Rd
Ft Irwin Rd
B Ave
5th St
Fort Irwin
Fort Irwin, CA 92310
North Loop
S Loop Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	19	37	12	138	14	66	8	52	141	62	70	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	40	13	150	15	72	9	57	153	67	76	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	364	438	76	318	308	57	99			210		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	364	438	76	318	308	57	99			210		
tC, single (s)	7.2	6.6	6.3	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	96	92	99	73	97	93	99			95		
cM capacity (veh/h)	509	478	974	561	572	1010	1488			1337		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	21	53	150	87	65	153	143	23
Volume Left	21	0	150	0	9	0	67	0
Volume Right	0	13	0	72	0	153	0	23
cSH	509	546	561	891	1488	1700	1337	1700
Volume to Capacity	0.04	0.10	0.27	0.10	0.01	0.09	0.05	0.01
Queue Length 95th (ft)	3	8	27	8	0	0	4	0
Control Delay (s)	12.4	12.3	13.7	9.5	1.0	0.0	3.9	0.0
Lane LOS	B	B	B	A	A		A	
Approach Delay (s)	12.3		12.2		0.3		3.4	
Approach LOS	B		B					

Intersection Summary				
Average Delay	6.4			
Intersection Capacity Utilization	34.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	30	122	52	33	133	49
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	133	57	36	145	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			165		248	99
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			165		248	99
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			96		79	94
cM capacity (veh/h)			1383		702	946

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	165	92	198
Volume Left	0	57	145
Volume Right	133	0	53
cSH	1700	1383	754
Volume to Capacity	0.10	0.04	0.26
Queue Length 95th (ft)	0	3	26
Control Delay (s)	0.0	4.8	11.5
Lane LOS		A	B
Approach Delay (s)	0.0	4.8	11.5
Approach LOS			B

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	23	14	92	20	10	19	30	53	28	28	270	58
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	15	100	22	11	21	33	58	30	30	293	63
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	550	539	325	632	555	73	357			88		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	550	539	325	632	555	73	357			88		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	96	86	93	97	98	97			98		
cM capacity (veh/h)	413	428	716	317	419	989	1202			1495		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	140	53	121	387
Volume Left	25	22	33	30
Volume Right	100	21	30	63
cSH	595	462	1202	1495
Volume to Capacity	0.24	0.12	0.03	0.02
Queue Length 95th (ft)	23	10	2	2
Control Delay (s)	12.9	13.8	2.4	0.8
Lane LOS	B	B	A	A
Approach Delay (s)	12.9	13.8	2.4	0.8
Approach LOS	B	B		

Intersection Summary				
Average Delay		4.5		
Intersection Capacity Utilization		35.4%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	88	16	37	56	41	18	60	45	201	179	52
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	96	17	40	61	45	20	65	49	218	195	57
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	105			113			452	321	104	380	307	83
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	105			113			452	321	104	380	307	83
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			94	89	95	55	66	94
cM capacity (veh/h)	1486			1470			349	571	945	481	579	968

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	128	146	134	470
Volume Left	15	40	20	218
Volume Right	17	45	49	57
cSH	1486	1470	602	554
Volume to Capacity	0.01	0.03	0.22	0.85
Queue Length 95th (ft)	1	2	21	225
Control Delay (s)	1.0	2.2	12.7	37.7
Lane LOS	A	A	B	E
Approach Delay (s)	1.0	2.2	12.7	37.7
Approach LOS			B	E

Intersection Summary				
Average Delay			22.6	
Intersection Capacity Utilization			51.2%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	97	371	260	49	85	131
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	105	403	283	53	92	142
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	336				923	309
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	336				923	309
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				66	80
cM capacity (veh/h)	1207				271	726

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	509	336	235
Volume Left	105	0	92
Volume Right	0	53	142
cSH	1207	1700	437
Volume to Capacity	0.09	0.20	0.54
Queue Length 95th (ft)	7	0	78
Control Delay (s)	2.5	0.0	22.4
Lane LOS	A		C
Approach Delay (s)	2.5	0.0	22.4
Approach LOS			C

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	67	21	25	48	11	38	11	60	15	51	101
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	73	23	27	52	12	41	12	65	16	55	110
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									3			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	64			96			365	233	84	233	239	58
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			96			365	233	84	233	239	58
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	99			98			91	98	93	97	91	89
cM capacity (veh/h)	1501			1455			470	636	956	643	638	999

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	111	91	118	182
Volume Left	15	27	41	16
Volume Right	23	12	65	110
cSH	1501	1455	1129	818
Volume to Capacity	0.01	0.02	0.10	0.22
Queue Length 95th (ft)	1	1	9	21
Control Delay (s)	1.1	2.3	10.8	10.7
Lane LOS	A	A	B	B
Approach Delay (s)	1.1	2.3	10.8	10.7
Approach LOS			B	B

Intersection Summary				
Average Delay			7.1	
Intersection Capacity Utilization			31.6%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	27	103	53	94	123	27
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	112	58	102	134	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	354	58			58	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354	58			58	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	95	89			91	
cM capacity (veh/h)	580	997			1540	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	29	112	58	102	163
Volume Left	29	0	0	0	134
Volume Right	0	112	0	102	0
cSH	580	997	1700	1700	1540
Volume to Capacity	0.05	0.11	0.03	0.06	0.09
Queue Length 95th (ft)	4	9	0	0	7
Control Delay (s)	11.5	9.1	0.0	0.0	6.3
Lane LOS	B	A			A
Approach Delay (s)	9.6		0.0		6.3
Approach LOS	A				

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	24.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	14	320	124	15	10	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	348	135	16	11	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	151				521	143
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	151				521	143
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	99
cM capacity (veh/h)	1424				508	902

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	363	151	22
Volume Left	15	0	11
Volume Right	0	16	11
cSH	1424	1700	650
Volume to Capacity	0.01	0.09	0.03
Queue Length 95th (ft)	1	0	3
Control Delay (s)	0.4	0.0	10.7
Lane LOS	A		B
Approach Delay (s)	0.4	0.0	10.7
Approach LOS			B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	15	315	129	14	10	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	342	140	15	11	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	155				523	148
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	155				523	148
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	99
cM capacity (veh/h)	1419				507	896

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	359	155	22
Volume Left	16	0	11
Volume Right	0	15	11
cSH	1419	1700	647
Volume to Capacity	0.01	0.09	0.03
Queue Length 95th (ft)	1	0	3
Control Delay (s)	0.4	0.0	10.8
Lane LOS	A		B
Approach Delay (s)	0.4	0.0	10.8
Approach LOS			B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	157	10	15	78	7	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	171	11	16	85	8	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			182		293	176
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			182		293	176
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			99		99	99
cM capacity (veh/h)			1364		683	859

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	182	101	18
Volume Left	0	16	8
Volume Right	11	0	11
cSH	1700	1364	777
Volume to Capacity	0.11	0.01	0.02
Queue Length 95th (ft)	0	1	2
Control Delay (s)	0.0	1.3	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	1.3	9.7
Approach LOS			A

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	26.9%	ICU Level of Service	A
Analysis Period (min)	15		

Outer Loop Rd
N Loop Rd
N Loop Rd Access
East
B Ave
Ft Irwin Rd
Inner Loop West Access
Inner Loop Cir
5th St
Goldstone Rd
Fort Irwin
Fort Irwin, CA 92310
North Loop
S Loop Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	31	34	16	108	22	97	10	38	66	55	56	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	37	17	117	24	105	11	41	72	60	61	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	361	315	61	279	250	41	67			113		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	361	315	61	279	250	41	67			113		
tC, single (s)	7.2	6.6	6.3	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	93	93	98	81	96	90	99			96		
cM capacity (veh/h)	493	565	993	605	622	1030	1528			1452		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	34	54	117	129	52	72	121	7
Volume Left	34	0	117	0	11	0	60	0
Volume Right	0	17	0	105	0	72	0	7
cSH	493	656	605	918	1528	1700	1452	1700
Volume to Capacity	0.07	0.08	0.19	0.14	0.01	0.04	0.04	0.00
Queue Length 95th (ft)	5	7	18	12	1	0	3	0
Control Delay (s)	12.8	11.0	12.4	9.6	1.6	0.0	3.9	0.0
Lane LOS	B	B	B	A	A		A	
Approach Delay (s)	11.7		10.9		0.7		3.7	
Approach LOS	B		B					

Intersection Summary				
Average Delay	7.3			
Intersection Capacity Utilization	32.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	30	41	40	49	126	57
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	45	43	53	137	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			77		195	55
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			77		195	55
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			97		82	94
cM capacity (veh/h)			1490		762	1001

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	77	97	199
Volume Left	0	43	137
Volume Right	45	0	62
cSH	1700	1490	823
Volume to Capacity	0.05	0.03	0.24
Queue Length 95th (ft)	0	2	24
Control Delay (s)	0.0	3.5	10.8
Lane LOS		A	B
Approach Delay (s)	0.0	3.5	10.8
Approach LOS			B

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	26	10	49	28	14	28	49	99	20	20	234	51
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	11	53	30	15	30	53	108	22	22	254	55
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	589	561	282	609	578	118	310			129		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	589	561	282	609	578	118	310			129		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	97	93	91	96	97	96			99		
cM capacity (veh/h)	378	411	757	355	402	933	1251			1456		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	92	76	183	332
Volume Left	28	30	53	22
Volume Right	53	30	22	55
cSH	538	487	1251	1456
Volume to Capacity	0.17	0.16	0.04	0.01
Queue Length 95th (ft)	15	14	3	1
Control Delay (s)	13.1	13.8	2.6	0.6
Lane LOS	B	B	A	A
Approach Delay (s)	13.1	13.8	2.6	0.6
Approach LOS	B	B		

Intersection Summary				
Average Delay		4.3		
Intersection Capacity Utilization		36.4%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	33	64	18	37	77	111	16	174	18	62	71	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	70	20	40	84	121	17	189	20	67	77	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					897							
pX, platoon unblocked												
vC, conflicting volume	204			89			429	436	79	490	385	144
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	204			89			429	436	79	490	385	144
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			97			96	61	98	79	85	98
cM capacity (veh/h)	1367			1500			445	484	975	318	515	895

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	125	245	226	160
Volume Left	36	40	17	67
Volume Right	20	121	20	15
cSH	1367	1500	503	422
Volume to Capacity	0.03	0.03	0.45	0.38
Queue Length 95th (ft)	2	2	57	43
Control Delay (s)	2.4	1.4	17.9	18.6
Lane LOS	A	A	C	C
Approach Delay (s)	2.4	1.4	17.9	18.6
Approach LOS			C	C

Intersection Summary				
Average Delay			10.1	
Intersection Capacity Utilization			44.0%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	119	305	273	52	67	142
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	129	332	297	57	73	154
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	353				915	325
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	353				915	325
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				73	78
cM capacity (veh/h)	1189				268	712

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	461	353	227
Volume Left	129	0	73
Volume Right	0	57	154
cSH	1189	1700	464
Volume to Capacity	0.11	0.21	0.49
Queue Length 95th (ft)	9	0	66
Control Delay (s)	3.2	0.0	19.9
Lane LOS	A		C
Approach Delay (s)	3.2	0.0	19.9
Approach LOS			C

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	44	75	26	57	103	7	18	22	38	3	15	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	82	28	62	112	8	20	24	41	3	16	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									3			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	120			110			455	435	96	443	445	116
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	120			110			455	435	96	443	445	116
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	97			96			96	95	96	99	96	98
cM capacity (veh/h)	1432			1438			454	466	942	450	465	928

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	158	182	85	36
Volume Left	48	62	20	3
Volume Right	28	8	41	16
cSH	1432	1438	898	600
Volume to Capacity	0.03	0.04	0.09	0.06
Queue Length 95th (ft)	3	3	8	5
Control Delay (s)	2.5	2.8	11.4	11.4
Lane LOS	A	A	B	B
Approach Delay (s)	2.5	2.8	11.4	11.4
Approach LOS			B	B

Intersection Summary				
Average Delay			5.0	
Intersection Capacity Utilization			25.9%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	34	48	42	22	70	53
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	37	52	46	24	76	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	255	46			46	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	255	46			46	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	95	95			95	
cM capacity (veh/h)	689	1013			1556	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	37	52	46	24	134
Volume Left	37	0	0	0	76
Volume Right	0	52	0	24	0
cSH	689	1013	1700	1700	1556
Volume to Capacity	0.05	0.05	0.03	0.01	0.05
Queue Length 95th (ft)	4	4	0	0	4
Control Delay (s)	10.5	8.7	0.0	0.0	4.4
Lane LOS	B	A			A
Approach Delay (s)	9.5		0.0		4.4
Approach LOS	A				

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	23.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	11	133	211	10	15	14
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	145	229	11	16	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			523			
pX, platoon unblocked						
vC, conflicting volume	240				403	235
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	240				403	235
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	98
cM capacity (veh/h)	1321				596	802

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	157	240	32
Volume Left	12	0	16
Volume Right	0	11	15
cSH	1321	1700	680
Volume to Capacity	0.01	0.14	0.05
Queue Length 95th (ft)	1	0	4
Control Delay (s)	0.7	0.0	10.5
Lane LOS	A		B
Approach Delay (s)	0.7	0.0	10.5
Approach LOS			B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	26.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	138	206	11	14	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	150	224	12	15	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	236				402	230
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	236				402	230
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	98
cM capacity (veh/h)	1325				598	807

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	161	236	32
Volume Left	11	0	15
Volume Right	0	12	16
cSH	1325	1700	690
Volume to Capacity	0.01	0.14	0.05
Queue Length 95th (ft)	1	0	4
Control Delay (s)	0.6	0.0	10.5
Lane LOS	A		B
Approach Delay (s)	0.6	0.0	10.5
Approach LOS			B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	25.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	79	8	11	80	9	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	86	9	12	87	10	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			95		201	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			95		201	90
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			99		99	98
cM capacity (veh/h)			1469		774	959

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	95	99	26
Volume Left	0	12	10
Volume Right	9	0	16
cSH	1700	1469	880
Volume to Capacity	0.06	0.01	0.03
Queue Length 95th (ft)	0	1	2
Control Delay (s)	0.0	1.0	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	1.0	9.2
Approach LOS			A

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	21.5%	ICU Level of Service	A
Analysis Period (min)	15		

Outer Loop Rd
N Loop Rd
5th St
Inner Loop Cir
West Access
East Access
B Ave
Ft Irwin Rd
Goldstone Rd
North Loop
Fort Irwin
Fort Irwin, CA 92310

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	27	15	118	16	105	1	19	118	77	83	22
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	29	16	128	17	114	1	21	128	84	90	24
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	403	409	90	311	304	21	114			149		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	403	409	90	311	304	21	114			149		
tC, single (s)	7.2	6.6	6.3	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	97	94	98	78	97	89	100			94		
cM capacity (veh/h)	458	495	957	574	572	1057	1469			1408		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	15	46	128	132	22	128	174	24
Volume Left	15	0	128	0	1	0	84	0
Volume Right	0	16	0	114	0	128	0	24
cSH	458	598	574	951	1469	1700	1408	1700
Volume to Capacity	0.03	0.08	0.22	0.14	0.00	0.08	0.06	0.01
Queue Length 95th (ft)	3	6	21	12	0	0	5	0
Control Delay (s)	13.1	11.5	13.1	9.4	0.4	0.0	4.0	0.0
Lane LOS	B	B	B	A	A		A	
Approach Delay (s)	11.9		11.2		0.1		3.5	
Approach LOS	B		B					

Intersection Summary				
Average Delay	6.5			
Intersection Capacity Utilization	35.2%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	16	40	40	55	135	53
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	43	43	60	147	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			61		186	39
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			61		186	39
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			97		81	94
cM capacity (veh/h)			1511		771	1021

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	61	103	204
Volume Left	0	43	147
Volume Right	43	0	58
cSH	1700	1511	829
Volume to Capacity	0.04	0.03	0.25
Queue Length 95th (ft)	0	2	24
Control Delay (s)	0.0	3.3	10.8
Lane LOS		A	B
Approach Delay (s)	0.0	3.3	10.8
Approach LOS			B

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	42	10	26	28	14	28	43	259	20	20	88	18
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	46	11	28	30	15	30	47	282	22	22	96	20
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	573	546	105	568	545	292	115			303		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	573	546	105	568	545	292	115			303		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	97	97	92	96	96	97			98		
cM capacity (veh/h)	387	424	949	397	424	747	1474			1246		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	85	76	350	137
Volume Left	46	30	47	22
Volume Right	28	30	22	20
cSH	489	496	1474	1246
Volume to Capacity	0.17	0.15	0.03	0.02
Queue Length 95th (ft)	16	13	2	1
Control Delay (s)	13.9	13.6	1.3	1.4
Lane LOS	B	B	A	A
Approach Delay (s)	13.9	13.6	1.3	1.4
Approach LOS	B	B		

Intersection Summary				
Average Delay		4.4		
Intersection Capacity Utilization	35.1%	ICU Level of Service	A	
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	36	51	26	22	77	146	18	148	19	44	75	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	55	28	24	84	159	20	161	21	48	82	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	242			84			410	438	70	460	373	163
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	242			84			410	438	70	460	373	163
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			96	67	98	87	85	99
cM capacity (veh/h)	1324			1507			461	486	988	357	528	874

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	123	266	201	140
Volume Left	39	24	20	48
Volume Right	28	159	21	11
cSH	1324	1507	510	466
Volume to Capacity	0.03	0.02	0.39	0.30
Queue Length 95th (ft)	2	1	47	31
Control Delay (s)	2.7	0.8	16.6	16.0
Lane LOS	A	A	C	C
Approach Delay (s)	2.7	0.8	16.6	16.0
Approach LOS			C	C

Intersection Summary				
Average Delay		8.4		
Intersection Capacity Utilization		38.7%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	112	201	331	77	34	94
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	122	218	360	84	37	102
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	443				864	402
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	443				864	402
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				87	84
cM capacity (veh/h)	1101				287	644

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	340	443	139
Volume Left	122	0	37
Volume Right	0	84	102
cSH	1101	1700	484
Volume to Capacity	0.11	0.26	0.29
Queue Length 95th (ft)	9	0	29
Control Delay (s)	3.8	0.0	15.4
Lane LOS	A		C
Approach Delay (s)	3.8	0.0	15.4
Approach LOS			C

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	27	60	25	37	75	15	42	25	21	8	19	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	65	27	40	82	16	46	27	23	9	21	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									3			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	98			92			327	316	79	321	321	90
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	98			92			327	316	79	321	321	90
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	98			97			92	95	98	98	96	99
cM capacity (veh/h)	1458			1459			570	561	963	567	563	960

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	122	138	96	38
Volume Left	29	40	46	9
Volume Right	27	16	23	9
cSH	1458	1459	744	623
Volume to Capacity	0.02	0.03	0.13	0.06
Queue Length 95th (ft)	2	2	11	5
Control Delay (s)	1.9	2.4	11.5	11.2
Lane LOS	A	A	B	B
Approach Delay (s)	1.9	2.4	11.5	11.2
Approach LOS			B	B

Intersection Summary				
Average Delay			5.3	
Intersection Capacity Utilization			25.2%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	89	104	62	55	59	63
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	97	113	67	60	64	68
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	264	67			67	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	264	67			67	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	86	89			96	
cM capacity (veh/h)	686	985			1528	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	97	113	67	60	133
Volume Left	97	0	0	0	64
Volume Right	0	113	0	60	0
cSH	686	985	1700	1700	1528
Volume to Capacity	0.14	0.11	0.04	0.04	0.04
Queue Length 95th (ft)	12	10	0	0	3
Control Delay (s)	11.1	9.1	0.0	0.0	3.8
Lane LOS	B	A			A
Approach Delay (s)	10.0		0.0		3.8
Approach LOS	B				

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	24.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	11	103	231	10	15	14
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	112	251	11	16	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	262				392	257
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	262				392	257
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	98
cM capacity (veh/h)	1297				606	782

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	124	262	32
Volume Left	12	0	16
Volume Right	0	11	15
cSH	1297	1700	680
Volume to Capacity	0.01	0.15	0.05
Queue Length 95th (ft)	1	0	4
Control Delay (s)	0.8	0.0	10.6
Lane LOS	A		B
Approach Delay (s)	0.8	0.0	10.6
Approach LOS			B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	24.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	108	226	11	14	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	117	246	12	15	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	258				391	252
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	258				391	252
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	98
cM capacity (veh/h)	1301				608	787

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	128	258	32
Volume Left	11	0	15
Volume Right	0	12	16
cSH	1301	1700	689
Volume to Capacity	0.01	0.15	0.05
Queue Length 95th (ft)	1	0	4
Control Delay (s)	0.7	0.0	10.5
Lane LOS	A		B
Approach Delay (s)	0.7	0.0	10.5
Approach LOS			B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	24.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	61	8	11	80	9	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	66	9	12	87	10	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			75		182	71
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			75		182	71
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			99		99	98
cM capacity (veh/h)			1493		795	984

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	75	99	26
Volume Left	0	12	10
Volume Right	9	0	16
cSH	1700	1493	903
Volume to Capacity	0.04	0.01	0.03
Queue Length 95th (ft)	0	1	2
Control Delay (s)	0.0	1.0	9.1
Lane LOS		A	A
Approach Delay (s)	0.0	1.0	9.1
Approach LOS			A

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	21.5%	ICU Level of Service	A
Analysis Period (min)	15		

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Appendix G
2031AM Build Improvement: Intersection Analysis Output Sheets

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Outer Loop Rd
N Loop Rd
Goldstone Rd
5th St
Inner Loop Cir
West Access
East
B Ave
Ft Irwin Rd
N Loop Rd Access
Fort Irwin
Fort Irwin, CA 92310
North Loop
S Loop Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	19	37	12	138	14	66	8	52	141	62	70	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	40	13	150	15	72	9	57	153	67	76	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	364	438	76	318	308	57	99			210		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	364	438	76	318	308	57	99			210		
tC, single (s)	7.2	6.6	6.3	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	96	92	99	73	97	93	99			95		
cM capacity (veh/h)	509	478	974	561	572	1010	1488			1337		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	21	53	150	87	65	153	143	23
Volume Left	21	0	150	0	9	0	67	0
Volume Right	0	13	0	72	0	153	0	23
cSH	509	546	561	891	1488	1700	1337	1700
Volume to Capacity	0.04	0.10	0.27	0.10	0.01	0.09	0.05	0.01
Queue Length 95th (ft)	3	8	27	8	0	0	4	0
Control Delay (s)	12.4	12.3	13.7	9.5	1.0	0.0	3.9	0.0
Lane LOS	B	B	B	A	A		A	
Approach Delay (s)	12.3		12.2		0.3		3.4	
Approach LOS	B		B					

Intersection Summary				
Average Delay	6.4			
Intersection Capacity Utilization	34.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	30	122	52	33	133	49
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	133	57	36	145	53
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			165		248	99
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			165		248	99
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			96		79	94
cM capacity (veh/h)			1383		702	946

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	165	92	198
Volume Left	0	57	145
Volume Right	133	0	53
cSH	1700	1383	754
Volume to Capacity	0.10	0.04	0.26
Queue Length 95th (ft)	0	3	26
Control Delay (s)	0.0	4.8	11.5
Lane LOS		A	B
Approach Delay (s)	0.0	4.8	11.5
Approach LOS			B

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	23	14	92	20	10	19	30	53	28	28	270	58
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	15	100	22	11	21	33	58	30	30	293	63
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	550	539	325	632	555	73	357			88		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	550	539	325	632	555	73	357			88		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	96	86	93	97	98	97			98		
cM capacity (veh/h)	413	428	716	317	419	989	1202			1495		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	140	53	121	387
Volume Left	25	22	33	30
Volume Right	100	21	30	63
cSH	595	462	1202	1495
Volume to Capacity	0.24	0.12	0.03	0.02
Queue Length 95th (ft)	23	10	2	2
Control Delay (s)	12.9	13.8	2.4	0.8
Lane LOS	B	B	A	A
Approach Delay (s)	12.9	13.8	2.4	0.8
Approach LOS	B	B		

Intersection Summary				
Average Delay		4.5		
Intersection Capacity Utilization		35.4%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	88	16	37	56	41	18	60	45	201	179	52
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	96	17	40	61	45	20	65	49	218	195	57
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	105			113			452	321	104	380	307	83
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	105			113			452	321	104	380	307	83
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			94	89	95	55	66	94
cM capacity (veh/h)	1486			1470			349	571	945	481	579	968

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	128	146	134	218	251
Volume Left	15	40	20	218	0
Volume Right	17	45	49	0	57
cSH	1486	1470	602	481	637
Volume to Capacity	0.01	0.03	0.22	0.45	0.39
Queue Length 95th (ft)	1	2	21	58	47
Control Delay (s)	1.0	2.2	12.7	18.5	14.3
Lane LOS	A	A	B	C	B
Approach Delay (s)	1.0	2.2	12.7	16.3	
Approach LOS			B	C	

Intersection Summary				
Average Delay	11.1			
Intersection Capacity Utilization	42.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	97	371	260	49	85	131
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	105	403	283	53	92	142
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	336				923	309
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	336				923	309
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				66	80
cM capacity (veh/h)	1207				271	726

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	509	336	235
Volume Left	105	0	92
Volume Right	0	53	142
cSH	1207	1700	437
Volume to Capacity	0.09	0.20	0.54
Queue Length 95th (ft)	7	0	78
Control Delay (s)	2.5	0.0	22.4
Lane LOS	A		C
Approach Delay (s)	2.5	0.0	22.4
Approach LOS			C

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	67	21	25	48	11	38	11	60	15	51	101
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	73	23	27	52	12	41	12	65	16	55	110
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									3			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	64			96			365	233	84	233	239	58
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64			96			365	233	84	233	239	58
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	99			98			91	98	93	97	91	89
cM capacity (veh/h)	1501			1455			470	636	956	643	638	999

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	111	91	118	182
Volume Left	15	27	41	16
Volume Right	23	12	65	110
cSH	1501	1455	1129	818
Volume to Capacity	0.01	0.02	0.10	0.22
Queue Length 95th (ft)	1	1	9	21
Control Delay (s)	1.1	2.3	10.8	10.7
Lane LOS	A	A	B	B
Approach Delay (s)	1.1	2.3	10.8	10.7
Approach LOS			B	B

Intersection Summary				
Average Delay			7.1	
Intersection Capacity Utilization			31.6%	ICU Level of Service	A
Analysis Period (min)			15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	27	103	53	94	123	27
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	112	58	102	134	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	354	58			58	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354	58			58	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	95	89			91	
cM capacity (veh/h)	580	997			1540	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	29	112	58	102	163
Volume Left	29	0	0	0	134
Volume Right	0	112	0	102	0
cSH	580	997	1700	1700	1540
Volume to Capacity	0.05	0.11	0.03	0.06	0.09
Queue Length 95th (ft)	4	9	0	0	7
Control Delay (s)	11.5	9.1	0.0	0.0	6.3
Lane LOS	B	A			A
Approach Delay (s)	9.6		0.0		6.3
Approach LOS	A				

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	24.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	14	320	124	15	10	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	348	135	16	11	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	151				521	143
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	151				521	143
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	99
cM capacity (veh/h)	1424				508	902

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	363	151	22
Volume Left	15	0	11
Volume Right	0	16	11
cSH	1424	1700	650
Volume to Capacity	0.01	0.09	0.03
Queue Length 95th (ft)	1	0	3
Control Delay (s)	0.4	0.0	10.7
Lane LOS	A		B
Approach Delay (s)	0.4	0.0	10.7
Approach LOS			B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	15	315	129	14	10	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	342	140	15	11	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	155				523	148
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	155				523	148
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	99
cM capacity (veh/h)	1419				507	896

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	359	155	22
Volume Left	16	0	11
Volume Right	0	15	11
cSH	1419	1700	647
Volume to Capacity	0.01	0.09	0.03
Queue Length 95th (ft)	1	0	3
Control Delay (s)	0.4	0.0	10.8
Lane LOS	A		B
Approach Delay (s)	0.4	0.0	10.8
Approach LOS			B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	157	10	15	78	7	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	171	11	16	85	8	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			182		293	176
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			182		293	176
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			99		99	99
cM capacity (veh/h)			1364		683	859

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	182	101	18
Volume Left	0	16	8
Volume Right	11	0	11
cSH	1700	1364	777
Volume to Capacity	0.11	0.01	0.02
Queue Length 95th (ft)	0	1	2
Control Delay (s)	0.0	1.3	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	1.3	9.7
Approach LOS			A

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	26.9%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix C
Air Emission Calculations

Fort Irwin New Hospital Project

Construction Emissions

Construction Year	Emissions (tons/year)						Emissions (metric tons/year
	ROG	CO	NOx	SOx	PM10	PM2.5	CO2
2012	0.33	1.77	2.13	0.001	3.64	0.85	269
2013	2.60	1.29	0.85	0.001	0.06	0.05	186
MDAQMD Thresholds (tons/yr)	25	100	25	25	15	15	NA

Construction PM10 and PM2.5 emissions include a 55% reduction in fugitive dust emissions to account for watering twice daily.

NA = MDAQMD has not established a significance threshold.

Operation Emissions

Alternative	Emissions (tons/year)						Emissions (metric tons/year
	ROG	CO	NOx	SOx	PM10	PM2.5	CO2
Proposed Action	4.68	45.16	6.47	0.060	10.17	2.01	5,933
No Build	2.96	32.89	4.52	0.05	7.69	1.52	4,151
Net Change	1.72	12.27	1.95	0.01	2.48	0.49	1,782
MDAQMD Thresholds (tons/yr)	25	100	25	25	15	15	NA

Operation emissions include vehicle emissions and area source emissions. The stationary sources at the new hospital would be similar to the stationary sources at the existing hospital and would be required to meet more stringent emission standards. Therefore, operation of the Proposed Action would not be expected to result in a net increase in emissions from stationary sources.

NA = MDAQMD has not established a significance threshold.

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Urbemis 2007 Version 9.2.4

Summary Report for Annual Emissions (Tons/Year)

File Name: C:\Projects\Fort Irwin\Hospital\Fort Irwin Hospital.urb924

Project Name: Fort Irwin Hospital

Project Location: San Bernadino County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012 TOTALS (tons/year unmitigated)	0.33	2.13	1.77	0.00	6.23	0.12	6.35	1.30	0.11	1.41	296.07
2012 TOTALS (tons/year mitigated)	0.33	2.13	1.77	0.00	3.52	0.12	3.64	0.74	0.11	0.85	296.07
Percent Reduction	0.00	0.00	0.00	0.00	43.42	0.00	42.60	43.40	0.00	39.99	0.00
2013 TOTALS (tons/year unmitigated)	2.60	0.85	1.29	0.00	0.01	0.06	0.06	0.00	0.05	0.05	205.01
2013 TOTALS (tons/year mitigated)	2.60	0.85	1.29	0.00	0.01	0.06	0.06	0.00	0.05	0.05	205.01
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Urbemis 2007 Version 9.2.4

Detail Report for Annual Construction Mitigated Emissions (Tons/Year)

File Name: C:\Projects\Fort Irwin\Hospital\Fort Irwin Hospital.urb924

Project Name: Fort Irwin Hospital

Project Location: San Bernadino County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Annual Tons Per Year, Mitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
2012	0.33	2.13	1.77	0.00	3.52	0.12	3.64	0.74	0.11	0.85	296.07
Mass Grading 04/24/2012-	0.12	0.95	0.56	0.00	2.40	0.05	2.45	0.50	0.05	0.55	101.19
Mass Grading Dust	0.00	0.00	0.00	0.00	2.40	0.00	2.40	0.50	0.00	0.50	0.00
Mass Grading Off Road Diesel	0.12	0.95	0.52	0.00	0.00	0.05	0.05	0.00	0.05	0.05	96.24
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.95
Fine Grading 07/23/2012-	0.06	0.45	0.26	0.00	1.12	0.02	1.15	0.23	0.02	0.26	47.43
Fine Grading Dust	0.00	0.00	0.00	0.00	1.12	0.00	1.12	0.23	0.00	0.23	0.00
Fine Grading Off Road Diesel	0.06	0.44	0.24	0.00	0.00	0.02	0.02	0.00	0.02	0.02	45.11
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.32
Trenching 09/04/2012-09/15/2012	0.01	0.07	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.27
Trenching Off Road Diesel	0.01	0.07	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.72
Trenching Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56
Asphalt 09/18/2012-09/29/2012	0.02	0.09	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	11.24
Paving Off-Gas	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.01	0.06	0.04	0.00	0.00	0.01	0.01	0.00	0.00	0.00	5.09
Paving On Road Diesel	0.00	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.04
Paving Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.11
Building 10/01/2012-05/24/2013	0.12	0.58	0.85	0.00	0.00	0.04	0.04	0.00	0.04	0.04	127.94
Building Off Road Diesel	0.10	0.49	0.35	0.00	0.00	0.03	0.03	0.00	0.03	0.03	53.50
Building Vendor Trips	0.01	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.31
Building Worker Trips	0.01	0.03	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	59.13
2013	2.60	0.85	1.29	0.00	0.01	0.06	0.06	0.00	0.05	0.05	205.01
Building 10/01/2012-05/24/2013	0.18	0.85	1.27	0.00	0.01	0.05	0.06	0.00	0.05	0.05	201.51
Building Off Road Diesel	0.15	0.72	0.53	0.00	0.00	0.05	0.05	0.00	0.04	0.04	84.30
Building Vendor Trips	0.01	0.09	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.12
Building Worker Trips	0.02	0.04	0.65	0.00	0.00	0.00	0.01	0.00	0.00	0.00	93.09
Coating 05/27/2013-06/22/2013	2.43	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.50

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Architectural Coating	2.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.50

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 7/23/2012 - 9/1/2012 - Default Fine Site Grading/Excavation Description

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

The following mitigation measures apply to Phase: Mass Grading 4/24/2012 - 7/20/2012 - Default Mass Site Grading/Excavation Description

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

Phase Assumptions

Phase: Fine Grading 7/23/2012 - 9/1/2012 - Default Fine Site Grading/Excavation Description

Total Acres Disturbed: 26

Maximum Daily Acreage Disturbed: 6.62

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 4/24/2012 - 7/20/2012 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 26

Maximum Daily Acreage Disturbed: 6.62

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 9/4/2012 - 9/15/2012 - Default Trenching Description

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Off-Road Equipment:
2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day
1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 9/18/2012 - 9/29/2012 - Default Paving Description
Acres to be Paved: 6.62
Off-Road Equipment:
4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day
1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day
2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day
1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

Phase: Building Construction 10/1/2012 - 5/24/2013 - Default Building Construction Description
Off-Road Equipment:
1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day
2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day
1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 5/27/2013 - 6/22/2013 - Default Architectural Coating Description
Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100
Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50
Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250
Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100
Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Urbemis 2007 Version 9.2.4

Summary Report for Annual Emissions (Tons/Year)

File Name: C:\Projects\Fort Irwin\Hospital\FortIrwinExistingHospital.urb924

Project Name: Operation of Old Hospital

Project Location: San Bernadino County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.13	0.00	0.28	0.00	0.00	0.00	0.51

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	2.83	4.52	32.61	0.05	7.69	1.52	4,576.58

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	2.96	4.52	32.89	0.05	7.69	1.52	4,577.09

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Urbemis 2007 Version 9.2.4

Summary Report for Annual Emissions (Tons/Year)

File Name: C:\Projects\Fort Irwin\Hospital\FortIrwinProposedAction.urb924

Project Name: Operation of New Hospital

Project Location: San Bernadino County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.42	0.40	0.89	0.00	0.00	0.00	473.00

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	4.26	6.07	44.27	0.06	10.17	2.01	6,068.48

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	4.68	6.47	45.16	0.06	10.17	2.01	6,541.48

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Appendix D
Economic Impact Analysis

APPENDIX D

Economic Impact Analysis

This section of the study looks at indirect and induced impacts that construction of a new hospital (Proposed Action) to replace Weed Army Community Hospital would have on San Bernardino County as a whole. The evaluation of indirect and induced impacts is achieved through regional economic analysis.

Construction Phase Impacts

Because construction activities for the new hospital would be located in San Bernardino County, California, an IMPLAN input-output (I-O) model of the San Bernardino economy was constructed.

For this analysis, the following assumptions were made:

- The region of influence for the economic impact analysis would be San Bernardino, California.
- The new hospital would be constructed over 900 days or approximately 2.5 years.
- Peak construction workforce would be expected to be 150 to 200 workers.
- Total actual construction budget would be approximately $250 million.
- Expenditures on materials and supplies would be estimated to be about 70percent of the total construction budget, or $175 million.
- About 10 percent or $17.5 million of the construction expenditures on materials and supplies would be estimated to be spent locally (within San Bernardino County)
- Construction payroll would be estimated to be approximately 18 percent of the total construction budget, or $45 million.
- Of the construction payroll, 60 percent would be assumed to be spent locally (San Bernardino County).
- Disposable labor income would be 70 percent of total labor income. This means that 30 percent of gross income would be used for taxes and savings.
- The base year of analysis is 2008, but the impacts were adjusted to reflect year 2010 price levels since project costs are in 2010 dollars.

Table D-1 shows the materials costs and labor costs for the project split by estimated costs assumed to be spent with San Bernardino County (local) and those assumed to be spent outside the county. Because engineering design on the new hospital is at a preliminary level, the cost estimates used in this analysis are also at a preliminary level.

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TABLE D-1
Development Cost of the Proposed Fort Irwin Hospital Replacement, 2010 Dollars
Weed Army Community Hospital EA, Fort Irwin, CA

	Total Materials Expenditure	Total Construction Payroll
Out of County	$157,500,000	$18,000,000
In-County (local)	$17,500,000	$27,000,000
Total	**$175,000,000**	**$45,000,000**

Table D-2 shows the results of the regional economic impact analysis of the construction phase of the project. As the numbers in the table show, in addition to the average peak direct employment of 175, the construction phase of the new hospital would result in secondary (indirect and induced) employment within San Bernardino County. Thus, along with the average peak direct 175 construction jobs, the estimated annual indirect and induced employment would be 86 and 74, respectively. The annual estimated indirect and induced income within the region would be about $3,439,600 and $3,036,900, respectively.

Due to the short-term nature of construction, the regional economic impacts associated with construction of the proposed Fort Irwin Hospital Replacement project are temporary.

TABLE D-2
Estimates of Annual Direct, Indirect, and Induced Impacts Associated with the Construction Phase of the Fort Irwin Hospital Replacement
Weed Army Community Hospital EA, Fort Irwin, CA

	Employment	Income
Direct	175	$14,560,000
Indirect	86	$3,439,600
Induced	74	$3,036,900
Total	334	$21,036,500

Numbers may not add due to rounding.
Income estimates are in 2010 dollars.

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Appendix B
California Environmental Quality Act Initial Study

Construction and Operation of the New Weed Army Community Hospital at Fort Irwin, California

Supplemental Initial Study

State Water Resources Control Board

February 2016

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1-2 Project Area

Acronyms and Abbreviations

2011 EA	Environmental Assessment/Initial Study document, titled *Construction and Operation of a New Weed Army Community Hospital*
BMP	best management practice
CDMG	California Department of Mines and Geology
CEQA	California Environmental Quality Act
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
DOE	U.S. Department of Energy
EA	Environmental Assessment
GHG	greenhouse gas
gpd	gallons per day
IS	Initial Study
MBTU	million British thermal unit
MDAQMD	Mojave Desert Air Quality Management District
mgd	million gallons per day
msl	mean sea level
MW	megawatt
NAAQS	National Ambient Air Quality Standards
N_2O	nitrous oxide
NEPA	National Environmental Policy Act of 1969
NOx	oxides of nitrogen
O_3	ozone
PM_{10}	particulate matter with aerodynamic diameter equal to or less than 10 microns
$PM_{2.5}$	particulate matter with aerodynamic diameter equal to or less than 2.5 microns
PRC	Public Resources Code
PV	photovoltaic
SO_2	sulfur dioxide
ton/yr	tons per year
UFC	Unified Facilities Criteria
USGS	U.S. Geological Survey
VOC	volatile organic compound
WTP	water treatment plant
WWTP	wastewater treatment plant

SECTION 1

Background Information

1.1 Project Title

Construction and Operation of the New Weed Army Community Hospital at Fort Irwin, California – Supplemental Initial Study

1.2 Lead Agency Name and Address

State Water Resources Control Board
Division of Drinking Water
1001 I Street, 17th Floor
Sacramento, CA 95814

1.3 Lead Agency Contact Person and Phone Number

Larry Morgan
State Water Resources Control Board
Division of Drinking Water
1001 I Street, 17th Floor
Sacramento, CA 95814
Email: Larry.Morgan@waterboards.ca.gov

1.4 Project Location

The new Weed Army Community Hospital is located in the cantonment of Fort Irwin, California. The coordinates of the project area are 35°16'20.02"N, 116°40'55.28"W.

1.5 General Plan Designation

The land is federally owned and is, therefore, outside the jurisdiction of the San Bernardino County Board of Supervisors (San Bernardino County, 2014). According to the *Fort Irwin Real Property Master Plan*, the project area is designated for either community or industrial uses (Michael Baker, Jr., 2008). The project area was previously used for training activities and evidence of past usage included heavy vehicle use, berms, scraping, structures, and pits.

1.6 Zoning

Fort Irwin does not have an official zoning map and it is not under the jurisdiction of the San Bernardino County Board of Supervisors (San Bernardino County, 2014). Fort Irwin utilizes a master plan to guide development and designate land uses. According to the Fort Irwin Real Property Master Plan, the project area is designated for either community or industrial uses (Michael Baker, Jr., 2008).

1.7 Background and Description of the Project

Fort Irwin is located approximately 37 miles northeast of Barstow, California, in the north-central part of the High Mojave Desert, as shown on Figure 1-1. Fort Irwin encompasses approximately 1,190 square miles (761,405 acres). Approximately half of Fort Irwin's land area is used for desert battlefield training. A cantonment area occupies approximately 3 square miles and provides temporary and permanent living quarters for soldiers and their families along with support facilities.

Fort Irwin's population includes approximately 5,000 assigned military members, a 5,637-civilian workforce, and 6,934 family members. The Fort Irwin water system provides water to approximately 18,000 customers daily. In addition, approximately 6,300 soldiers visit Fort Irwin during training rotations, which occur

Figure 1-1
Vicinity Map
MEDCOM Supplemental EA
Fort Irwin, California

0 12.5 25 50
Miles

N

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approximately 10 times each year (Fort Irwin, 2012). The Weed Army Community Hospital is the primary health care facility for these individuals. The mission of the hospital is to provide and manage the health care of soldiers, military families, and retirees; to support the readiness and deployment of a medically protected force while achieving effective health care practices; and to meet diverse future requirements. In addition, there typically are 4,000 to 6,000 civilian contractors who work as support personnel on Base and who could also use the hospital in a medical emergency.

The Weed Army Community Hospital building is outdated and does not comply with California building requirements (Senate Bill 1953), primarily due to seismic concerns. Alterations or additions to the current building cannot be performed without a seismic retrofit, which would be cost prohibitive. A joint Environmental Assessment (EA)/Initial Study (IS) document, titled *Construction and Operation of a New Weed Army Community Hospital,* was prepared in 2011 analyzing the construction and operation of a replacement hospital within a 79-acre parcel that would comply with current building standards, and is hereafter referred to as 2011 EA/IS. During construction of the replacement hospital, several design elements were identified that require additional National Environmental Policy Act of 1969 (NEPA) and California Environmental Quality Act (CEQA) analysis. Impacts to the natural and human environment from the development of a 79-acre parcel in the developed Fort Irwin cantonment were determined to be less-than-significant, and a Finding of No Significant Impact/Mitigated Negative Declaration was issued. A large portion of the 79-acre parcel has been cleared and graded, which includes the project area. This IS analyzes and documents potential impacts on the human and natural environment that would result from implementation of these additional design elements and is tiered off of the 2011 EA/IS. The 2011 EA/IS is incorporated by reference and included as Appendix A to the Draft Supplemental EA.

The final hospital design included elements that were not fully analyzed in the 2011 EA/IS. These include elements required to provide support and resiliency to hospital systems primarily to comply with Unified Facilities Criteria (UFC) 4-510-01, Criteria for Military Medical Facilities. UFC 4-510-01 requires that certain types of military hospitals must have infrastructure in place to keep the hospital operational during emergency conditions that could entail loss of electricity and/or loss of water and wastewater systems. These additional features would be implemented within the 79-acre parcel originally assessed in the 2011 EA/IS (Figure 1-2). There have been no changes to the construction boundary as described in the 2011 EA/IS. This supplemental IS analyzes the construction and operation of the additional design features, which is also referred to as the Proposed Action. The proposed additional features include the following:

- 518,000-gallon emergency water storage tank
- Ten 50,000-gallon emergency wastewater storage tanks (total of 500,000 gallons)
- 2.4-megawatt (MW) solar array
- Two 25,000-gallon belowground fuel storage tanks
- Five 2.5-million British thermal unit (MBTU) and two 1.0-MBTU boilers
- Three 1.5-MW diesel generators

The proposed features would provide backup water supply and wastewater storage; additional emergency power from generators and fuel storage for generators; additional heat energy from boilers; and solar power generation to offset the operational power needs of the new hospital. These new hospital features would comply with current building codes and standards and would meet the health care needs of the Fort Irwin community.

Temporary construction staging areas for the proposed features would be located within the 79-acre parcel evaluated in the 2011 EA/IS.

The solar array was constructed based on the assessment in the 2011 EA/IS, which included an evaluation of impacts from all construction within the identified 79-acre parcel; however, the 2011 EA/IS did not include the specific size of the array or an evaluation of impacts from operation of this feature. This IS will evaluate impacts from operation and measures that would be implemented to reduce potential impacts.

This IS will focus on resource areas that could be impacted by the proposed new features, which include the following:

- Biological Resources
- Water Resources
- Air Quality
- Utilities
- Hazardous Materials
- Noise
- Aesthetics/Visual Resources
- Air Transportation

Other resource areas would not be impacted by the proposed new features and were adequately addressed in the 2011 EA/IS. The 2011 EA/IS is referenced for resource areas where conditions and/or impacts would not change as a result of the proposed additional features.

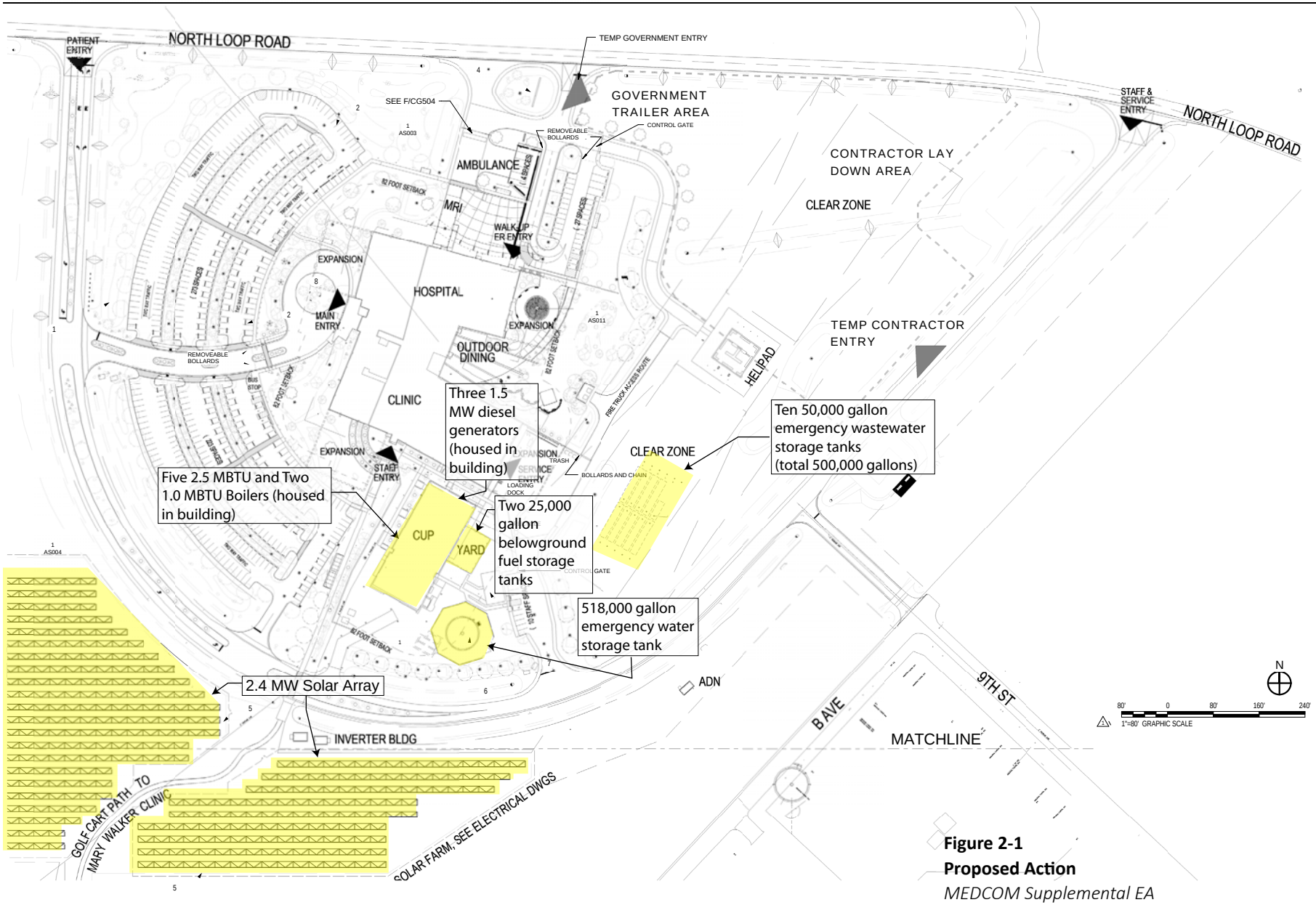

Figure 2-1
Proposed Action
MEDCOM Supplemental EA
Fort Irwin, California

CH2MHILL®

SECTION 2

Environmental Determination

2.1 Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this project; that is, they would involve at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐	Aesthetics	☐	Agriculture Resources	☐	Air Quality
☐	Biological Resources	☐	Cultural Resources	☐	Geology/Soils
☐	Greenhouse Gas Emissions	☐	Hazards & Hazardous Materials	☐	Hydrology/Water Quality
☐	Land Use/Planning	☐	Mineral Resources	☐	Noise
☐	Population/Housing	☐	Public Services	☐	Recreation
☐	Transportation/Traffic	☐	Utilities/Service Systems	☐	Mandatory Findings of Significance

2.2 Determination (to be completed by the Lead Agency)

The following was determined based on this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature	Date
Title	Agency

SECTION 3

Evaluation of Environmental Impacts

3.1 Aesthetics

Aesthetics Checklist

Would the project:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c. Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

3.1.1 Setting

The proposed project area is a 79-acre parcel located within the heavily developed cantonment. The cantonment is the developed area of Fort Irwin that has housing, community facilities, administrative facilities, storage facilities, medical facilities, utility infrastructure, a helicopter landing pad, an RV park, a 12.7-acre solar array, and other facilities to support the Fort Irwin training mission. The wastewater treatment plant (WWTP) is located in the southeast portion of the cantonment, which is heavily industrial, and a new water treatment plant (WTP) is under construction just west of the developed cantonment. The existing hospital and helicopter landing pad are located just south of the project area. Military flights, either associated with the hospital landing pad or other training activities, regularly occur over and around the cantonment. Training activities and tank maneuvers occur in the designated training areas surrounding the cantonment. Tiefort Mountain, which is approximately 5 miles east of the project area, is a prominent feature in the landscape, along with other mountains nearby. The new Weed Army replacement hospital and associated components are being constructed within the 79-acre parcel.

3.1.2 Impacts Analysis

a. Would the project have a substantial adverse effect on a scenic vista?

NO IMPACT. The project would not be located in an area considered as a scenic vista and would have No Impact.

b. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

NO IMPACT. The proposed project would not be located within a state scenic highway and would have No Impact.

c. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

LESS-THAN-SIGNIFICANT IMPACT. Impacts to aesthetics from development of the 79-acre parcel for the replacement hospital were determined to be less-than-significant in the 2011 EA/IS. The proposed features would be compatible with the hospital complex and surrounding landscape of the cantonment. The ten 50,000-gallon emergency wastewater storage tanks and two 25,000-gallon underground storage tanks would be placed underground, while the boilers and generators would be placed indoors. These features would not be noticeable upon completion of construction. The 518,000-gallon emergency water storage tank and solar array would be visible upon completion of construction. The Fort Irwin Installation Design Guidelines promote visual order and enhance natural and manmade conditions through implementation of consistent architectural themes and standards, which would apply to the hospital complex (Michael Baker, Jr., Inc. 2008). The water storage tank would be approximately 30 feet tall and would be placed adjacent to the replacement hospital as shown on Figure 1-2. The proposed solar array encompasses 7.8 acres and is adjacent to the replacement hospital. There is an existing 12.7-acre solar array adjacent to the RV park, west of the project area. Both the solar array and water storage tank would be fenced. The water storage tank and solar array would be consistent with the visual character of the developed cantonment, which is a mix of industrial, residential, community, commercial, and support facilities. The water storage tank and solar array would not substantially degrade the visual character of the area; therefore, impacts would be Less-Than-Significant.

d. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

LESS-THAN-SIGNIFICANT IMPACT. As stated in the 2011 EA, the replacement hospital would not create a new source of light or glare; however, the proposed solar array at the replacement hospital would create a new source of glare. The panels would have an anti-reflective coating to reduce the glare. The solar array would be expected to reflect approximately 2 percent of the sunlight (Federal Aviation Administration, 2010). A glare analysis was conducted and determined that the glare would not be a hazard to helicopter pilots utilizing certain flightpaths above the solar array (RLF, 2014). The glare created by the proposed solar array would be minimal and would not affect any daytime views in the area. A Less-Than-Significant Impact would be expected as a result of the Proposed Action.

3.2 Agriculture and Forest Resources

Agriculture and Forest Resources Checklist

Would the project:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code (PRC) Section 12220(g)) or timberland (as defined in PRC Section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d. Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

3.2.1 Setting

The project would be constructed in the cantonment of Fort Irwin. The project would be in an area that has been cleared for development.

3.2.2 Impacts Analysis

a. Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

NO IMPACT. The proposed project is not located on or near land designated for agricultural use as defined by the Farmland Mapping and Monitoring Program or the Williamson Act. The project would not be located on agricultural land nor would it convert agricultural lands to nonagricultural use; therefore, No Impact would occur.

b. Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

NO IMPACT. The proposed project would not be located on land zoned for agriculture or under a Williamson Act contract; therefore, No Impact would occur.

c. Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC section 1220(g)) or timberland (as defined in PRC section 4526)?

NO IMPACT. No forest or timber land is present at the project site or in the project vicinity. No forest land would be affected by the project; therefore, No Impact would occur.

d. Would the project result in the loss of forest land or conversion of forest land to non-forest use?

NO IMPACT. No forest land is present at the project site or in the project vicinity. No forest land would be affected by the project; therefore, No Impact would occur.

e. Would the project involve other changes in the existing environment which, due to their location or nature, could result in the conversion of Farmland, to non-agricultural use?

NO IMPACT. No farmland is on or adjacent to the project area; therefore, No Impact would occur.

3.3 Air Quality

Air Quality Checklist

Would the project:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone [O_3] precursors)?	☐	☐	☒	☐
d. Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e. Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

3.3.1 Setting

The proposed project is located in San Bernardino County within the Mojave Desert Air Quality Management District (MDAQMD). San Bernardino County is designated nonattainment for particulate matter with aerodynamic diameter equal to or less than 10 microns (PM_{10}) for both federal and state standards. The southern portion of the Fort Irwin installation (below the 90 Universal Transverse Mercator grid line) is designated nonattainment for O_3 for both federal and state standards. The Proposed Action would be located north of the federal O_3 nonattainment; therefore, the project would be located in a federal attainment area for O_3. The project area is designated as attainment for all other pollutants.

High particulate matter concentrations in the Mojave Desert are typically the result of wind erosion from exposed or disturbed land areas. Activities at Fort Irwin, such as vehicle travel on unpaved roads and training maneuvers, create fugitive PM_{10} emissions. Fort Irwin has conducted PM_{10} monitoring since 1994 and operates eight PM_{10} monitoring sites within its boundary. Fort Irwin implements standard management practices to reduce particulate emissions, including but not limited to the following:

- Using water for short-term surface stabilization
- Minimizing tracking of dirt onto paved roads
- Covering haul trucks
- Stabilizing sites with chemicals or vegetation
- Paving parking lots
- Placing gravel to control windblown dust

The MDAQMD implements air quality programs required by state and federal mandates, enforces rules and regulations based on air pollution laws, and educates business owners and residents to protect air quality. The MDAQMD air quality plan applicable to the Proposed Action is the *Federal Particulate Matter (PM_{10}) Attainment Plan* (MDAQMD, 1995). Construction of the Proposed Action would be subject to MDAQMD Rules 403 and 403.2.

3.3.2 Impacts Analysis

a. Would the project conflict with or obstruct implementation of the applicable air quality plan?

LESS-THAN-SIGNIFICANT IMPACT. Exhaust emissions would result from construction equipment, vehicles, and fugitive dust emissions resulting in short-term emissions of carbon monoxide (CO), oxides of nitrogen (NO_x), volatile organic compounds (VOCs), sulfur oxide (SO_x), PM_{10}, and particulate matter with aerodynamic diameter equal to or less than 2.5 microns ($PM_{2.5}$). Fugitive dust emissions include emissions from soil disturbing activities, unpaved roads, and paved roads. Estimated emissions from construction of the Proposed Action compared to MDAQMD significance thresholds are shown in Tables 3-1 through 3-3.

TABLE 3-1
Proposed Action Construction Emissions for 2015
Construction and Operation of the New Weed Army Community Hospital, Fort Irwin, CA

	Emissions for 2015 (ton/yr)					
Emission Source	**VOC**	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Construction Emissions	0.971	8.85	6.51	0.0137	1.06	0.500
Vehicle Emissions	0.123	1.07	0.421	0.0016	0.0218	0.0166
Total Emissions	**1.09**	**9.92**	**6.93**	**0.0153**	**1.08**	**0.517**
MDAQMD Thresholds (ton/yr)	25	100	25	25	15	15
Thresholds Exceeded for Any Activity?	No	No	No	No	No	No

Source: Appendix C of the Draft Final Supplemental Environmental Assessment (CH2M HILL, 2015 in progress).
SO_2 sulfur dioxide
ton/yr tons per year

Table 3-2 shows construction emissions resulting from the Proposed Action for 2016.

TABLE 3-2
Proposed Action Construction Emissions for 2016
Construction and Operation of the New Weed Army Community Hospital, Fort Irwin, CA

	Emissions for 2016 (ton/yr)					
Emission Source	**VOC**	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Construction Emissions	0.755	7.47	4.68	0.0128	0.895	0.402
Vehicle Emissions	0.124	1.07	0.422	0.0016	0.0219	0.0167
Total Emissions	**0.879**	**8.54**	**5.10**	**0.0144**	**0.917**	**0.419**
MDAQMD Thresholds (ton/yr)	25	100	25	25	15	15
Thresholds Exceeded for Any Activity?	No	No	No	No	No	No

Source: Appendix C of the Draft Final Supplemental Environmental Assessment (CH2M HILL, 2015 in progress).

Table 3-3 shows construction emissions resulting from the Proposed Action for 2017.

TABLE 3-3
Proposed Action Construction Emissions for 2017
Construction and Operation of the New Weed Army Community Hospital, Fort Irwin, CA

	Emissions for 2017 (ton/yr)					
Emission Source	**VOC**	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Construction Emissions	0.494	4.95	3.11	0.0093	0.635	0.278
Vehicle Emissions	0.0901	0.778	0.307	0.0012	0.0159	0.000
Total Emissions	**0.584**	**5.73**	**3.42**	**0.0105**	**0.651**	**0.278**
MDAQMD Thresholds (ton/yr)	25	100	25	25	15	15
Thresholds Exceeded for Any Activity?	No	No	No	No	No	No

Source: Appendix C of the Draft Final Supplemental Environmental Assessment (CH2M HILL, 2015 in progress).

Estimated annual construction emissions would be well below the MDAQMD thresholds for all criteria (Tables 3-1 through 3-3). In addition, the project would be constructed in compliance with MDAQMD Rules 403 and 403.2. Best management practices (BMPs) would be utilized to limit impacts from fugitive dust to the extent practicable. The project construction activity would be consistent with the regional and local air quality planning strategy. A Less-Than-Significant Impact would be expected as a result of construction of the Proposed Action.

The proposed emergency generators and boilers would contribute to increased air emissions during operation of the Proposed Action. Estimated annual emissions during operation and maintenance of the additional features are presented in Table 3-4.

TABLE 3-4
Proposed Action Operational Emissions
Supplemental Environmental Assessment, Fort Irwin, California

	Annual Emissions (ton/yr)					
Emission Source	**VOC**	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Operational Emissions	0.612	5.83	10.1	0.0138	0.522	0.522
Total Emissions	**0.612**	**5.83**	**10.1**	**0.0138**	**0.522**	**0.522**
MDAQMD Thresholds (ton/yr)	25	100	25	25	15	15
Thresholds Exceeded for Any Activity?	No	No	No	No	No	No

Source: Appendix C of the Draft Final Supplemental Environmental Assessment (CH2M HILL, 2015 in progress).

As shown in Table 3-4, annual emissions during operation and maintenance of the Proposed Action would be well below MDAQMD significance thresholds and would not exceed National Ambient Air Quality Standards (NAAQS). Operation of the Proposed Action would not result in a significant air quality impact and, therefore, would not conflict with or obstruct implementation of the MDAQMD air quality plan. Operation of the Proposed Action would result in a long-term Less-Than-Significant Impact.

b. Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

LESS-THAN-SIGNIFICANT IMPACT. Construction of the proposed project would cause temporary minor increases in ambient air pollutant concentrations; however, given that construction activities would be temporary, long-term impacts would not occur. As shown in Tables 3-1 through 3-3, estimated emissions during construction for all criteria pollutants would be well below the MDAQMD thresholds. Table 3-4 shows estimated annual emissions from the Proposed Action once operational, which are well below MDAQMD thresholds and would not violate NAAQS. The project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. In addition, the proposed project would implement applicable criteria pollutant control measures identified by MDAQMD Rules 403 and 403.2. BMPs, such as those listed in Section 3.3.1, would be utilized to reduce air impacts. A Less-Than-Significant Impact would be expected as a result of the Proposed Action.

c. Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for O_3 precursors)?

LESS-THAN-SIGNIFICANT IMPACT. In developing thresholds of significance for air pollutants, MDAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. Projects that do not exceed the significance thresholds are not considered to be cumulatively significant. As shown in Tables 3-1 through 3-4, project construction and operational emissions would be lower than the MDAQMD significance thresholds. Because the project would emit pollutants below the thresholds of significance for an individual project, it would not result in a cumulative considerable emission increase of nonattainment pollutants (PM_{10}), and the air quality impact on non-attainment criteria pollutants would be a Less-Than-Significant Impact.

d. Would the project expose sensitive receptors to substantial pollutant concentrations?

LESS-THAN-SIGNIFICANT IMPACT. Exhaust emissions from construction equipment contain toxic air contaminants, such as diesel particulate matter, that have potential cancer and noncancerous chronic health effects, especially to sensitive receptors; however, as stated in the 2011 EA, the project is not near any sensitive receptors. As discussed in previous sections, project construction emissions would be temporary and below the MDAQMD threshold and, therefore, would not expose nearby receptors to a substantial amount of criteria pollutants. Exposures to the toxic air contaminant emissions from the construction activities would be short-term in nature, and long-term exposure to diesel particulate matter from construction would not occur. In addition, the project construction would require implementing the BMPs and following the emission control measures described in the CEQA guideline, including minimizing idling times and maintaining equipment in good condition. These measures would help minimize construction-related pollutants; therefore, the proposed project would not expose sensitive receptors to substantial pollutant concentrations. A Less-Than-Significant Impact would be expected as a result of the Proposed Action during construction.

As shown in Table 3-4, emissions from operation of the boilers and generators would be well below MDAQMD significance thresholds and, therefore, are not expected to generate substantial pollutant concentrations. A Less-Than-Significant Impact would be anticipated during project operation.

e. Would the project create objectionable odors affecting a substantial number of people?

LESS-THAN-SIGNIFICANT IMPACT. Using diesel construction equipment during project construction may generate minor odors immediately adjacent to operating equipment. Construction emissions

would be temporary and would not be expected to create objectionable odors affecting a substantial number of people. Emissions from the emergency generators could generate objectionable odors associated during testing and emergency situations. However, due to the location of the generators, those affected would be limited primarily to operations workers and, therefore, a substantial number of people would not be affected. The emergency wastewater tanks would only be used during emergencies and would not be expected to generate substantial odors that would affect nearby receptors. A Less-Than-Significant Impact would be expected as a result of the Proposed Action.

3.4 Biological Resources

Biological Resources Checklist

Would the project:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local or regional habitat conservation plan?	☐	☐	☒	☐

3.4.1 Setting

The 2011 EA/IS assessed impacts for the development of the 79-acre parcel for a replacement hospital. The impact from development within the 79-acre parcel for the replacement hospital was considered less-than-significant. A larger portion of the 79-acre parcel has been cleared and graded for the replacement hospital complex, including the project area. Impacts to biological resources from the construction and operation of the proposed water storage tank, wastewater storage tanks, underground storage tanks, boilers, and generators would be the same as described in the 2011 EA/IS, as these structures would be placed in an area that has been cleared and graded within the 79-acre parcel previously analyzed.

The solar array could have additional impacts to bird species. The solar array encompasses 7.8 acres in two separate clusters within the 79-acre parcel and is surrounded by development. Each cluster is approximately 4 acres and is fenced. A golf cart trail runs between the two clusters, which would be approximately 80 feet wide at the narrowest distance between the two clusters. The solar panels are photovoltaic (PV) and fixed in place, meaning the panels do not track the sun. The panels have an anti-reflective coating.

Currently, the 79-acre parcel is cleared and construction is underway for the replacement hospital and components. The solar array has been constructed. There is no breeding habitat within the project area for

bird species. As stated in the 2011 EA/IS, special-status bird species that might occur in the area include the following:

- Bendire's thrasher (*Toxostoma bendirei*)
- Burrowing owl (*Athene cunicularia*)
- Crissal thrasher (*Toxostoma crissale*)
- Le Conte's thrasher (*Toxostoma lecontei*)
- Loggerhead shrike (*Lanius ludovicianus*)
- California gull (*Larus californicus*)
- Golden eagle (*Aquila chrysaetos*)
- Northern harrier (*Circus cyaneus*)
- Vaux's swift (*Chaetura vauxi*)
- Wintering ferruginous hawks (*Buteo regalis*)

These species could occur in the project area for foraging, though it would be unlikely due to the amount of human activity and lack of preferred foraging habitat. Table 3-2 of the 2011 EA/IS lists potential special-status bird species that occur in the region and common bird species that occur in the area are listed on page 3-30 in the 2011 EA/IS.

3.4.2 Impact Analysis

a. Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

LESS-THAN-SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED.

Impacts on Special-status Plant Species. As stated in the 2011 EA/IS no special-status plant species were identified within the project area and no impacts to special-status plant species would occur from development of the 79-acre parcel. The project area has been cleared and graded, and there would be no potential for special-status plant species to occur in the project area.

Impacts on Wildlife, Including Special-status Species. The 2011 EA/IS adequately addressed conditions and potential impacts to wildlife, including special-status species, from construction and operation of the replacement hospital complex, but did not include a detailed analysis of the impacts of the proposed solar array. Impacts to wildlife, including special-status species, were considered less-than-significant with mitigation in the 2011 EA/IS. The project area has been cleared and no additional impacts would occur from removal of potential bird habitat.

Long-term impacts to bird species could occur as a result of long-term operation of the solar array. Collision-related fatalities of birds have been documented at solar projects of all technology types and would be the main impact to birds from a PV solar array once operational (U.S. Department of Energy [DOE], 2015). The cause of these collision-related fatalities could be that solar arrays emit glare or polarized light that could attract insects and in turn attract foraging birds and/or solar arrays attract migrating waterfowl and shorebirds due to what is called the "lake effect," because migrating waterfowl perceive the PV solar panels as bodies of water and collide with structures when they attempt to land. No empirical research has been completed to assess the attraction of PV facilities to migrating birds (DOE, 2015).

Potential impacts to birds from solar facilities depends largely on project size and location (DOE, 2015). Most research has been conducted at larger utility-scaled solar arrays, which are typically over 100 acres. These sites are mainly located in undeveloped areas and are often surrounded by potential bird habitat. Some of these larger solar facilities also have nearby cooling ponds, which can attract

additional birds leading to greater impacts to bird species. Solar arrays that are less attractive and accessible to birds would have reduced impacts to birds (Kagan et al., 2014).

The proposed solar array is in an urban environment and is adjacent to the replacement hospital under construction in a heavily developed portion of the cantonment. There is an existing helicopter pad and a new helicopter pad being constructed in the vicinity of the solar array. Noise and human activity make the project area unattractive, which likely limits the use of the area for birds. There are percolation and evaporation ponds at the Fort Irwin WWTP approximately 1.5 miles east of the project area that are known to attract waterfowl and other birds typically associated with open bodies of water and riparian areas; however, the ponds are located in a lightly developed portion of the cantonment where limited and sporadic activity occurs. The solar array is constructed as two separate clusters with space between them, which would limit the size of the "lake effect." Each cluster is approximately 4 acres and would be separated by a landscaped golf cart trail, which forms an approximately 80-foot buffer at the narrowest distance between the two clusters. Each row of solar panels is 12 feet apart. The solar panels would be fixed tilt and not track the sun; therefore, avian species would have a limited view angle from the panels that could potentially be perceived as a waterbody.

Some collisions with structures may not be fatal, leaving the bird vulnerable to predators (Kagan et. al, 2014). To reduce predation on birds with nonfatal collisions, a fence would be placed around each cluster of the solar array. Also, to reduce pest species in the hospital complex, and potential predation within the solar array, roosting deterrents, such as bird spikes, would be utilized at certain locations.

Since the solar array would be small in size and in two separate clusters, fixed tilt panels, and located in an urban environment, impacts to bird species would be expected to be Less-Than-Significant with the use of mitigation.

Mitigation and Avoidance Measures for Special-status Wildlife Species. The proposed project includes the following avoidance and minimization measures to reduce impacts on special-status wildlife species during construction to a Less-Than-Significant level:

1) **Bird Species.** Operation of the solar array could impact bird species for the long-term. To avoid potential adverse impacts, the following measures would be implemented within the project area:
   - Place fence around the solar array to prevent predation of birds after nonfatal collisions.
   - Perform routine daily inspection of solar array for injured birds.
   - Roosting deterrents, such as bird spikes, would be placed in certain areas of the hospital complex to deter pest species from roosting.
2) **Pest Species.** Construction activity and long-term operation of the replacement hospital might attract additional pest species, including ravens, where additional food or trash is available. To avoid potential adverse impacts, the following measures would be implemented at the Proposed Action project area and staging areas:
   - During construction, all trash and debris would be placed in receptacles for delivery to approved landfill facilities.
   - Daily cleanup of trash and debris would be required, including emptying and disposing of trash in receptacles.
   - Any water applied to prevent dust would be applied so as to prevent pooling and eliminate a potential subsidy. Any water containers, to include water trucks, would have openings covered to keep pest species out.
   - Roosting deterrents, such as bird spikes, would be placed in certain areas of the hospital complex to deter pest species from roosting.

b. Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

NO IMPACT. As stated in the 2011 EA/IS, constructing the Proposed Action would not affect any riparian habitat, or other sensitive natural community, such as U.S. Fish and Wildlife Services designated critical habitat for the desert tortoise; therefore, No Impact would occur.

c. Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

NO IMPACT. As stated in the 2011 EA/IS, there are no federally or state protected wetlands in or near the project area; therefore, No Impact, either permanent or temporary, would occur.

d. Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

LESS-THAN-SIGNIFICANT IMPACT. As stated in the 2011 EA/IS, the Proposed Action would not interfere with the movements of wildlife and no impacts would be expected. The addition of the proposed features, except for the proposed solar array, would have the same impacts as described in the 2011 EA/IS. The proposed solar array could attract bird species and interfere with migratory bird movements. However, the small size of the solar array split into two clusters with fixed tilt PV panels, as well as the fact that the solar array is located in an urban environment, would reduce the “lake effect” and the attractiveness to migratory birds; therefore, impacts would be Less-Than-Significant.

e. Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

NO IMPACT. As stated in the 2011 EA/IS, development of the 79-acre parcel for the replacement hospital would not conflict with any local policies or ordinances protecting biological resources and No Impact would occur. The proposed additional features would not conflict with any local policies or ordinances protecting biological resources and No Impact would be expected.

f. Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

NO IMPACT. As stated in the 2011 EA/IS, the project area is located within the geographical area covered by the West Mojave Desert Conservation Plan and the development of the 79-acre parcel would not conflict with the requirements of the plan. The proposed additional features would not conflict with the requirements of the plan and No Impact would be expected.

3.5 Cultural Resources

Cultural Resources Checklist

Would the Project:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☒	☐
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☒	☐
c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐
d. Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐

3.5.1 Setting

Conditions and impacts, as described in the 2011 EA/IS, would be the same for this action. As stated in the 2011 EA/IS, no impacts to cultural resources would occur as a result of the development of the 79-acre parcel. The cultural resource analysis is located in the 2011 EA/IS.

3.5.2 Impacts Analysis

a. Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

LESS-THAN-SIGNIFICANT IMPACT. As stated in the 2011 EA/IS, the 79-acre parcel does not contain any features or structures with qualities that would be considered historical resources; therefore, No Impact on a historical resource as defined in Section 15064.5 would occur; however, due to the potential to inadvertently discover cultural resources, there would be a Less-Than-Significant Impact.

In the event that cultural resources are discovered during ground disturbing activities, work in the vicinity shall be suspended until a qualified archaeologist has assessed the find. The qualified archaeologist will evaluate the find and, in coordination with the State Water Resources Control Board and Fort Irwin, and in consultation with the California State Historic Preservation Office and federally recognized Native American tribes with which Fort Irwin normally consults, will identify and implement any mitigation deemed necessary to record and/or protect the resource(s).

b. Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

LESS-THAN-SIGNIFICANT IMPACT. As stated in the 2011 EA/IS, impacts from development of the 79-acre project area would be less-than-significant. No additional impacts beyond those described in the 2011 EA/IS would occur as a result of the additional features.

c. Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

LESS-THAN-SIGNIFICANT IMPACT. As stated in the 2011 EA/IS, no impact to paleontological resources would be expected, because the project site has already been highly disturbed. If paleontological resources are uncovered during construction, then all applicable local, state, and federal regulation

would be followed. Due to the potential to inadvertently discover cultural resources, there would be a Less-Than-Significant Impact.

d. Would the project disturb any human remains, including those interred outside of formal cemeteries?

LESS-THAN-SIGNIFICANT IMPACT. As stated in the 2011 EA/IS, no recorded instances of prehistoric or historic human remains are known to be within or adjacent to the project area. If there is unexpected discovery of human remains, then compliance with regulations for the discovery of human remains on federally owned and/or managed lands would be required and impacts would be less-than-significant.

All human remains would be treated with respect and dignity upon discovery. The Fort Irwin Installation Archaeologist must be notified immediately upon discovery of human remains. In accordance with the *Fort Irwin Integrated Cultural Resources Management Plan*, all activities near the discovery must cease and a reasonable effort to protect the human remains must be made. If the remains are prehistoric, then the Fort Irwin installation archaeologist would initiate the proper procedures under the Archaeological Resources Protection Act and/or the Native American Graves Protection and Repatriation Act to determine the disposition of the materials in consultation with the State Historic Preservation Officer and Native American tribes.

The San Bernardino County Coroner will be contacted in the event that human remains are discovered.

3.6 Geology and Soils

Geology and Soils Checklist

Would the Project:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv) Landslides?	☐	☐	☐	☒
b. Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☐	☒
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

3.6.1 Setting

The California Division of Mines and Geology (CDMG) has not identified any Alquist-Priolo Fault-Rupture Hazard Zones in the Fort Irwin cantonment. Several Quaternary faults, which indicate evidence of seismic activity in the past 1.6 million years, occur in the Irwin Basin, which includes Garlic Springs Fault approximately 2 miles east of the project area. However, this fault has not been identified as active in the past 11,000 years (CDMG, 1999; U.S. Army, 2006).

As described in the 2011 NEPA/CEQA document, there are no important soil resources in the project area. The surface soils within the project area are highly disturbed, primarily from vehicle movement, community uses, training activities, and past construction endeavors (Appendix A of the Draft Supplemental EA).

3.6.2 Impacts Analysis

a. Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

NO IMPACT. The project site is not located within a special study zone under the Alquist-Priolo Special Studies Act. The nearest fault is the Garlic Springs Fault, which is approximately 2 miles to the east and has not been identified as active in the past 11,000 years; therefore, No Impact would be expected (CDMG, 1999).

ii) Strong seismic ground shaking?

LESS-THAN-SIGNIFICANT IMPACT. Fort Irwin has experienced moderate seismicity in the recent past. A significant earthquake event along either the Garlock or Death Valley fault zone in the area of the installation could result in ground acceleration in excess of 0.3g (U.S. Army, 2006). The project would incorporate standard seismic design considerations and recommendations, including design features to withstand these types of events. Therefore, Less-Than-Significant Impacts from seismic events would be expected.

iii) Seismic-related ground failure, including liquefaction?

NO IMPACT. The project area is not identified as being in an area designated as susceptible to liquefaction (San Bernardino County, 2015). Project design would conform with the Uniform Building Code guidelines to avoid or minimize potential damage from seismic shaking, fault rupture, and liquefaction on the site; therefore, No Impact would be expected.

iv) Landslides?

NO IMPACT. The project location is relatively flat with no potential for landslides or mudflows; therefore, No Impact would occur.

b. Would the project result in substantial soil erosion or the loss of topsoil?

LESS-THAN-SIGNIFICANT IMPACT. The 2011 EA/IS adequately assessed conditions and impacts to soils from the development within the 79-acre parcel for the replacement hospital. Erosion impacts from development of the replacement hospital complex within the 79-acre parcel were determined to be less-than-significant with the use of BMPs. Impacts to soils from construction of the additional features within the project area would be the same as described in the 2011 EA/IS with the use of BMPs; therefore, impacts would be Less-Than-Significant.

c. Would the project be located on a geologic unit or soils that is unstable, or that would become unstable as a result of the project, and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?

NO IMPACT. The project would not be located on a geologic unit or soils that are unstable or that would become unstable as a result of the project, potentially resulting in an on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. The project would use the most up-to-date construction and engineering techniques to ensure safe construction; therefore, No Impact would be expected.

d. Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

NO IMPACT. The soils within the project area are general sandy soils, which have a very low expansive potential. The proposed project would be designed and constructed in conformance with the Uniform

Building Code guidelines to avoid or minimize potential damage from seismic shaking, fault rupture, and liquefaction on the site; therefore, No Impact would occur.

e. Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

NO IMPACT. This is not applicable to this project. The wastewater storage tanks would store wastewater temporarily if the Fort Irwin WWTP were to go offline. There are no proposed septic tanks or alternative wastewater disposal systems included within the Proposed Action; therefore, No Impact would occur.

3.7 Greenhouse Gas Emissions

Greenhouse Gas Emissions Checklist

Would the Project:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Generate greenhouse gas (GHG) emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b. Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs?	☐	☐	☒	☐

3.7.1 Setting

Various gases in the Earth's atmosphere play an important role in moderating the Earth's surface temperature. Solar radiation enters Earth's atmosphere from space, and a portion of the radiation is absorbed by the Earth's surface. The Earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. GHGs are transparent to solar radiation but effectively absorb infrared radiation. Consequently, radiation that would otherwise escape back into space is retained, resulting in a warming of the Earth's atmosphere. This phenomenon is known as the greenhouse effect.

GHGs include both naturally occurring and anthropogenic gases that trap heat in the Earth's atmosphere. GHGs include, but are not limited to, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrochlorofluoro-carbons, perfluorocarbons, and sulfur hexafluoride. Although there is disagreement as to the speed of global warming and the extent of the impacts attributable to human activities, most in the scientific community now agree that there is a direct link between increased emission of GHGs and long-term global temperature.

In the United States, the main source of GHG emissions is electricity generation, followed by transportation. In California, however, transportation sources (passenger cars, light-duty trucks, other trucks, buses, and motorcycles) make up the largest category of GHG-emitting sources (California Air Resources Board, 2013). In 2011, the annual California statewide GHG emissions were 448.11 million metric tons of CO_2-equivalent (CO_2e) (California Air Resources Board, 2013). The transportation sector accounts for about 38 percent of the statewide GHG emissions inventory. The electric power sector accounts for about 19 percent of the total statewide GHG emissions inventory. The dominant GHG emitted is CO_2, primarily from fossil fuel combustion.

3.7.2 Impact Analysis

a. Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

LESS-THAN-SIGNIFICANT IMPACT. The MDAQMD GHG emission threshold for significance for CO_2e is 100,000 tons per year (MDAQMD, 2011). The Proposed Action would generate GHG emissions from construction-related activities and during long-term operation. Construction year 2015 would have the highest amount of emissions among years left of construction. The anticipated CO_2e during 2015 was estimated to be 1,422 CO_2e tons, which includes the construction of the entire hospital complex, including the additional features. The estimated CO_2e emissions from construction are well below the MDAQMD threshold. Construction of the Proposed Action would result in a short-term less-than-significant increase in GHG emissions. The estimated yearly CO_2e emissions during operation of the

emergency generators and boilers were estimated to be 8,963 tons, which is well below the MDAQMD threshold. The full air quality analysis is located in Appendix C of this Supplemental EA package.

The GHG emissions during the construction period and emissions during long-term operation would not be expected to contribute substantially to the regional GHG emission inventory or contribute to global climate change. Therefore, the project would result in a Less-Than-Significant Impact from GHG emissions.

b. Would the project conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs?

LESS-THAN-SIGNIFICANT IMPACT. Emissions of GHGs from construction activities and long-term operation were estimated to be below the MDAQMD threshold and below the President's Council of Environmental Quality reference point of 25,000 ton/yr of CO_2e. The Proposed Action would comply with local and federal regulations regarding GHGs and would result in a Less-Than-Significant Impact.

3.8 Hazards and Hazardous Materials

Hazards and Hazardous Materials Checklist

Would the Project:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
d. Be located on a site, which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐
e. For a project located within an airport land use plan, or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐

3.8.1 Setting

The 2011 EA/IS adequately addressed existing conditions of the 79-acre parcel and adequately analyzed impacts to hazardous materials resulting from the construction of the replacement hospital. The additional features could have additional impacts that were not addressed in the 2011 EA/IS.

3.8.2 Impacts Analysis

a,b. Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

LESS-THAN-SIGNIFICANT IMPACT. Small amounts of potentially hazardous materials, namely fuel, would be used on a short-term basis during project construction. To minimize the potential for a spill, the

construction contractor would implement equipment maintenance and standard construction practice BMPs. With the use of spill prevention, countermeasures, and containment measures, Less-Than-Significant Impacts from the use of hazardous materials, such as fuel, would be expected. Hazardous materials that would occur in the replacement hospital complex as a result of the additional features would include, fuel and small amounts of hazardous materials in the solar panel. The fuel storage tanks would be double-walled with a leak detection system.

Long-term operation and maintenance of the solar array would likely generate small amounts of hazardous waste. Dielectric fluids are used in electrical equipment such as switches, transformers, and capacitors. Solar cell materials often contain small amounts of cadmium, selenium, and arsenic. It is highly unlikely that hazardous waste generated from the solar array would pose a risk to the public or the environment. Hazardous waste generated from the disposal of expired, damaged, or malfunctioning solar equipment would either be recycled or characterized and properly disposed of as hazardous waste by qualified personnel. A maintenance plan would be implemented to ensure that equipment is replaced on a scheduled basis, reducing the potential for equipment failure or malfunction. The solar array would be fenced to limit public access and prevent potential accidental collisions with vehicles. A Less-Than-Significant Impact would be expected from long-term operation of the additional features.

c. Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

LESS-THAN-SIGNIFICANT IMPACT. There are no schools within one-quarter mile. The additional features would not be expected to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste, during operations. With the use of spill prevention and containment measures for handling hazardous materials, such as fuel, Less-Than-Significant Impacts from the use of hazardous materials, such as fuel, would be expected.

d. Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

LESS-THAN-SIGNIFICANT IMPACT. Fort Irwin is listed on the Envirostor database, also known as the Cortese List (California Department of Toxic Substances Control, 2015). However, the project area is not located in an area known to be contaminated. The project is not located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and would be expected to create a Less-Than-Significant Impact with regard to hazard to the public or environment. The project area has been cleared and graded for development of the replacement hospital.

Any hazardous materials found during project construction would be handled in compliance with applicable laws and regulations regarding transport, handling, disposal, and storage. All federal, state, and local reporting requirements would be followed regarding the use of hazardous and nonhazardous materials at the project site. Regardless of the potential to encounter munitions or explosives of concern, contractors working on Fort Irwin would be required to attend a briefing on potential encounters with unexploded ordnance and munitions or explosives of concern. A Less-Than-Significant Impact would be expected as a result of the Proposed Action.

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

NO IMPACT. The project area is not located within an airport land use plan or within 2 miles of a public airport or public use airport. The project would not result in any safety hazard for people residing or working in the project area; therefore, No Impact would result.

f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

NO IMPACT. No private airstrips are located within the project vicinity. The proposed project would not result in a safety hazard for people residing or working in the project area; therefore, No Impact would occur.

g. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

NO IMPACT. The project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; therefore, No Impact would occur. The additional features would allow for continued operation of the replacement hospital during a potential catastrophe, which would be a long-term benefit to Fort Irwin.

h. Would the project expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

LESS-THAN-SIGNIFICANT IMPACT. The project area has been cleared of vegetation and the potential for a fire during construction would be minimal. Fire management on Fort Irwin consists of rapid response and effective control of fires. A Less-Than-Significant Impact would be expected as a result of the Proposed Action during construction. The Fort Irwin replacement hospital would be in a developed portion of the cantonment where the risk of a wildland fire is low.

3.9 Hydrology and Water Quality

Hydrology and Water Quality Checklist

Would the Project:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite?	☐	☐	☐	☒
d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?	☐	☐	☒	☐
e. Create or contribute runoff water, which would exceed the capacity of existing or planned storm water drainage systems, or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f. Otherwise substantially degrade water quality?	☐	☐	☒	☐
g. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h. Place within a 100-year flood hazard area structures, which would impede or redirect flood flows?	☐	☐	☐	☒
i. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j. Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

3.9.1 Setting

The 2011 EA/IS adequately addressed the conditions within the 79-acre parcel and potential impacts resulting from construction and operation of the replacement hospital. The parcel has been cleared and there are no surface waters on the site. The 2011 EA/IS stated that no increase in water usage would be expected as a result of the replacement hospital.

The Fort Irwin water supply is provided by wells from a combination of the Bicycle Lake Basin, Langford Lake Basin, and Irwin Basin, all of which occur within the confines of the Fort Irwin boundary and are located near

the cantonment. The Irwin Basin is located at the cantonment. Fort Irwin is currently withdrawing more water from the aquifers than is being replenished, except for the Irwin Basin (Fort Irwin, 2014). Beginning in 1992, artificial recharge rates from percolation of treated sewage to the groundwater have exceeded pumpage rates and have stabilized water-level declines in the Irwin Basin (U.S. Geological Survey [USGS], 2003). Fort Irwin has implemented conservation measures and is building a new WTP that would be more efficient. Fort Irwin has contracted with USGS to identify future water sources within the boundaries of the Base (Fort Irwin, 2014).

A water supply investigation was conducted for Fort Irwin in 2007. The investigation was based on an average pumping rate of 3.5 million gallons per day (mgd) and a water level floor elevation of either 1,700 feet mean sea level or 1,900 feet mean sea level. Under these parameters, it is estimated that the water level in the Irwin Basin would continue to increase, due to artificial recharge, while the Bicycle Basin could sustain production through 2050, and production in the Langford Basin would decline below sustainable levels between 2035 and 2050. If the average pumpage rate was doubled to 7.0 mgd, it is estimated that the Irwin Basin water level would continue to increase through artificial recharge, and the Bicycle Lake Basin could sustain production levels until 2030 or 2043, while the Langford Lake Basin would sustain production until 2023 or 2035. The local basins can continue to meet current water demands using existing wells and pumping system approximately through year 2035 (Fort Irwin, 2007).

Fort Irwin monitors the quality of its groundwater because it is the only source for drinking water. Water from wells in all three basins has high fluoride concentrations, with 90 percent of all wells sampled having fluoride above the California maximum contaminant level of 2 milligrams per liter. Arsenic has also been detected at concentrations above the state maximum contaminant level of 10 micrograms per liter in 80 percent of the wells sampled. Potential sources of both fluoride and arsenic are the volcanic rocks common to the area. Water used for drinking is treated to required standards.

3.9.2 Impact Analysis

a. Would the project violate any water quality standards or waste discharge requirements?

LESS-THAN-SIGNIFICANT IMPACT. As stated in the 2011 EA/IS, no surface waters are on or near the project area. Standard construction BMPs would be implemented to reduce impacts from erosion. Therefore, there would be Less-Than-Significant Impacts on water quality or waste discharge requirements.

b. Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

LESS-THAN-SIGNIFICANT IMPACT. Project construction would require water for use during typical construction tasks and activities such as dust control, soil compaction, and general housekeeping practices. The source of water during construction would be a combination of groundwater from Bicycle Lake, Irwin, and Langford Lake groundwater basins. Tertiary treated wastewater (recycled water) from the Fort Irwin tertiary treatment plant would be available for dust suppression, which would be the largest use of water during construction.

The water tank, wastewater storage tanks, fuel storage tanks, boilers, and generators would be located within the 26-acre portion of the parcel analyzed for construction water use in the 2011 EA. Additional water for construction beyond that determined in the 2011 EA would not be needed for these features. The solar array is located outside of the 26-acre portion analyzed in the 2011 EA. Construction of studies of large-scale solar PV projects found peak water use for most projects ranged from 1.3 to 2.6 acre-feet per MW per year (Sandia National Laboratory, 2013). This range would convert to approximately 85,000 to 169,000 gallons of water use for the one month primary construction period for the 2.4-MW solar

array. Of that amount, all but approximately 500 to 2,000 gallons would be for dust control (Sandia National Laboratory, 2013). As noted above, dust control would use treated wastewater and would not require additional pumping of groundwater. Construction of the Proposed Action would not substantially deplete groundwater resources and, therefore, would have a Less-Than-Significant impact on groundwater.

Overall water use for the new hospital was analyzed in the 2011 EA. Because the new hospital would be Leadership in Energy and Environmental Design silver certified, it would be more efficient and use as much or less water than the hospital it is replacing. It is estimated that the hospital would use 30,000 gallons per day (gpd) with a peak demand of 75,000 gpd.

The amount of water needed for the components of the Proposed Action, and specifically the additional boilers, water storage tank, and water used for cleaning the solar array, would be minimal. The water storage tank would require 518,000 gallons of potable water for initial filling; however, Fort Irwin plans to remove an existing 1,000,000-gallon underground potable water storage tank located within the cantonment north of the residential area and outside the proposed hospital site. The underground concrete tank was constructed in 1944 to provide water to the cantonment area. Under a separate project, the tank will be decommissioned and disconnected from the Fort Irwin water system within the next 6 months and will be demolished within the next 18 months. This would offset the water required to fill the 518,000-gallon tank associated with the Proposed Action and would not significantly change annual water consumption for the long-term during filling. The solar panels would require 15,000 gallons of water per year for cleaning, which would be a minimal negligible increase in annual water usage (0.002 percent). Water use by the boilers would be limited to initial filling of the boiler system and periodic maintenance of the system. This water use would be included within and is not expected to exceed the projected average daily flow rate of 30,000 gpd, and a peak flow rate at 75,000 gpd estimated for operation of the entire hospital and additional water would not be needed (CH2M HILL, 2014). There would be no additional impacts to groundwater supplies from operation and maintenance of the boilers (CH2M HILL, 2014).

Operation of the entire hospital would require an average of 30,000 gpd, including all of the components of the Proposed Action, except for cleaning the solar array. This amount of water is about 1.6 percent of the average daily use rate for Fort Irwin (1.92 mgd) and would come from wells in the Bicycle Lake Basin, Langford Lake Basin, and Irwin Basin. The impact of water use by the hospital would be decreased by a reduction in water use at the building currently housing the Weed Army Hospital. Improved efficiency in the new water treatment plant, expansion of the recycled water system, and ongoing conservation measures at Fort Irwin would further offset impacts from water withdrawals associated with the new hospital. The components of the Proposed Action would not meaningfully increase the water needed. The Fort Irwin water system has the capacity to support these additional features and groundwater supplies would not be substantially affected; therefore, a Less-Than-Significant Impact to groundwater supplies during the operation phase would be expected as a result of the Proposed Action.

c. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite?

NO IMPACT. The 2011 EA/IS addressed impacts associated with clearing and developing the project area. The project area has been cleared and there are no natural drainage patterns. A stormwater system has been constructed within the 79-acre parcel. No additional impacts would occur from construction and operation of the additional features.

d. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?

LESS-THAN-SIGNIFICANT IMPACT. The 2011 EA/IS addressed impacts related to drainage patterns and stormwater runoff. As stated in the 2011 EA/IS, the replacement hospital complex would have a stormwater system capable of handling a 10-year flood, which would include retention ponds. The additional features would be included in the stormwater design and post-construction BMPs would be sized to accommodate runoff from the additional features. A Less-Than-Significant Impact would be expected as a result of the Proposed Action.

e. Would the project create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?

LESS-THAN-SIGNIFICANT IMPACT. As stated in the 2011 EA/IS, the replacement hospital complex would have a stormwater system capable of handling a 10-year flood, which would include retention ponds. The additional features would be included in the stormwater design and post-construction BMPs would be sized to accommodate runoff from the additional features. A Less-Than-Significant Impact would be expected as a result of the Proposed Action.

f. Would the project otherwise substantially degrade water quality?

LESS-THAN-SIGNIFICANT IMPACT. All potential water quality impacts are discussed in “a.,” “c.,” and “d.” and there would be a Less-Than-Significant Impact.

g. Would the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

NO IMPACT. As stated in the 2011 EA/IS, the project does not include housing; therefore, No Impact would occur.

h. Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?

NO IMPACT. The 2011 EA/IS stated that structures within the 79-acre parcel would not be within a known 100-year floodplain and would not impede or redirect stormwater flows. The additional features would be placed within the 79-acre parcel and would not impede or redirect stormwater flows; therefore, No Impact would occur.

i. Would the project expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?

NO IMPACT. As stated in the 2011 EA/IS, there are no levees or dams in the vicinity of the project area, and none are included with the additional features; therefore, No Impact would occur.

j. Would the project result in inundation by seiche, tsunami, or mudflow?

NO IMPACT. People or structures would not be exposed to hazards associated with seiches, tsunamis, or mudflows. The nature of the project would preclude any impacts associated with seiche, tsunami, or mudflows; therefore, No Impact would occur.

3.10 Land Use and Planning

Land Use and Planning Checklist

Would the Project:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Physically divide an established community?	☐	☐	☐	☒
b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

3.10.1 Setting

The 2011 EA/IS adequately addressed conditions and potential impacts related to land use and planning. As stated in the 2011 EA/IS, the project area was designated for either community or industrial uses. There were no land use impacts in the 2011 EA/IS (Appendix A of the Draft Supplemental EA). Construction for the replacement hospital is underway.

3.10.2 Impact Analysis

a. Would the project physically divide an established community?

NO IMPACT. The additional features would occur within the 79-acre parcel and no additional impacts would be expected.

b. Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

NO IMPACT. The additional features would not conflict with any applicable land use plan, policy or regulation, including the *Fort Irwin Real Property Master Plan* (Michael Baker, Jr., Inc., 2008); therefore, No Impact would occur.

c. Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?

NO IMPACT. As stated in the 2011 EA/IS, the 79-acre parcel is in the West Mojave Desert Conservation Plan area and construction and operation of the replacement hospital would not conflict with the requirements of that plan. The additional features would not conflict with a habitat conservation plan or a natural community conservation plan; therefore, No Impact would occur.

3.11 Mineral Resources

Mineral Resources Checklist

Would the Project:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b. Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

3.11.1 Setting

As stated in the 2011 EA/IS, mineral resources, such as iron, gold, and potentially silver, are within the boundaries of Fort Irwin; however, no mining or exploration is carried out within the original boundaries of Fort Irwin due to an exclusion signed by President Roosevelt in the 1940s (U.S. Army, 2006). No known mineral resources are in the project area.

3.11.2 Impact Analysis

a. Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

NO IMPACT. Impacts to mineral resources resulting from the proposed new features would be the same as those described in the 2011 EA/IS. As stated in the 2011 EA/IS, the project area is not in a delineated mineral resource recovery site and development within the 79-acre parcel would not result in the loss of availability of any known mineral resources. No impact to mineral resources would occur as a result of the proposed new features.

b. Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

NO IMPACT. As stated in the 2011 EA/IS, development within the 79-acre parcel would not result in the loss or availability of a mineral resource recovery site as described in “a.” above. No mineral resources have been delineated within the project area. The project area is not located within an established mineral resource zone, and no economically viable mineral deposits are known to be present; additionally, no mining or exploration is conducted within the original boundaries of Fort Irwin due to the previously mentioned exclusion. No Impact would occur as a result of the Proposed Action.

3.12 Noise

Noise Resources Checklist

Would the project:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

3.12.1 Setting

Noise conditions within the project area are the same as those described in the 2011 NEPA/CEQA document.

3.12.2 Impact Analysis

3.12.2.1 Short-Term Construction Noise Impacts

Noise conditions and potential impacts from noise as a result of the Proposed Action were adequately assessed in the 2011 NEPA/CEQA document. Those conditions have not changed and the construction of the additional features would not increase noise impacts above those determined in the 2011 NEPA/CEQA document.

a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

LESS-THAN-SIGNIFICANT IMPACT. Impacts to noise from the proposed new features would be the same as those described in the 2011 EA/IS. Anticipated noise levels generated from construction of the proposed new features would be the same as those anticipated for the construction of the replacement hospital, as described in the 2011 EA/IS. Noise levels associated with construction activities at the nearest residences to the east could be as high as 65 decibels. As stated in the 2011 EA/IS, impacts associated with exposure of persons to noise during construction are considered to be less-than-significant because construction activities would be temporary, would be limited to daytime hours, and

would be primarily at a distance from residents and noise-sensitive receptors that would allow for adequate noise reduction.

b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

LESS-THAN-SIGNIFICANT IMPACT. The Proposed Action would not result in a substantial permanent increase in ambient noise levels in the project vicinity. Impacts associated with groundborne vibration or groundborne noise resulting from construction in the 79-acre parcel were adequately assessed in the 2011 EA/IS. As stated in the 2011 EA/IS, should construction activity require the use of a pile driver, inappropriate noise levels could be experienced at family housing units and unaccompanied housing units as far away as approximately 3,200 feet. However, the use of a pile driver would likely be limited and it is expected that such activities would not expose residents to excessive groundborne vibration; therefore, impacts would be less-than-significant.

c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

NO IMPACT. The generators would be enclosed and would have noise-reducing mufflers. Also, the generators would only operate during tests and emergency conditions. The proposed new features would not result in a permanent source of noise and would not change noise levels for the long-term; therefore, No Impact would occur.

d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

LESS-THAN-SIGNIFICANT IMPACT. As stated in the 2011 EA/IS, construction in the 79-acre parcel would temporarily increase noise levels that would be perceptible in the vicinity of construction activities, which would be a less-than-significant impact. Noise impacts from construction of the proposed new features would be the same as those described in the 2011 EA/IS. There would be a temporary Less-Than-Significant Impact from noise during construction. There would be a temporary Less-Than-Significant Impact from noise during testing of generators and during emergency use. The generators would be enclosed and would have noise-reducing mufflers, and noise from operation of the generators during emergencies or tests would likely not be perceivable by individuals in the area. There would be a Less-Than-Significant Impact from noise during operation of the proposed new features from temporary and/or periodic increases in ambient noise levels.

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

NO IMPACT. The project is not located within 2 miles of a public airport or public use airport, so No Impact would occur.

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

NO IMPACT. The project is not located within 2 miles of a private airstrip, so No Impact would occur.

3.13 Population and Housing

Population and Housing Checklist

Would the Project:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

3.13.1 Setting

Conditions would be the same as described in the 2011 EA/IS. The proposed project would be constructed in an undeveloped area of the cantonment adjacent to housing and industrial areas, and would not conflict with populations or housing resources.

3.13.2 Impact Analysis

a. Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

NO IMPACT. As stated in the 2011 EA/IS, the replacement hospital would not induce growth at Fort Irwin. The proposed additional features would not induce population growth, as the features would be part of the replacement hospital complex; therefore, No Impact would be expected.

b. Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

NO IMPACT. As stated in the 2011 EA/IS, the 79-acre parcel is an undeveloped area of the cantonment and would not displace any existing housing or necessitate the construction of replacement housing elsewhere; therefore, No Impact would occur.

c. Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

NO IMPACT. The project would not result in the displacement of any people, housing, or businesses and would not necessitate the movement or demolition of any housing. Project construction and operation would not displace people, nor would it necessitate constructing replacement housing elsewhere; therefore, No Impact would occur.

3.14 Public Services

Public Services Checklist

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Fire protection?	☐	☐	☐	☒
b. Police protection?	☐	☐	☐	☒
c. Schools?	☐	☐	☐	☒
d. Parks?	☐	☐	☐	☒
e. Other public facilities?	☐	☐	☐	☒

3.14.1 Setting

Public services and facilities are provided and maintained by Fort Irwin, including fire, medical, military police, and public works.

3.14.2 Impact Analysis

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services?

a. Fire protection?

NO IMPACT. As stated in the 2011 EA/IS, the Fort Irwin fire department could require an additional ladder truck to adequately respond to emergencies that may occur at the replacement hospital and no adverse impact to fire protection would be expected. The additional features would not require additional fire protection.

b. Police protection?

NO IMPACT. The project would entail the construction of the additional features for the replacement hospital, which would not increase population and would not likely affect crime rates in the vicinity. Therefore, additional police protection would not be needed, and No Impact would occur.

c. Schools?

NO IMPACT. The proposed additional features would not generate additional population or students during construction or operation, and No Impact would occur.

d. Parks?

NO IMPACT. The proposed additional features would not increase the use of or affect existing recreational facilities, and No Impact would occur.

e. Other public facilities?

NO IMPACT. The proposed additional features would not result in an increase in population during project construction or operation; therefore, there would be No Impact to other government services or public facilities.

3.15 Recreation

Recreation Checklist

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

3.15.1 Setting

Conditions, as stated in the 2011 EA/IS, have not changed. The proposed project is located in an undeveloped area of the cantonment. No designated recreational facilities are within the project area.

3.15.2 Impact Analysis

a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

NO IMPACT. The proposed project would have No Impact on the use or condition of recreational facilities on Fort Irwin.

b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

NO IMPACT. The project does not include recreational facilities. There would be No Impact to any recreational facilities on Fort Irwin.

3.16 Transportation/Traffic

Transportation/Traffic Checklist

Would the project:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐
b. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☒	☐
d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e. Result in inadequate emergency access?	☐	☐	☐	☒
f. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☒	☐

3.16.1 Setting

Transportation and traffic conditions are the same as described in the 2011 EA/IS.

3.16.2 Impact Analysis

a. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

LESS-THAN-SIGNIFICANT IMPACT. As stated in the 2011 EA/IS, there would be short-term construction related traffic impacts associated with development within the 79-acre parcel for the replacement hospital, which were considered less-than-significant. Transportation impacts related to construction of the additional features would be the same as those described in the 2011 EA/IS, which were considered less-than-significant.

The water storage tank, fuel tanks, additional boilers, generators, and wastewater storage tanks would not impact traffic for the long-term. The solar array would be placed near the new hospital helicopter pad, which could affect air transportation due to potential glare; however, a glare analysis conducted concluded that proposed flight paths for helicopters landing and taking off from the replacement

hospital helicopter pad were not negatively affected by the glare potential from the solar array (RLF, 2014).

b. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

LESS-THAN-SIGNIFICANT IMPACT. As stated in the 2011 EA/IS, minor upgrades to roadways near the project area for the replacement hospital were recommended by a 2010 traffic study. The additional features would not have impacts beyond those stated in the 2011 EA/IS; therefore, impacts would be Less-Than-Significant.

c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

LESS-THAN-SIGNIFICANT IMPACT. There would be no change in air traffic levels or patterns as a result of the additional features. The water storage tank, fuel tanks, additional boilers, generators, and wastewater storage tanks would not impact air traffic. The solar array would be placed near the new hospital helicopter pad, which could affect air transportation due to potential glare. However, a glare analysis conducted concluded that proposed flight paths for helicopters landing and taking off from the replacement hospital helipad were not negatively affected by the glare potential from the solar array. The glare study did indicate that there would be a glare when approaching the helipad from the west in the early morning from 6:00 am to 7:00 am in both the spring and fall (RLF, 2014). The solar array would result in a Less-Than-Significant safety impact for air traffic.

Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

NO IMPACT. The project would not include or exacerbate dangerous design features or incompatible uses; therefore, No Impact would occur.

d. Result in inadequate emergency access?

NO IMPACT. The additional features would be constructed within the hospital complex and would support operation of the hospital; therefore, No Impact would occur.

e. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

NO IMPACT. The project would not affect public transit facilities, nor would the project conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities. No Impact would be expected as a result of the Proposed Action.

3.17 Utilities and Service Systems

Utilities and Service Systems Checklist

Would the project:	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Exceed wastewater treatment requirements of the applicable RWQCB?	☐	☐	☐	☒
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
e. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g. Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

3.17.1 Setting

The additional features could affect water consumption, but would not affect other utilities; therefore, this section focuses on the Fort Irwin water system and potential impacts associated with water consumption resulting from the additional features.

The current capacity of the Fort Irwin water system is 3.5 mgd, while the average usage rate for 2015, up to October, was 1.9 mgd. The average usage rate for water in 2014 was 1.92 mgd. There will be an additional 1.6 mgd of water available for use in the next few months, which would increase the Fort Irwin water system capacity to 5.1 mgd. The Fort Irwin water supply is provided by wells from a combination of the Bicycle Lake Basin, Langford Lake Basin, and Irwin Basin, all of which occur within the confines of the Fort Irwin boundary. Fort Irwin is withdrawing more water from the aquifers than is being replenished, except for the Irwin Basin (Fort Irwin, 2014). Fort Irwin has implemented conservation measures, has planned to expand the recycled water system, and is building a new WTP to be completed in 2016 that would be more efficient. Fort Irwin has contracted with USGS to identify future water sources (Fort Irwin, 2014).

3.17.2 Impact Analysis

a. Exceed wastewater treatment requirements of the applicable RWQCB?

NO IMPACT. The additional features are not anticipated to increase wastewater production that could impact treatment requirements. The wastewater storage tanks would provide for storage of wastewater in case of a potential outage at the Fort Irwin WWTP, which would be a long-term benefit to hospital

operations in emergency conditions. The Proposed Action would not increase wastewater treatment requirements of the Regional Water Quality Control Board and No Impact would occur.

b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

NO IMPACT. The additional features would not require new water or wastewater treatment facilities. The wastewater storage tanks would store wastewater during emergencies when the Fort Irwin WWTP could experience an outage. No upgrades to existing facilities would be required as a result of the additional features; therefore, No Impact would occur.

c. Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

NO IMPACT. The 2011 EA/IS addressed the development within the 79-acre parcel and potential stormwater impacts. The stormwater protection system for the replacement hospital was designed for a 10-year storm event, which would include stormwater runoff from the additional features. The proposed additional features would have no additional impact to the stormwater system; therefore, No Impact would occur.

d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

LESS-THAN-SIGNIFICANT IMPACT. The additional features are not expected to substantially change water usage at Fort Irwin for the long-term and Fort Irwin has capacity within the water system. A minor increase in water usage would occur during construction. Water would mainly be needed during construction for dust suppression. The water for dust suppression is primarily supplied via treated wastewater (recycled water). Other construction water needs would be supplied by the Fort Irwin WTP. The use of water for construction would be temporary and the amount needed during construction would be minimal. There would be a short-term increase in water usage to fill the 518,000-gallon potable water storage tank; however, Fort Irwin is removing a 1,000,000-gallon potable water storage tank. This would offset demand caused by filling the 518,000-gallon water storage tank. It is anticipated that 15,000 gallons of water would be needed to clean solar panels twice a year. The Fort Irwin water system has capacity to supply the additional features with the amount of needed water and no new or expanded entitlements would be needed; therefore, a Less-Than-Significant impact would occur.

While the PV facility is in operation, the water usage for the PV facility is expected to be 15,000 gallons a year for the two cleaning events that would require 7,500 gallons of water for each event. Water would be supplied from the Fort Irwin WTP. The use of water from the construction of the PV facility would be minimal and would pose a Less-Than-Significant impact to the Fort Irwin water utility.

The addition of six new boilers is not expected to have an impact on water usage beyond the demand already estimated for the hospital (30,000 gpd average and 75,000 gpd peak use).

The current capacity and average use of the Fort Irwin water system is 3.5 mgd and 1.9 mgd, respectively. The Fort Irwin water system has capacity to supply the additional features with the amount of needed water and no new or expanded entitlements would be needed; therefore, a Less-Than-Significant impact would occur.

e. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

NO IMPACT. The additional features would not increase wastewater treatment and would not result in a determination by the wastewater treatment provider; therefore, No Impact would occur.

f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

LESS-THAN-SIGNIFICANT IMPACT. During project construction, a small amount of construction waste could be generated; however, no demolition would be involved during construction activities. The Fort Irwin landfill would be utilized if there is available capacity. If needed, a landfill outside of Fort Irwin with sufficient capacity could be utilized to accept the construction waste. Hazardous solid waste potentially generated from long-term use and maintenance of the solar array would be disposed of at a proper landfill that accepts hazardous waste outside of Fort Irwin. A Less-Than-Significant Impact would occur as a result of the Proposed Action.

g. Comply with federal, state, and local statutes and regulations related to solid waste?

NO IMPACT. The project may require disposal of construction debris, which would likely be limited to a small amount of discarded construction materials and excess fill. No demolition would occur during construction activities. Debris from construction would be disposed of in a lawful manner consistent with federal, state, and local regulations. Construction waste is accepted at local disposal facilities.

The Proposed Action would generate solid waste during long-term operation and maintenance of the solar array. Dielectric fluids are used in electrical equipment such as switches, transformers, and capacitors. Solar cell materials often contain small amounts of cadmium, selenium, and arsenic. Hazardous waste generated from the disposal of expired, damaged, or malfunctioning solar equipment would either be recycled or characterized and disposed of as hazardous waste. Hazardous solid waste that cannot be recycled would be disposed of at a proper landfill outside of Fort Irwin in compliance with federal, state, and local statutes; therefore, No Impact would occur.

3.18 Mandatory Findings of Significance

Mandatory Findings of Significance Checklist

	Potentially Significant Impact	Less-Than-Significant with Mitigation Incorporation	Less-Than-Significant Impact	No Impact
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects?)	☐	☐	☒	☐
c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

LESS-THAN-SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. The additional features would be constructed in an area of the 79-acre parcel that has been cleared for construction of the Fort Irwin replacement hospital. There would be no loss of habitat as a result of construction and operation of the additional features. Temporary impacts could occur during construction; however, the construction period would be temporary and proposed mitigation would reduce all impacts to a Less-Than-Significant level. Operation of the solar array could affect bird populations; however, the solar array would be small in size, would be fenced, and would be in a developed area of the cantonment near a helipad. Impacts to bird species from long-term operation of the solar would be expected to be Less-Than-Significant.

b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects?

LESS-THAN-SIGNIFICANT IMPACT. As indicated throughout this IS, impacts on all environmental resources were deemed to result in either "No Impact," a "Less-Than-Significant Impact," or "Less-Than-Significant with Mitigation Incorporation." As a result, the project would not constitute cumulatively considerable impacts; there would be a Less-Than-Significant Impact.

c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

LESS-THAN-SIGNIFICANT IMPACT. As indicated throughout this IS, impacts on all environmental resources were deemed to result in either "No Impact," a "Less-Than-Significant Impact," or "Less-Than-Significant with Mitigation Incorporation." As a result, the project and its proposed mitigation measures would not create environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly. The additional features would allow for the replacement hospital to function in catastrophic conditions, which would be a long-term benefit to those who reside, work, and train at Fort Irwin.

SECTION 4

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Appendix C
Record of Non-Applicability and Air Emission Calculations

RECORD OF NON-APPLICABILITY (RONA) FOR GENERAL CONFORMITY

NAME OF PROJECT: Construction and Operation of the New Weed Community Hospital at Ft. Irwin, CA

PROJECT ID NUMBER: _____

POINT OF CONTACT: Ronald W. Vaughn

PHONE/EMAIL: 678.530.4366 / rvaughn1@ch2m.com

START DATE: 2012

General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the project described above according to the requirements of 40 CFR 93, Subpart B. The requirements of the rule are not applicable to this project/action because:

The project/action qualifies as an exempt action under. The applicable exemption citation is 40 CFR 93.153: _____.

OR

Total direct and indirect emissions from this project/action have been estimated at *(only include information for the applicable pollutants):*

_____ tons/yr of NOx

_____ tons/yr of VOC

1.14 tons/yr of PM10

_____ tons/yr of _____ *(specify pollutant)*

_____ tons/yr of _____ *(specify pollutant)*

These levels are below the conformity threshold values established at the 40 CFR 93.153 (b), **AND** this project/action is not considered regionally significant under 40 CFR 93.153 (i).

Supporting documentation and emission estimates are:

Attached Supplemental EA for the Construction and Operation of the New Weed Community Hospital

Appear in NEPA Documentation _____ *(cite reference)*

Other _____ *(cite reference)*

_____ 01/12/16

Environmental Coordinator *(Title and Signature)* Date

CFR 93.153

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LIST OF ATTACHMENTS

Attachment 1: Emission Calculations

GENERAL CONFORMITY REVIEW (GCR)

Supplemental Environmental Assessment for the Construction and Operation of the New Weed Army Community Hospital, Ft. Irwin, San Bernardino County, California

1.0 PROPOSED ACTION

The Proposed Action would implement design elements to the construction and operation of the new hospital that were not fully analyzed in the 2011 EA. These elements include a water storage tank, emergency wastewater storage tanks, a solar arry, fuel storage tanks, boilers, and diesel generators.

2.0 CALCULATION OF EMISSIONS FROM PROPOSED ACTION

The emissions associated with the proposed action are construction- and operation-related.

2.1 Construction and Vehicle-Related Emissions

The Proposed Action is to implement design elements to support the operation of the hospital. The proposed action would require the use of various pieces of construction equipment. Construction emissions were calculated using South Coast Air Quality Management District's (SCAQMD's) California Emission Estimator Model (CalEEMod) (version 2013.2.2) and assuming disturbance of a maximum of 33.82 acres. CalEEMod has default equipment mixes for building construction, grading, and excavation/trenching that were selected. PM10 and PM2.5 emissions were mitigated based on the requirements outlined in the *Federal Particulate Matter (PM10) Attainment Plan* (MDAQMD, 1995) and MDAQMD Rules 403 and 403.2.

Mobile emissions would include personally owned vehicles (POVs) used by construction workers and delivery trucks traveling to Ft. Irwin. CARB's EMFAC2007 model (version 2.30) was used to calculate vehicle emission factors. It was assumed each construction worker and delivery truck would travel 80 miles per day round-trip to the construction site. Detailed emission calculations are provided in Attachment 1 and are summarized in Tables 2-1, 2-2, 2-3, 2-4, 2-5, and 2-6.

TABLE 2-1
Summary of Construction Related Emissions – New Weed Army Community Hospital
Fort Irwin, California

Activity	CO tons/yr	VOC (tons/yr)	NO_X tons/yr	SO_2 tons/yr	PM_{10} tons/yr	$PM_{2.5}$ tons/yr
Construction Emissions	6.48	0.649	3.68	0.0076	0.564	0.271
Vehicle Emissions	0.632	0.0731	0.249	0.0009	0.0129	0.00984
Total 2012 Construction Emissions	**7.11**	**0.722**	**3.92**	**0.0086**	**0.577**	**0.281**

TABLE 2-2
Summary of Construction Related Emissions – New Weed Army Community Hospital
Fort Irwin, California

Activity	CO tons/yr	VOC (tons/yr)	NO_X tons/yr	SO_2 tons/yr	PM_{10} tons/yr	$PM_{2.5}$ tons/yr
Construction Emissions	10.0	1.01	5.94	0.0130	1.01	0.457
Vehicle Emissions	1.07	0.124	0.422	0.0016	0.0219	0.0167
Total 2013 Construction Emissions	**11.0**	**1.14**	**6.36**	**0.0146**	**1.03**	**0.474**

TABLE 2-3
Summary of Construction Related Emissions – New Weed Army Community Hospital
Fort Irwin, California

Activity	CO tons/yr	VOC (tons/yr)	NO_X tons/yr	SO_2 tons/yr	PM_{10} tons/yr	$PM_{2.5}$ tons/yr
Construction Emissions	10.0	1.12	7.65	0.0143	1.11	0.551
Vehicle Emissions	1.07	0.123	0.421	0.0016	0.0218	0.0166
Total 2014 Construction Emissions	**11.1**	**1.25**	**8.07**	**0.0159**	**1.14**	**0.568**

TABLE 2-4
Summary of Construction Related Emissions – New Weed Army Community Hospital
Fort Irwin, California

Activity	CO tons/yr	VOC (tons/yr)	NO_X tons/yr	SO_2 tons/yr	PM_{10} tons/yr	$PM_{2.5}$ tons/yr
Construction Emissions	8.85	0.971	6.51	0.0137	1.06	0.500
Vehicle Emissions	1.07	0.123	0.421	0.0016	0.0218	0.0166
Total 2015 Construction Emissions	**9.92**	**1.09**	**6.93**	**0.0153**	**1.08**	**0.517**

TABLE 2-5
Summary of Construction Related Emissions – New Weed Army Community Hospital
Fort Irwin, California

Activity	CO tons/yr	VOC (tons/yr)	NO_X tons/yr	SO_2 tons/yr	PM_{10} tons/yr	$PM_{2.5}$ tons/yr
Construction Emissions	7.47	0.755	4.68	0.0128	0.895	0.402
Vehicle Emissions	1.07	0.124	0.422	0.00160	0.0219	0.0167
Total 2016 Construction Emissions	**8.54**	**0.879**	**5.10**	**0.0144**	**0.917**	**0.419**

TABLE 2-6
Summary of Construction Related Emissions – New Weed Army Community Hospital
Fort Irwin, California

Activity	CO tons/yr	VOC (tons/yr)	NO_X tons/yr	SO_2 tons/yr	PM_{10} tons/yr	$PM_{2.5}$ tons/yr
Construction Emissions	4.95	0.494	3.11	0.0093	0.635	0.278
Vehicle Emissions	0.778	0.0901	0.307	0.0012	0.0159	0.000
Total 2017 Construction Emissions	**5.73**	**0.584**	**3.42**	**0.0104**	**0.651**	**0.278**

As shown in Tables 2-1, 2-2, 2-3, 2-4, 2-5 and 2-6, a maximum increase of 0.577 tons of PM_{10} would be expected due to construction related activities in 2012; 1.03 tons in 2013; 1.14 tons in 2014; 1.08 tons in 2015; 0.917 tons in 2016; and 0.651 tons in 2017.

2.2 Operational Emissions

The Proposed Action would result in new operation emissions associated with the operation of generators and boilers. Detailed emission calculations are provided in Attachment 1 and are summarized in Table 2-7.

TABLE 2-7
Summary of Operational Emissions – New Weed Army Community Hospital
Fort Irwin, California

Activity	CO tons/yr	VOC (tons/yr)	NO_X tons/yr	SO_2 tons/yr	PM_{10} tons/yr	$PM_{2.5}$ tons/yr
	2015					
Operational Emissions	5.83	0.612	10.1	0.0138	0.522	0.522
Total Operational Emissions	**5.83**	**0.612**	**10.1**	**0.0138**	**0.522**	**0.522**

As shown in Table 2-7, an increase of 0.522 tons of PM_{10} would be expected due to operational related activities in 2018.

3.0 CONCLUSION

Total annual emissions generated by the proposed actions are expected to peak with the release of 1.14 tons of PM_{10}, due to construction related activities in 2014. This increase is well below the conformity threshold values. Therefore, a general conformity review is deemed unnecessary at this time.

Attachment 1
Emission Calculations

Ft. Irwin - MEDCOM

San Bernardino-Mojave Desert County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	1,473.20	1000sqft	33.82	1,473,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2018
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction phases provided by client.

Off-road Equipment - All equipment is assumed to be used approximately 6 hours per day.

Off-road Equipment - All equipment is assumed to be used approximately 6 hours per day.

Off-road Equipment - All equipment is assumed to be used approximately 6 hours per day.

Off-road Equipment - All equipment is assumed to be used approximately 6 hours per day.

Trips and VMT - Mobile emissions, including personally owned vehicles used by construction workers and delivery trucks traveling to Ft. Irwin, were calculated using CARB's EMFAC2007 model.

Vehicle Trips - Default values were altered to accurately reflect the trips associated with the site following completion of the project.

Land Use Change - The 33.82 acres are currently forest land covered in scrub. Following the project, no part of the 33.82 acres will remain as forest land.

Sequestration -

Construction Off-road Equipment Mitigation - Values altered to accurately reflect particulate control measures.

Mobile Land Use Mitigation -

Area Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	90
tblConstructionPhase	NumDays	500.00	1,387.00
tblConstructionPhase	NumDays	45.00	445.00
tblConstructionPhase	PhaseEndDate	3/13/2014	5/2/2016
tblConstructionPhase	PhaseEndDate	6/6/2019	9/2/2015
tblConstructionPhase	PhaseEndDate	10/2/2015	3/6/2014
tblConstructionPhase	PhaseStartDate	3/7/2014	4/26/2016
tblConstructionPhase	PhaseStartDate	9/22/2017	12/19/2013
tblConstructionPhase	PhaseStartDate	9/3/2015	2/5/2014
tblGrading	AcresOfGrading	333.75	112.50
tblOffRoadEquipment	HorsePower	162.00	78.00
tblOffRoadEquipment	HorsePower	84.00	226.00

tblOffRoadEquipment	HorsePower	255.00	89.00
tblOffRoadEquipment	HorsePower	199.00	84.00
tblOffRoadEquipment	HorsePower	162.00	125.00
tblOffRoadEquipment	HorsePower	171.00	46.00
tblOffRoadEquipment	LoadFactor	0.38	0.48
tblOffRoadEquipment	LoadFactor	0.74	0.29
tblOffRoadEquipment	LoadFactor	0.40	0.20
tblOffRoadEquipment	LoadFactor	0.36	0.74
tblOffRoadEquipment	LoadFactor	0.38	0.42
tblOffRoadEquipment	LoadFactor	0.42	0.45
tblOffRoadEquipment	OffRoadEquipmentType	Air Compressors	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Forklifts	Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentType	Generator Sets	Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Pavers	Excavators
tblOffRoadEquipment	OffRoadEquipmentType	Welders	Other Construction Equipment
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	5.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	0.00

tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	7.00	6.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2018
tblTripsAndVMT	VendorTripNumber	241.00	0.00
tblVehicleTrips	CC_TL	7.30	0.00
tblVehicleTrips	CNW_TL	7.30	0.00
tblVehicleTrips	CW_TL	9.50	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	WD_TR	6.97	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2012	0.6487	3.6756	6.4781	7.6600e-003	0.3841	0.1798	0.5639	0.1020	0.1688	0.2709	0.0000	664.0950	664.0950	0.0751	0.0000	665.6715
2013	1.0117	5.9393	9.9677	0.0130	0.7108	0.2959	1.0066	0.1794	0.2776	0.4570	0.0000	1,108.3385	1,108.3385	0.1213	0.0000	1,110.8867
2014	1.1237	7.6484	10.0476	0.0143	0.7163	0.3972	1.1135	0.1809	0.3703	0.5512	0.0000	1,215.6501	1,215.6501	0.1512	0.0000	1,218.8248
2015	0.9712	6.5065	8.8453	0.0137	0.7141	0.3424	1.0565	0.1803	0.3195	0.4998	0.0000	1,137.8125	1,137.8125	0.1312	0.0000	1,140.5674
2016	0.7549	4.6798	7.4738	0.0128	0.6510	0.2444	0.8954	0.1729	0.2288	0.4018	0.0000	1,034.4205	1,034.4205	0.1030	0.0000	1,036.5844
2017	0.4935	3.1074	4.9467	9.2800e-003	0.4714	0.1635	0.6349	0.1252	0.1531	0.2783	0.0000	730.0036	730.0036	0.0715	0.0000	731.5048
Total	**5.0036**	**31.5570**	**47.7592**	**0.0707**	**3.6477**	**1.6230**	**5.2708**	**0.9407**	**1.5181**	**2.4588**	**0.0000**	**5,890.3203**	**5,890.3203**	**0.6533**	**0.0000**	**5,904.0396**

2.1 Overall Construction

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2012	0.6487	3.6756	6.4781	7.6600e-003	0.0845	0.1798	0.2643	0.0285	0.1688	0.1973	0.0000	664.0947	664.0947	0.0751	0.0000	665.6712
2013	1.0117	5.9392	9.9677	0.0130	0.1473	0.2959	0.4432	0.0488	0.2776	0.3263	0.0000	1,108.3379	1,108.3379	0.1213	0.0000	1,110.8861
2014	1.1237	7.6484	10.0476	0.0143	0.1486	0.3972	0.5457	0.0492	0.3703	0.4195	0.0000	1,215.6494	1,215.6494	0.1512	0.0000	1,218.8241
2015	0.9712	6.5065	8.8453	0.0137	0.1481	0.3424	0.4905	0.0490	0.3195	0.3685	0.0000	1,137.8118	1,137.8118	0.1312	0.0000	1,140.5668
2016	0.7549	4.6798	7.4738	0.0128	0.1433	0.2444	0.3877	0.0483	0.2288	0.2772	0.0000	1,034.4200	1,034.4200	0.1030	0.0000	1,036.5839
2017	0.4935	3.1074	4.9467	9.2800e-003	0.1038	0.1635	0.2673	0.0350	0.1531	0.1880	0.0000	730.0032	730.0032	0.0715	0.0000	731.5044
Total	**5.0036**	**31.5570**	**47.7592**	**0.0707**	**0.7756**	**1.6230**	**2.3986**	**0.2587**	**1.5181**	**1.7768**	**0.0000**	**5,890.3171**	**5,890.3171**	**0.6533**	**0.0000**	**5,904.0364**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**78.74**	**0.00**	**54.49**	**72.50**	**0.00**	**27.74**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	7.4620	1.3000e-004	0.0137	0.0000		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	0.0263	0.0263	7.0000e-005	0.0000	0.0278
Energy	0.2645	2.4041	2.0194	0.0144		0.1827	0.1827		0.1827	0.1827	0.0000	7,284.0144	7,284.0144	0.2647	0.0924	7,318.2058
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	370.8178	0.0000	370.8178	21.9147	0.0000	831.0266
Water						0.0000	0.0000		0.0000	0.0000	108.0813	1,269.4254	1,377.5066	11.1593	0.2742	1,696.8518
Total	**7.7264**	**2.4042**	**2.0331**	**0.0144**	**0.0000**	**0.1828**	**0.1828**	**0.0000**	**0.1828**	**0.1828**	**478.8991**	**8,553.4661**	**9,032.3652**	**33.3388**	**0.3666**	**9,846.1120**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	7.4620	1.3000e-004	0.0137	0.0000		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	0.0263	0.0263	7.0000e-005	0.0000	0.0278
Energy	0.2645	2.4041	2.0194	0.0144		0.1827	0.1827		0.1827	0.1827	0.0000	7,284.0144	7,284.0144	0.2647	0.0924	7,318.2058
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	370.8178	0.0000	370.8178	21.9147	0.0000	831.0266
Water						0.0000	0.0000		0.0000	0.0000	108.0813	1,269.4254	1,377.5066	11.1573	0.2738	1,696.6794
Total	**7.7264**	**2.4042**	**2.0331**	**0.0144**	**0.0000**	**0.1828**	**0.1828**	**0.0000**	**0.1828**	**0.1828**	**478.8991**	**8,553.4661**	**9,032.3652**	**33.3368**	**0.3661**	**9,845.9396**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.11**	**0.00**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
New Trees	0.0000
Vegetation Land Change	-483.6260
Total	**-483.6260**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Construction	Building Construction	5/30/2012	9/21/2017	5	1387	
2	Grading	Grading	12/19/2013	9/2/2015	5	445	
3	Excavation Phase 1	Trenching	2/5/2014	3/6/2014	5	22	
4	Excavation Phase 2	Trenching	4/26/2016	5/2/2016	5	5	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 112.5

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Excavation Phase 2	Excavators	2	6.00	78	0.48
Construction	Cranes	0	0.00	226	0.29
Grading	Excavators	0	0.00	162	0.38
Construction	Forklifts	0	0.00	89	0.20
Construction	Generator Sets	5	6.00	226	0.29
Construction	Rubber Tired Dozers	2	6.00	89	0.20
Construction	Rubber Tired Loaders	2	6.00	84	0.74
Excavation Phase 1	Excavators	2	6.00	125	0.42
Grading	Rubber Tired Dozers	0	0.00	255	0.40
Grading	Scrapers	0	0.00	361	0.48
Grading	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Construction	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Grading	Graders	2	6.00	174	0.41
Construction	Welders	0	0.00	46	0.45
Construction	Other Construction Equipment	1	6.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	2	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Construction	12	619.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Excavation Phase 1	2	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Excavation Phase 2	2	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Clean Paved Roads

3.2 Construction - 2012

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3135	3.1237	1.3434	3.0900e-003		0.1757	0.1757		0.1652	0.1652	0.0000	277.7454	277.7454	0.0406	0.0000	278.5980
Total	**0.3135**	**3.1237**	**1.3434**	**3.0900e-003**		**0.1757**	**0.1757**		**0.1652**	**0.1652**	**0.0000**	**277.7454**	**277.7454**	**0.0406**	**0.0000**	**278.5980**

3.2 Construction - 2012

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3352	0.5519	5.1346	4.5700e-003	0.3841	4.0400e-003	0.3881	0.1020	3.6200e-003	0.1056	0.0000	386.3496	386.3496	0.0345	0.0000	387.0735
Total	**0.3352**	**0.5519**	**5.1346**	**4.5700e-003**	**0.3841**	**4.0400e-003**	**0.3881**	**0.1020**	**3.6200e-003**	**0.1056**	**0.0000**	**386.3496**	**386.3496**	**0.0345**	**0.0000**	**387.0735**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3135	3.1237	1.3434	3.0900e-003		0.1757	0.1757		0.1652	0.1652	0.0000	277.7451	277.7451	0.0406	0.0000	278.5977
Total	**0.3135**	**3.1237**	**1.3434**	**3.0900e-003**		**0.1757**	**0.1757**		**0.1652**	**0.1652**	**0.0000**	**277.7451**	**277.7451**	**0.0406**	**0.0000**	**278.5977**

3.2 Construction - 2012

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3352	0.5519	5.1346	4.5700e-003	0.0845	4.0400e-003	0.0886	0.0285	3.6200e-003	0.0321	0.0000	386.3496	386.3496	0.0345	0.0000	387.0735
Total	**0.3352**	**0.5519**	**5.1346**	**4.5700e-003**	**0.0845**	**4.0400e-003**	**0.0886**	**0.0285**	**3.6200e-003**	**0.0321**	**0.0000**	**386.3496**	**386.3496**	**0.0345**	**0.0000**	**387.0735**

3.2 Construction - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.5101	5.0385	2.2589	5.2300e-003		0.2856	0.2856		0.2683	0.2683	0.0000	469.7625	469.7625	0.0678	0.0000	471.1856
Total	**0.5101**	**5.0385**	**2.2589**	**5.2300e-003**		**0.2856**	**0.2856**		**0.2683**	**0.2683**	**0.0000**	**469.7625**	**469.7625**	**0.0678**	**0.0000**	**471.1856**

3.2 Construction - 2013

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.4942	0.8255	7.6731	7.7000e-003	0.6509	6.0600e-003	0.6570	0.1729	5.4400e-003	0.1784	0.0000	634.3084	634.3084	0.0524	0.0000	635.4079
Total	**0.4942**	**0.8255**	**7.6731**	**7.7000e-003**	**0.6509**	**6.0600e-003**	**0.6570**	**0.1729**	**5.4400e-003**	**0.1784**	**0.0000**	**634.3084**	**634.3084**	**0.0524**	**0.0000**	**635.4079**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.5101	5.0385	2.2589	5.2300e-003		0.2856	0.2856		0.2683	0.2683	0.0000	469.7619	469.7619	0.0678	0.0000	471.1850
Total	**0.5101**	**5.0385**	**2.2589**	**5.2300e-003**		**0.2856**	**0.2856**		**0.2683**	**0.2683**	**0.0000**	**469.7619**	**469.7619**	**0.0678**	**0.0000**	**471.1850**

3.2 Construction - 2013

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.4942	0.8255	7.6731	7.7000e-003	0.1433	6.0600e-003	0.1493	0.0483	5.4400e-003	0.0537	0.0000	634.3084	634.3084	0.0524	0.0000	635.4079
Total	**0.4942**	**0.8255**	**7.6731**	**7.7000e-003**	**0.1433**	**6.0600e-003**	**0.1493**	**0.0483**	**5.4400e-003**	**0.0537**	**0.0000**	**634.3084**	**634.3084**	**0.0524**	**0.0000**	**635.4079**

3.2 Construction - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4808	4.6972	2.2295	5.2300e-003		0.2679	0.2679		0.2515	0.2515	0.0000	468.4892	468.4892	0.0666	0.0000	469.8884
Total	**0.4808**	**4.6972**	**2.2295**	**5.2300e-003**		**0.2679**	**0.2679**		**0.2515**	**0.2515**	**0.0000**	**468.4892**	**468.4892**	**0.0666**	**0.0000**	**469.8884**

3.2 Construction - 2014

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.4246	0.7303	6.7379	7.6900e-003	0.6509	5.4400e-003	0.6564	0.1729	4.9100e-003	0.1778	0.0000	616.6582	616.6582	0.0472	0.0000	617.6486
Total	**0.4246**	**0.7303**	**6.7379**	**7.6900e-003**	**0.6509**	**5.4400e-003**	**0.6564**	**0.1729**	**4.9100e-003**	**0.1778**	**0.0000**	**616.6582**	**616.6582**	**0.0472**	**0.0000**	**617.6486**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4808	4.6972	2.2295	5.2300e-003		0.2679	0.2679		0.2515	0.2515	0.0000	468.4886	468.4886	0.0666	0.0000	469.8878
Total	**0.4808**	**4.6972**	**2.2295**	**5.2300e-003**		**0.2679**	**0.2679**		**0.2515**	**0.2515**	**0.0000**	**468.4886**	**468.4886**	**0.0666**	**0.0000**	**469.8878**

3.2 Construction - 2014

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.4246	0.7303	6.7379	7.6900e-003	0.1433	5.4400e-003	0.1487	0.0483	4.9100e-003	0.0532	0.0000	616.6582	616.6582	0.0472	0.0000	617.6486
Total	**0.4246**	**0.7303**	**6.7379**	**7.6900e-003**	**0.1433**	**5.4400e-003**	**0.1487**	**0.0483**	**4.9100e-003**	**0.0532**	**0.0000**	**616.6582**	**616.6582**	**0.0472**	**0.0000**	**617.6486**

3.2 Construction - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4633	4.4305	2.2195	5.2300e-003		0.2572	0.2572		0.2412	0.2412	0.0000	466.6905	466.6905	0.0651	0.0000	468.0574
Total	**0.4633**	**4.4305**	**2.2195**	**5.2300e-003**		**0.2572**	**0.2572**		**0.2412**	**0.2412**	**0.0000**	**466.6905**	**466.6905**	**0.0651**	**0.0000**	**468.0574**

3.2 Construction - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3666	0.6461	5.9400	7.6000e-003	0.6509	4.9700e-003	0.6559	0.1729	4.5100e-003	0.1774	0.0000	589.6926	589.6926	0.0425	0.0000	590.5853
Total	**0.3666**	**0.6461**	**5.9400**	**7.6000e-003**	**0.6509**	**4.9700e-003**	**0.6559**	**0.1729**	**4.5100e-003**	**0.1774**	**0.0000**	**589.6926**	**589.6926**	**0.0425**	**0.0000**	**590.5853**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4633	4.4305	2.2195	5.2300e-003		0.2572	0.2572		0.2412	0.2412	0.0000	466.6900	466.6900	0.0651	0.0000	468.0568
Total	**0.4633**	**4.4305**	**2.2195**	**5.2300e-003**		**0.2572**	**0.2572**		**0.2412**	**0.2412**	**0.0000**	**466.6900**	**466.6900**	**0.0651**	**0.0000**	**468.0568**

3.2 Construction - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3666	0.6461	5.9400	7.6000e-003	0.1433	4.9700e-003	0.1483	0.0483	4.5100e-003	0.0528	0.0000	589.6926	589.6926	0.0425	0.0000	590.5853
Total	**0.3666**	**0.6461**	**5.9400**	**7.6000e-003**	**0.1433**	**4.9700e-003**	**0.1483**	**0.0483**	**4.5100e-003**	**0.0528**	**0.0000**	**589.6926**	**589.6926**	**0.0425**	**0.0000**	**590.5853**

3.2 Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4346	4.0901	2.1906	5.2300e-003		0.2388	0.2388		0.2238	0.2238	0.0000	464.7604	464.7604	0.0640	0.0000	466.1049
Total	**0.4346**	**4.0901**	**2.1906**	**5.2300e-003**		**0.2388**	**0.2388**		**0.2238**	**0.2238**	**0.0000**	**464.7604**	**464.7604**	**0.0640**	**0.0000**	**466.1049**

3.2 Construction - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3191	0.5780	5.2733	7.5900e-003	0.6509	4.6800e-003	0.6556	0.1729	4.2700e-003	0.1772	0.0000	568.4468	568.4468	0.0387	0.0000	569.2589
Total	**0.3191**	**0.5780**	**5.2733**	**7.5900e-003**	**0.6509**	**4.6800e-003**	**0.6556**	**0.1729**	**4.2700e-003**	**0.1772**	**0.0000**	**568.4468**	**568.4468**	**0.0387**	**0.0000**	**569.2589**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4346	4.0900	2.1906	5.2300e-003		0.2388	0.2388		0.2238	0.2238	0.0000	464.7599	464.7599	0.0640	0.0000	466.1044
Total	**0.4346**	**4.0900**	**2.1906**	**5.2300e-003**		**0.2388**	**0.2388**		**0.2238**	**0.2238**	**0.0000**	**464.7599**	**464.7599**	**0.0640**	**0.0000**	**466.1044**

3.2 Construction - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.3191	0.5780	5.2733	7.5900e-003	0.1433	4.6800e-003	0.1480	0.0483	4.2700e-003	0.0526	0.0000	568.4468	568.4468	0.0387	0.0000	569.2589
Total	**0.3191**	**0.5780**	**5.2733**	**7.5900e-003**	**0.1433**	**4.6800e-003**	**0.1480**	**0.0483**	**4.2700e-003**	**0.0526**	**0.0000**	**568.4468**	**568.4468**	**0.0387**	**0.0000**	**569.2589**

3.2 Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2951	2.7328	1.5693	3.7900e-003		0.1603	0.1603		0.1501	0.1501	0.0000	334.5527	334.5527	0.0460	0.0000	335.5182
Total	**0.2951**	**2.7328**	**1.5693**	**3.7900e-003**		**0.1603**	**0.1603**		**0.1501**	**0.1501**	**0.0000**	**334.5527**	**334.5527**	**0.0460**	**0.0000**	**335.5182**

3.2 Construction - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1984	0.3746	3.3774	5.4900e-003	0.4714	3.2200e-003	0.4746	0.1252	2.9600e-003	0.1282	0.0000	395.4509	395.4509	0.0255	0.0000	395.9866
Total	**0.1984**	**0.3746**	**3.3774**	**5.4900e-003**	**0.4714**	**3.2200e-003**	**0.4746**	**0.1252**	**2.9600e-003**	**0.1282**	**0.0000**	**395.4509**	**395.4509**	**0.0255**	**0.0000**	**395.9866**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2951	2.7328	1.5693	3.7900e-003		0.1603	0.1603		0.1501	0.1501	0.0000	334.5523	334.5523	0.0460	0.0000	335.5178
Total	**0.2951**	**2.7328**	**1.5693**	**3.7900e-003**		**0.1603**	**0.1603**		**0.1501**	**0.1501**	**0.0000**	**334.5523**	**334.5523**	**0.0460**	**0.0000**	**335.5178**

3.2 Construction - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.1984	0.3746	3.3774	5.4900e-003	0.1038	3.2200e-003	0.1070	0.0350	2.9600e-003	0.0379	0.0000	395.4509	395.4509	0.0255	0.0000	395.9866
Total	**0.1984**	**0.3746**	**3.3774**	**5.4900e-003**	**0.1038**	**3.2200e-003**	**0.1070**	**0.0350**	**2.9600e-003**	**0.0379**	**0.0000**	**395.4509**	**395.4509**	**0.0255**	**0.0000**	**395.9866**

3.3 Grading - 2013

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0597	0.0000	0.0597	6.4400e-003	0.0000	6.4400e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.2800e-003	0.0750	0.0336	4.0000e-005		4.2000e-003	4.2000e-003		3.8700e-003	3.8700e-003	0.0000	4.0910	4.0910	1.2000e-003	0.0000	4.1163
Total	**7.2800e-003**	**0.0750**	**0.0336**	**4.0000e-005**	**0.0597**	**4.2000e-003**	**0.0639**	**6.4400e-003**	**3.8700e-003**	**0.0103**	**0.0000**	**4.0910**	**4.0910**	**1.2000e-003**	**0.0000**	**4.1163**

3.3 Grading - 2013

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	2.3000e-004	2.1400e-003	0.0000	1.8000e-004	0.0000	1.8000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1767	0.1767	1.0000e-005	0.0000	0.1770
Total	**1.4000e-004**	**2.3000e-004**	**2.1400e-003**	**0.0000**	**1.8000e-004**	**0.0000**	**1.8000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1767**	**0.1767**	**1.0000e-005**	**0.0000**	**0.1770**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.0300e-003	0.0000	4.0300e-003	4.3000e-004	0.0000	4.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.2800e-003	0.0750	0.0336	4.0000e-005		4.2000e-003	4.2000e-003		3.8700e-003	3.8700e-003	0.0000	4.0910	4.0910	1.2000e-003	0.0000	4.1163
Total	**7.2800e-003**	**0.0750**	**0.0336**	**4.0000e-005**	**4.0300e-003**	**4.2000e-003**	**8.2300e-003**	**4.3000e-004**	**3.8700e-003**	**4.3000e-003**	**0.0000**	**4.0910**	**4.0910**	**1.2000e-003**	**0.0000**	**4.1163**

3.3 Grading - 2013

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	2.3000e-004	2.1400e-003	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1767	0.1767	1.0000e-005	0.0000	0.1770
Total	**1.4000e-004**	**2.3000e-004**	**2.1400e-003**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.1767**	**0.1767**	**1.0000e-005**	**0.0000**	**0.1770**

3.3 Grading - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0597	0.0000	0.0597	6.4400e-003	0.0000	6.4400e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2086	2.1433	0.9731	1.2200e-003		0.1203	0.1203		0.1107	0.1107	0.0000	117.9375	117.9375	0.0349	0.0000	118.6694
Total	**0.2086**	**2.1433**	**0.9731**	**1.2200e-003**	**0.0597**	**0.1203**	**0.1799**	**6.4400e-003**	**0.1107**	**0.1171**	**0.0000**	**117.9375**	**117.9375**	**0.0349**	**0.0000**	**118.6694**

3.3 Grading - 2014

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4300e-003	5.9000e-003	0.0544	6.0000e-005	5.2600e-003	4.0000e-005	5.3000e-003	1.4000e-003	4.0000e-005	1.4400e-003	0.0000	4.9811	4.9811	3.8000e-004	0.0000	4.9891
Total	**3.4300e-003**	**5.9000e-003**	**0.0544**	**6.0000e-005**	**5.2600e-003**	**4.0000e-005**	**5.3000e-003**	**1.4000e-003**	**4.0000e-005**	**1.4400e-003**	**0.0000**	**4.9811**	**4.9811**	**3.8000e-004**	**0.0000**	**4.9891**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.0300e-003	0.0000	4.0300e-003	4.3000e-004	0.0000	4.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2086	2.1433	0.9731	1.2200e-003		0.1203	0.1203		0.1107	0.1107	0.0000	117.9374	117.9374	0.0349	0.0000	118.6693
Total	**0.2086**	**2.1433**	**0.9731**	**1.2200e-003**	**4.0300e-003**	**0.1203**	**0.1243**	**4.3000e-004**	**0.1107**	**0.1111**	**0.0000**	**117.9374**	**117.9374**	**0.0349**	**0.0000**	**118.6693**

3.3 Grading - 2014

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4300e-003	5.9000e-003	0.0544	6.0000e-005	1.1600e-003	4.0000e-005	1.2000e-003	3.9000e-004	4.0000e-005	4.3000e-004	0.0000	4.9811	4.9811	3.8000e-004	0.0000	4.9891
Total	**3.4300e-003**	**5.9000e-003**	**0.0544**	**6.0000e-005**	**1.1600e-003**	**4.0000e-005**	**1.2000e-003**	**3.9000e-004**	**4.0000e-005**	**4.3000e-004**	**0.0000**	**4.9811**	**4.9811**	**3.8000e-004**	**0.0000**	**4.9891**

3.3 Grading - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0597	0.0000	0.0597	6.4400e-003	0.0000	6.4400e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1394	1.4264	0.6537	8.2000e-004		0.0802	0.0802		0.0738	0.0738	0.0000	78.2356	78.2356	0.0234	0.0000	78.7261
Total	**0.1394**	**1.4264**	**0.6537**	**8.2000e-004**	**0.0597**	**0.0802**	**0.1399**	**6.4400e-003**	**0.0738**	**0.0802**	**0.0000**	**78.2356**	**78.2356**	**0.0234**	**0.0000**	**78.7261**

3.3 Grading - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9900e-003	3.5000e-003	0.0322	4.0000e-005	3.5300e-003	3.0000e-005	3.5500e-003	9.4000e-004	2.0000e-005	9.6000e-004	0.0000	3.1938	3.1938	2.3000e-004	0.0000	3.1986
Total	**1.9900e-003**	**3.5000e-003**	**0.0322**	**4.0000e-005**	**3.5300e-003**	**3.0000e-005**	**3.5500e-003**	**9.4000e-004**	**2.0000e-005**	**9.6000e-004**	**0.0000**	**3.1938**	**3.1938**	**2.3000e-004**	**0.0000**	**3.1986**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.0300e-003	0.0000	4.0300e-003	4.3000e-004	0.0000	4.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1394	1.4264	0.6537	8.2000e-004		0.0802	0.0802		0.0738	0.0738	0.0000	78.2355	78.2355	0.0234	0.0000	78.7260
Total	**0.1394**	**1.4264**	**0.6537**	**8.2000e-004**	**4.0300e-003**	**0.0802**	**0.0842**	**4.3000e-004**	**0.0738**	**0.0742**	**0.0000**	**78.2355**	**78.2355**	**0.0234**	**0.0000**	**78.7260**

3.3 Grading - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9900e-003	3.5000e-003	0.0322	4.0000e-005	7.8000e-004	3.0000e-005	8.0000e-004	2.6000e-004	2.0000e-005	2.9000e-004	0.0000	3.1938	3.1938	2.3000e-004	0.0000	3.1986
Total	**1.9900e-003**	**3.5000e-003**	**0.0322**	**4.0000e-005**	**7.8000e-004**	**3.0000e-005**	**8.0000e-004**	**2.6000e-004**	**2.0000e-005**	**2.9000e-004**	**0.0000**	**3.1938**	**3.1938**	**2.3000e-004**	**0.0000**	**3.1986**

3.4 Excavation Phase 1 - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.9600e-003	0.0712	0.0482	7.0000e-005		3.5000e-003	3.5000e-003		3.2200e-003	3.2200e-003	0.0000	7.1643	7.1643	2.1200e-003	0.0000	7.2088
Total	**5.9600e-003**	**0.0712**	**0.0482**	**7.0000e-005**		**3.5000e-003**	**3.5000e-003**		**3.2200e-003**	**3.2200e-003**	**0.0000**	**7.1643**	**7.1643**	**2.1200e-003**	**0.0000**	**7.2088**

3.4 Excavation Phase 1 - 2014

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9000e-004	5.0000e-004	4.5900e-003	1.0000e-005	4.4000e-004	0.0000	4.5000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.4199	0.4199	3.0000e-005	0.0000	0.4205
Total	**2.9000e-004**	**5.0000e-004**	**4.5900e-003**	**1.0000e-005**	**4.4000e-004**	**0.0000**	**4.5000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.4199**	**0.4199**	**3.0000e-005**	**0.0000**	**0.4205**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.9600e-003	0.0712	0.0482	7.0000e-005		3.5000e-003	3.5000e-003		3.2200e-003	3.2200e-003	0.0000	7.1643	7.1643	2.1200e-003	0.0000	7.2088
Total	**5.9600e-003**	**0.0712**	**0.0482**	**7.0000e-005**		**3.5000e-003**	**3.5000e-003**		**3.2200e-003**	**3.2200e-003**	**0.0000**	**7.1643**	**7.1643**	**2.1200e-003**	**0.0000**	**7.2088**

3.4 Excavation Phase 1 - 2014

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9000e-004	5.0000e-004	4.5900e-003	1.0000e-005	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	4.0000e-005	0.0000	0.4199	0.4199	3.0000e-005	0.0000	0.4205
Total	**2.9000e-004**	**5.0000e-004**	**4.5900e-003**	**1.0000e-005**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**3.0000e-005**	**0.0000**	**4.0000e-005**	**0.0000**	**0.4199**	**0.4199**	**3.0000e-005**	**0.0000**	**0.4205**

3.5 Excavation Phase 2 - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.1800e-003	0.0117	9.0600e-003	1.0000e-005		8.5000e-004	8.5000e-004		7.8000e-004	7.8000e-004	0.0000	1.1254	1.1254	3.4000e-004	0.0000	1.1325
Total	**1.1800e-003**	**0.0117**	**9.0600e-003**	**1.0000e-005**		**8.5000e-004**	**8.5000e-004**		**7.8000e-004**	**7.8000e-004**	**0.0000**	**1.1254**	**1.1254**	**3.4000e-004**	**0.0000**	**1.1325**

3.5 Excavation Phase 2 - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	9.0000e-005	8.2000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0880	0.0880	1.0000e-005	0.0000	0.0881
Total	**5.0000e-005**	**9.0000e-005**	**8.2000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0880**	**0.0880**	**1.0000e-005**	**0.0000**	**0.0881**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.1800e-003	0.0117	9.0600e-003	1.0000e-005		8.5000e-004	8.5000e-004		7.8000e-004	7.8000e-004	0.0000	1.1254	1.1254	3.4000e-004	0.0000	1.1325
Total	**1.1800e-003**	**0.0117**	**9.0600e-003**	**1.0000e-005**		**8.5000e-004**	**8.5000e-004**		**7.8000e-004**	**7.8000e-004**	**0.0000**	**1.1254**	**1.1254**	**3.4000e-004**	**0.0000**	**1.1325**

3.5 Excavation Phase 2 - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	9.0000e-005	8.2000e-004	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0880	0.0880	1.0000e-005	0.0000	0.0881
Total	**5.0000e-005**	**9.0000e-005**	**8.2000e-004**	**0.0000**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0880**	**0.0880**	**1.0000e-005**	**0.0000**	**0.0881**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	0.00	0.00	0.00	59.00	28.00	13.00	92	5	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.433723	0.068979	0.183157	0.159578	0.045778	0.007720	0.006780	0.077795	0.000831	0.001129	0.010289	0.000587	0.003654

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	4,666.9024	4,666.9024	0.2145	0.0444	4,685.1664
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	4,666.9024	4,666.9024	0.2145	0.0444	4,685.1664
NaturalGas Mitigated	0.2645	2.4041	2.0194	0.0144		0.1827	0.1827		0.1827	0.1827	0.0000	2,617.1121	2,617.1121	0.0502	0.0480	2,633.0394
NaturalGas Unmitigated	0.2645	2.4041	2.0194	0.0144		0.1827	0.1827		0.1827	0.1827	0.0000	2,617.1121	2,617.1121	0.0502	0.0480	2,633.0394

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	4.90428e+007	0.2645	2.4041	2.0194	0.0144		0.1827	0.1827		0.1827	0.1827	0.0000	2,617.1121	2,617.1121	0.0502	0.0480	2,633.0394
Total		**0.2645**	**2.4041**	**2.0194**	**0.0144**		**0.1827**	**0.1827**		**0.1827**	**0.1827**	**0.0000**	**2,617.1121**	**2,617.1121**	**0.0502**	**0.0480**	**2,633.0394**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	4.90428e+007	0.2645	2.4041	2.0194	0.0144		0.1827	0.1827		0.1827	0.1827	0.0000	2,617.1121	2,617.1121	0.0502	0.0480	2,633.0394
Total		**0.2645**	**2.4041**	**2.0194**	**0.0144**		**0.1827**	**0.1827**		**0.1827**	**0.1827**	**0.0000**	**2,617.1121**	**2,617.1121**	**0.0502**	**0.0480**	**2,633.0394**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	1.63083e+007	4,666.9024	0.2145	0.0444	4,685.1664
Total		**4,666.9024**	**0.2145**	**0.0444**	**4,685.1664**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	1.63083e+007	4,666.9024	0.2145	0.0444	4,685.1664
Total		**4,666.9024**	**0.2145**	**0.0444**	**4,685.1664**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	7.4620	1.3000e-004	0.0137	0.0000		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	0.0263	0.0263	7.0000e-005	0.0000	0.0278
Unmitigated	7.4620	1.3000e-004	0.0137	0.0000		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	0.0263	0.0263	7.0000e-005	0.0000	0.0278

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.7071					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	5.7536					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.3100e-003	1.3000e-004	0.0137	0.0000		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	0.0263	0.0263	7.0000e-005	0.0000	0.0278
Total	**7.4620**	**1.3000e-004**	**0.0137**	**0.0000**		**5.0000e-005**	**5.0000e-005**		**5.0000e-005**	**5.0000e-005**	**0.0000**	**0.0263**	**0.0263**	**7.0000e-005**	**0.0000**	**0.0278**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Consumer Products	5.7536					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.3100e-003	1.3000e-004	0.0137	0.0000		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	0.0263	0.0263	7.0000e-005	0.0000	0.0278
Architectural Coating	1.7071					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.4620**	**1.3000e-004**	**0.0137**	**0.0000**		**5.0000e-005**	**5.0000e-005**		**5.0000e-005**	**5.0000e-005**	**0.0000**	**0.0263**	**0.0263**	**7.0000e-005**	**0.0000**	**0.0278**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	1,377.5066	11.1573	0.2738	1,696.6794
Unmitigated	1,377.5066	11.1593	0.2742	1,696.8518

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	340.678 / 0	1,377.5066	11.1593	0.2742	1,696.8518
Total		**1,377.5066**	**11.1593**	**0.2742**	**1,696.8518**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	340.678 / 0	1,377.5066	11.1573	0.2738	1,696.6794
Total		**1,377.5066**	**11.1573**	**0.2738**	**1,696.6794**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	370.8178	21.9147	0.0000	831.0266
Unmitigated	370.8178	21.9147	0.0000	831.0266

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	1826.77	370.8178	21.9147	0.0000	831.0266
Total		**370.8178**	**21.9147**	**0.0000**	**831.0266**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	1826.77	370.8178	21.9147	0.0000	831.0266
Total		**370.8178**	**21.9147**	**0.0000**	**831.0266**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	-483.6260	0.0000	0.0000	-483.6260

10.1 Vegetation Land Change

Vegetation Type

	Initial/Final	Total CO2	CH4	N2O	CO2e
	Acres	MT			
Scrub	33.82 / 0	-483.6260	0.0000	0.0000	-483.6260
Total		**-483.6260**	**0.0000**	**0.0000**	**-483.6260**

10.2 Net New Trees

Species Class

	Number of Trees	Total CO2	CH4	N2O	CO2e
		MT			
Miscellaneous	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Summary of Construction Related Emissions

Emissions for 2012 (tons/yr)

Activities	CO	VOC	NO_X	SO_2	PM_{10}	$PM_{2.5}$
Ft. Irwin - MEDCOM	6.48	0.649	3.68	0.0077	0.564	0.271
Vehicles - Ft. Irwin - MEDCOM	0.632	0.073	0.249	0.0009	0.0129	0.0098
Total, Construction Emissions, ton/year	7.11	0.722	3.92	0.0086	0.577	0.281

Emissions for 2013 (tons/yr)

Activities	CO	VOC	NO_X	SO_2	PM_{10}	$PM_{2.5}$
Ft. Irwin - MEDCOM	10.0	1.01	5.94	0.0130	1.01	0.457
Vehicles - Ft. Irwin - MEDCOM	1.07	0.124	0.422	0.00160	0.0219	0.0167
Total, Construction Emissions, ton/year	11.0	1.14	6.36	0.0146	1.03	0.474

Emissions for 2014 (tons/yr)

Activities	CO	VOC	NO_X	SO_2	PM_{10}	$PM_{2.5}$
Ft. Irwin - MEDCOM	10.0	1.12	7.65	0.0143	1.11	0.551
Vehicles - Ft. Irwin - MEDCOM	1.07	0.123	0.421	0.00159	0.0218	0.0166
Total, Construction Emissions, ton/year	11.1	1.25	8.07	0.0159	1.14	0.568

Emissions for 2015 (tons/yr)

Activities	CO	VOC	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO2e
Ft. Irwin - MEDCOM	8.85	0.971	6.51	0.0137	1.06	0.500	1,257
Vehicles - Ft. Irwin - MEDCOM	1.07	0.123	0.421	0.0016	0.0218	0.0166	164
Transmission Pipeline Replacement - Phase 2 (W52)	0.410	0.0563	0.580	0.0006	0.0384	0.0354	
Vehicles - Transmission Pipeline Replacement - Phase 2 (W52)	0.283	0.0381	0.213	0.0006	0.0094	0.0075	
Total, Construction Emissions, ton/year	10.6	1.19	7.72	0.0165	1.13	0.559	1,422

Emissions for 2016 (tons/yr)

Activities	CO	VOC	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO2e
Ft. Irwin - MEDCOM	7.47	0.755	4.68	0.0128	0.895	0.402	1,143
Vehicles - Ft. Irwin - MEDCOM	1.07	0.124	0.422	0.0016	0.0219	0.0167	165
Transmission Pipeline Replacement - Phase 3 (W52)	0.402	0.0521	0.533	0.0006	0.0350	0.0322	
Transmission Pipeline Replacement - Phase 4 (W52)	0.405	0.0525	0.537	0.0006	0.0353	0.0325	
Vehicles - Transmission Pipeline Replacement - Phase 3 (W52)	0.258	0.0351	0.192	0.0006	0.00874	0.0069	
Vehicles - Transmission Pipeline Replacement - Phase 4 (W52)	0.260	0.0353	0.193	0.0006	0.00880	0.0069	
Total, Construction Emissions, ton/year	9.87	1.05	6.56	0.0167	1.01	0.497	1,308

Emissions for 2017 (tons/yr)

Activities	CO	VOC	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO2e
Ft. Irwin - MEDCOM	4.95	0.494	3.11	0.0093	0.635	0.278	732
Vehicles - Ft. Irwin - MEDCOM	0.778	0.0901	0.307	0.0012	0.0159	0.0121	120
Transmission Pipeline Replacement - Phase 5 (W52)	0.4001	0.0485	0.492	0.0006	0.0319	0.0294	
Vehicles - Transmission Pipeline Replacement - Phase 5 (W52)	0.240	0.0328	0.175	0.0006	0.0082	0.0064	
Total, Construction Emissions, ton/year	6.36	0.665	4.08	0.0116	0.691	0.326	851

Summary of Construction Related Emissions

Summary of Operation Related Emissions

Activities	CO	VOC	NO_X	SO_2	PM_{10}	$PM_{2.5}$	CO2e
Generators - Ft. Irwin - MEDCOM	0.625	0.057	1.09	0.0013	0.036	0.036	124
Boilers - Ft. Irwin - MEDCOM	5.21	0.555	9.02	0.0125	0.486	0.486	8,838
Total, Operation Emissions, ton/year	5.83	0.612	10.1	0.0138	0.522	0.522	8,963

1.0 Calculation of Emissions from Vehicles

1.1 Calculation of Criteria Pollutant Emission for POVs

1.1.1 Calculation of Mileage for POVs & Delivery Trucks

Vehicle Type[1]	Number/day	Miles/Vehicle/ Day	Total Miles/ Day
POVs	10	80.0	800
Delivery Trucks	2	80.0	160
TOTAL			960

(1) Passenger Vehicles (<8500 pounds) & Delivery Trucks (>8500 pounds)
(2) Miles are total for the project.

1.1.2 Calculation of Criteria Pollutant Emission Rates

Vehicle Type	Vehicle Model Year	Number of Vehicles	Daily Mileage [1]	Vehicle Emission Factors (lb/mile) [2]						Actual Emissions (lb/day) [3]					
				CO	VOC	NO_X	SO_X	PM10	PM2.5	CO	VOC	NO_X	SO_X	PM10	PM2.5
POVs	Default	10	800	0.0077	0.00080	0.00078	0.000011	0.000090	0.000057	6.12E+00	6.37E-01	6.21E-01	8.58E-03	7.18E-02	4.60E-02
Delivery Trucks	Default	2	160	0.015	0.0022	0.017	0.000027	0.00065	0.00055	2.47E+00	3.58E-01	2.77E+00	4.27E-03	1.04E-01	8.79E-02
TOTAL EMISSIONS										**8.60**	**1.00**	**3.39**	**0.013**	**0.18**	**0.13**

(1) Daily mileage is for all the vehicles in a vehicle category. Input the appropriate mileage estimated in Section 1.1.1
(2) California Air Resources Board's EMFAC2007 model (version 2.30) was used to calculate vehicle emission factors.
(3) Emission Factor (lb/mile) x Daily Mileage = Actual Emissions (lb/day)

Year	Days of Construction
2012	147
2013	249
2014	248
2015	248
2016	249
2017	181

Location of Unit or Unit ID (FACID)	Engine Manufacturer	Engine Model	Generator Engine Rating (hp)	Generator Engine Rating (kW)	Run Time (hr/yr)	Annual Heat Input (MMBtu/yr)	NOx (tons/yr)	CO (tons/yr)	PM10 (tons/yr)	PM2.5 (tons/yr)	SOx (tons/yr)	VOC (tons/yr)	CO2 (tons/yr)	CH4 (tons/yr)	N2O (tons/yr)	CO2e (tons/yr)
			2,012	1,500	36	507	3.62E-01	2.08E-01	1.19E-02	1.19E-02	4.39E-04	1.90E-02	41.3	1.68E-03	3.35E-04	41.5
			2,012	1,500	36	507	3.62E-01	2.08E-01	1.19E-02	1.19E-02	4.39E-04	1.90E-02	41.3	1.68E-03	3.35E-04	41.5
			2,012	1,500	36	507	3.62E-01	2.08E-01	1.19E-02	1.19E-02	4.39E-04	1.90E-02	41.3	1.68E-03	3.35E-04	41.5
							(lb/yr)	**(lb/yr)**	**(lb/yr)**	**(lb/yr)**	**(lb/yr)**	**(lb/yr)**	**(lb/yr)**	**(lb/yr)**	**(lb/yr)**	**(lb/yr)**
						TOTAL	2,171	1,250	71	71	3	114	247,955	10.1	2.0	248,806
							(tons/yr)	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**
						TOTAL	**1.09**	**0.625**	**0.036**	**0.036**	**0.0013**	**0.057**	**124**	**5.03E-03**	**1.01E-03**	**124**

Emission Factor

Constituent	Tier 2 kW > 900	UOM
NO_x (1)	6.08	g/kW-hr
CO	3.50	g/kW-hr
PM_{10} (2)	0.20	g/kW-hr
$PM_{2.5}$ (2)	0.20	g/kW-hr
SOx (3)	1.21E-05	lb/hp-hr
VOC (1)	0.32	g/kW-hr

(1) Per CARB guidance based on the 2005 Carl Moyer Program, Part IV: Appendices, Appendix B, page B-20, table B-22, the emission factor for (NOx+NMHC) is assumed to be 95% NOx and 5% VOC: NOx=.95*(NOx+NMHC), VOC=.05*(NOx+NMHC) for EPA Tier 2 engines

(2) $PM_{10} = PM_{2.5}$

(3) From AP 42 Table 3.3-1 and 3.4-1

Emission rate calculations for greenhouse gases

GHG emission factors obtained from U.S. EPA Mandatory Reporting of GHGs, Final Rule; Tables C-1 and C-2

Constituent	Emission Factor (lb/MMBtu)	Global Warming Potential (GWP)
CO_2	163.1	1
CH_4	0.0066	25
N_2O	0.0013	298