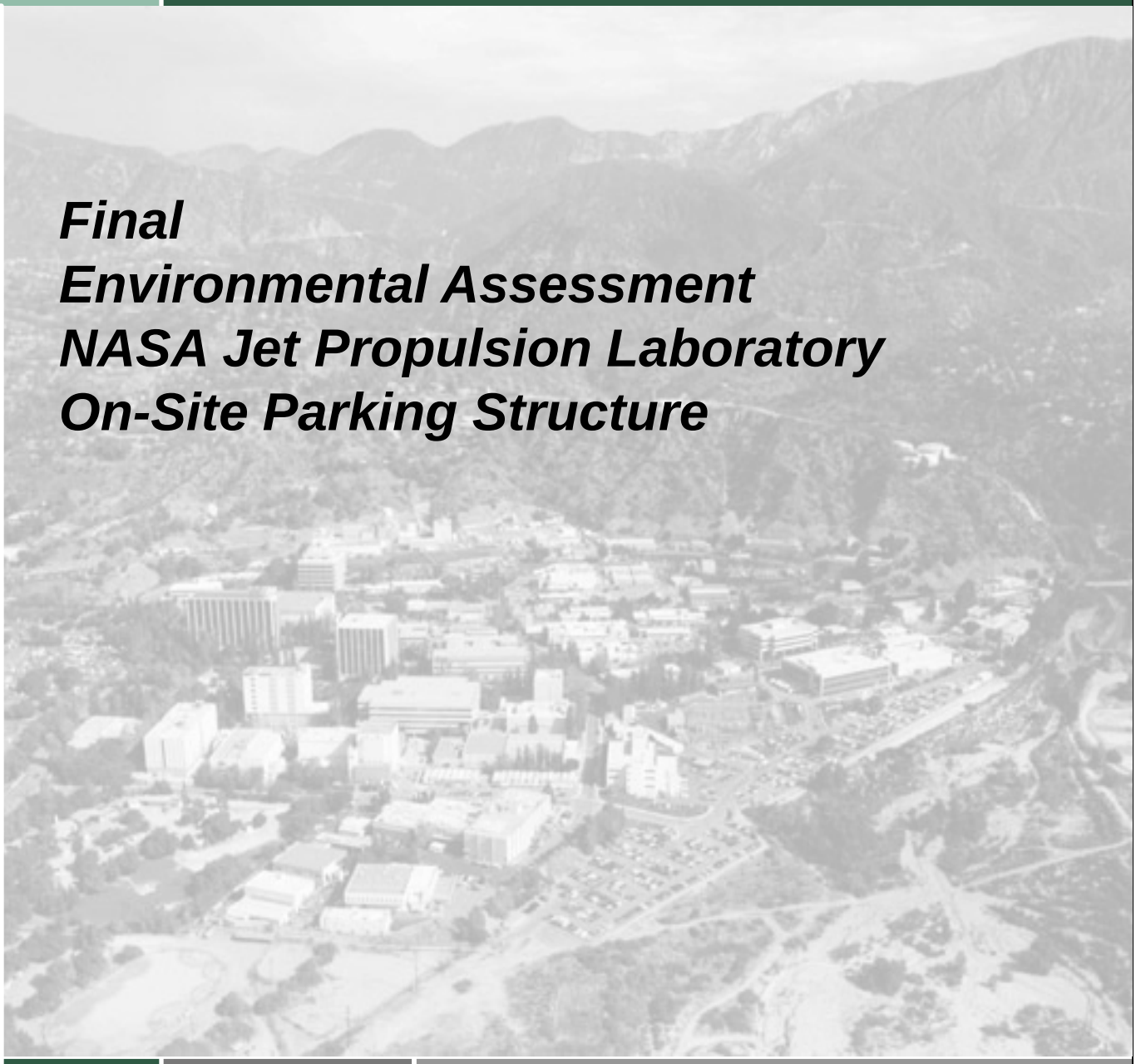
Final Environmental Assessment NASA Jet Propulsion Laboratory On-Site Parking Structure



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July 2012

NASA

JPL

ENVIRONMENTAL ASSESSMENT
NASA JET PROPULSION LABORATORY
ON-SITE PARKING STRUCTURE

NASA Jet Propulsion Laboratory
California Institute of Technology
4800 Oak Grove Drive, Pasadena, CA

Lead Agency: National Aeronautics and Space Administration
Proposed Action: Construct and Operate NASA JPL Facility On-Site Parking Structure
Date: July 2012

ABSTRACT

The National Aeronautics and Space Administration (NASA) is proposing to construct and operate an on-site parking structure at the NASA Jet Propulsion Laboratory (JPL) to address the imminent and long-term need associated with the expiration of the East Arroyo Parking Lot lease and its 1,093 parking spaces in 2013. Since 1952, the City of Pasadena has leased the 3.84-hectare (9.58-acre) East Arroyo Parking Lot to NASA JPL for motor vehicle parking by its on-site workforce. The current lease period extends through June 30, 2013. In 2007, the City of Pasadena notified NASA JPL that it has another beneficial use for the East Arroyo Parking Lot site and it intends to install percolation ponds (spreading basins). NASA JPL supports the City of Pasadena's groundwater improvement projects relative to environmentally beneficial use of its land as a spreading basin. Thus, NASA JPL must vacate the East Arroyo Parking Lot and construct an onsite parking structure.

This project is a capital project identified in the 2011 NASA JPL Facility Master Plan Updates Programmatic Environmental Assessment. The proposed on-site parking structure would strategically prepare the Center for the future by optimizing Federal property use in support of NASA JPL mission activities. In the environmental assessment (EA), NASA analyzes the potential impacts of feasible alternatives, including the No-Action Alternative. This EA has been prepared in accordance with the National Environmental Policy Act and the National Historic Preservation Act to evaluate the proposed parking structure on the human and physical environment and provide an opportunity for the public to review and comment on the project. This EA serves as notification to the public of a proposed action, consistent with Section 800.2(d) of Title 36 Code of Federal Regulations (CFR), and seeks the views of the public and consulting parties on the effects, if any, on historic properties in accordance with Section 800.5 of Title 36 CFR.

Written comments on this EA should be submitted within 15 days from the date published. Please direct comments via U.S. mail or email, to:

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This EA was carried out at the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NOTICE
National Environmental Policy Act (NEPA), Environmental Assessment (EA) for the NASA Jet Propulsion Laboratory On-Site Parking Structure, July 2012

AGENCY
National Aeronautics and Space Administration, Jet Propulsion Laboratory

ACTION
Finding Of No Significant Impact (FONSI)

SUMMARY
Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321, et seq.), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500-1508), and NASA policy and procedures (14 CFR Part 1216, Subpart 1216.3), and after careful review of the EA, NASA has made a finding of no significant impact (FONSI) with respect to the proposed NASA Jet Propulsion Laboratory (JPL) On-Site Parking Structure. On the basis of the EA for the On-Site Parking Structure, it is concluded that the environmental impacts associated with the proposed action at Alternative A-Arroyo Parking Structure or Alternative B- Mall Parking Structure will not individually or cumulatively have a significant effect on the quality of the human and natural environment. Thus, an Environmental Impact Statement will not be prepared.

The NASA JPL On-Site Parking Structure EA considered the environmental impacts from the construction and operation of an on-site parking structure at NASA JPL to address the imminent and long-term need associated with the expiration of the East Arroyo Parking Lot lease and its 1,093 parking spaces in 2013. Since 1952, the City of Pasadena has leased the 3.84-hectare (9.58-acre) East Arroyo Parking Lot to NASA JPL for motor vehicle parking by its on-site workforce. The current lease period extends through June 30, 2013. In 2007, the City of Pasadena notified NASA JPL that it has another beneficial use for the East Arroyo Parking Lot site and it intends to install percolation ponds (spreading basins). NASA JPL supports the City of Pasadena's groundwater improvement projects relative to environmentally beneficial use of its land as a spreading basin. Thus, NASA JPL must vacate the East Arroyo Parking Lot and construct an onsite parking structure. In the EA, NASA analyzes the potential environmental impacts of feasible alternatives, including the No-Action Alternative.

Once the parking structure is constructed and in use, NASA JPL would remove all structures and other improvements made by NASA JPL in the formerly leased East Arroyo Parking lot. Improvements to be removed by NASA JPL would include:

- Removing the guard structure at the southern end of the leased parking area;
- Removing all NASA JPL bus stops and their foundations;
- Removing all chain link fencing and gates surrounding the leased parking lot area;
- Removing chain link fencing on north and south side of bridle trail crossing the parking lot area;
- Removing all bollards, sign posts, and lighting located in the leased parking lot area;
- Removing asphalt paving and base material; and
- Filling and compacting holes in soil left from the removal of the aforementioned foundations, footings, poles or other structures in the leased parking area.

Removal of the existing lot improvements would not include the removal of paving on the Lower Road nor approximately 200 parking spaces to remain for the City of Pasadena. This is consistent with the lease between the City of Pasadena and NASA JPL.

ALTERNATIVES

Parking structure design considerations and selection criteria described in the EA were used to develop alternatives which include parking structures located on the north, south, west, east, and "mall" areas of the facility. These five on-site locations were identified as potential alternative sites for construction of the on-site parking structure. Three of the five on-site locations were eliminated from further review because they were not reasonable alternatives. The remaining two alternatives continued on for evaluation in the EA as the proposed action, and these are: Alternative A- Arroyo Parking Structure, and Alternative B- Mall Parking Structure. The No Action Alternative was also evaluated in detail. The No Action Alternative assumes that neither Alternative A- Arroyo Parking Structure nor Alternative B -Mall Parking Structure would be constructed and the imminent and long-term parking needs of NASA JPL would not be met. Although this alternative does not satisfy the purpose and need for imminent and long-term parking at NASA JPL, it is included in the environmental analysis and is analyzed in accordance with Council on Environmental Quality (CEQ) regulations for implementing NEPA.

Alternative A, Arroyo Parking Structure

Alternative A would be a concrete parking structure located in the southeast edge of NASA JPL adjacent to the Arroyo Seco. With a maximum footprint of approximately 6,612 sq m (71,176 SF), the rectangular structure would be constructed on an area of not more than 1.3 ha (3.2 ac), would have no more than 7 levels and include approximately 1,250 parking stalls.

The site is owned by NASA and occupied by an asphalt parking lot, which slopes gently towards the south. Underground utilities, including a 25-cm (10-in) water main, storm drains, and catch basins, exist in the proposed project area but would not be moved or affected under Alternative A. Two structures, a 427-sq m (4,600-SF) corrugated metal hangar (Building 322) and temporary modular offices (Building 1714), which is currently empty, would be demolished as part of Alternative A. Building 322 would be re-constructed on the north end of the proposed project site. The new structure (to be named Building 344) would duplicate Building 322 and would consist of a 9-m (30-ft) tall pre-manufactured metal building on a concrete slab with a footprint of 17.7 m (58 ft) by at least 23 m (75 ft) long. The interior would be open with a free standing 5-ton gantry crane spanning the width and running the length of the building. Building 344 would include power, lighting, fire detection & protection systems, roof & wall insulation, and a HVAC system to JPL standards.

The proposed parking structure is to be design-build and the project has yet to enter into the design phase. However, for this EA, NASA JPL assumed a contemporary parking structure design with double-bay double-helix ramp-access. NASA JPL does not anticipate design features for either alternative that would be so unique or so far outside of this generic structure. If the ultimate design does differ substantially, then further analysis will be conducted as appropriate and additional NEPA as warranted.

Alternative B, Mall Parking Structure

Alternative B would consist of a concrete parking structure with a maximum footprint of 4,320 sq m (46,500 SF). The proposed approximately 1,000-stall Mall Parking Structure would be no more than 9 levels and constructed in a 1.7 ha (4.2 ac) area of the existing Mariner Mall area of NASA JPL. The Mariner Mall is located at the main entrance to the NASA JPL facility and is almost entirely surrounded by buildings.

Three structures are located within the proposed structure footprint and would be demolished, then relocated, as part of Alternative B. The buildings are, Building 249, Visitor Control with an areas of 399 sq m (4,296 SF); Building 250, Main Guard Shelter with an area of 18.5 m (199 SF); and Building 257, Main Guard Island with an area of 2.4 sq m (26 SF). In addition, the removal of approximately 114 mature landscape trees would be required. There would be 8 permanent workforce and 3 security personnel that would need to be relocated from these structures. NASA JPL also considered replacing or co-locating these demolished structures within the proposed Mall Parking Structure, but either would be a lengthy and costly process to implement.

The proposed parking structure is to be design-build and the project has yet to enter into the design phase. However, for this EA, NASA JPL assumed a contemporary parking structure design with double-bay double-helix ramp-access. NASA JPL does not anticipate design features for either alternative that would be so unique or so far outside of this generic structure. If the ultimate design does differ substantially, then further analysis will be conducted as appropriate and additional NEPA as warranted.

ANTICIPATED ENVIRONMENTAL IMPACTS

In addition to fulfilling the requirements of NEPA, its associated regulations, and the regulations of NASA, this EA complies with all applicable environmental, natural resource, and cultural resource statutes, regulations, and guidelines, which may require permits, approvals, consultations with outside agencies, or implementation of mitigation measures. Those considerations are included in the separate analyses set forth in the EA. Any additional statutes, regulations, and guidelines are included in the EA, by resource area.

Analysis of potential environmental impacts associated with an EA typically addresses numerous resource areas that may be affected by implementation of the proposed actions or a no action alternative. In the case of NASA JPL implementing the proposed action at either Alternative A, Alternative B sites, certain environmental resource areas that typically receive attention have been initially examined and determined not to warrant detailed analysis as per CEQ guidance (40 CFR 1501.7[3]). These areas include socioeconomics, environmental justice, geology and soils, and cultural resources.

Those resource areas warranting further discussion in the EA because of the potential effect the proposed action may have on that resource area include land use, traffic and transportation, utilities and services, noise, air quality, water resources, biological resources, hazardous materials and waste, and visual resources. The EA demonstrated that there would be no significant adverse environmental impact associated with implementation of the proposed action at either alternative site.

Mitigation measures have been developed and will be implemented to minimize short- and long-term impacts to the Proposed Action. These best management practices (BMPs) and mitigation measures are summarized below:

- On-site bus services may be rescheduled and/or re-routed to avoid times or routes that would otherwise create localized impacts due to construction activities.
- Contractors will be provided specific construction routes and schedules designed to minimize conflicts with routine vehicular traffic and avoid normal peak-traffic hours of on-site personnel.
- All contractors performing work lasting 2 weeks or longer in duration will receive "Rapid-gate" badges, precluding them from having to physically check in at the gate every time they enter or leave the facility.

- Design landscape plans for minimum water use (e.g., plant native, drought-tolerant species); incorporate energy conservation measures into parking structure design to mitigate impacts related to power systems; recycle construction-related debris.
- Contractors will employ routine maintenance of all construction equipment, including noise mufflers, and regular maintenance of the emission control devices on all construction equipment to reduce fugitive dust during construction.
- Dust suppression and other construction-related water uses will be performed using water from tanker trucks.
- Construction contractors will be required to submit a Construction Management Plan including plans to control impacts to air quality during construction.
- Contractors will adhere to work noise restriction schedules contained in municipal codes to minimize potential impacts from demolition and construction activities on the surrounding residential properties.
- Portable noise barriers within the equipment area and around stationary noise sources will be established.
- NASA JPL will implement erosion and sediment control practices, such as sediment trapping, filtering, and other BMPs, as appropriate.
- NASA JPL will prepare a Storm Water Pollution Prevention Plan that will address BMPs employed to control erosion and sediment loss at the project site.

PUBLIC INVOLVEMENT

NASA JPL sought input for this EA through various public involvement activities. These activities included a comment period and informal scoping meetings with local individuals.

During scoping at the start of the NEPA process, four small group and informal public meetings were held with stakeholders identified through NASA's ongoing environmental clean-up effort. These meetings provided an opportunity for NASA JPL to better understand key stakeholder concerns and address these in the EA evaluation.

NASA JPL issued the draft EA for a 15 day public comment period that ended June 28, 2012. NASA JPL published a Notice of Availability (NOA) announcing the availability of the Draft EA in the Pasadena Star News and the La Canada Valley Sun, and made it available for public review on the NASA Management Office website and at the following locations:

Altadena Public Library
East Mariposa
Altadena, CA 91001

Pasadena Public Library
285 East Walnut
Pasadena, CA 91101

NASA Headquarters Library,
1120 E. Street, SW
Washington, DC 20546

La Canada Flintridge Public Library
4545 West Oakwood Avenue
La Canada, CA 91011

NASA JPL also sent the draft EA to Federal, State, and local agencies and interested individuals identified during scoping. NASA JPL received 37 comments. See Appendix A for a summary of comments received and NASA JPL responses.

CONCLUSIONS

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321, et seq.), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500-1508), and NASA policy and procedures (14 CFR Part 1216, Subpart 1216.3), and after careful review of the EA, NASA has made a finding of no significant impact (FONSI) with respect to the proposed NASA Jet Propulsion Laboratory (JPL) On-Site Parking Structure. On the basis of the EA for the On-Site Parking Structure, it is concluded that the environmental impacts associated with the proposed action at Alternative A- Arroyo Parking Structure or Alternative B- Mall Parking Structure will not individually or cumulatively have a significant effect on the quality of the human and natural environment.

Therefore, an environmental impact statement will not be prepared and NASA JPL is issuing this FONSI. The Final EA and FONSI will be available in NASA Management Office website: https://nmo.nasa.gov/general_frameset.cfm?home_button=1&site=home&CFID=316020&CFTOKEN=34385941

E. Trinh

Dr. Eugene Trinh
Director NASA Management Office

07/03/12

Date

APPENDIX A

Summary of Public Comments on Draft EA and NASA JPL Responses

Summary of Comments	NASA JPL Response
One commenter requested the installation of a new bridge that could obviate the need for most passenger vehicle traffic north to the existing JPL Bridge, across the bridge, and then south to the new parking structure.	A new bridge would not meet the purpose and need of providing immediate parking. Also, funding for an on-site parking structure is a line item in the congressionally approved budget and there is no contingency in this budget for construction of a new bridge over non-federal land. Construction of new roadway and bridge across the Arroyo Seco would not be consistent with the Hahamongna Master Plan.
Three commenters support Alternative A-Arroyo Parking Structure	Comments noted.
Two commenters recommended sustainability features such as electrical support for future photo voltaic panels, structural and electrical support for future electric vehicle charging stations, use of regionally indigenous plant materials, appropriate irrigation systems and maintenance practices in the landscaping, best practices for increasing rainfall runoff, bicycle facilities, and install sufficient solar photovoltaic generating capacity on the structure to meet the parking structure power needs.	The parking structure is to be design-build and the project has yet to enter into the design phase. NASA JPL will make efforts within the approved budget to provide for sustainability features in the parking structure design and construction. Design and construction will comply with NASA JPL Facilities Design Standards which include the use of appropriate landscaping, irrigation, and maintenance.
One commenter suggested additional ideas including a new or realigned on-site access road at the East Gate, providing an environmentally powered (i.e., electric or other low-carbon fuel) bus for local commuters, and charging a fee for parking.	Comment noted. NASA JPL recognizes that a critical balance of several strategies would be required to ensure adequate parking, continued availability of transportation options, and adequate levels of service on the roadways and circulation within and around the Laboratory. While these ideas are worthy of consideration in an overall parking strategy, they will not be evaluated as a part of this EA, which covers only the parking structure construction and removal of the East Arroyo Lot improvements.
One commenter noted contradiction in Alternative B regarding negligible adverse impacts on operational air emissions and an increase in on-site traffic congestion.	Compared to Alternative A, Alternative B would involve more driving across the lab, and does have potential for incremental air impacts/onsite traffic congestion, although still minor and not warranting of additional analysis.
One commenter suggested an additional mitigation measure of maintaining an access control system to maintain the pre-project distribution of employee-generated traffic volumes during both the peak-generating hours and on a daily basis. The commenter also suggested that the mitigation measure(s) effectiveness be monitored and modified if needed to maintain the balance of traffic. The commenter also suggested the sharing of this monitoring information with affected stakeholders.	Comment noted. NASA JPL will consider mitigation measures to maintain the balance of traffic between Oak Grove Blvd. and Windsor Avenue entrances to the Lab. NASA/JPL will also monitor this traffic balance at peak and off peak hours to determine if the mitigation measure(s) implemented are effective. Modifications to the mitigation measure(s) implemented will also be considered should NASA/JPL's evaluation show the measure(s) to be ineffective.

One commenter suggested relocating text in the EA from construction impacts to operational impacts.	Comment noted and the changes were made.
One commenter corrected a species of tree for removal in Alternative A.	Comment noted and the change was made.
Three commenters suggested minimizing impacts on viewshed from Alternative A including the use of vegetation and a creative/fun wall to soften the façade of Alternative A.	The parking structure is to be design-build and has yet to enter into the design phase. The EA states that NASA JPL would attempt to minimize any potential impacts to visual resources by developing a pleasing eastern facade during design and construction. The use of vegetation is not precluded.
Three commenters suggested no longer leasing the West Arroyo parking lot so that it can be returned to open space.	NASA/JPL and the City of Pasadena have agreed that it is to their mutual benefit to continue this lease.
Two commenters suggested including spaces for subcompact and mini cars.	The proposed parking structure is to be design-build and the project has yet to enter into the design phase. NASA/JPL will make efforts within the approved budget to maximize the number of space by providing for subcompact and mini cars.
Two commenters suggested including the Los Angeles County's proposed sediment removal project in the cumulative impacts	Although not associated with this project, NASA JPL, in response to this comment, has included a description of the Los Angeles County's upcoming sediment removal project in the Cumulative Impact section of the EA.
One commenter noted that not the entire Hahamongna basin is designated as Open Space.	The EA was updated to reflect that most of the Hahamongna basin is designated as Open Space.
Two commenters recommended coordination with the City of Pasadena prior to construction activities that would interrupt or inconvenience users of Hahamongna Watershed Park (HWP)	As is NASA JPL practice, coordination with the City of Pasadena on construction activities that may interrupt or inconvenience users of HWP will be conducted.
One commenter refuted the biological survey and stated there were several species of concern on-site.	The biological survey was conducted by a certified biologist, which did not find those species onsite. Since either alternative has some potential for minor offsite impacts, mitigation has been included in the EA to minimize disturbance to species.
One commenter suggested compliance with dark sky outdoor lighting.	The proposed parking structure is to be design-build and the project has yet to enter into the design phase. NASA JPL included the use of downward pointing energy conserving lighting in recent construction and will make efforts to include similar lighting in the parking structure.
One commenter suggested construction activities related to Alternative A may adversely impact east parking lot entry road at the corner of Windsor Avenue and Ventura Street	The EA identifies short term minor adverse traffic impacts from the demolition and asphalt removal associated with vacating the East Arroyo Parking Lot. Most construction traffic will use the regular south gate contractor entrance.
One commenter suggested traffic circulation impacts would cause some JPL employees to seek parking in HWP.	As it has in the past, NASA JPL will notify employees of potential short term traffic impacts during construction and provide alternative routes and on-site parking.
One commenter suggested emergency conditions could necessitate the use of HWP as a vehicular emergency exit route.	Current NASA JPL emergency/contingency plans include exit through the Hahamongna park during extreme emergencies.
One commenter suggested the Upper Road will provide better East access to JPL.	The HWP Master Plan specifies the use of the Lower Road by the public and the NASA JPL workforce.
One commenter suggested restoration of the East Parking Lot with native	NASA JPL will remove all structures and other improvements in the East Lot , the City of Pasadena then has plans to

vegetation	recontour the area for use as spreading basins.
One commenter questioned the need for 1,093 parking spaces.	Since the parking structure is to be design-build and the project has yet to enter into the design phase, conservative estimates have been applied to quantities. Structure height and number of parking spaces are budget dependent and will be determined after the start of the design/build process.
Three commenters wanted assurance that only the JPL workforce and not the public would use the parking structure.	A badge is required to access the NASA JPL facility and the parking structure will be built within the NASA JPL facility.
One commenter suggested a more detailed description of Southern California Edison's utility relocation.	The parking structure is to be design-build and the project has yet to enter into the design phase. The EA states that other functional, structural, and site features/requirements would be addressed during the design phase, including the relocation of a 16-kilovolt (kV) overhead power line by SCE, either by re-routing the overhead lines around the new parking structure; or installing underground lines from the NASA JPL fence line into the Alternative A site. NASA JPL has agreed to accommodate SCE's on-site access to its facilities.
One commenter wanted a clearer image of local floodplain elevations.	The image provided was made larger (whole page) to enhance detail for the reader. With regards to Alternative A, the project site is not within the Los Angeles (LA) County Flood Control easement.
One commenter wanted early and quality consultation with the Native American representatives.	NASA JPL will comply with the necessary Native American cultural resources regulations to insure that the proper procedures for the protection of Native American cultural resources are fully implemented. If any assistance is required in regards to Native American cultural resources, NASA JPL will communicate with the appropriate Native American contacts provided.

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Common Metric/British System Equivalents

Length

1 centimeter (cm) = 0.3937 in
1 in = 2.54 cm
1 cm = 0.0328 foot (ft)
1 ft = 30.48 cm
1 meter (m) = 3.2808 feet
1 ft = 0.3048 m
1 kilometer (km) = 0.6214 mile (mi)
1 mi = 1.6093 km

Area

1 square centimeter (cm^2) = 0.1550 square inch (in^2)
1 in^2 = 6.4516 cm^2
1 square meter (m^2) = 10.7639 square feet (ft^2)
1 ft^2 = 0.09290 m^2
1 square kilometer (km^2) = 0.3861 square mile (mi^2)
1 mi^2= 2.5900 km^2
1 hectare (ha) = 2.4710 acres (ac)
1 ac = 0.4047 ha
1 ha = 10,000 m^2
1 m^2 = .0001 ha

Volume

1 cubic centimeter (cm^3) = 0.0610 cubic inch (in^3)
1 in^3 = 16.3871 cm^3
1 cubic meter (m^3) = 35.3147 cubic feet (ft^3)
1 ft^3 = 0.0283 m^3
1 m^3= 1.308 cubic yards (yd^3)
1 yd^3 = 0.76455 m^3
1 liter (l) = 1.0567 quarts (qt)
1 qt = 0.9463264 l
1 l = 0.2642 gallon (gal)
1 gal = 3.7845 l

Weight

1 gram (g) = 0.0353 ounce (oz)
1 oz = 28.3495 g
1 kilogram (kg) = 2.2046 pounds (lb)
1 lb = 0.4536 kg
1 metric ton (mt) = 1.1023 tons
1 ton = 0.9072 mt

ABBREVIATION / ACRONYM LIST

$\mu g/m^3$	micrograms per cubic meter
ac	acre
ACM	asbestos-containing material
amsl	above mean sea level
ANF	Angeles National Forest
APCD	Air Pollution Control Districts
AQCR	air quality control region
AQMD	Air Quality Management Districts
ARTS	Pasadena Area Rapid Transit
BMPs	best management practices
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Caltech	California Institute of Technology
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFA	California Department of Food and Agriculture
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIP	Capital Improvement Plan
cm	Centimeter
CNEL	community noise equivalent level
CO	carbon monoxide
CO_2	carbon dioxide
COPC	contaminant of potential concern
CRWQCB	California Regional Water Quality Control Board
CWA	Clean Water Act
dBA	A-weighted decibel
DSN	Deep Space Network
EA	environmental assessment
EO	Executive Order
EPCRA	Emergency Planning & Community Right-to-Know Act
ERP	Environmental Restoration Program
FEMA	Federal Emergency Management Agency
FFRDC	Federally Funded Research & Development Center
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
ft	foot/feet
ha	hectare
HWP	Hahamongna Watershed Park
in	inch(es)
JPL	Jet Propulsion Laboratory
kg	kilogram
kV	kilovolt
LACDPW	Los Angeles County Department of Public Works

LACFD	Los Angeles County Fire Department
LBP	lead-based paint
LF	linear feet
LOS	level of service
m	meter(s)
mg/m^3	milligrams per cubic meter
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
NO_X	nitrous oxides
NPD	NASA Policy Directive
NPDES	National Pollutant Discharge Elimination System
NPG	NASA Policy Guidance
NPL	National Priority List
NPR	NASA Procedural Requirement
NSPS	New Source Performance Standards
O_3	ozone
OU	operable unit
Pb	lead
PCBs	polychlorinated biphenyls
PEA	programmatic environmental assessment
PM_{10}	10 microns in diameter
$PM_{2.5}$	2.5 microns in diameter
ppm	parts per million
RCRA	Resource and Conservation Recovery Act
RI	Remedial Investigation
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SF	square foot/feet
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_4	sulfates
SOCAB	South Coast Air Basin
sq m	square meter
SR	State Route
SRA	Source Receptor Areas
SVOC	semi-volatile organic compound
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TRTP	Tehachapi Renewable Transmission Project
TSCA	Toxic Substances Control Act
TSP	total suspended particulates
U.S.	United States
URBEMIS	URBan EMISsions 2007 model
USACE	U.S. Army Corps of Engineers
USC	U.S. Code

USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
vpd	vehicles per day

EXECUTIVE SUMMARY

ES-1 Introduction

This Environmental Assessment (EA) is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969; 40 Code of Federal Regulations (CFR), Parts 1500-1508, the Council on Environmental Quality (CEQ) regulations implementing NEPA; and National Aeronautics and Space Administration (NASA) NEPA Guidelines found in NASA Procedural Requirement (NPR) 8580.1, *Implementing the National Environmental Policy Act and Executive Order 12114*.

The Jet Propulsion Laboratory (JPL) is a Federally Funded Research and Development Center (FFRDC) operated by the California Institute of Technology (Caltech) under a contract with the National Aeronautics and Space Administration (NASA). JPL is NASA's lead center for the robotic exploration of the solar system, and is responsible for operating NASA's Deep Space Network (DSN).

In 2010-2011, NASA conducted an analysis of existing facilities and infrastructure, while simultaneously forecasting future needs and objectives to enable NASA to meets its mission. NASA JPL developed a comprehensive facility planning strategy which would cover the next two decades through the concurrent implementation of the NASA JPL Master Plan Update 2011-2032 (AC Martin. 2011) for the three NASA JPL facilities in California: (1) the main JPL facility on Oak Grove Drive in Pasadena (hereafter referred to as "NASA JPL"); (2) the Table Mountain Facility in Wrightwood; and (3) the Goldstone Deep Space Communications Complex at Fort Irwin National Training Center. NASA prepared a Programmatic Environmental Assessment (PEA), 2011 NASA JPL Facility Master Plan Updates Programmatic Environmental Assessment (NASA JPL 2011a), to analyze the potential impacts from implementing the Master Plan Update for these three JPL facilities. The Finding of No Significant Impact was signed on January 25, 2012.

This EA provides NEPA analysis and documentation for the NASA proposal to construct and operate a parking structure at the NASA Jet Propulsion Laboratory (JPL) in Pasadena, California to address the need associated with the expiration of the East Arroyo Parking Lot lease and its 1,093 parking spaces. The proposal is a capital project identified in the Facility Master Plan Updates PEA. Therefore, much of the information contained in that document will be tiered from and incorporated by reference into this EA. Since the proposed project is to be design-build and the project has yet to enter into the design phase, conservative estimates have been applied to quantities and analyses, where applicable.

ES-2 Purpose and Need

ES-2.1 Statement of Purpose

The purpose of the proposed action is to construct an on-site parking structure in the NASA JPL facility to accommodate approximately 1,093 parking spaces.

ES-2.2 Statement of Need

NASA JPL needs to replace approximately 1,093 offsite parking spaces due to the expiration of the East Arroyo Parking Lot lease with the City of Pasadena.

Since 1952, the City of Pasadena has leased the 3.84-hectare (ha) (9.58-acre [ac]) East Arroyo Parking Lot to NASA JPL for use as a motor vehicle parking lot by its on-site workforce. The current lease period is for 7 years from January 1, 2004 through December 31, 2010, with an additional two and one-half year option (option period of January 1, 2011 through June 30, 2013). NASA JPL is currently in the option period which ends June 30, 2013. In 2007, the City notified NASA JPL that it has another beneficial use for the East Arroyo Parking Lot site and intends to install percolation ponds (spreading basins), which is also consistent with the 2003 Hahamongna Master Plan (City of Pasadena 2007).

NASA JPL supports the City's groundwater improvement projects relative to environmentally beneficial use of its land as a spreading basin. While NASA JPL will not seek to renew the lease of the East Arroyo Parking Lot at the end of the lease option period, an extension to the current lease will be sought to continue use of the lot until replacement parking is available.

Parking within the NASA JPL facility is typically at capacity on a daily basis. The projected imminent loss of 1,093 parking spaces amounting to approximately 25 percent of the 4,453 spaces currently available for NASA JPL creates an immediate need for parking capacity to accommodate the vehicles that are currently parked at the East Arroyo Parking Lot.

Since the NASA JPL on-site workforce is essential to supporting mission critical tasks, and thus timely access to work facilities is critical, there is a need for parking on site. There are no off-site parking facilities in the vicinity of the NASA JPL facility that can meet the resulting parking demand when the East Arroyo Parking Lot is no longer available to NASA JPL.

ES-3 Alternatives Considered

All alternatives were screened against the following criteria:

- The alternative, at a minimum, must replace the parking capacity lost as a result of the non-renewal of the lease with the City of Pasadena for parking in the Arroyo Seco;
- The alternative must maintain adequate levels of service on the roadways and circulation within and around NASA JPL;
- The alternative cannot require the purchase or lease of off-site property, per NASA Headquarters directive;
- The alternative cannot adversely impact the NASA mission and operations;
- The alternative must comply with federal, state, and local building and safety requirements;
- The alternative should be compatible with the NASA JPL Master Plan Update, to the extent practicable; and
- The alternative should enable NASA to maintain its flexibility in connection with future development of NASA JPL.

Results of the 2010 Parking Plan and Study (NASA JPL 2010) included increasing on- and off-site parking supply to reduce imminent and long-term parking deficiencies. A substantial increase in parking availability must occur to meet the goals and objectives established in the Parking Plan and Study for mitigating the projected parking shortage. To address its immediate on-site parking needs, NASA JPL excluded the purchase of new land and identified on-site parking alternatives to resolve imminent parking deficiencies. The purchase of off-site property to accommodate a parking structure does not meet the imminent need because it would consist of a lengthy process to identify a suitable location, undergo negotiations with the property owner(s), and proceed through the state and local re-zoning and permitting processes.

Various parking structure alternatives using the design considerations described in detail in this document were considered to address the need created by the expiration of the existing East Arroyo Parking Lot lease. Scenarios include parking structures located on the north, south, west, east and "mall" areas of the facility. These scenarios are described below.

ES-3.1 Alternatives Eliminated from Further Study

As part of the NEPA process, reasonable alternatives must be evaluated to determine the impact of each such alternative on the human environment. For alternatives to be considered reasonable, they must be technically and economically feasible, and meet the purpose and need of the project. Five alternatives were considered and three alternatives were eliminated as viable alternatives.

ES-3.1.1 West Facility Site

This alternative would consist of a parking structure to be constructed on the west side of the NASA JPL facility in the area of the existing West Parking Lot. This lot is currently leased from the Flintridge Riding Club and a proposed parking structure would require NASA JPL to purchase a portion of this property to construct the parking structure. While relinquishing the leased Flintridge Riding Club property would meet NASA JPL's long-term objectives and this alternative could be considered to meet long-term parking needs, it was eliminated from further consideration for addressing the loss of parking capacity resulting from the non-renewal of the East Arroyo Parking Lot lease primarily because it would require the purchase of private property, which entails a lengthy process to identify a suitable location, complete negotiations with the property owner(s), and proceed through the state and local re-zoning and permitting processes. This alternative will not be explored further in this EA.

ES-3.1.2 North Facility Site

This alternative would consist of building a parking structure and access driveway north of Explorer Road at the edge of the built-up area of NASA JPL. Construction in this location would require significant and costly retaining structures to develop a workable direct access road to the project site. Extensive excavation and export of soil would be required to provide a level parking footprint and to accommodate the increased vehicle and pedestrian traffic into and out of the proposed parking structure. Structural walls would be required to support lateral soils and structure surcharge loads. It is anticipated that this would result in potential long-term impacts to soils from erosion.

Also, a northern location for the parking structure assumes that it would be placed against the steep hill slopes, where it could be built behind the Bridge Fault set-back line. Building atop a fault line would impose considerable and costly engineering elements to ensure the structure does not collapse or sustain major damage from a seismic event. This alternative would also require the demolition and removal of thirteen trailers prior to construction, including Trailers 1701-1712 and Building 79. Assuming the engineering and safety issues discussed above can be addressed, the time needed for completion of the construction project would not allow NASA to have an operational parking facility available when its access to the East Arroyo Parking Lot ends. As part of implementation of this alternative, NASA JPL considered employing a shuttle service from the parking structure to employee work stations, similar to what is currently being used in conjunction with the East Arroyo Lot, but this would not meet sustainability objectives of decreased on-site operational transportation distances and trips of industrial vehicles and overall operational uphill vehicular travel. This alternative was eliminated from further consideration because of the limitations identified above and will not be explored further in this EA.

ES-3.1.3 South Facility Site

This alternative would consist of a structure in the southern part of NASA JPL, close to the southeast entry and outside the main loop road. While this alternative location would reduce on-site commuter traffic for those vehicles allowed through the Southgate entrance, resulting in a potential long-term beneficial effect to on-site transportation, it would also require the removal of five occupied office structures (Buildings 291, 201, 234, 190, and 200) and assumes that all 224 affected building personnel and their functions displaced by the parking structure could be relocated into new and/or re-purposed facilities vacated as part of the Master Plan Update. This alternative was eliminated from further consideration because it would not solve parking issues in the near term, as it is contingent upon lengthy and costly new facility construction and/or repurposing existing facilities for the major relocation of the on-site workforce and functions, which would be difficult to accomplish because of minimal available space at JPL to relocate people and functions into.

ES-3.2 Alternatives for Continued Evaluation

The remaining alternatives for continued evaluation in this EA are located on the west and east side of NASA JPL. These two structures were identified as the Mall Parking Structure on the west side and the Arroyo Parking Structure on the east side of the facility. **Table ES-1** compares these alternatives.

Table ES-1. Comparison of NASA JPL Parking Structure Alternatives

Requirements and Characteristics	Alternative A, Arroyo Parking Structure	Alternative B, Mall Parking Structure
Maximum Project Area	1.3 ha (3.2 ac)	1.7 ha (4.2 ac)
Maximum Levels	7	9
Maximum Height	23 m (75 ft)	29 m (95 ft)
Maximum Structure Footprint	37.8 m (124 ft) by 175 m (574 ft) = 6,612 sq m (71,176 SF)	76 m (250 ft) by 59.4 m (186 ft) = 4,320 sq m (46,500 SF)
Maximum Total Structural Area	39,675 sq m (427,056 SF)	34,560 sq m (372,000)
Maximum Vehicle Clearance	2.03 m (6 ft 8 in)	2.03 m (6 ft 8 in)
Maximum Spaces per Typical Level	248	152
Parking Spaces	Approximately 1,250 stalls	Approximately 1,000 stalls
Maximum Displaced Parking Spaces	250 stalls	NA
Demolition/Removal	• Bldg. 1714, temporary modular offices; • Bldg. 322, metal maintenance shop, 427 sq m (4,600 SF) • Removal of asphalt and associated infrastructure at existing East Arroyo Parking Lot	• Bldg. 249, Visitor Control, 399 sq m (4,296 SF); • Bldg. 250, Main Guard Shelter, 18.5 sq m (199 SF); • Bldg. 257, Main Guard Island, 2.4 sq m (26 SF). • Removal of asphalt and associated infrastructure at existing East Arroyo Parking Lot

Sources: Data from JPL 2010, NASA JPL Parking Plan and Study, Oct 2010; and Chirino, 2012.
Notes: sq m=square meters; SF=square feet; ft=feet; m=meters; in=inches; NA=Not Applicable.

Referring to **Table ES-1**, the parking structure heights were arrived at by assuming a 6-m (20-ft) ground level, 3 m (10 ft) for each typical level, and a 1.5-m (5-ft) parapet. To establish an upper bounding height for each structure for purposes of impact analysis in this EA, NASA JPL has established seven floors for Alternative A and nine floors for Alternative B. This does not necessarily mean the alternative structures would be that height. It is likely that they would be less. Structure height would be determined after the start of the design/build process.

The proposed parking structure under either Alternative A or B would be entirely on site the secured NASA JPL facility and would meet all applicable requirements, including policy directives of NASA and the JPL operating contractor. The design-build process would include the appropriate requirements for either alternative. For example, construction of Alternative A would require specific design for security considerations due to its immediate proximity to the NASA JPL property boundary and an adjoining bridle path used by the public.

The East Arroyo Parking Lot would remain in use until the proposed action is implemented under either Alternative A or B. Once the parking structure is constructed and in use, NASA JPL would remove all structures and other improvements made by NASA JPL. Improvements to be removed by NASA JPL would include:

- Removing the guard structure at the southern end of the leased parking area;
- Removing all JPL bus stops and their foundations;
- Removing all chain link fencing and gates surrounding the leased parking lot area;
- Removing chain link fencing on north and south side of bridle trail crossing the parking lot area;
- Removing all bollards, sign posts, and lighting located in the leased parking lot area;
- Removing asphalt paving and base material; and
- Filling and compacting soil in holes left from the removal of the aforementioned foundations, footings, poles or other structures in the leased parking area.

Removal of the existing lot improvements would not include the paving on the Lower Road nor the northernmost approximate 200 spaces of the East Arroyo parking lot. Contractors would haul all removed material, estimated to include approximately 2,370 cubic meters (3,100 cubic yards) of asphalt paving and 1,147 cubic meters (1,500 cubic yards) of crushed base material, to an approved off-site landfill. NASA JPL anticipates no more than 400 truckloads over a 20-day period to haul the material off site, for an estimated 20 truckloads per day. Further details on transportation impacts are contained in Section 3.2 of this EA. The remaining lot would be restored to existing grade. All removal activities would be completed no later than 120 days after the lease termination date and NASA JPL anticipates these activities would require approximately 60 days.

It is NASA JPL's intent to acquire a lease modification or an easement from the City of Pasadena to enable access to an existing access road from Windsor Avenue to the JPL Bridge. This instrument would be acquired prior to construction of the proposed parking structure.

Alternative A, Arroyo Parking Structure; Alternative B, Mall Parking Structure; and the No Action Alternative are described below.

ES-3.3 Alternative A

The proposed Arroyo Parking Structure was developed to meet the need for parking capacity that would result from the non-renewal of the East Arroyo Parking Lot lease. Implementation of Alternative A would fulfill the project's purpose and need, is consistent with the NASA JPL Master Plan Update, and allows NASA to achieve the objectives identified in Section 1.2 of this EA.

Alternative A would be a concrete parking structure, reinforced to meet State of California and seismic design requirements, would be located in the southeast edge of NASA JPL, adjacent to the Arroyo Seco. With a maximum footprint of approximately 6,612 square meters (sq m) (71,176 square feet [SF]), the rectangular structure would be constructed on an area of not more than 1.3 ha (3.2 ac), and include approximately 1,250 parking stalls. Further requirements and characteristics are included in **Table ES-1**. The site is currently owned by NASA and occupied by an asphalt parking lot, which slopes gently towards the south.

Underground utilities, including a 25-centimeter (cm) (10-inch [in]) water main, storm drains, and catch basins, exist in the proposed project area but would not be moved/affected under Alternative A. Two structures, a 427-sq m (4,600-SF) corrugated metal hangar (Building 322) and temporary modular offices (Building 1714), which is currently empty, are located adjacent to the eastern property line in the south-central portion of the site.

These two structures would be demolished as part of Alternative A, along with two California Sycamore trees. Building 322 would be re-constructed on the north end of the proposed project site. Since this building is currently unoccupied, there would be no costly or lengthy employee relocation issues. The new structure (to be named Building 344) would duplicate Building 322 and would consist of a 9-m (30-ft) tall pre-manufactured metal building on a concrete slab with a footprint of 17.7 m (58 ft) by at least 23 m (75 ft) long. The interior would be open with a free standing 5-ton gantry crane spanning the width and running the length of the building. Building 344 would include power, lighting, fire detection & protection systems, roof & wall insulation, and a HVAC system to JPL standards.

Other functional, structural, and site features/requirements to be addressed during project design for Alternative A would include:

- A possible security booth for security staff and surveillance equipment;
- Storage and maintenance area;
- Three open stairwells and two elevators;
- Internal and external lighting and emergency lighting;
- Americans with Disability Act access ramping at curbs;
- Relocation of a 16-kilovolt (kV) overhead power line by Southern California Edison (SCE), either by re-routing the overhead lines around the new parking structure; or installing underground lines from the NASA JPL fence line into the proposed site;
- Engineering controls to address potential flood waters associated with Arroyo Seco;
- Maintaining a minimum 4.6-m (15-ft) wide buffer zone since the proposed parking structure would be adjacent to the HWP;

- Maintaining a minimum overhead ground height clearance of 6.1 m (20 ft) at the south end of the proposed structure for roll-off bins that are part of the Building 324 Recycling Center operations; and
- Employing sustainability features such as the use of permeable pavers, and providing structural support required for the future implementation of photovoltaic panels over the entire upper parking level.

The proposed project site on the existing asphalt parking lot is bounded along the eastern boundary by a chain link fence, which is approximately 4.6 m (15 ft) inside of the eastern JPL property line. The public currently uses this 4.6-m (15-ft) area as a pedestrian and horse trail. Beyond the property line, the topography drops abruptly into the Arroyo Seco Wash and the Devils Gate Spreading Grounds. The project would include modification to surrounding on-site access roads and parking areas within the project area.

As identified in **Table ES-1**, Alternative A would offset the immediate parking demand from the expiration of the East Arroyo Parking Lot lease and its 1,093 parking spaces with minimal reduction of existing parking after the existing ground parking displacement of 250 spaces is taken into account.

ES-3.4 Alternative B

The proposed Mall Parking Structure was developed to meet the need for parking capacity that would result from the non-renewal of the East Arroyo Parking Lot lease, and allows NASA to achieve the objectives identified within Section 1.2 of this EA.

Alternative B would consist of a concrete parking structure, reinforced to meet State of California and seismic design requirements, on a maximum footprint of 4,320 sq m (46,500 SF). The proposed approximately 1,000-stall Mall Parking Structure would be constructed in a 1.7 ha (4.2 ac) area of the existing Mariner Mall area of NASA JPL.

As indicated in **Table ES-1**, the height of the parking structure under Alternative B would be greater than that for Alternative A because of its smaller footprint. Although the Mall area is comprised of approximately 1.7 ha (4.2 ac), the entire site is not available for establishing the footprint of the proposed parking structure due to the proximity of adjacent existing buildings. After consideration of existing fire code, which requires at least a 12.2-m (40-ft) minimum setback for construction (*meaning* that construction is not permitted within 12.2 m (40 ft) of existing buildings) and the unknown future for Building 180 (proposed seismic bracing, addition, or replacement) , the 4,320-sq m (46,500-SF) footprint for the Mall Parking Structure was established. While a shorter parking structure (larger footprint) would be preferred for Alternative B, technical and regulatory restrictions eliminate this scenario.

Three structures, Building 249, Visitor Control 399 sq m (4,296 SF); Building 250, Main Guard Shelter 18.5 m (199 SF); and Building 257, Main Guard Island 2.4 sq m (26 SF), are located within the proposed structure footprint and would be demolished, then relocated, as part of Alternative B, along with the removal of approximately 114 mature landscape trees. Any new facility construction and/or repurposing existing facilities for the major relocation of the on-site workforce and functions would be difficult to implement due to minimal available space at JPL for relocating a displaced workforce and their functions. NASA JPL also considered co-locating these demolished structures within the proposed mall parking

structure, but this would be a lengthy and costly process to implement. Alternative B would also require the relocation of existing underground utilities, including:

- 300 linear feet (LF) of 8-in water main;
- 200 LF of 6-in water main;
- 200 LF of 2-in and 3-in service lines;
- 200 LF stretch of 6-in natural gas line;
- 300 LF of the main telecommunications line; and
- 200 LF of an abandoned 10-in vitreous clay sanitary sewer.

The mall area is owned by NASA so there would be no need to acquire any property through lease or purchase. Other functional, structural, and site features/requirements to be addressed during project design would include:

- A possible security booth for security staff and surveillance equipment;
- A storage and maintenance area;
- Three open stairwells and two elevators;
- Internal and external lighting and emergency lighting;
- Americans with Disability Act access with ground floor parking spaces and ramping at curbs;
- Relocation of several underground utility systems; and
- Employing sustainability features such as the use of permeable pavers, and providing structural support required for the future implementation of photovoltaic panels over the entire upper parking level.

Further requirements and characteristics are included in **Table ES-1**.

Construction of a parking structure at the Mall location was not described in the Master Plan Update (AC Martin 2011). Specifically, the Mall area would be preserved as open space with ornamental landscaping and be connected to a NASA JPL-wide pedestrian circulation network. Constructing a parking structure at the Mall location would require additional land use planning and might require facility modifications associated with establishing alternative outdoor gathering facilities.

ES-3.5 No Action Alternative

Under the No-Action Alternative, the actions proposed in this EA as part of Master Plan implementation would not be taken. The construction of Alternative A, Arroyo Parking Structure or the Mall Parking Structure under Alternative B would not occur under this alternative and would not meet NASA JPL's imminent and long-term parking needs.

Although this alternative does not satisfy the purpose and need for imminent and long-term parking at NASA JPL, it is included in the environmental analysis to provide a baseline for comparison with Alternative A and Alternative B and is analyzed in accordance with CEQ regulations for implementing NEPA. Although this alternative would eliminate unavoidable adverse, short-term impacts associated with the Alternatives A and B, the No Action Alternative would not satisfy the purpose and need for this project.

ES-4 Environmental Consequences

The EA evaluates potential impacts of implementing Alternative A, Alternative B, and the No Action Alternative. It was determined that several resource areas would not be affected by implementing Alternative A, Alternative B, or the No Action Alternative. Those resource areas include socioeconomics, environmental justice, geology and soils, and cultural resources.

Implementing Alternative A, Alternative B, or the No Action Alternative would have no adverse effect on land use outside NASA JPL borders. Alternative A would result in long-term beneficial impacts to on-site land use while implementation of Alternative B would result in moderate adverse effects because its implementation would require additional facility modifications to re-locate the outdoor gathering facilities. Alternative B would also result in the removal of approximately 114 mature landscape trees.

Long-term beneficial effects on parking are expected under Alternatives A or B with implementation of a new on-site parking structure. There would be short-term minor adverse effects on traffic and transportation, air quality, and noise from construction under Alternatives A and B, while the No Action Alternative would result in short-term and moderate adverse effects. Long-term, there would be negligible effects on air quality and noise under Alternatives A and B, and Alternative B would result in moderate adverse impacts on traffic and transportation. The No Action Alternative would result in moderate long-term impacts to traffic and transportation, air quality, and noise.

There would be short-term minor effects on utilities and services from construction and the relocation of the overhead electrical transmission line under Alternative A, while Alternative B would result in short-term moderate effects due to the relocation of underground utilities. Long-term, there would be negligible effects on utilities and services under Alternative A, Alternative B, or the No Action Alternative.

Under Alternatives A and B, short-term minor impacts to water resources are anticipated during construction, while negligible impacts are expected over the long term under Alternative A, Alternative B, or the No Action Alternative. Short- and long-term negligible impacts to biological resources are anticipated under Alternative A, Alternative B, or the No Action Alternative. Under Alternative B, short-term minor impacts from hazardous wastes are anticipated during construction, while no impacts are expected over the long term under Alternative A, Alternative B, or the No Action Alternative. Short- and long-term negligible impacts to visual resources are expected under Alternative A, Alternative B, or the No Action Alternative.

ES-5 Conclusions

Implementing Alternative A, Alternative B, or the No Action Alternative would not result in significant impacts to the physical environment of NASA JPL or off site. The conclusion of no significant impact is predicated upon implementing best management practices (BMPs) and mitigation measures during and immediately following proposed activities. Collectively, BMPs and mitigation measures to be implemented have been identified and summarized in **Section 3.0** of this EA. These BMPs and mitigation measures are summarized in **Table ES-2**.

Based on the analyses presented in this EA and information provided by all consulted personnel, the proposed activities would not have significant impacts on the human environment. Therefore, preparing an Environmental Impact Statement is not warranted.

Table ES-2. Summary of Best Management Practices and Mitigation Measures

Resource Area	Proposed BMPs and Mitigation Measures under Alternative A and Alternative B
Land Use	No mitigation measures.
Traffic and Transportation	• On-site bus services may be rescheduled and/or re-routed to avoid times or routes that would otherwise create localized impacts due to construction activities. • Contractors will be provided specific construction routes and schedules designed to minimize conflicts with routine vehicular traffic and avoid normal peak-traffic hours of on-site personnel. All loads will have either bills of lading or manifests prior to entering/leaving the facility. Traffic will be redirected when construction activities occur in areas currently dedicated to vehicular travel and parking. • Contractors will operate under limited parking availability, and will restrict their employees from bringing unnecessary commuter vehicles on-site. • All contractors performing work lasting 2 weeks or longer in duration will receive "Rapid-gate" badges, precluding them from having to physically check in at the gate every time they enter or leave the facility. While construction contractors will be encouraged to carpool to the facility, some contractor crews will be required to operate remote security trailers in off-site locations and then bus their employees in and out daily.
Utilities and Services	• Design landscape plans for minimum water use (e.g., plant native, drought-tolerant species). • Incorporate energy conservation measures into parking structure design to mitigate impacts related to power systems. • Recycle construction-related debris.
Air Quality	• Contractors will employ proper control measures, including routine maintenance of all construction equipment, and regular maintenance of the emission control devices on all construction equipment to reduce fugitive dust during construction. • Dust suppression and other construction-related water uses will be performed using water from tanker trucks filled from local hydrants. • Construction contractors will be required to submit a Construction Management Plan including plans to control impacts to air quality during construction. • Construction activities under the Proposed Action will comply with South Coast Air Quality Management District (SCAQMD) regulations, including SCAQMD Rule 402, which specifies that there shall be no dust impacts off-site sufficient to cause a nuisance, and SCAQMD Rule 403, which restricts visible emissions from construction.
Noise	• Contractors will adhere to work noise restriction schedules contained in municipal codes to minimize potential impacts from demolition and construction activities on the surrounding residential properties. • All construction equipment powered by an internal combustion engine will be equipped with a properly maintained muffler. • Air compressors will meet current U.S. Environmental Protection Agency noise emission standards. • New construction equipment will be used as much as possible since it is generally quieter than older equipment. • Portable noise barriers within the equipment area and around stationary noise sources will be established.

Resource Area	Proposed BMPs and Mitigation Measures under Alternative A and Alternative B
Water Resources	• NASA JPL will implement erosion and sediment control practices, such as sediment trapping, filtering, and other BMPs, as appropriate. The existing Storm Water Management Plan will be modified to address long-term runoff and pollutant discharge. • NASA JPL will prepare a Storm Water Pollution Prevention Plan (SWPPP) to include time frames when soil would be re-stabilized after being disturbed, the type of stabilization to be used, record of weekly storm events inspections, and maintenance necessary to keep BMPs employed until the site reaches 70 percent stabilization. The SWPPP will address BMPs employed to control erosion and sediment loss at the project site. • Contractors will avoid adverse impacts on the 100-year floodplain associated with the Arroyo Seco by limiting construction activities to the elevated ground above Arroyo Seco embankments, and ensuring coordination with the CRWQCB during and after high intensity or ongoing rainfall events if construction activities were to occur on or below the embankments (Alternative A Only).
Biological Resources	• Restore disturbed areas and replace with native species or similar vegetation species after completion of construction activities.
Hazardous Materials and Hazardous Wastes	• Removal of contaminated building structures, equipment, and soil will be consistent with NASA policies and Federal, state, and local requirements, and include both BMPs and appropriate construction management practices. • Because one localized area of the project site contains impacted soil, proper inspection and monitoring requirements will be included as part of project controls to ensure proper protection of the health and safety of on-site workers during any proposed construction and/or excavation activities. Additional provisions for environmental compliance (health and safety plan, soil/waste management plan, etc.) will be identified to address future utility or incidental earthwork involving limited or shallow soil excavation in areas where impacted soil may be present.

1.0 PURPOSE AND NEED FOR ACTION

1.1 Introduction

The Jet Propulsion Laboratory (JPL) is a Federally Funded Research and Development Center (FFRDC) operated by the California Institute of Technology (Caltech) under a contract with the National Aeronautics and Space Administration (NASA). JPL is NASA's lead center for the robotic exploration of the solar system, and is responsible for operating NASA's Deep Space Network (DSN). JPL's primary mission is the planning, advocacy, and execution of unmanned exploratory scientific flight through the solar system. This includes activities in the areas of planetary exploration, earth science, astrobiology, telecommunications, and astrophysics. JPL also conducts research and development work for other Federal agencies, creating international expertise in key fields such as space science instrumentation and telecommunications, spacecraft component design and systems integration, micro-devices, electronics, and software automation.

NASA's mission is "to pioneer the future in space exploration, scientific discovery and aeronautics research." In 2010-2011, NASA JPL conducted an analysis of existing facilities and infrastructure, while simultaneously forecasting future needs and objectives to enable NASA to meets its mission. NASA JPL developed a comprehensive facility planning strategy which would cover the next two decades through the concurrent implementation of the NASA JPL Master Plan Update 2011-2032 (AC Martin 2011) for the three NASA JPL facilities in California: (1) the main JPL facility on Oak Grove Drive in Pasadena (hereafter referred to as "NASA JPL"); (2) the Table Mountain Facility in Wrightwood; and (3) the Goldstone Deep Space Communications Complex at Fort Irwin National Training Center. NASA prepared the 2011 NASA JPL Facility Master Plan Updates Programmatic Environmental Assessment (NASA JPL 2011a), hereafter referred to as the "Master Plan Updates PEA", to analyze the potential impacts from implementing the NASA JPL Master Plan Update 2011-2032 ("Master Plan Update") for these three JPL facilities. The Finding of No Significant Impact was signed on January 25, 2012.

This proposed project evaluated in this document is the construction of a new on-site parking structure to provide parking for those vehicles that currently are parked in the leased parking lot in the Arroyo Seco, a proposed capital project identified in the Master Plan Updates PEA. Therefore, much of the information contained in that document will be tiered from and incorporated by reference in this Environmental Assessment (EA). Since the proposed project is to be design-build and the project has yet to enter into the design phase, conservative estimates have been applied to quantities and analyses, where applicable.

Recognizing its stewardship responsibilities, NASA is committed to integrating environmental considerations into its planning and decision-making activities consistent with the spirit of the National Environmental Policy Act (NEPA) of 1969. A review of the potential effects on historic resources from the proposed project consistent with Section 106 of the National Historic Preservation Act has been fulfilled; no historic properties would be affected and no cultural artifacts have been identified in the proposed project area.

NASA has prepared this EA to be consistent with NEPA requirements and the Council on Environmental Quality (CEQ) regulations on implementing NEPA. The latest NASA NEPA Guidelines found in NASA Procedural Requirement (NPR) 8580.1, *Implementing the National Environmental Policy Act and Executive Order 12114,* have been used in preparing this EA (NASA. 2001).

The main NASA JPL facility is located in the northern metropolitan Los Angeles area, between the cities of Pasadena and La Cañada Flintridge, and the community of Altadena in unincorporated Los Angeles County (**Figure 1-1**). NASA JPL is separated from residential neighborhoods by the foothills of the San Gabriel Mountains to the north and the Arroyo Seco Canyon to the east. The residential neighborhood of La Cañada Flintridge borders NASA JPL on the west. An equestrian club (Flintridge Riding Club) and a Los Angeles County Fire Department (LACFD) facility lie to the southwest, La Cañada High School, Hahamongna Watershed Park (HWP), and Devil's Gate Dam are farther south (**Figure 1-2**).

NASA JPL encompasses 73.3 hectares (ha) (181.2 acres [ac]) and contains 244,335 square meters (sq m) (2,630,000 square feet [SF]) of space. Approximately 63.5 ha (156.9 ac) are federally owned. NASA JPL includes three parcels of leased land: 4.2 ha (10.24 ac) on the west side of the site is leased from the Flintridge Riding Club for use as surface parking; and a .5 ha (1.23 ac) parcel on the western edge of the Arroyo Seco and a 3.9 ha (9.58 ac) parcel on the east side of the site are leased from the City of Pasadena for use as surface parking.

NASA JPL has a usable site area of 29.5 ha (72.8 ac), or 40 percent of the total acreage, with the main developed area in the southern half of the site. The on-site workforce consists of approximately 5,000 full-time equivalent employees. Three areas are unsuitable or unavailable for development: the steep area to the north comprises 22.2 ha (54.8 ac); the earthquake fault zone that runs through the site occupies 11.5 ha (28.4 ac); and the Edison Power Substation located in the southeastern area of the Lab is a 0.36-ha (0.9-ac) parcel. There are 138 buildings and 20 trailers at JPL.

Situated on the south-facing slope of the San Gabriel foothills, NASA JPL is surrounded by natural settings on the northern, eastern, and southern boundaries. The northern foothills of the Angeles National Forest (ANF) are covered with native chaparral. The Arroyo Seco to the east is typically a dry river bed and only contains water during periods of rainfall. The adjacent western residential area has an abundance of vegetation that contributes to the scenic vistas. The mesa ridge is the northern boundary of the facility. The majority of the facility slopes away from the steep hillside of the mesa. NASA JPL is situated above the surrounding community and is a prominent visual feature in the area. Built on sloping terrain, its buildings and roads are terraced into the hillside.

1.2 Purpose and Need for Action

1.2.1 Statement of Purpose

The purpose of the proposed action is to construct an on-site parking structure in the NASA JPL facility to accommodate approximately 1,093 parking spaces.

1.2.2 Statement of Need

NASA JPL needs to replace approximately 1,093 offsite parking spaces due to the expiration of the East Arroyo Parking Lot lease with the City of Pasadena.

Since 1952, the City of Pasadena has leased the 3.84-ha (9.58-ac) East Arroyo Parking Lot to NASA JPL for use as a motor vehicle parking lot by its on-site workforce (**Figure 1-3**).

Figure 1-1. NASA JPL Regional Context Map

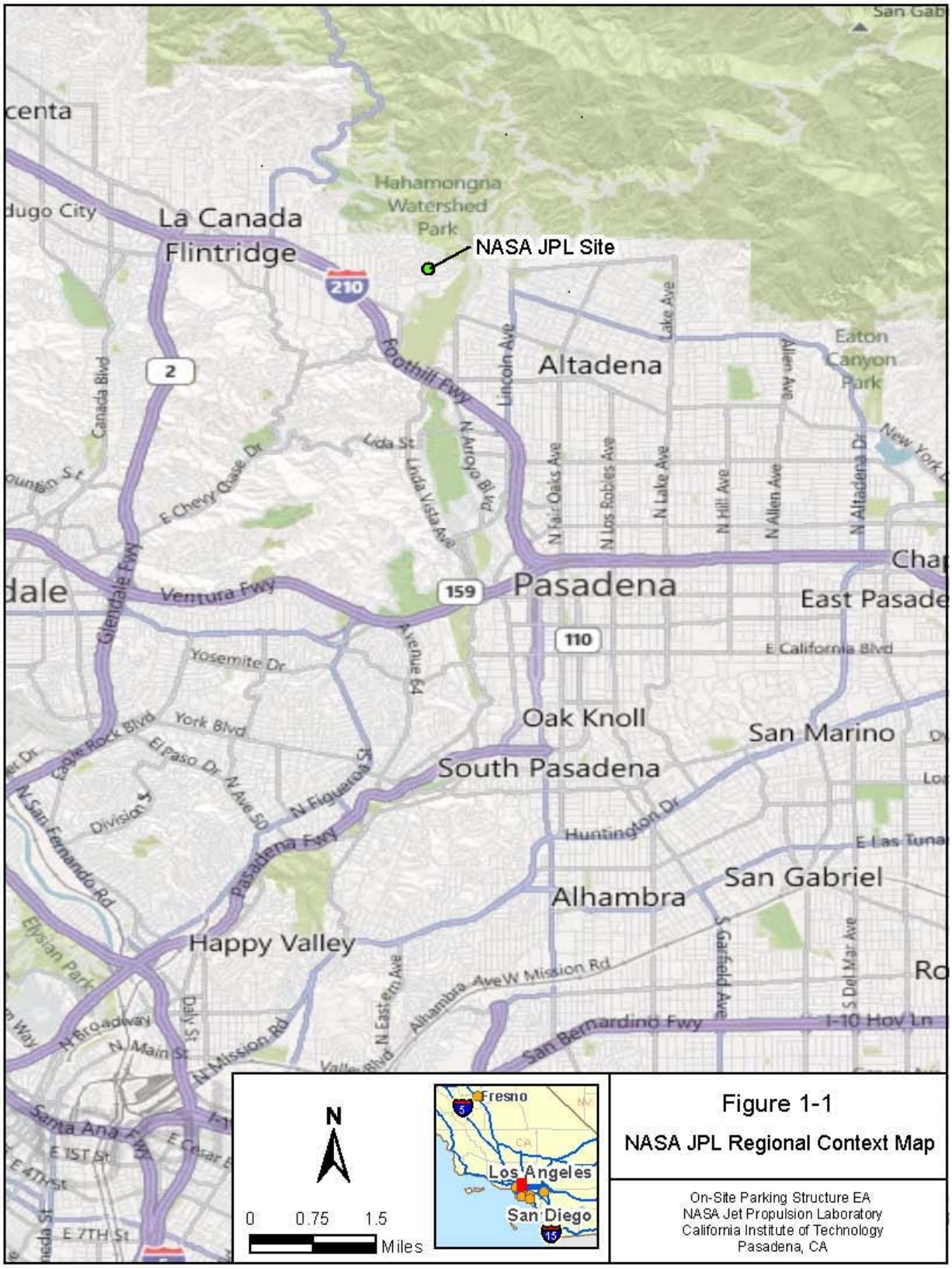


Figure 1-2. Aerial View of NASA JPL

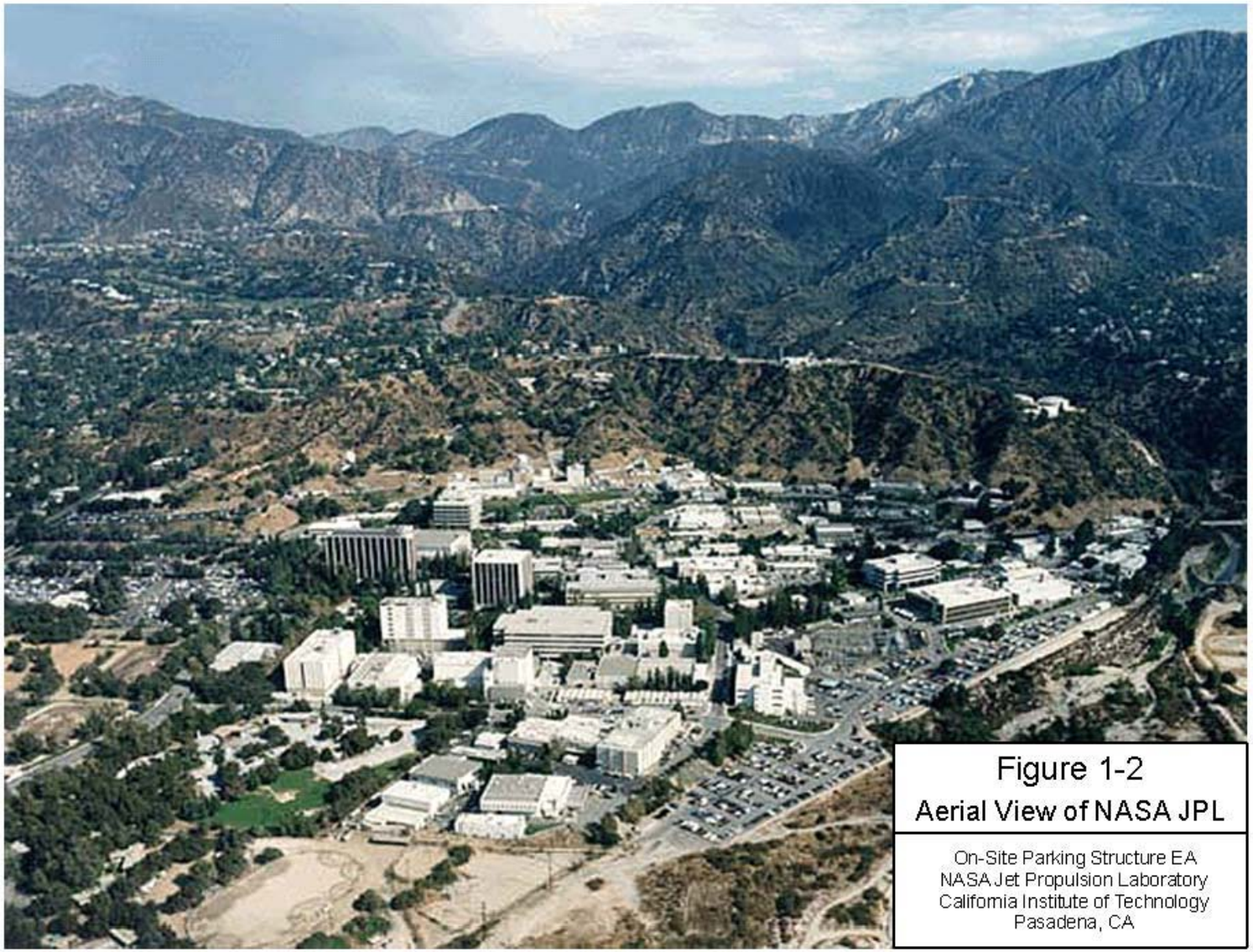
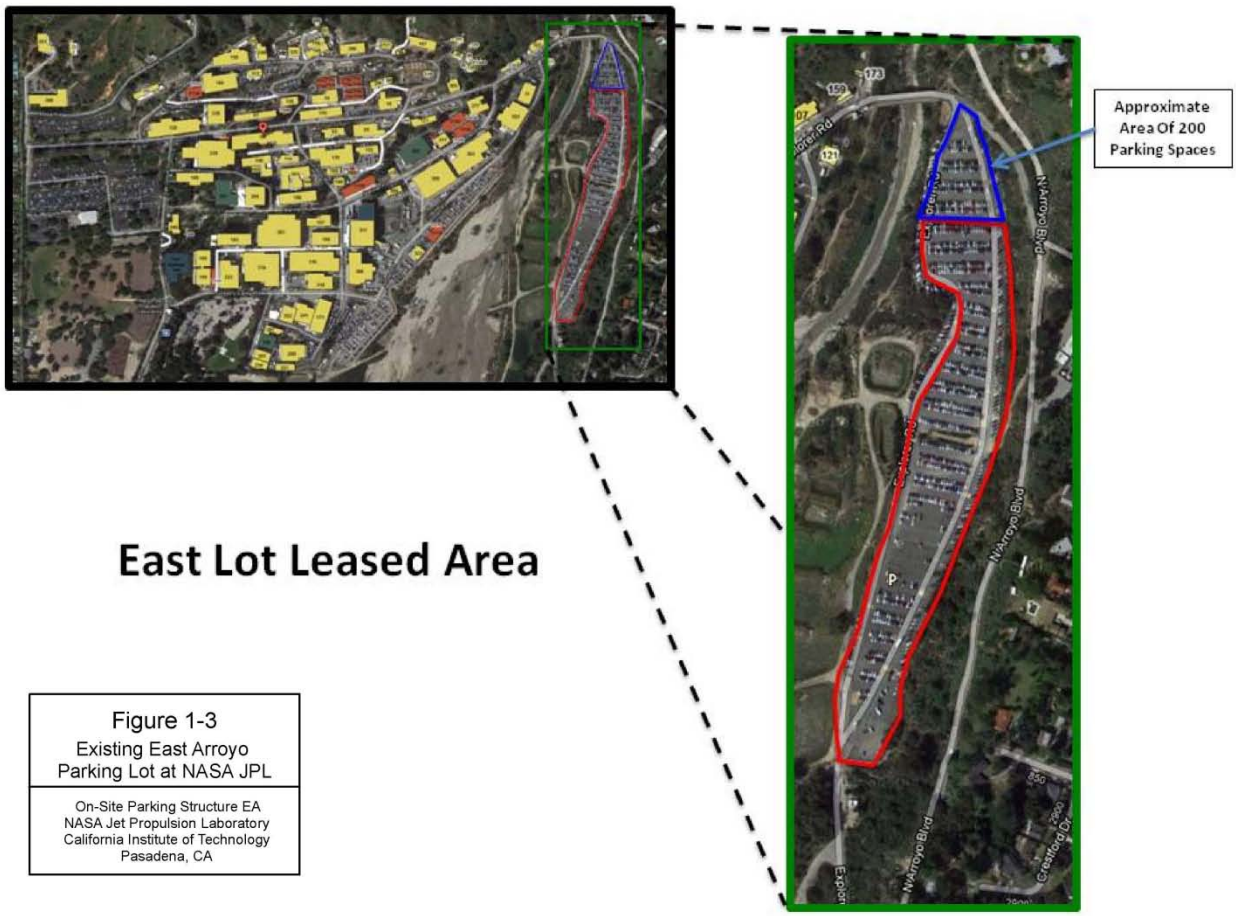


Figure 1-3. Existing East Arroyo Parking Lot at NASA JPL



Source: NASA JPL, January 2012

The current lease period is for 7 years from January 1, 2004 through December 31, 2010, with an additional two and one-half year option (option period of January 1, 2011 through June 30, 2013). NASA JPL is currently in the option period which ends June 30, 2013. In 2007, the City notified NASA JPL that it has another beneficial use for the East Arroyo Parking Lot site and intends to install percolation ponds (spreading basins), which is also consistent with the 2003 Hahamongna Master Plan (City of Pasadena 2007). NASA JPL supports the City of Pasadena's groundwater improvement projects relative to environmentally beneficial use of its land as a spreading basin. An extension to the current lease will be sought to continue use of the lot only until replacement parking is available.

It is NASA JPL's intent to acquire a lease modification or an easement from the City of Pasadena to enable access to an existing access road from Windsor Avenue to the JPL Bridge. This instrument would be acquired prior to construction of the proposed parking structure.

Parking within the NASA JPL facility typically is at capacity on a daily basis. The projected imminent loss of 1,093 parking spaces amounting to approximately 25 percent of the 4,453 spaces currently available for NASA JPL results in an immediate need for parking capacity to accommodate the number of vehicles currently accommodated in the leased lot in the Arroyo Seco. Since the NASA JPL on-site

workforce is essential to supporting mission critical tasks, and, thus, timely access to work facilities is critical, there is a need for parking on site as there are no existing off-site parking facilities in proximity to the NASA JPL facility that can meet the demand that will be created when the Arroyo Seco leased lot is no longer available to NASA JPL.

1.3 Regulatory Framework

Table 1-1 lists statutes, regulations, executive orders, and NPRs, NASA Policy Directives (NPDs), and Policy Guidance (NPG) that govern and/or influence the scope of this EA. A number of statutes were considered but found to have no influence on this project. Although this list is not all-inclusive, the proposed alternatives must comply with applicable regulatory requirements.

Table 1-1. Summary of Applicable Regulatory Requirements

Regulatory Requirement
Statutes • National Environmental Policy Act of 1969 (42 U.S.C. §4321-4347) • National Historic Preservation Act of 1966 (16 U.S.C. § 470, *et seq*.) (89 P.L.966)); (referred to herein as "Section 106") • Clean Air Act of 1970 as amended (42 U.S.C. § 7401, *et seq*.) • Clean Water Act of 1977 as amended (33 U.S.C. § 1251, *et seq*.) • Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9601, *et seq*.) • Archaeological Resources Protection Act of 1979 (16 U.S.C. §470aa-mm) • Endangered Species Act of 1973 (16 U.S.C. §1531-1544) • Resource Conservation and Recovery Act (42 U.S.C. § 6901, *et seq*.) • Toxic Substances Control Act 15 U.S.C. §§ 2601-2697
Regulations • Council on Environmental Quality Regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508) • 36 CFR Part 800—Protection of Historic Properties • 32 CFR Part 229—Protection of Archaeological Resources: Uniform Regulations • 40 CFR 6, 51, and 93 – Conformity of General Federal Actions to State or Federal Implementation Plans • 29 CFR Part 1910, Occupational Safety and Health Standards • 33 CFR 320-330 – U.S. Army Corps of Engineers Regulations • 40 CFR Parts 300 through 399 – Hazardous Substance Regulations • 40 CFR Part 61 Subpart M – National Emission Standard for Asbestos • Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation (Federal Register, Vol. 48, No. 190, 44716-44742)
Executive Orders • Executive Order (EO) 11593 – Protection and Enhancement of the Cultural Environment • EO 11988 – Floodplain Management • EO 11990 – Protection of Wetlands • EO 12898 – Environmental Justice • EO 13287 – Preserve America • EO 13327 – Federal Real Property Management • EO 13423 – Strengthening Federal Environmental, Energy, and Transportation Management

Regulatory Requirement
• EO 13514 – Federal Leadership in Environmental , Energy, and Economic Performance • NASA Procedural Requirements, Policy Directives, and Policy Guidance • NASA Procedural Requirement (NPR) 8553.1B, "NASA Environmental Management System," September 22, 2009 • NPR 8580.1, "Implementing the National Environmental Policy Act and EO 12114," November 26, 2001 • NPD 1600.2A, "NASA Security Policy" • NPG 1620.1B, "Security Procedures and Guidelines" • NPD 8831.1C and 2D, "Maintenance and Operations of Institutional and Program Facilities and Related Equipment"

1.4 Environmental Issues

Potential impacts of the proposed alternatives described in this document were assessed in accordance with NPR 8580.1, which requires that impacts to resources be analyzed in terms of their context, duration, and intensity. To help the public and decision-makers understand the implications of impacts, they are described in the short- and long-term, cumulatively, and within context, based on an understanding and interpretation by resource professionals and specialists. The resource areas to be reviewed and discussed in this EA include land use, traffic and transportation, utilities and services, air quality, noise, water resources, biological resources; hazardous materials and waste; and visual resources.

2.0 ALTERNATIVES CONSIDERED

This section describes the process used for developing alternatives and for eliminating alternatives from further study. This section also provides detailed descriptions of the three alternatives carried forward for further study in this document, Alternatives A and B, and the No Action Alternative; and provides a comparison of environmental consequences between the alternatives. The alternatives analyzed in this document in accordance with NEPA are the result of agency and internal scoping input. All alternatives considered must meet the purpose and need for the proposed action.

2.1 Process for Alternatives Development

Given the objectives that NASA has identified, criteria were developed to screen proposed alternatives. The criteria are:

- The alternative, at a minimum, must replace the parking spaces that will be lost as a result non-renewal of the East Arroyo Parking Lot lease;
- The alternative must maintain adequate levels of service on the roadways and circulation within and around NASA JPL;
- The alternative cannot require the purchase or lease of off-site property, per NASA Headquarters directive;
- The alternative cannot adversely impact the NASA mission and operations;
- The alternative should be compatible with the NASA JPL Master Plan Update, to the extent practicable; and
- The alternative should enable NASA to maintain its flexibility in connection with future development of NASA JPL.

NASA JPL, as part of the master planning process and related efforts and studies, is exploring viable mitigation strategies to address imminent and long-term parking deficiencies identified at the NASA JPL facility to avoid impacts to mission capabilities and facility operations. NASA JPL's approach to address the need for parking with a long-term solution is set forth in the 2010 NASA JPL Parking Plan and Study (NASA JPL 2010) that defined projected parking shortfall; analyzed existing studies, programs, and projections; analyzed viable short-, mid-, and long-term parking options; and recommended strategies to mitigate projected parking deficiencies by minimizing parking requirements, reducing environmental impacts of parking increases, and minimizing construction and financial impacts.

To address its immediate parking needs resulting from the non-renewal of the Arroyo Seco lease, NASA JPL excluded the purchase of new land and identified on-site parking alternatives. The purchase of off-site property to accommodate a parking structure does not meet the need associated with the non-renewal of the lease because it would consist of a lengthy process to identify a suitable location, undergo negotiations with the property owner(s), and proceed through the state and local re-zoning and permitting processes.

Various parking structure alternatives using the design considerations described in this report were considered to address the loss of parking capacity when the Arroyo Seco lease ends. Scenarios include parking structures located on the north, south, west, east and "mall" areas of the facility.

2.1.1 Alternatives Eliminated from Further Study

As part of the NEPA process, reasonable alternatives must be evaluated. Once an alternative is determined not to be reasonable, no further assessment of that alternative is required under NEPA. If there are several reasonable alternatives, a reasonable range of alternatives must be evaluated. An alternative is reasonable if it meets project purpose and need and is technically and economically feasible.

In its master planning update process, NASA JPL identified three on-site locations where a parking structure can be located. In the EA undertaken as part of the master planning update process, NASA JPL assessed the potential impacts on the human environment from implementing the alternative described in the Master Plan Update (AC Martin 2011), which is identified in Section 2.1.1.2 of the Master Plan Updates PEA (NASA JPL 2011a) as the preferred alternative. The PEA's preferred alternative included the east location as the site for the parking structure to address the anticipated loss of parking capacity at the leased East Arroyo Seco Parking Lot. The other two locations, one location south of the center of NASA JPL and one location north of the center of NASA JPL, were eliminated from further review.

The north and south locations are described more fully below. NASA also considered a location to the west of the center of the facility. Like the north and south locations, this location, which is described below, was eliminated because it is not a reasonable alternative. **Figure 2-1** provides their general location.

2.1.1.1 West Facility Site

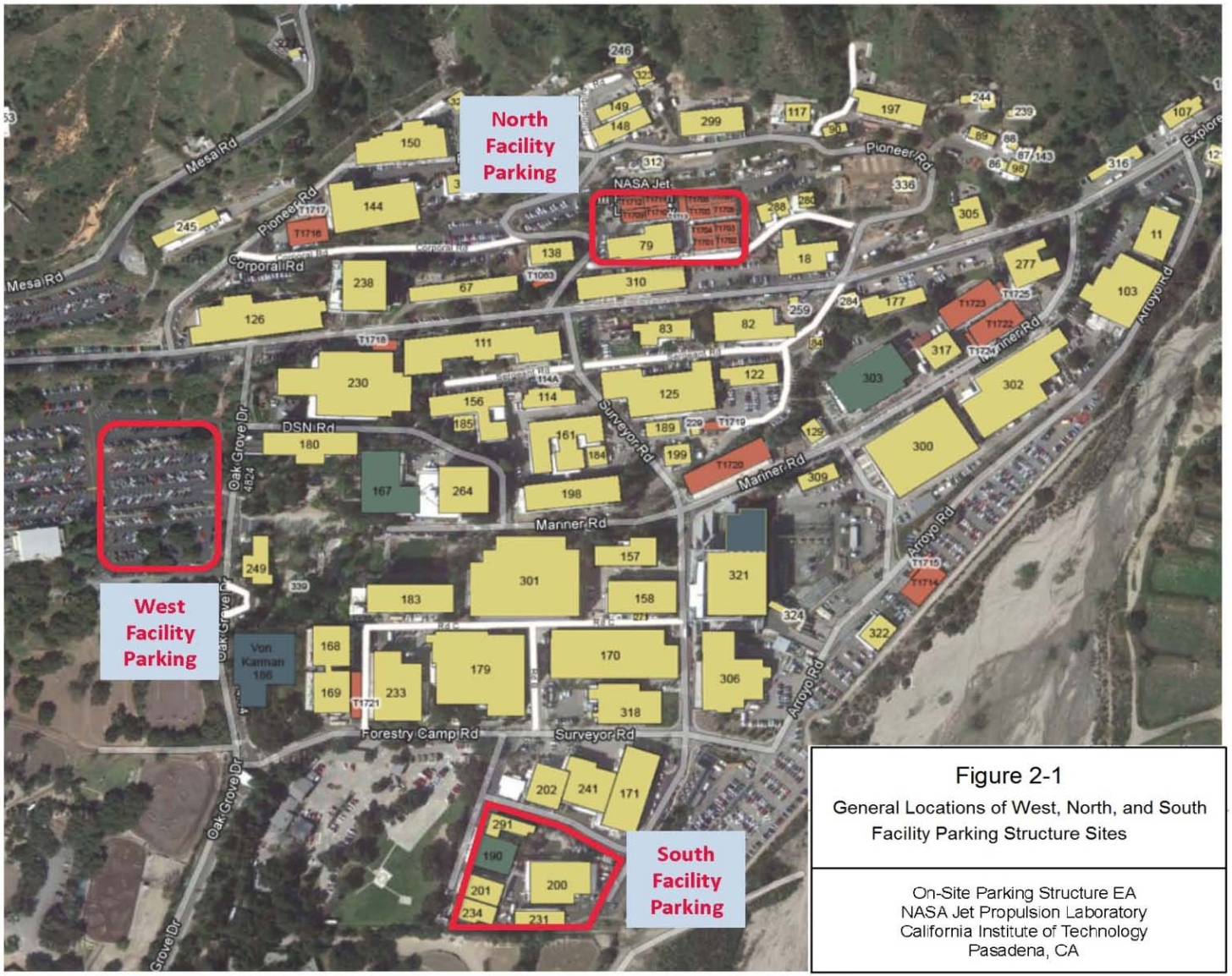
This alternative would consist of a parking structure to be constructed on the west side of the NASA JPL facility in the area of the existing West Parking Lot. This lot is currently leased from the Flintridge Riding Club and a proposed parking structure would require NASA JPL to purchase a portion of this property to construct the parking structure.

While relinquishing the leased Flintridge Riding Club property would meet NASA JPL's long-term objectives and this alternative could be considered to meet long-term parking needs, it was eliminated from further consideration for providing capacity to address the loss of parking capacity caused by the non-renewal of the Arroyo Seco lease primarily because it would require the purchase of private property, which entails a lengthy process. The time needed to identify a suitable location, complete negotiations with the property owner(s), and proceed through state and local re-zoning and permitting processes is incompatible with NASA JPL's need to have a parking structure available when the it no longer has access to the parking lot in the Arroyo Seco. This alternative was not considered in the Master Plan Updates PEA and will not be explored further in this EA.

2.1.1.2 North Facility Site

This alternative would consist of building a parking structure and access driveway north of Explorer Road at the edge of the built-up area of NASA JPL. Construction in this location would require significant and costly retaining structures to develop a workable direct access road to the project site. Extensive excavation and export of soil would be required to provide a level parking footprint and to accommodate the increased vehicle and pedestrian traffic into and out of the proposed parking structure. Structural walls would be required to support lateral soils and structure surcharge loads. It is anticipated that this would result in potential long-term impacts to soils from erosion.

Figure 2-1. General Locations of West, North, and South Facility Parking Structure Sites



Source: NASA JPL, January 2012

Also, a northern location for the parking structure assumes that it would be placed against the steep hill slopes, where it could be built behind the Bridge Fault set-back line. Building atop a fault line would impose considerable and costly engineering elements to ensure the structure does not collapse or sustain major damage from a seismic event. This alternative would also require the demolition and removal of thirteen trailers prior to construction, including Trailers 1701-1712 and Building 79. Assuming the engineering and safety issues discussed above can be addressed, the time needed for completion of the construction project will not allow NASA to have an operational parking facility available when its access to the Arroyo Seco parking lot ends.

As part of implementation of this alternative, NASA JPL considered employing a shuttle service from the parking structure to employee work stations, similar to what is currently being used in conjunction with the East Arroyo Lot, but this would not meet sustainability objectives of decreased on-site operational transportation distances and trips of industrial vehicles and overall operational uphill vehicular travel. This alternative was eliminated from further consideration primarily because of the limitations identified above and was not considered in the Master Plan Updates PEA. It will not be explored further in this EA.

2.1.1.3 South Facility Site

This alternative would consist of a structure in the southern part of NASA JPL, close to the southeast entry and outside the main loop road. While this alternative location would reduce on-site commuter traffic for those vehicles allowed through the Southgate entrance, resulting in a potential long-term beneficial effect to on-site transportation, it would also require the removal of five occupied office structures (Buildings 291, 201, 234, 190, and 200) and assumes that all 224 affected building personnel and their functions displaced by the parking structure could be relocated into new and/or re-purposed facilities vacated as part of the Master Plan Update.

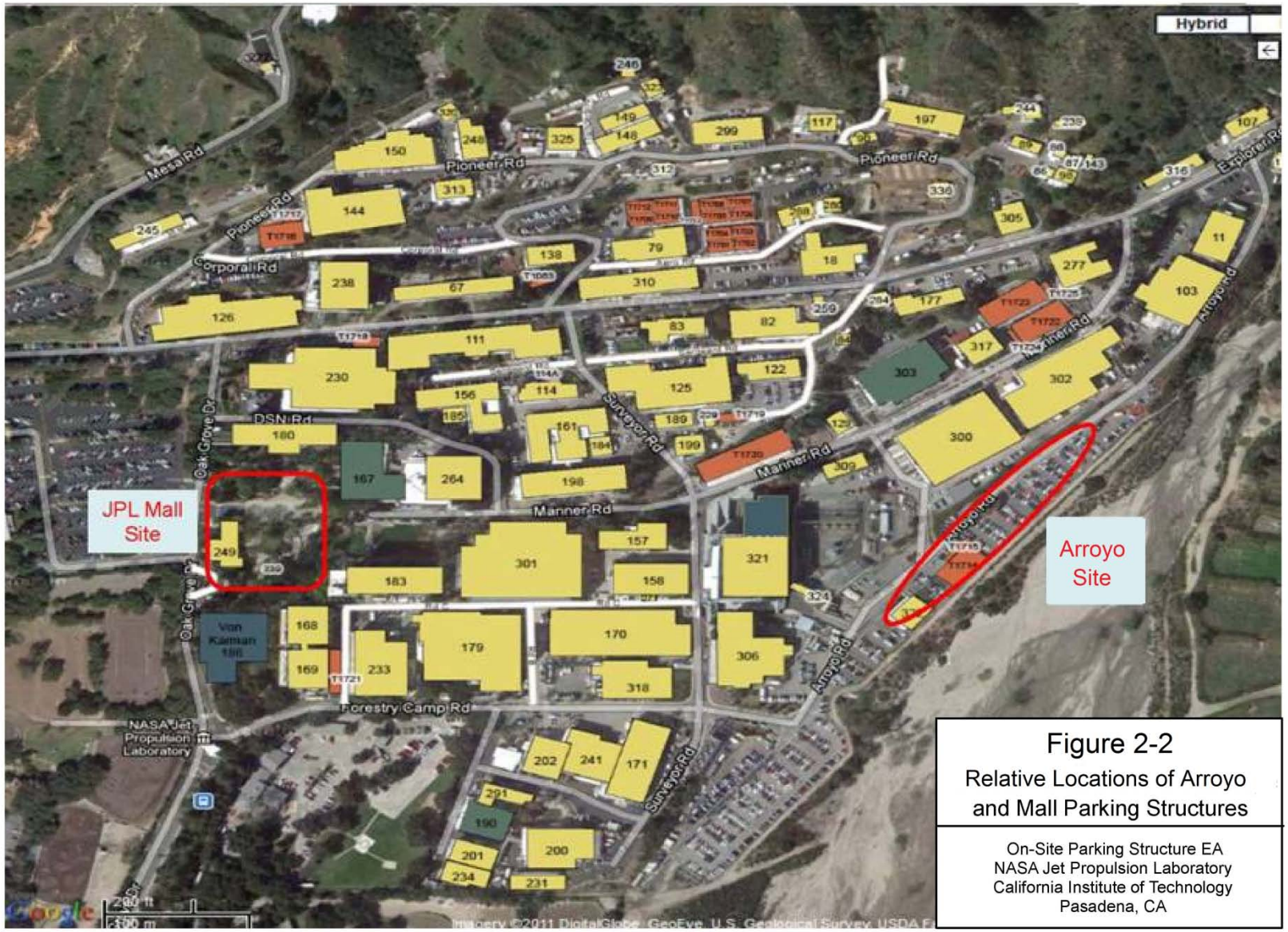
This alternative was eliminated from further consideration in this EA because it would not solve parking issues in the near term, as it is contingent upon lengthy and costly new facility construction and/or repurposing existing facilities for the major relocation of the on-site workforce and functions, which would be difficult to accomplish because of minimal available space at JPL to relocate people and functions into.

2.1.2 Alternatives for Continued Evaluation

The remaining alternatives for continued evaluation in this EA are located on either the west or east side of NASA JPL. These two structures were identified as the Mall Parking Structure on the west side of NASA JPL within the current property line and the Arroyo Parking Structure on the east side of the facility. **Table 2-1** presents a comparison of these two alternatives, and their relative locations on the NASA JPL campus are depicted in **Figure 2-2**.

Parking structure alternatives were influenced by contemporary parking regulation/design, which uses one-size-fits-all spaces of approximately 2.7 m wide x 5.4 m long (9 ft x 18 ft). Vehicles outside the norm are typically accommodated on ground or garage adjacent levels designed with increased vertical clearance and fewer/no structural system obstacles. The standard 2.7-m x 5.4-m (9-ft x 18-ft) stall, when used in a double-loaded parking bay, requires a drive aisle of approximately 7.6 m (25 ft) to accommodate two-way traffic and sufficient maneuvering space for stall ingress and egress.

Figure 2-2. Relative Locations of Arroyo and Mall Parking Structures



Source: NASA JPL, January 2012

Table 2-1. Comparison of NASA JPL Parking Structure Alternatives

Requirements and Characteristics	Alternative A, Arroyo Parking Structure	Alternative B, Mall Parking Structure
Maximum Project Area	1.3 ha (3.2 ac)	1.7 ha (4.2 ac)
Maximum Levels	7	9
Maximum Height	23 m (75 ft)	29 m (95 ft)
Maximum Structure Footprint	37.8 m (124 ft) by 175 m (574 ft) = 6,612 sq m (71,176 SF)	76 m (250 ft) by 59.4 m (186 ft) = 4,320 sq m (46,500 SF)
Maximum Total Structural Area	39,675 sq m (427,056 SF)	34,560 sq m (372,000)
Maximum Vehicle Clearance	2.03 m (6 ft 8 in)	2.03 m (6 ft 8 in)
Maximum Spaces per Typical Level	248	152
Parking Spaces	Approximately 1,250 stalls	Approximately 1,000 stalls
Maximum Displaced Parking Spaces	250 stalls	NA
Demolition/Removal	• Bldg. 1714, temporary modular offices • Bldg. 322, metal maintenance shop, 427 sq m (4,600 SF) • Removal of asphalt and associated infrastructure at existing East Arroyo Parking Lot	• Bldg. 249, Visitor Control, 399 sq m (4,296 SF) • Bldg. 250, Main Guard Shelter, 18.5 sq m (199 SF) • Bldg. 257, Main Guard Island, 2.4 sq m (26 SF) • Removal of asphalt and associated infrastructure at existing East Arroyo Parking Lot

Sources: Data from JPL 2010, NASA JPL Parking Plan and Study, Oct 2010; and Chirino, 2012.
Notes: sq m=square meters; SF=square feet; ft=feet; m=meters; in=inches; NA=Not Applicable.

Adding up the parts yields a standard parking bay width of 18.6 m (61 ft). Structural columns add an additional 0.6-1.2 m (2-4 ft).

To avoid the inefficiency of a separate (no parking spaces) ramp to travel between levels, parking aisles/bays are sloped at no more than 5 percent. Since the parking bay itself is the ramp, and slopes are mild, two 18.6-m (61-ft) wide bays (minimum) in a switch-back configuration are necessary. A well-designed garage includes only whole levels (floors) and closed-loop ramps to avoid cars stacking and u-turning at top-of-ramp dead-ends. Given the 18.6-m (61-ft) spans across parking bays and a code-minimum vertical clearance of 2.1 m (7 ft), structural slabs and beams of approximately 0.9 m (3 ft) depth are required, with a minimum level-to-level height of 3 m (10 ft).

Moreover, optimization of the geometry-dictated basics described above by parking structure designers over time has resulted in the "double-bay double-helix ramp-access open parking garage." Structural material volume, floor area and cost per parking space are minimized; construction standardization and storage/throughput of vehicles is maximized. Referring to **Table 2-1**, the parking structure heights were arrived at by assuming a 6-m (20-ft) ground level, 3 m (10 ft) for each typical level, and a 1.5 m (5-ft) parapet. To establish an upper bounding height for each structure for purposes of impact analysis in this EA, NASA JPL has established a maximum seven floors for Alternative A and nine floors for Alternative

B. This does not necessarily mean the alternative structures would be that height. It is likely that they would be less. Structure height would be determined after the start of the design/build process.

The proposed parking structure under either Alternative A or B would be entirely on site the secured NASA JPL facility and would meet all applicable requirements, including policy directives of NASA and the JPL operating contractor. The design-build process would include the appropriate requirements for either alternative. For example, construction of Alternative A would require specific design for security considerations due to its immediate proximity to the NASA JPL property boundary and an adjoining bridle path used by the public.

The East Arroyo Parking Lot would remain in use until the proposed action is implemented under either Alternative A or B. Once the parking structure is constructed and in use, NASA JPL would remove all structures and other improvements made by NASA JPL. Improvements to be removed by NASA JPL would include:

- Removing the guard structure at the southern end of the leased parking area;
- Removing all JPL bus stops and their foundations;
- Removing all chain link fencing and gates surrounding the leased parking lot area;
- Removing chain link fencing on north and south side of bridle trail crossing the parking lot area;
- Removing all bollards, sign posts, and lighting located in the leased parking lot area;
- Removing asphalt paving and base material; and
- Filling and compacting soil in holes left from the removal of the aforementioned foundations, footings, poles or other structures in the leased parking area.

Removal of the existing lot improvements would not include the paving on the Lower Road nor the northernmost approximate 200 spaces of the East Arroyo parking lot. Contractors would haul all removed material, estimated to include approximately 2,370 cubic meters (3,100 cubic yards) of asphalt paving and 1,147 (1,500 cubic yards) of crushed base material, to an approved off-site landfill. NASA JPL anticipates no more than 400 truckloads over a 20-day period to haul the material off site, for an estimated 20 truckloads per day. Further details on transportation impacts are contained in Section 3.2. The remaining lot would be restored to existing grade. All removal activities would be completed no later than 120 days after the lease termination date (NASA JPL 2012 and **Appendix A**) and NASA JPL anticipates these activities would require approximately 60 days.

It is NASA JPL's intent to acquire a lease modification or an easement from the City of Pasadena to enable access to an existing access road from Windsor Avenue to the JPL Bridge. This instrument would be acquired prior to construction of the proposed parking structure.

Alternative A, Arroyo Parking Structure; Alternative B, Mall Parking Structure; and the No Action Alternative are described below. Impacts to environmental issues resulting from these alternatives will be analyzed in Chapter 3 for direct, indirect, and/or cumulative impacts set forth in CEQ's regulations, 40 CFR § 1508.25.

2.2 Alternative A, Arroyo Parking Structure

The proposed Arroyo Parking Structure was developed to meet the need for parking capacity that will result from the non-renewal of the Arroyo Seco parking lot lease. Implementation of Alternative A would

fulfill this project's purpose and need, is consistent with the Master Plan Update, and allows the agency to achieve the objectives identified in Section 1.2 of this EA.

Alternative A would be a concrete parking structure, reinforced to meet State of California and seismic design requirements, would be located in the southeast edge of NASA JPL adjacent to the Arroyo Seco (**Figure 2-2**). With a maximum footprint of approximately 6,612 sq m (71,176 SF), the rectangular structure would be constructed on an area of not more than 1.3 ha (3.2 ac), and include approximately 1,250 parking stalls. Further requirements and characteristics are included in **Table 2-1**.

The site is currently owned by NASA and occupied by an asphalt parking lot, which slopes gently towards the south. Underground utilities, including a 25-cm (10-in) water main, storm drains, and catch basins, exist in the proposed project area but would not be moved or affected under Alternative A. Two structures, a 427-sq m (4,600-SF) corrugated metal hangar (Building 322) and temporary modular offices (Building 1714), which is currently empty, are located adjacent to the eastern property line in the south-central portion of the site.

These two structures would be demolished as part of Alternative A, along with two mature California Sycamore trees. Building 322 would be re-constructed on the north end of the proposed project site. Since this building is currently unoccupied, there would be no costly or lengthy employee relocation issues. The new structure (to be named Building 344) would duplicate Building 322 and would consist of a 9-m (30-ft) tall pre-manufactured metal building on a concrete slab with a footprint of 17.7 m (58 ft) by at least 23 m (75 ft) long. The interior would be open with a free standing 5-ton gantry crane spanning the width and running the length of the building. Building 344 would include power, lighting, fire detection & protection systems, roof & wall insulation, and a HVAC system to JPL standards.

Other functional, structural, and site features/requirements to be addressed during project design for Alternative A would include:

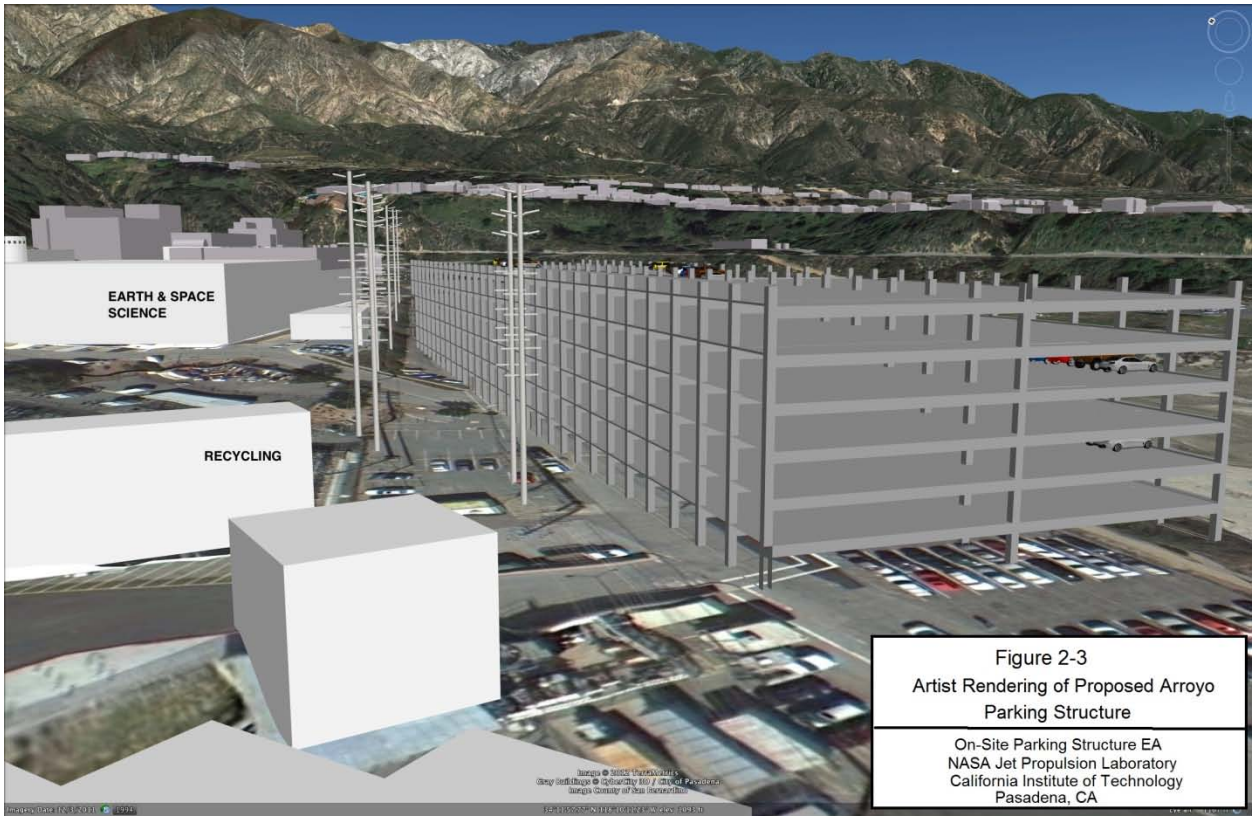
- A possible security booth for security staff and surveillance equipment;
- Storage and maintenance area;
- Three open stairwells and two elevators;
- Internal and external lighting and emergency lighting;
- Americans with Disability Act access ramping at curbs;
- Relocation of a 16 kilovolt (kV) overhead power line by Southern California Edison (SCE), either by re-routing the overhead lines around the new parking structure; or installing underground lines from the NASA JPL fence line into the proposed site;
- Engineering controls to address potential flood waters associated with Arroyo Seco;
- Maintaining a minimum 4.6-m (15-ft) wide buffer zone since the proposed parking structure would be adjacent to the HWP;
- Maintaining a minimum overhead ground height clearance of 6.1 m (20 ft) at the south end of the proposed structure for roll-off bins that are part of the Building 324 Recycling Center operations; and

- Employing sustainability features such as permeable pavers, and providing structural support required for the future implementation of photovoltaic panels over the entire upper parking level.

The proposed project site on the existing asphalt parking lot is bounded along the eastern boundary by a chain link fence, which is approximately 4.6 m (15 ft) inside of the eastern JPL property line. The public currently uses this 4.6 m (15 ft) area as a pedestrian and horse trail. Beyond the property line, the topography drops abruptly into the Arroyo Seco Wash and the Devils Gate Spreading Grounds.

The project would include modification to surrounding on-site access roads and parking areas. An artist rendering without any architectural details of the proposed maximum 7-level structure is depicted in **Figure 2-3**. The East Arroyo Parking Lot would remain in use until completion of Alternative A.

Figure 2-3. Artist Rendering of Proposed Arroyo Parking Structure



Source: NASA JPL, February 2012

As identified in **Table 2-1**, Alternative A would offset the immediate parking demand from the expiration of the East Arroyo Parking Lot lease and its 1,093 parking spaces with minimal reduction of existing parking after the existing ground parking displacement of 250 spaces is taken into account.

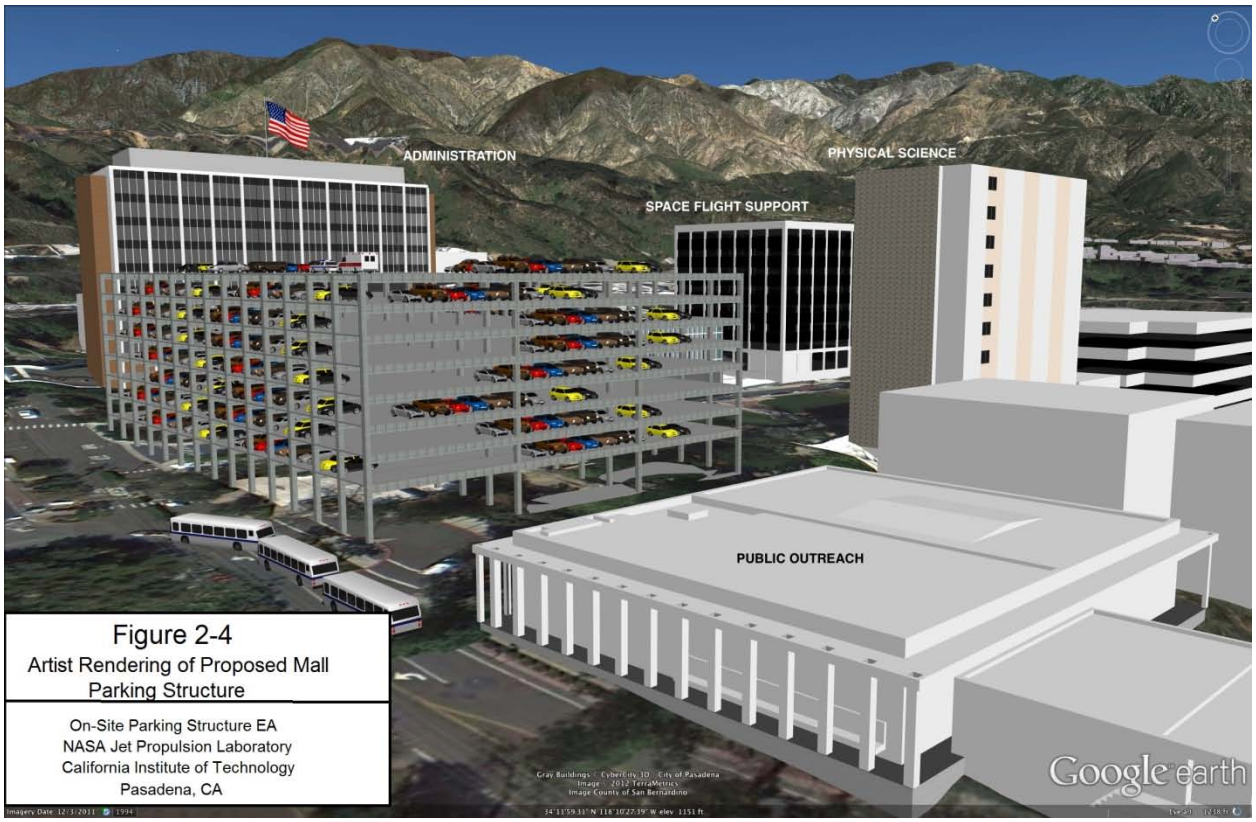
2.3 Alternative B, Mall Parking Structure

The proposed Mall Parking Structure was developed to meet the need for parking capacity that would result from the non-renewal of the East Arroyo Parking Lot lease, and allows NASA to achieve the objectives identified within Section 1.2 of this EA.

Alternative B would consist of a concrete parking structure, reinforced to meet State of California and seismic design requirements, on a maximum footprint of 4,320 sq m (46,500 SF). The proposed approximately 1,000-stall Mall Parking Structure would be constructed in a 1.7 ha (4.2 ac) area of the existing Mariner Mall area of NASA JPL (**Figures 2-2 and 2-4**).

As indicated in **Table 2-1**, the maximum 9-level height of the parking structure under Alternative B would be greater than that for Alternative A because of its smaller footprint. Although the Mall area is comprised of approximately 1.7 ha (4.2 ac), the entire site is not available for establishing the footprint of the proposed parking structure due to the proximity of adjacent existing buildings.

Figure 2-4. Artist Rendering of Proposed Mall Parking Structure



Source: NASA JPL, February 2012

After consideration of existing fire code, which requires at least a 12.2-m (40-ft) minimum setback for construction (*meaning* that construction is not permitted within 12.2 m (40 ft) of existing buildings) and the unknown future for Building 180 (proposed seismic bracing, addition, or replacement) , the 4,320-sq m (46,500-SF) footprint for the Mall Parking Structure was established.. While a shorter parking structure (larger footprint) would be preferred for Alternative B, technical and regulatory restrictions eliminate this scenario.

The mall is located at the main entrance to the NASA JPL facility and is almost entirely surrounded by buildings. As such, any major construction located there would utilize the visitor parking area immediately to the west for construction staging. This would require unscheduled closures of the main gate, and for unspecified periods of time, until completion of construction so construction and delivery vehicles would be able to access the construction site. The mall is the largest open area on the facility and

is landscaped with native and ornamental trees, providing shade to the existing pedestrian circulation system.

Construction of a parking structure at the Mall location was not described in the Master Plan Update (AC Martin 2011). Specifically, the Mall area would be preserved as open space with ornamental landscaping and be connected to a NASA JPL-wide pedestrian circulation network. Constructing a parking structure at the Mall location would require additional land use planning and might require facility modifications associated with establishing alternative outdoor gathering facilities.

Three structures, Building 249, Visitor Control 399 sq m (4,296 SF); Building 250, Main Guard Shelter 18.5 m (199 SF); and Building 257, Main Guard Island 2.4 sq m (26 SF), are located within the proposed structure footprint and would be demolished, then relocated, as part of Alternative B, along with the removal of approximately 114 mature landscape trees. There would be 8 permanent workforce and 3 security personnel that would need to be relocated from these structures. NASA JPL also considered replacing or co-locating these demolished structures within the proposed Mall Parking Structure, but either would be a lengthy and costly process to implement.

Alternative B would also require the relocation of existing underground utilities, including:

- 300 linear feet (LF) of 8-inch (in) water main;
- 200 LF of 6-in water main;
- 200 LF of 2-in and 3-in service lines;
- 200 LF stretch of 6-in natural gas line;
- 300 LF of the main telecommunications line; and
- 200 LF of an abandoned 10-in vitreous clay sanitary sewer.

The mall area is owned by NASA so there would be no need to acquire any property through lease or purchase. Other functional, structural, and site features/requirements to be addressed during project design would include:

- A possible security booth for security staff and surveillance equipment;
- A storage and maintenance area;
- Three open stairwells and two elevators;
- Internal and external lighting and emergency lighting;
- Americans with Disability Act access with ground floor parking spaces and ramping at curbs;
- Relocation of several underground utility systems; and
- Employing sustainability features such as the use of permeable pavers, and providing structural support required for the future implementation of photovoltaic panels over the entire upper parking level.

Further requirements and characteristics are included in **Table 2-1**.

Construction of a parking structure at the Mall location was not described in the Master Plan Update (AC Martin 2011). Specifically, the Mall area would be preserved as open space with ornamental landscaping and be connected to a NASA JPL-wide pedestrian circulation network. Constructing a parking structure at the Mall location would require additional land use planning and might require facility modifications associated with establishing alternative outdoor gathering facilities.

2.4 No Action Alternative

Under the No-Action Alternative, the actions proposed in this EA would not be taken. The construction of Alternative A, Arroyo Parking Structure, or the Mall Parking Structure under Alternative B would not occur under this alternative and would not meet NASA JPL's imminent and long-term parking needs.

Although this alternative does not satisfy the purpose and need for the project, it is included in the environmental analysis to provide a baseline for comparison with Alternative A and Alternative B and is analyzed in accordance with CEQ regulations for implementing NEPA. Although this alternative would eliminate unavoidable adverse, short-term impacts associated with the Alternatives A and B, the No Action Alternative would not satisfy the purpose and need for this project.

2.5 Comparison of Impacts

Table 2-2 summarizes the alternatives effects on each resource based on the impact analysis described in Section 3, Affected Environment and Environmental Impacts, of this EA.

Table 2-2. Summary of Potential Impacts

Resource Issue	Alternative A	Alternative B	No Action Alternative
Land Use	Short-term: Minor off-site impacts because of demolition activities associated with removal of East Arroyo Lot. Minor on-site impacts because of demolition and construction.	Short-term: Minor off-site impacts because of demolition activities associated with removal of East Arroyo Lot. Moderate adverse impacts to on-site land use are anticipated because this alternative would require relocation of the mall open space.	Short-term: No impact.
	Long-term: Minor beneficial impacts to on-site land use would result from a more cohesive setting at NASA JPL. Also, removal of the East Arroyo Parking Lot would result in a long-term beneficial impact to land use once the City constructs its proposed percolation ponds (spreading basins) to increase groundwater recharge and provide water during drought years.	Long-Term: While there may be minor beneficial impacts to on-site land use resulting from a more cohesive setting at NASA JPL, moderate adverse impacts to on-site land use are also anticipated because implementation of Alternative B would require additional facility modifications to re-locate the outdoor gathering facilities. Similar to Alternative A, removal of the East Arroyo Parking Lot would result in a long-term beneficial impact to land use once the City constructs its proposed percolation ponds (spreading basins).	Long-Term: No impact.
Traffic and Transportation	Short-Term: Minor adverse impacts from construction on traffic, street use, and parking availability on-site and in surrounding areas. Minor adverse impacts would also include demolition and asphalt removal activities associated with vacating the existing East Arroyo Parking Lot, where activities would include constructing a temporary haul road for heavy equipment to haul removed material to an approved offsite landfill.	Short-Term: Moderate adverse impacts on traffic generation, traffic volume, street use, and parking availability both on-site and in surrounding areas. On-site traffic would be affected as the Main Gate would need to be shut down until demolition and construction is complete. A portion of the West Lot would need to be utilized for construction lay down and storage purposes. This would affect on-site pedestrian and vehicle access along the western portion of the facility. All roads around the construction site have a potential for being adversely impacted due to large-scale utility relocations required for construction. This would impact on-site and	Short- and Long-Term: NASA JPL would lose the East Arroyo Parking Lot and its 1,093 parking spaces. The resulting facility-wide parking issues would not be addressed and moderate short to long-term adverse impacts are anticipated. The on-site workforce would seek to park off-site on local streets in the surrounding communities, and walk into the NASA JPL facility. Specifically, the on-site workforce would park to the northwest of NASA JPL along Starlight Crest Drive, to the west along Viro Road, and southeast of the facility along Arroyo Road and El Nido Road. Over the

Resource Issue	Alternative A	Alternative B	No Action Alternative
		off-site traffic patterns leading up to the NASA JPL facility by forcing some of the traffic to enter through the South and East gates. Some of the on-site workforce currently parking in the West Lot may have to temporarily park in the East Arroyo Lot, temporarily changing off-site traffic patterns. Traffic congestion during peak traffic hours at the Main Gate would produce a short-term adverse impact, particularly as new subcontractors are required to undergo security check-in at the facility south gate security checkpoint. This would cause a short-term delay for the on-site workforce, other contractors, and visitors entering NASA JPL. Minor adverse impacts would also include demolition and asphalt removal activities associated with vacating the existing East Arroyo Parking Lot, where activities would include constructing a temporary haul road for heavy equipment to haul removed material to an approved offsite landfill.	long term, this impact may lessen as the on-site workforce would seek to commute to the NASA JPL facility in multi-passenger vehicles and/or use public transportation.
	Long-Term: Beneficial impacts on parking as expiration of East Arroyo Parking Lot lease with City of Pasadena would be addressed.	Long-Term: While there would be beneficial impacts on parking since the expiration of East Arroyo Parking Lot lease with City of Pasadena would be addressed, there would also be moderate adverse impacts to on-site traffic since all NASA JPL traffic (West Lot as well as those vehicles previously commuting to the East Arroyo Parking Lot) would have to enter the lab by driving up Oak Grove Avenue, except for those vehicles allowed to park within the interior of the Lab.	

Resource Issue	Alternative A	Alternative B	No Action Alternative
		Further, the number of vehicle trips vehicle miles traveled would increase and the on-site workforce accessing NASA JPL from the East Gate would contribute to on site traffic congestion when they travel to and from the proposed parking structure.	
Utilities and Services	Short-Term: Minor adverse impacts from construction due to re-location of overhead electrical transmission lines and temporary disruptions/outages in electrical power, natural gas supplies, and water, sanitary, and storm sewer lines. Minor adverse impacts would also include temporary disruptions/outages in electrical power, natural gas supplies, and water, sanitary, and storm sewer lines associated with vacating the existing East Arroyo Parking Lot.	Short-Term: Adverse impacts from construction somewhat greater in intensity than under Alternative A due to temporary disruptions/outages in electrical power, natural gas supplies, and water, sanitary, and storm sewer lines; and. re-location of various underground utilities. Minor adverse impacts would also include temporary disruptions/outages in electrical power, natural gas supplies, and water, sanitary, and storm sewer lines associated with vacating the existing East Arroyo Parking Lot.	Short- and Long-Term: Negligible impacts
	Long-Term: Negligible impacts	Long-Term: Negligible impacts	
Air Quality	Short-Term: Minor and intermittent impacts at regional/local scale from particulate matter and engine exhaust emissions generated during construction and demolition activities. Vacating the existing East Arroyo Parking Lot may also result in short-term minor impacts due to the associated demolition and asphalt removal activities. Activities would include constructing a temporary haul road for heavy equipment to haul removed material to an approved offsite landfill. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of	Short-Term: Similar to Alternative A.	Short- and Long-Term: NASA JPL would lose the East Arroyo Parking Lot and its 1,093 parking spaces. The resulting facility-wide parking issues would not be addressed and moderate short and long-term adverse impacts to air quality are anticipated from particulate matter and engine exhaust emissions. The on-site workforce would seek to park off-site on local streets in the surrounding communities, and walk into the NASA JPL facility. Specifically, the on-site workforce would park to the northwest of NASA JPL along Starlight Crest Drive, to the west along Viro Road, and southeast of the facility along

Resource Issue	Alternative A	Alternative B	No Action Alternative
	those activities.		Arroyo Road and El Nido Road. Over the long term, this impact may lessen as the on-site workforce would seek to commute to the NASA JPL facility in multi-passenger vehicles and/or use public transportation.
	Long-Term: Negligible adverse impacts on operational air emissions.	Long-Term: Negligible adverse impacts on operational air emissions.	
Noise	Short-Term: Minor on-site impacts on ambient noise from construction activities. Impacts would be minor because these activities would be carried out during normal working hours.	Short-Term: Similar to Alternative A.	Short- and Long-Term: NASA JPL would lose the East Arroyo Parking Lot and its 1,093 parking spaces. The resulting facility-wide parking issues would not be addressed and moderate short to long-term adverse impacts on noise are anticipated. The on-site workforce would seek to park off-site on local streets in the surrounding communities, and walk into the NASA JPL facility. Specifically, the on-site workforce would park to the northwest of NASA JPL along Starlight Crest Drive, to the west along Viro Road, and southeast of the facility along Arroyo Road and El Nido Road. Over the long term, this noise impact may lessen as the on-site workforce would seek to commute to the NASA JPL facility in multi-passenger vehicles and/or use public transportation.
	Long-Term: Negligible adverse impacts. There would be no increase in parking capacity, therefore there would be no incremental increase in noise.	Long-Term: Similar to Alternative A.	

Resource Issue	Alternative A	Alternative B	No Action Alternative
Water Resources	Short-Term: Minor adverse impact on surface water and groundwater and negligible effect on floodplains during construction. Erosion and sedimentation controls would be implemented as BMPs. Vacating the existing East Arroyo Parking Lot may also result in minor impacts with disruptions to storm water collection, flow, and transportation due to the associated demolition and asphalt removal activities.	Short-Term: Similar to Alternative A except there would be no floodplain impacts.	Short-Term: No impact.
	Long-Term: Negligible adverse impacts. There would be no change in the total on-site impervious surface (ground surface that would not allow water to soak in), as the proposed parking structure would replace the current paved parking lot on the eastern perimeter of NASA JPL. There would be a net decrease in impervious surface resulting from NASA JPL vacating the existing East Arroyo Parking Lot and removing the asphalt surface and base material.	Long-Term: Negligible impacts. There would be a small increase in the total on-site impervious surface (ground surface that would not allow water to soak in), as the proposed parking structure would replace landscape features along with the existing structures, sidewalks, and pavement on the western perimeter of NASA JPL. Similar to Alternative A, there would be a net decrease in impervious surface resulting from NASA JPL vacating the existing East Arroyo Parking Lot and removing the asphalt surface and base material.	Long-Term: No impact.
Biological Resources	Short- and Long-Term: Negligible adverse impacts. Vacating the existing East Arroyo Parking Lot may result in negligible noise impacts to wildlife due to the associated demolition and asphalt removal activities.	Short- and Long-Term: Similar to Alternative A.	Short- and Long-Term: No impact
Hazardous Materials	Short-Term: Negligible impact. Hazardous materials used during construction not expected to increase. Vacating the existing East Arroyo Parking Lot may result in negligible to minor impacts due to the associated demolition and asphalt removal	Short-Term: Similar to Alternative A.	Short-Term: No impact.

Resource Issue	Alternative A	Alternative B	No Action Alternative
	activities. Activities would include constructing a temporary haul road for heavy equipment to haul removed material to an approved offsite landfill.		
	Long-Term: Negligible adverse impact, as hazardous materials used would not increase. Procurement of products containing hazardous materials would be comparable to those currently used.	Long-Term: Similar to Alternative A.	Long-Term: No impact.
Hazardous Waste	Short-Term: Negligible adverse impacts are anticipated from facility demolition.	Short-Term: Minor adverse impacts from hazardous and chemical wastes generated from facility demolition.	Short-Term: No impact.
	Long-Term: Negligible adverse impact, as hazardous wastes would be similar to the baseline condition waste streams.	Long-Term: Similar to Alternative A.	Long-Term: No impact.
Visual Resources	Short- and Long-Term: Negligible adverse impacts.	Short- and Long-Term: Negligible adverse impacts.	Short- and Long-Term: No adverse impacts.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

This section describes the current environmental and socioeconomic conditions at NASA JPL most likely to be affected by the proposed action, as well as the potential impacts resulting from implementation of Alternative A, Alternative B, or No Action Alternative. The section also includes an analysis of the potential cumulative impacts at NASA JPL, unavoidable adverse impacts, the relationship between short-term use of the human environment and the maintenance and enhancement of long-term productivity, and irreversible and irretrievable commitments of resources. Proposed mitigation measures are included for each environmental issue, as appropriate, to reduce potential impacts.

Much of the information used to develop this section has been obtained from the Master Plan Updates PEA (NASA 2011) and will be incorporated by reference, in compliance with CEQ regulations. Summaries of the information from the PEA will be provided where these data are incorporated by reference. Potential impacts were identified and assessed for each environmental issue by assigning standards of significance for comparison against the No Action Alternative. A conclusion statement is included at the end of each environment issue section stating whether any identified resource impacts were determined to be significant or less than significant.

Impacts are described separately for construction and operational activities, may be direct or indirect, and are described in terms or type, context, duration, and intensity, which is consistent with the CEQ regulations. Impacts are defined in general terms and are qualified as adverse or beneficial, and as short-term or long-term. For the purposes of this EA, short-term impacts are generally considered those impacts occurring during construction activities. For example, air quality impacts from fugitive dust associated with construction would be considered short-term as they would only last for the duration of the construction activities. Long-term impacts are generally considered those impacts that would result in permanent effects. For example, the loss of vegetation, or the increase in traffic associated with the new parking structure, would be considered long-term. The thresholds of change for the intensity of impacts are defined as follows:

- *Negligible*, the impact is localized and not measureable, or at the lowest level of detection;
- *Minor*, the impact is localized and slight, but detectable;
- *Moderate*, the impact is readily apparent and appreciable; or
- *Major*, the impact is severely adverse and highly noticeable.

Analysis of potential environmental effects associated with an EA typically addresses numerous resource areas that may be affected by implementation of proposed actions or a no action alternative. In the case of NASA JPL implementing Alternative A, Alternative B, or the No Action Alternative, certain environmental resource areas that typically receive attention have been initially examined and determined not to warrant detailed analysis as per CEQ guidance (40 CFR 1501.7[3]). These areas include socioeconomics, environmental justice, geology and soils, and cultural resources. Each of these subject areas are discussed briefly below.

Socioeconomics

Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly population and economic activity. Socioeconomics at and surrounding NASA JPL were described in Sections 3.1.2 and 4.1.2 of the Master Plan Updates PEA and are incorporated herein by

reference. **Table 3-1** presents the racial and ethnic characteristics for the study area, including Los Angeles County, Altadena, Pasadena, and La Cañada-Flintridge.

Table 3-1. Social Characteristics of NASA JPL Study Area and County – Race & Ethnicity (2000)

Area	Total Population	Percentage of Population by Race & Ethnicity						
		Non-Latino White Alone	Black or African American Alone	American Indian or Alaska Native Alone	Asian Alone	Native Hawaiian or Other Pacific Islander Alone	Two or More Races	Hispanic or Latino (regardless of race)
Altadena (Census Tracts 4603.01, 4603.02, and 4610)	42,610	47.3%	31.4%	0.6%	4.2%	0.1%	6.1%	20.4%
Pasadena (Census Tract 4604)	133,936	53.4%	14.4%	0.7%	10.0%	0.1%	5.4%	33.4%
La Cañada Flintridge (Census Tracts 4605.01, 4605.02, and 4607)	20,318	74.5%	0.4%	0.2%	20.6%	0.0%	3.3%	4.8%
Los Angeles County	9,519,331	48.7%	9.8%	0.8%	11.9%	0.3%	4.9%	44.6%

Source: U.S. Census Bureau, Race and Ethnicity 2000 data
Note: Data may not add up to 100 percent because persons may report more than one racial category

Alternatives A or B would not alter the number of personnel assigned to NASA JPL, or change local population densities or distribution, or result in any increased development. Therefore, there would be no changes in area population or associated demands for housing and support services. It is anticipated that temporary employment of up to 50 personnel during construction of either Alternatives A or B would result in a short-term beneficial impact to the surrounding communities.

Also included with socioeconomics are concerns pursuant to Executive Order (EO) 13045, “Protection of Children from Environmental Health Risks and Safety Risks.” This EO directs federal agencies to identify and assess environmental health and safety risks that might disproportionately affect children. Alternatives A or B would not pose any adverse or disproportionate environmental health and safety risks to children living on or in the vicinity of NASA JPL. The proposed project area does not include residential areas, and the likelihood of the presence of children at the site of Alternative A, Alternative B, or the No Action Alternative, is considered minimal, which further limits the potential for any effects. Thus, implementing Alternative A, Alternative B, or the No Action Alternative would have little or no effect on socioeconomic issues at NASA JPL or in the surrounding area; therefore, any potential impacts were determined to be less than significant.

Environmental Justice

EO 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires that federal agencies address the effects of policies on minorities and low-income populations and communities, and to ensure that there would be no disproportionately high and adverse human health or environmental effects to minority or low-income populations or communities in the area. Environmental Justice at and surrounding NASA JPL were described in Sections 3.1.3 and 4.1.3 of the Master Plan Updates PEA and are incorporated herein by reference. A “minority” is defined as a person

who is Black, Hispanic (regardless of race), Asian American, American Indian, and/or Alaskan Native. "Low-income" is defined as a household income at or below the U.S. Census Bureau Poverty Threshold (Federal Highway Administration [FHWA], 1998).

No environmental justice populations were identified that would be impacted by Alternative A, Alternative B, or the No Action Alternative. Minority populations were identified in four census tracts in the surrounding area of Altadena, Pasadena, and La Cañada Flintridge (NASA 2011). Census Tracts 4603.01, 4603.02, and 4610 in Altadena; and 4604 in Pasadena would represent areas of potential Environmental Justice concerns. However, demolition and construction activities associated with the Proposed Action would be localized to the construction zone, and within the secured NASA JPL perimeter. Thus, construction activities would not pose a disproportionate effect on identified minority populations in the local community. While low income individuals do reside within the surrounding community, the percentages in the potentially affected census tracts are well below the 50 percent required to be considered a "low-income population" as defined by U.S. Department of Housing and Urban Development (HUD) guidelines.

Therefore, there would be no disproportionately high and adverse human health or environmental effects to minority or low-income populations or communities in the area. Thus, implementing Alternative A, Alternative B, or the No Action Alternative would have little or no effect on environmental justice issues at NASA JPL or in the surrounding area; therefore, any potential impacts were determined to be less than significant.

Geology and Soils

Geology and soils at and surrounding NASA JPL were described in Sections 3.1.8 and 4.1.8 of the Master Plan Updates PEA and are incorporated herein by reference. Please refer to that document for a description of the regulatory framework that relate to geology and soils, and must be considered by JPL during the decision making process for projects that involve earth moving or soil disturbance, such as grading, excavation, backfilling, or the modification of existing structures or construction of new structures. Land resources are described in terms of topography, geology, and seismology.

The Arroyo Seco, a drainage course emanating from the San Gabriel Mountains, has incised through the alluvium on the southeast side of NASA JPL. The near surface soils reflect the underlying parent material, are granular, and include a fine to coarse sandy loam, underlain by sands and silty to clayey sands with gravel and cobbles (Johnson Fain, 2003). A significant portion of the Site was eroded and washed out during flooding in 1969, and was subsequently repaired by placement of up to 5.8 m (19 ft) of fill (NASA JPL 2011b). The on-site soils have moderate to high foundation-bearing capacity and low to moderate expansion potential.

Construction or demolition activities under Alternatives A or B are not expected to have an adverse effect on the project site's pre-existing seismic conditions. The site is not within an area identified as having a potential for seismic slope instability nor is it included within a landslide zone. The site is not located within a designated Alquist-Priolo Earthquake Fault Zone for fault surface rupture hazard. The closest potentially active fault to the project site is the JPL Bridge segment of the Sierra Madre Fault located approximately 244 m (800 ft) northwest of the site. The surface traces of any active or potentially active faults are not known to pass directly through or project towards the site.

Therefore, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed parking structure is not anticipated (NASA JPL 2011c).

The proposed parking structure in either location is unlikely to trigger local seismic events, but could be impacted by such events. The State of California (Uniform) Building Code sets standards for investigation and mitigation of facility conditions related to fault movement, liquefaction, landslides, differential compactions/seismic settlement, ground rupture, ground shaking, tsunami, seiche, and seismically induced flooding. Mitigation of geological (including earthquake) and soil (geotechnical) issues must be undertaken in compliance with the California Building Code.

For facility seismic compliance, NASA JPL has established stringent structural criteria and "setback zones" from the main fault trace (Boyle, 1988). Appropriate engineering techniques would be incorporated into site design to ensure that risks from earthquakes, liquefaction, etc., are minimized. With implementation of these standard measures, there should be no adverse impacts as a result of the proposed project. Implementing Alternative A, Alternative B, or the No Action Alternative would not have an adverse effect on either NASA JPL's or off-site geology and seismology; therefore, any potential impacts were determined to be less than significant.

Cultural Resources

Cultural Resources at and surrounding NASA JPL were described in Sections 3.1.12 and 4.1.12 of the Master Plan Updates PEA and are incorporated herein by reference. Please refer to that document for a description of the regulatory framework that relate to cultural resources.

No known or recorded archaeological resources are located within the boundaries of NASA JPL (McKenna et al., 1993). A Cultural Resources Survey of alternative locations for a proposed parking structure at NASA JPL near the Arroyo Seco was completed in 1993 (McKenna et al., 1993) that characterized the archaeological and historical background of the site. Based on the survey, the proposed site was considered to be clear of any known cultural resources, but the study emphasized that there is potential for buried deposits indicative of either prehistoric or historic activities within NASA JPL. NASA JPL would follow the Protocol for the Inadvertent Discovery of Cultural Artifacts (JPL Rule Doc ID 72132) should an inadvertent discovery of a cultural artifact occur at NASA JPL.

NASA JPL initiated consultation through the Section 106 process with the California State Historic Preservation Office as part of the NASA JPL Facility Master Plan Updates PEA. As a result of this consultation, a programmatic agreement (PA) is being developed that identifies any mitigation measures to be implemented as well as preservation design guidelines for the defined character areas in NASA JPL. Once the PA has been finalized and approved, NASA JPL will implement all stipulated mitigation measures and preservation design guidelines as part of the proposed project. Based on the 2010 Historic Survey of the NASA JPL site, no known structures identified to be eligible for listing in the National Register of Historic Places would be affected by implementation of either Alternative A or B. Implementing Alternative A, Alternative B, or the No Action Alternative would not have an adverse effect on NASA JPL's cultural resources; therefore, any potential impacts were determined to be less than significant.

Those resource areas warranting further discussion in this EA because of the potential effect Alternative A, Alternative B, or the No Action Alternative may have on that resource area include land use, traffic

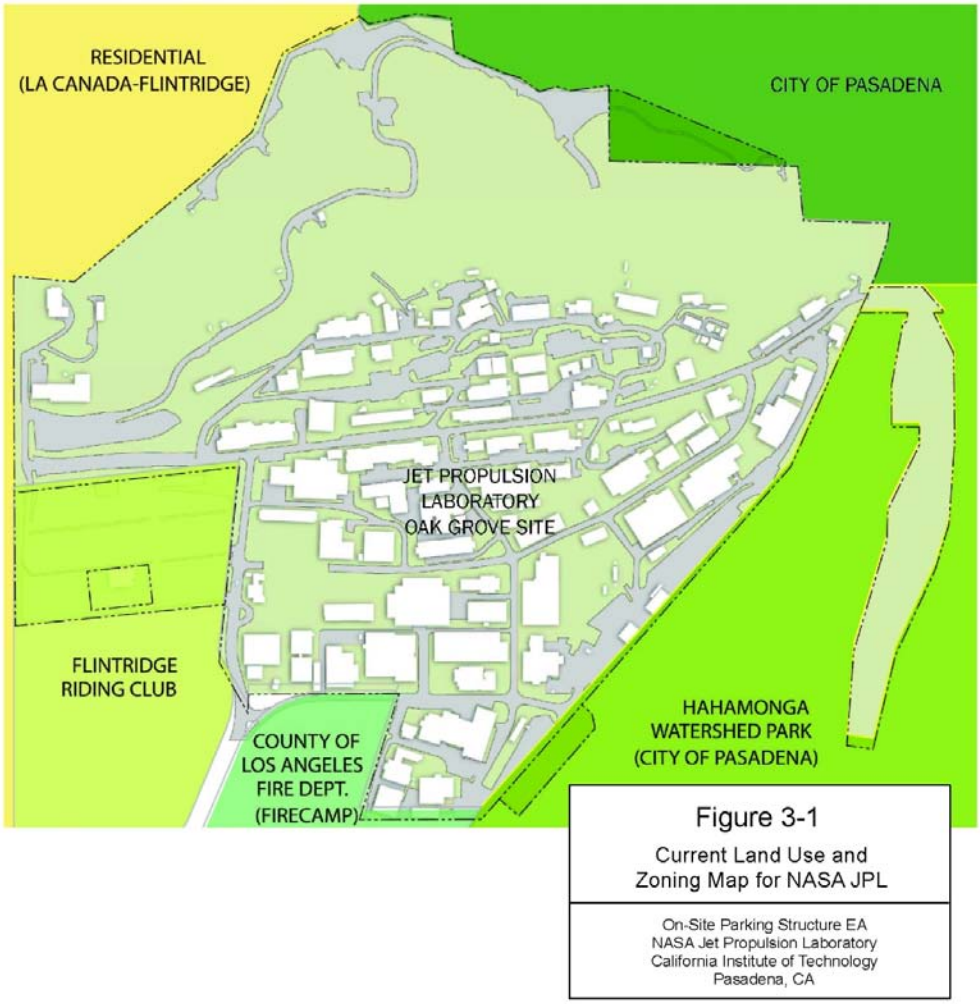
and transportation, utilities and services, noise, air quality, water resources, biological resources, hazardous materials and waste, and visual resources.

3.1 Land Use

3.1.1 Affected Environment

The land use at and surrounding NASA JPL was described in Sections 3.1.1 and 4.1.1 of the Master Plan Updates PEA and is incorporated herein by reference. Briefly, NASA JPL consists of 138 buildings and other minor ancillary structures, totaling over 233,000 gross sq m (2.5 million gross SF) in area. The primary land use near NASA JPL is residential along with undeveloped areas of the ANF to the north. The communities of La Cañada Flintridge, Pasadena, and Altadena to the west, south, and east, respectively, are predominantly low density, single family residences. The ANF is largely undeveloped and improved with hiking/equestrian trails and service roads. No state forests or parks exist in the surrounding area. Future expansion at NASA JPL is limited by local topography and surrounding regional land use. **Figure 3-1** depicts current land use and zoning.

Figure 3-1. Current Land Use and Zoning Map for NASA JPL



Source: JPL Oak Grove Master Plan Update 2011-2032, March 2011

There are no industrial land uses near NASA JPL. The Arroyo Seco adjacent to NASA JPL, which serves as a flood control reservoir, is currently used for spreading basins and recreational facilities. Other specialized land uses adjacent to NASA JPL include equestrian riding clubs and a LACFD facility.

The southernmost 121.4 ha (300 ac) of the Upper Arroyo Seco are operated as the HWP. The lower eastern portion of the HWP area is comprised of a sediment plain located upstream of the Devil's Gate Dam. It also contains Johnson Field, which had been used in the past for softball games, group picnics, and related activities.

The western portion of the HWP area contains HWP (formerly Oak Grove Park). This area is dominated by passive recreation uses, water conservation, and flood control activities. Most of the basin is designated as Open Space in the Land Use Element of the City of Pasadena Comprehensive General Plan. The surrounding communities of Pasadena, La Cañada, and Altadena have ample recreation and cultural facilities for residents and visitors alike. Recreational opportunities are such that a tourist-based economy in the area has continued to increase steadily. No recreation opportunities exist within the project area.

3.1.2 Environmental Impacts

Alternative A, Alternative B, or the No Action Alternative would result in significant land use impacts if any were judged to be in conflict with adopted plans and policies for the facility or surrounding communities; or if it violated zoning ordinances for the facility or surrounding communities. While no significant impacts are anticipated, any potential adverse or beneficial impacts under each alternative, however insignificant, will be discussed in the following sections.

3.1.2.1 Alternative A

No short- or long-term impacts to land use in surrounding areas are anticipated. Once NASA JPL vacates the existing East Arroyo Parking Lot it occupies under lease with the City of Pasadena, NASA JPL would remove all asphalt, concrete, and fencing and return the lot to the City. The City is proposing to construct percolation ponds (spreading basins) to increase groundwater recharge and provide water during drought years (City of Pasadena 2007). This would result in a long-term beneficial impact to land use.

Alternative A would occur in an area on NASA JPL that already contains multiple buildings consisting of various types of architecture. There are industrial type operations at the proposed project site including the existing surface parking lot, the SCE substation, a large cooling tower, and a semi-conductor laboratory. Short-term and minor adverse impacts and long-term beneficial impacts to land use on-site at NASA JPL are anticipated as described below.

Construction Impacts

On-site land uses may be subject to short-term minor impacts due to the demolition of Building 322 and 1714 (temporary modular offices), and the subsequent construction of the parking structure and re-construction of Building 322 (as Building 344). These effects would be localized and occur only when demolition or construction activities actually occur and would continue for the duration of those activities. Occupants of on-site buildings adjacent to areas scheduled for demolition or construction would be subject to temporary or intermittent impacts. Additionally, there would be on-site inconveniences from modified parking and pedestrian patterns, and from increases in background noise.

Vacating the existing East Arroyo Parking Lot may be subject to short-term minor impacts due to the associated demolition and asphalt removal activities. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of those activities. Alternative A would have no long-term impacts to land use or zoning on-site at NASA JPL because it is conducted on federal property and therefore not subject to county and city zoning requirements.

Alternative A is consistent with the present use and zoning for NASA JPL; therefore, any potential impacts were determined to be less than significant.

Operational Impacts

No adverse operational impacts are anticipated. There would be minor internal changes to the use of land within NASA JPL. For instance, existing parking areas would be reclaimed and redeveloped into the proposed parking structure. Minor beneficial impacts to on-site land use would result from a more cohesive facility setting; therefore, any potential impacts were determined to be less than significant.

Removal of the East Arroyo Parking Lot would result in a long-term beneficial impact to land use once the City constructs its proposed percolation ponds (spreading basins) to increase groundwater recharge and provide water during drought years.

3.1.2.2 Alternative B

No short- or long-term adverse impacts to land use in surrounding off-site areas are anticipated. **Figure 2-4** depicts the proposed mall parking structure location within the existing NASA JPL setting and surroundings.

Construction Impacts

Construction of a parking structure at the Mall location was not described in the Master Plan Update (AC Martin 2011). Specifically, the Mall area would be preserved as open space with ornamental landscaping and be connected to a NASA JPL-wide pedestrian circulation network. Constructing a parking structure at the Mall location would require additional land use planning and might require facility modifications associated with establishing alternative outdoor gathering facilities.

Vacating the existing East Arroyo Parking Lot may be subject to short-term minor impacts due to the associated demolition and asphalt removal activities. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of those activities.

Operational Impacts

No adverse operational impacts are anticipated. There would be minor internal changes to the use of land within NASA JPL. Removal of the East Arroyo Parking Lot would result in a long-term beneficial impact to land use once the City constructs its proposed percolation ponds (spreading basins) to increase groundwater recharge and provide water during drought years.

In conclusion, any potential impacts to land use were determined to be less than significant.

3.1.2.3 No Action Alternative

Under the No Action Alternative, there would be no changes to either land use or zoning in areas surrounding NASA JPL, or on-site; therefore, no adverse impacts to land use are anticipated. In conclusion, any potential impacts to land use were determined to be less than significant.

3.2 Traffic and Transportation

3.2.1 Affected Environment

Traffic and transportation at and surrounding NASA JPL were described in Sections 3.1.4 and 4.1.4 of the Master Plan Updates PEA and are incorporated herein by reference. Analysis includes consideration of the existing roadway and circulation system in the NASA JPL area, and whether the Proposed Action would increase the traffic generated on the facility. Transit and parking considerations are also included in the analysis. NASA JPL is served by a transportation system that connects it to regional freeways and a local roadway system.

3.2.1.1 Transportation Network

Regional

The US Interstate 210 Foothill Freeway is a limited access east-west freeway facility, which provides regional access to NASA JPL from the San Fernando Valley to the northwest, and the San Gabriel Valley and Inland Empire to the east. In the vicinity of NASA JPL, the I-210 freeway has four mixed-flow travel lanes in each direction. The Berkshire Avenue/Oak Grove Drive exit provides the most direct access to NASA JPL from the eastbound and westbound traffic routes (AC Martin 2011).

State Route (SR) 134 (Ventura Freeway) is an east-west freeway that connects Pasadena with the San Fernando Valley to the west. The Ventura Freeway is located to the south of NASA JPL. Additional regional access is provided via SR 2 (Glendale Freeway) located west of NASA JPL. In the project vicinity, four mixed-flow travel lanes and one high occupancy vehicle lane are provided in each direction on the Ventura Freeway. An interchange with the Foothill Freeway is located southeast of the Center.

Local

The principal arterial road providing access to the main entrance of NASA JPL is Oak Grove Drive along the western limits of the facility. Oak Grove Drive has a total average weekday traffic count of approximately 9,308 vehicles per day (vpd) near the Main Gate. It is a four-lane road with no parking and limited sidewalks. The primary arterial feeders to Oak Grove Drive are Foothill Boulevard, the Foothill Freeway eastbound and westbound ramps, and Berkshire Place.

Oak Grove Drive provides access to the primary parking facilities used by the on-site workforce, visitors, and service vehicles. Foothill Boulevard is designated as a primary arterial west of Crown Avenue, and a major arterial east of Crown Avenue (AC Martin 2011). There is one westbound lane and two eastbound lanes on Foothill Boulevard near the NASA JPL Main Gate. Berkshire Place is a major arterial with two travel lanes in each direction (AC Martin 2011). There are no parking facilities along Berkshire Place.

Access to the East Gate and the south end of the East Arroyo Parking Lot is provided via Windsor Avenue. Windsor Avenue provides one travel lane in each direction, plus a separate left turning lane at intersections. In 2008, the total average weekday traffic count south of the Arroyo parking lot was

5,963 vpd. The total average weekday traffic count north of the Arroyo Parking Lot at the East Gate was approximately 2,583 vpd (KOA Corporation, 2008). Windsor Avenue is primarily residential in nature in the vicinity of NASA JPL.

3.2.1.2 Bicycle Facilities

A bikeway runs from South Pasadena to HWP and connects to bicycle lanes on Oak Grove Drive. On-street bicycle lanes are provided north of Foothill Boulevard and south of Berkshire Place (AC Martin 2011).

3.2.1.3 Traffic Generation and Circulation

Morning traffic and afternoon congestion is common on Foothill Boulevard between Crown Avenue and Oak Grove Drive. Much of the congestion is a result of two high schools, a middle school, an elementary school, and NASA JPL being in the same vicinity. Traffic congestion occurs at the gates, especially when visitors and deliveries mix with entering personnel (Boyle, 1988), during high security, and during high-profile media events. On-site traffic is limited because of security checkpoints with no public thoroughfare. On-site vehicle circulation is provided by two-lane roads through the central core areas of NASA JPL. On-site traffic volumes are depicted in **Table 3-2**.

Table 3-2. NASA JPL Existing Traffic Volumes

Segment	Peak Traffic Volume		
	Weekday	AM Peak Hour (6-8 AM)	PM Peak Hour (4-6 PM)
East Arroyo Parking Lot	6,137	966	961
Explorer Road (near northern gate)	2,941	445	338
Oak Grove Drive (near main gate)	9,967	1,094	1,083
Forestry Camp Road	3,227	421	353
Ranger Road (south of West Lot)	8,063	932	941
Ranger Road (adjacent to West Lot)	3,455	312	340
Mesa Road (adjacent to telecom facility)	500	130	48

Source: JPL Oak Grove Master Plan Update 2011-2032, 2011

On-site traffic is limited due to limited parking and facility access, and the physical size of the roads. Roads serving the northern portion of the Lab are steep and winding, making transportation of large or sensitive equipment challenging and time sensitive. A variety of delivery and haul trucks serve NASA JPL daily, and circulation is managed to avoid peak traffic and full parking associated with daily Lab operations. For example, liquid nitrogen is delivered daily by a 20-m (65-ft) truck and trailer. There are multiple liquid nitrogen tanks at NASA JPL that require the truck to navigate through the Lab, making between one and seven stops. Delivery is scheduled between 6:00 and 10:00 PM to minimize disruption to on-site traffic circulation (AC Martin 2011).

3.2.1.4 Public Transportation

The following public transit lines serve NASA JPL, and are operated by LACMTA, Pasadena Area Rapid Transit (ARTS) and the City of Glendale (Beeline): Metro 177; Metro 268; Pasadena ARTS Bus Line

51/52; Glendale Beeline 3; JPL-Woodbury Shuttle; and JPL Shuttle. Lines servicing NASA JPL pick up and drop off passengers at the bus stop located at the Oak Grove Drive security checkpoint. The JPL shuttle bus system is a direct interface between regional public transportation, publicly used facilities, and on-site transit. The service transports the on-site workforce between the East Arroyo Parking Lot and employee workstations along a mostly perimeter route. The buses run every 20 minutes from 7:00 AM to 9:00 AM and 3:00 PM to 5:00 PM (JPL 2008). Passenger stops are located in the East Arroyo parking lot and along internal streets.

Buses take 10 to 15 minutes to circulate around the core of NASA JPL. Travel time from the East Arroyo parking lot to bus stops along the route takes approximately 5 to 10 minutes depending on the distance traveled on the bus. The time an employee spends in transit from when they leave their vehicle in the East Arroyo parking lot may be lengthy as buses may be full and pass by waiting passengers and/or a recent departure of a bus. Parking bus service stops at, but does not circulate through, the West parking area. Few stops have shelters and/or benches.

3.2.1.5 Parking

There are 4,453 on- and off-site parking spaces at NASA JPL. Parking is limited due to the high density of buildings in the main development area and lack of adequate planning in early stages of the facility's history. The ability to meet parking needs is one of the most serious problems facing NASA JPL. **Table 3-3** provides current parking numbers at NASA JPL (JPL 2010).

Table 3-3. Current Parking at NASA JPL

Type	Location	No. of Spaces
Owned	Onsite	1,646
Leased from City of Pasadena	Adjacent, East Arroyo	1,093
Leased from City of Pasadena	Adjacent, Lower Arroyo	208
Leased from Flintridge Riding Club	Adjacent	1,041
Leased Offsite	3 miles – Woodbury (parking for leased building)	451
TOTAL Parking Spaces		**4,453**

Source: NASA JPL Parking Study and Plan, October 2010

On-Site Parking

Approximately 1,646 parking spaces are currently provided within the NASA JPL facility in surface lots, lots adjacent to buildings, underground parking below buildings, and parking on streets inside facility boundaries (**Figure 3-2**). Parking facilities are interspersed throughout the facility, and are served by the NASA JPL shuttles. On-site priority parking is provided for car and van pools. Carpools with three or more persons may park in "green" hang tag locations.

Two person carpools may park in the cross-hatched "unassigned parking" areas, while vanpools are given individually reserved parking spaces. Approximately 875 on-site parking spaces are priority reserved spaces. Preferential parking is also provided for electric, compressed natural gas, and hybrid vehicles.

Leased Parking

The following three surface parking lots are leased for NASA JPL use, totaling 2,342 leased spaces (These lots are depicted in **Figure 3-2**):

- **East Arroyo Lot –** 1,093 parking spaces are contained in the East Arroyo Lot. NASA JPL's lease of the lot extends through 2013 and the City of Pasadena has informed NASA JPL that it will not be renewing the lease, as the City intends to repurpose that area for the expansion of their existing groundwater spreading basins as outlined in the HWP master plan (City of Pasadena 2007). Therefore, this lot will no longer be available for NASA JPL use and the Proposed Action seeks to replace this reduction of parking capacity.
- **West Lot –** This lot contains 1,041 surface parking spaces, which is currently leased from the Flintridge Riding Club. Because this parking facility is leased, parking supply may not always be available, which would jeopardize NASA JPL's ability to provide sufficient parking in the future.
- **Lower Arroyo Lot –** The Lower Arroyo lot, accessed from Forestry Camp Road, leased from the City of Pasadena, comprises 208 surface parking spaces.

Based on the expiration of the East Arroyo Parking Lot, leased parking may not always be available. Moreover, with NASA JPL's long-term plans to relocate personnel and operational functions from the Woodbury site to NASA JPL, the total long-term future parking reduction would be over 2,500 spaces which would need to be accounted for somewhere within the confines of NASA JPL. NASA JPL would evaluate on- and off-site parking options. Some of the existing and potential parking areas are currently covered by temporary buildings, temporary storage containers, and miscellaneous materials and equipment, which may be non-essential to facility operations. Thus, the opportunity exists to capture additional parking space on the facility with minimal expense or investment, but not enough to meet anticipated future needs.

3.2.2 Environmental Impacts

This section describes the potential environmental consequences associated with traffic and transportation, as a result of implementing Alternative A, Alternative B, or the No Action Alternative at NASA JPL. Any of the three actions would result in a significant transportation impact if it resulted in a substantial increase in traffic generation, a substantial increase in the use of the connecting street systems or mass transit, or if on-site parking demand would not be met by projected supply.

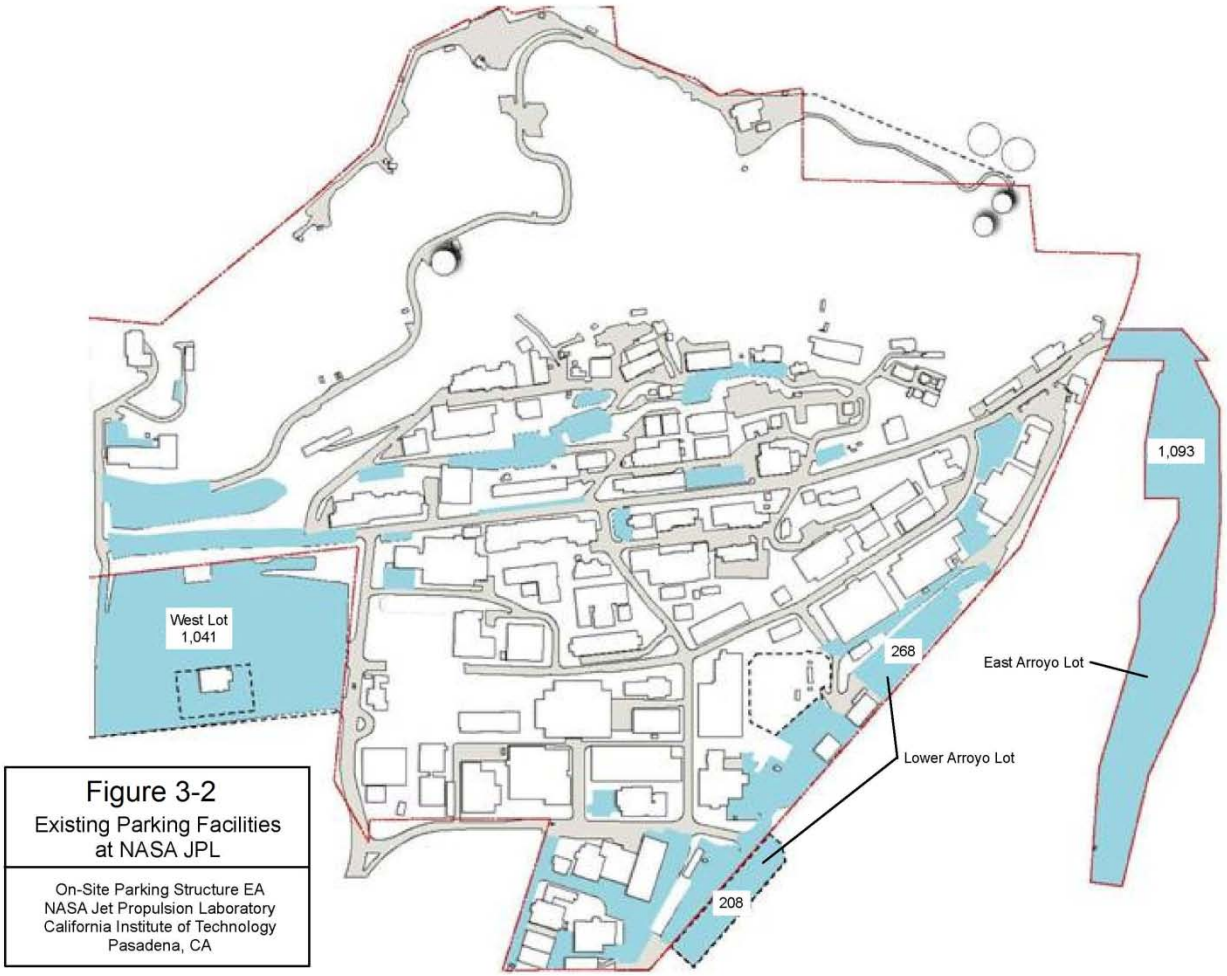
It is NASA JPL's intent to acquire a lease modification or an easement from the City of Pasadena to enable access to an existing access road from Windsor Avenue to the JPL Bridge. This instrument would be acquired prior to construction of the proposed parking structure.

While no significant impacts are anticipated, any potential adverse or beneficial impacts under each alternative, however insignificant, will be discussed in the following sections.

3.2.2.1 Alternative A

Short- and long-term minor to moderate adverse impacts to traffic and transportation are anticipated as a result of Alternative A.

Figure 3-2. Existing Parking Facilities at NASA JPL



Source: JPL Oak Grove Master Plan Update 2011-2032, March 2011

Construction Impacts

Demolition and construction-related activities associated with implementation of Alternative A are anticipated to produce short-term and minor adverse impacts on traffic generation, traffic volume, street use, and parking availability both on-site and in surrounding areas. Impacts to mass transit are anticipated to be negligible.

The total estimated personnel working on-site on demolition and construction activities would be approximately 50 workers at any one time. Alternative A would affect traffic generation and street system usage on-site and in surrounding areas over the short- and long-term. Increases in traffic volumes and adverse impacts to traffic flow on-site are likely due to additional traffic entering, leaving, and cycling through NASA JPL as a result of contractors performing construction-related activities. In particular, there would be an overall increase in the volume of truck and (heavy) equipment traffic as a result of removal of debris during demolition, and delivery of building materials during construction. Truck traffic for equipment would be episodic and dispersed over time.

A specific short-term and minor adverse impact would be the potential for traffic congestion during peak traffic hours at the Main Gate, particularly as new subcontractors are required to undergo security at the facility south gate security checkpoint. This would cause a short-term delay for the on-site workforce, other contractors, and visitors entering the NASA JPL facility. In consideration of the existing traffic volumes presented in **Table 3-1**, the addition of approximately 50 contractor vehicles per day would represent a negligible net increase in the traffic count. The worst case-scenario for increased traffic volumes would be approximately 5 percent if all contractors were to arrive during morning peak hour volumes. This would be only a minor increase in net average volumes.

Vacating the existing East Arroyo Parking Lot may result in short-term minor impacts due to the associated demolition and asphalt removal activities. Activities would include constructing a temporary haul road for heavy equipment to haul removed material to an approved offsite landfill. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of those activities.

Operational Impacts

Long-term beneficial effects on parking are expected under Alternative A with implementation of a new on-site parking structure, although there would be no change in parking capacity or increase in overall traffic volume. Thus, operation of the new structure would result in negligible short- and long-term impacts. In anticipation of an on-site parking structure, NASA JPL is currently developing a facility vehicular access system that would strive to maintain the off-site traffic balance in the surface streets that serve the NASA JPL facility. The planned facility vehicular access system would allow the on-site workforce to access the NASA JPL facility through their designated security gate at all times.

The greatest demand for the movement of people at NASA JPL is the daily travel between parking areas located on the periphery of the facility to employee work stations located in the core of the facility. Most of the on-site workforce parking in the existing East Arroyo parking area use a bus service to get to their work stations, given the distance and steep grades that exist between the parking area and buildings. Implementation of Alternative A would eliminate the need for continuous bus service.

In conclusion, any potential impacts to traffic and transportation were determined to be less than significant.

Mitigation Measures

The following is a summary of proposed mitigation measures under Alternative A:

- On-site bus services may be rescheduled and/or re-routed to avoid times or routes that would otherwise create localized impacts due to construction activities.
- Contractors will be provided specific construction routes and schedules designed to minimize conflicts with routine vehicular traffic and avoid normal peak-traffic hours of on-site personnel. Truck traffic for construction materials coming on site and demolition debris transported off site could at times approach ten trucks per hour. All loads will have either bills of lading or manifests prior to entering/leaving the facility. Traffic will be redirected when construction activities occur in areas currently dedicated to vehicular travel and parking. All truck traffic will be scheduled and routed to minimize impacts on local traffic.

- Contractors will operate under limited parking availability, and will restrict the on-site workforce from bringing unnecessary commuter vehicles on-site. Additionally, contractor shift start-times will be adjusted to preclude readily apparent increases in traffic volumes during peak morning and evening hours for the remainder of the on-site workforce and contractors. Construction contractors will use shifts starting 30 minutes prior to peak employee traffic in efforts to start and finish daily construction activities earlier.
- All contractors performing work lasting two weeks or longer in duration will receive "Rapid-gate" badges, precluding them from having to physically check in at the gate every time they enter or leave the facility. While construction contractors will be encouraged to carpool to the facility, some contractor crews will be required to operate remote security trailers in off-site locations and then bus their employees in and out daily.

The NASA JPL Security Department is also in the process of developing an on-site access system for the on-site workforce after construction of the parking structure. This new on-site access system would serve to minimize off-site traffic impacts by maintaining gate access currently used by the on-site workforce to access the facility. The on-site workforce would use the same freeway off-ramps and roads so neither roadway facility is overburdened after the proposed parking structure is built. Additional and more detailed mitigation for transportation impacts will be identified as the conceptual design is initiated.

3.2.2.2 Alternative B

Similar to Alternative A, short- and long-term minor to moderate adverse impacts to traffic and transportation are anticipated as a result of Alternative B.

Construction Impacts

Demolition and construction-related activities associated with the implementation of Alternative B are anticipated to produce short-term moderate adverse impacts on traffic generation, traffic volume, street use, and parking availability both on-site and in surrounding areas. On-site traffic would be affected as the Main Gate would need to be shut down until demolition and construction is complete. Since occupied buildings would be demolished, the on-site workforce currently housed in those buildings would need to be relocated into new or existing facilities for demolition activities to take place. Construction would commence at the completion of demolition activities. This phased process (identification of existing structures or construction of new facilities to relocate employees, demolition of occupied structures, and preparation for construction) would present a much longer time frame to implement the parking structure at this site as compared to Alternative A.

Moreover, a portion of the West Lot would need to be utilized for construction lay down and storage purposes. This would require temporary closure of the main gate until completion of construction so construction and delivery vehicles would be able to access the construction site. This would also affect on-site pedestrian and vehicle access along the western portion of the facility. All roads around the construction site have a potential for being adversely impacted due to large-scale utility relocations required for construction of the Alternative B parking structure. This would impact on-site and off-site traffic patterns leading up to the NASA JPL facility by forcing some of the traffic to enter through the South and East gates. Some of the on-site workforce currently parking in the West Lot may have to temporarily park in the East Arroyo Lot, temporarily changing off-site traffic patterns.

Traffic congestion during peak traffic hours at the Main Gate would produce a short-term adverse impact, particularly as new subcontractors are required to undergo security check-in at the facility south gate security checkpoint. This would cause a short-term delay for the on-site workforce, other contractors, and visitors entering the NASA JPL facility. Impacts to mass transit are anticipated to be negligible.

Vacating the existing East Arroyo Parking Lot may result in short-term minor impacts due to the associated demolition and asphalt removal activities. Activities would include constructing a temporary haul road for heavy equipment to haul removed material to an approved offsite landfill. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of those activities.

Operational Impacts

Similar to Alternative A, long-term beneficial effects on parking are expected under Alternative B with implementation of a new on-site parking structure, although there would be no increase in parking capacity.

In anticipation of an on-site parking structure, NASA JPL is currently developing a facility vehicular access system that would strive to maintain the off-site traffic balance in the surface streets that serve the NASA JPL facility. The planned facility vehicular access system would allow the on-site workforce to access the NASA JPL facility through their designated security gate at all times.

Most of the on-site work force parking in the existing leased East Arroyo Parking Lot uses the JPL Shuttle service to get to their work stations, given the distance that exists between the parking area and buildings. Similar to Alternative A, the proximity of the proposed Alternative B structure to the NASA JPL facility core would make it easier for the on-site workforce to walk from the structure to work locations, reducing dependence on bus services to reach work stations. Employees accessing the NASA JPL facility from the East Gate would contribute to on-site traffic congestion when they travel to and from the proposed Alternative B parking structure site.

In conclusion, traffic congestion during peak traffic hours at the Main Gate would produce a short-term adverse impact. However, any potential impacts to traffic and transportation were determined to be less than significant.

Mitigation Measures

Proposed mitigation measures under Alternative B would be similar to those proposed under Alternative A.

3.2.2.3 No Action Alternative

Under the No Action Alternative, NASA JPL would lose the East Arroyo Parking Lot and its 1,093 parking spaces. The resulting facility-wide parking issues would not be addressed and moderate short to long-term adverse impacts are anticipated. The on-site workforce would seek to park off-site on local streets in the surrounding communities, and walk into the NASA JPL facility. Over the long term, this impact may lessen as the on-site workforce would seek to commute to the NASA JPL facility in multi-passenger vehicles and/or use public transportation. However, the long-term impact would not be eliminated.

3.3 Utilities and Services

3.3.1 Affected Environment

Utilities and services consist of systems and physical structures that enable a population in a specified area to function. Utilities and Services at and surrounding NASA JPL were described in Sections 3.1.5 and 4.1.5 of the Master Plan Updates PEA and are incorporated herein by reference. Infrastructure is human-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as "urban" or developed. The current utility infrastructure at NASA JPL includes electrical power, natural gas, fuel oil, water, sanitary sewer, nitrogen and compressed air, telecommunications, and storm sewers.

The utility systems at NASA JPL have been installed incrementally throughout the development of the facility. The current utility infrastructure includes elements spanning its entire history. Some original pipes and equipment date back to the World War II era. The majority of the newer utility systems are buried below grade in a relatively protected environment and their condition is not expected to have changed since construction. NASA JPL has evaluated Federal energy reduction goals and has programs to address these goals. NASA JPL has shown good progress towards these energy reduction goals.

3.3.2 Environmental Impacts

This section describes the potential environmental consequences associated with utilities and services, as a result of implementing Alternative A, Alternative B, or the No Action Alternative at NASA JPL. Any of the three actions would result in an adverse impact to utilities or services if the project required more utilities and services than the existing capacity could provide, or required services in conflict with adopted plans and policies for the area. While no significant impacts are anticipated, any potential adverse or beneficial impacts under each alternative, however insignificant, will be discussed in the following sections.

The availability of utilities and services and their capacity to support growth are regarded as essential to economic growth of an area. Issues and concerns regarding utilities are related to creating stress on infrastructure systems, such that the existing infrastructure must be updated or changed. Assessing impacts to utilities and services entails a determination of infrastructure that would be used as a result of either Alternative A or B.

3.3.2.1 Alternative A

Short-term minor adverse impacts to utilities and services are anticipated as a result of Alternative A. No long-term adverse impacts are expected. There are no activities identified that would cause an adverse impact on existing infrastructure outside NASA JPL property.

Construction Impacts

While no on-site upgrades are expected to be needed for electrical power, natural gas, potable water, storm sewers, and sanitary systems, SCE would be rerouting the existing 16Kv overhead electrical power line heading south east from the existing SCE substation. SCE may also relocate 66Kv overhead lines that exclusively serve the NASA JPL facility to relocated poles within the NASA JPL property. Short-term minor impacts are anticipated on site during the actual re-routing activities. Short-term minor impacts are also expected on site due to temporary disruptions/outages in electrical power, natural gas supplies, and

water, sanitary, and storm sewer lines. Vacating the existing East Arroyo Parking Lot may also result in short-term minor impacts to off-site utilities due to the associated demolition and asphalt removal activities.

No relocation of underground utilities is anticipated under Alternative A. The proposed project would not place a demand for public utility services, emergency response and safety management, security management, schools, and parks, nor would it be a major impact to regional or local energy supplies. There would be no adverse impact to the surrounding communities.

The need for emergency services is related to the number of personnel or employees working at the facility. It has been noted that the maximum number of on-site contractor employees is unlikely to exceed 50 workers at any one time. The construction contractor would retain the primary responsibility for ensuring worker safety, and would be responsible for ensuring emergency preparedness procedures are developed and followed by construction personnel. No additional equipment or amendments to existing emergency services agreements are anticipated. The new parking structure planned under Alternative A would not result in an increase in electric power demand.

Operational Impacts

Implementing Alternative A with the construction of a new parking structure would not have any long-term adverse effect on NASA JPL's utilities and services. No activities or change in operations have been identified that would have an adverse effect on community facilities and services. Existing services such as emergency response, fire, police, and other services would continue to be able to serve NASA JPL.

In conclusion, any potential impacts to utilities and infrastructure were determined to be less than significant.

Mitigation Measures

Proposed mitigation measures under Alternative A include: designing landscape plans for minimum water use (e.g., plant native, drought-tolerant species); incorporating energy conservation measures into parking structure design to mitigate impacts related to power systems; and recycling construction-related debris.

3.3.2.2 Alternative B

Similar to Alternative A, short-term adverse impacts to utilities and services are anticipated as a result of Alternative B, although these effects would be somewhat greater as compared to Alternative A. Similar to Alternative A, no long-term adverse impacts are expected. There are no activities identified that would cause an adverse impact on existing infrastructure outside NASA JPL property.

Construction Impacts

Similar to Alternative A, no upgrades are expected to be needed for electrical power, natural gas, potable water, storm sewers, and sanitary systems. Alternative B would require the relocation of existing underground utilities, including:

- 300 LF of 8-in water main;
- 200 LF of 6-in water main;
- 200 LF of 2-in and 3-in electrical service lines;
- 200 LF stretch of 6-in natural gas line;

- 300 LF of the main telecommunications line; and
- 200 LF of an abandoned 10-in vitreous clay sanitary sewer.

Short-term adverse impacts are anticipated during the actual utility re-routing activities, and these effects would be somewhat greater as compared to Alternative A. Short-term minor impacts are also expected due to temporary disruptions/outages in electrical power, natural gas supplies, and water, sanitary, and storm sewer lines. The proposed project would not place a demand for public utility services, emergency response and safety management, security management, schools, and parks, nor would it be a major impact to regional or local energy supplies.

Similar to Alternative A, vacating the existing East Arroyo Parking Lot may result in short-term minor impacts due to the associated demolition and asphalt removal activities. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of those activities.

Operational Impacts

Implementing Alternative B with the construction of a new parking structure would not have any long-term adverse effect on NASA JPL's utilities and services. No activities or change in operations have been identified that would have an adverse effect on community facilities and services. Existing services such as emergency response, fire, police, and other services would continue to be able to serve NASA JPL.

The need for emergency services is related to the number of personnel or employees working at the facility. It has been noted that the maximum number of on-site contractor employees is unlikely to exceed 50 workers at any one time. The contractor would retain the primary responsibility for ensuring worker safety, and would be responsible for ensuring emergency preparedness procedures are developed and followed by contractor personnel. No additional equipment or amendments to existing emergency services agreements are anticipated. Similar to Alternative A, the new parking structure planned under Alternative B would not result in an increase in electric power demand.

In conclusion, any potential impacts to traffic and transportation were determined to be less than significant.

Mitigation Measures

Similar to Alternative A, proposed mitigation measures under Alternative B include: designing landscape plans for minimum water use (e.g., plant native, drought-tolerant species); incorporating energy conservation measures into parking structure design to mitigate impacts related to power systems; and recycling construction-related debris.

3.3.2.3 No Action Alternative

Under the No Action Alternative, there would be no changes to utilities and services in areas surrounding NASA JPL, or on-site; therefore, no adverse impacts to utilities and services are anticipated. In conclusion, any potential impacts to traffic and transportation were determined to be less than significant.

3.4 Air Quality

3.4.1 Affected Environment

Air quality at and surrounding NASA JPL was described in Sections 3.1.6 and 4.1.6 of the Master Plan Updates PEA and is incorporated herein by reference. The following sections describe the local air resources in terms of climate, air quality standards, air quality conditions, and the NASA JPL air pollution sources, controls, and reporting requirements. Air emission sources and the controls employed to minimize emissions, are also discussed.

NASA JPL and the surrounding communities of Pasadena, Altadena, and La Cañada-Flintridge, are located in the eastern portion of the Los Angeles metropolitan area, within the South Coast Air Basin (SOCAB). The SOCAB consists of Orange County, all of Los Angeles County except for the Antelope Valley, the non-desert portion of western San Bernardino County, and the western and Coachella Valley portions of Riverside County.

3.4.1.1 Climate

The SOCAB has a distinctive climate determined by its geographical location. Regional meteorology is dominated by a persistent high-pressure area, which resides over the eastern Pacific Ocean. The SOCAB has a subtropical climate characterized by warm, dry summers and mild winters, infrequent rainfall and moderate humidity, with moderate daytime onshore breezes. This mild climatic condition is occasionally interrupted by periods of hot easterly winds associated with Santa Ana winds, winter storms, and infrequent summer thunderstorms. The Santa Ana winds can be strong near the mouths of canyons oriented along the direction of airflow, such as the Arroyo Seco.

3.4.1.2 Air Quality Standards

The air quality in a given region or area is measured by the concentrations of various pollutants in the atmosphere. The measurements of pollutants in ambient air are expressed in units of parts per million (ppm), milligrams per cubic meter (mg/m^3), or micro grams per cubic meter ($\mu g/m^3$). The air quality in a region is a result of not only the types and quantities in an area, but also surface topography, the size of the topographical ‘air basin’, and the prevailing meteorological conditions.

Air pollutants are regulated at the Federal, state, and local regulatory agency levels with each agency having different levels of responsibility. The U.S. Environmental Protection Agency (USEPA) regulates at the Federal level, while the California Air Resources Board (CARB) regulates at the state level. The CARB has delegated the responsibility for implementation of the Federal Clean Air Act (CAA) and California CAA (CCAA) to local air pollution control agencies. Regional ‘Air Quality Management Districts’ (AQMD) or ‘Air Pollution Control Districts’ (APCD) serve as the regulatory authority for each of the air basins within California. NASA JPL and the City of Pasadena are located within the SOCAB, which is in turn regulated by the South Coast Air Quality Management District (SCAQMD).

The CAA directed the USEPA to establish national standards for air, resulting in the development of the National Ambient Air Quality Standards (NAAQS); the New Source Performance Standards (NSPS); and the National Emission Standards for Hazardous Air Pollutants. NAAQS were established for a set of six main air pollutants, referred to as ‘criteria pollutants’. The six criteria pollutants are ozone (O_3); carbon

monoxide (CO); nitrogen dioxide (NO_2); sulfur dioxide (SO_2); lead (Pb); and respirable particulate matter for PM_{10} and particulates equal to or less than 2.5 microns in diameter ($PM_{2.5}$).

The NAAQS ambient air quality standards were developed with a set of 'primary' thresholds to protect the public health, and a set of 'secondary' air quality levels to protect public welfare such as effects on vegetation, crops, wildlife, economic values, and visibility. The USEPA is the regulatory agency charged with enforcing the NAAQS. The USEPA classifies the air quality in an Air Quality Control Region (AQCR), or in sub-areas of an AQCR, according to whether the concentrations of criteria pollutants in ambient air exceed the primary or secondary NAAQS. Areas within each AQCR are designated as either 'attainment', 'non-attainment', 'maintenance', or 'unclassified' for each of the six criteria pollutants.

California adopted the NAAQS and promulgates additional California Ambient Air Quality Standards (CAAQS), under the CCAA. The CCAA identifies ten criteria pollutants and the California standards are generally more stringent that the Federal primary standards. For many of the pollutants, the CAAQS is identical to the NAAQS; however, in some cases, such as particulate matter, the CAAQS is more stringent than the NAAQS. **Table 3-4** presents the primary and secondary NAAQS and AAQS, and compares the CCAA with the Federal standards.

The CAA Amendments of 1990 require Federal agencies to ensure their proposed actions conform to the applicable State Implementation Plan (SIP). Federal agencies are prohibited from engaging in, supporting, or approving an activity that causes or contributes to any new violation of a NAAQS, which establishes primary and secondary standards for the six criteria pollutants; increases the frequency or severity of existing violations of any NAAQS; or delays the timely attainment of any NAAQS or required interim emission reductions or milestones.

Table 3-4. State of California and Federal Air Quality Standards

Pollutant	Averaging Time	California Standard Concentration	National Standard	
			Primary	Secondary
O3	1-Hour	0.009 ppm (180 µg/m^3)	--	Same as primary standard
	8-Hour[b]	0.070 ppm (137 µg/m^3)	0.08 ppm (157 µg/m^3)	
PM_{10}	24-Hour[a]	50 µg/m^3	150 µg/m^3	Same as primary standard
	Annual Arithmetic mean[d]	20 µg/m^3	--	
$PM_{2.5}$	24-Hour[f]	No separate State standard	35 µg/m^3	Same as primary standard
	Annual Arithmetic mean[e]	12 µg/m^3	15 µg/m^3	
CO	8-Hour[a]	9.0 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)	None
	1-Hour[a]	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
NO_2	Annual Arithmetic mean	0.030 ppm (56 µg/m^3)	0.053 ppm (100 µg/m3)	Same as primary standard
	1-Hour	0.18 ppm (338 µg/m^3)	--	
SO_2	Annual Arithmetic mean	--	0.030 ppm (80 µg/m^3)	--

Pollutant	Averaging Time	California Standard Concentration	National Standard	
			Primary	Secondary
	24-Hour [a]	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)	--
	3-Hour [a]	--	--	0.5 ppm (1300 µg/m^3)
	1-Hour	0.25 ppm (655 µg/m^3)	--	--
	1-Hour	0.25 ppm (655 µg/m^3)	--	--
Pb	30-Day Average	1.5 µg/m^3	--	--
	Calendar year	--	1.5 µg/m^3	Same as primary standard
Visibility reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer visibility of 10 miles or more due to particles when relative humidity is less than 70 percent	No Federal Standards	
Sulfates	24-Hour	25 µg/m^3		
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)		
Vinyl Chloride	24-Hour	0.001 ppm (42 µg/m^3)		

Sources: USEPA, 2007 and CARB, 2007. Notes: ppm= parts per million; µg/m3= micrograms per cubic meter; mg/m3 = milligrams per cubic meter. Parenthetical values are approximate equivalent concentrations.

a. Not to be exceeded more than once per year.
b. To attain this standard, the 3-year average of the fourth highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
c. Standard is attained when expected number of days per year with maximum hourly average concentrations above 0.12 ppm is ≤ 1. EPA revoked the 1-hour ozone standard in all areas except the fourteen 8-hour ozone nonattainment Early Action Compact Areas.
d. To attain standard, the expected PM10 concentration at each monitor within an area must not exceed 50 µg/m3.
e. To attain this standard, the 3-year average of the fourth highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
f. To obtain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 3542 µg/m3.

Referred to as the General Conformity requirement, the intent is to promote long-range planning for the attainment and maintenance of air quality standards by evaluating air quality impacts of Federal actions before they are undertaken. An Applicability Analysis is the initial screening evaluation of the action. The action's emissions must be calculated, and assumptions noted, unless the action is exempt or clearly *de minimis*. If calculated emission levels are above thresholds found in 40 CFR 93.153, or if they are "regionally significant," a conformity determination must be made. If project emissions are below threshold levels, the Federal action is presumed to conform, the project may proceed as planned and the General Conformity Rule has been met.

Table 3-5 presents the General Conformity *de minimis* thresholds, by regulated pollutant. *De minimis* thresholds vary depending on the severity of the nonattainment area classification. Stationary emissions sources subject to NSR air permitting, including minor NSR, are not required to be counted towards the

General Conformity *de minimis* thresholds. The reasoning for this is that by meeting the criteria and going through the approval process with the appropriate Federal, state or local air quality permitting authority, these emissions sources are demonstrating that they are in conformity with the SIP. The *de minimis* emission levels vary by criteria pollutant and severity of the region's nonattainment conditions. **Table 3-6** presents the *de minimis* emission thresholds for the NASA JPL Applicability Analysis.

Table 3-5. Conformity *de minimis* Emission Thresholds

Pollutant	Status	Classification	*de minimis* Limit (tpy)
Ozone (measured as NO_x or VOCs)	Nonattainment	Extreme	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 (NO_x)
		All others	100
	Maintenance	Inside ozone transport region	50 (VOCs)/100 (NO_x)
		Outside ozone transport region	100
Carbon Monoxide (CO)	Nonattainment/ maintenance	All	100
Particulate Matter (PM_{10})	Nonattainment/ maintenance	Serious	70
		Moderate	100
		Not applicable	100
Sulfur Dioxide (SO_2)	Nonattainment/ maintenance	Not applicable	100
Nitrogen Oxides (NO_2)	Nonattainment/ maintenance	Not applicable	100
Lead (PB)	Nonattainment/ maintenance	All	25

Source: 40 CFR 93.153; tpy=tons per year

Table 3-6. *De minimis* Emission Thresholds for NASA JPL Applicability Analysis

Pollutant	SOCAB Attainment Designation	*De minimis* Threshold (tpy)
Ozone (measured as NO_x or VOCs/ROG)	Nonattainment / Severe – 17[a]	10[a]
Particulate Matter – PM_{10}	Nonattainment / Serious	70
Particulate Matter – $PM_{2.5}$ (and each separate precursor)[b/c]	Nonattainment	100
Nitrogen Dioxide (NO_2)	Attainment / Maintenance	100
Carbon Monoxide (CO)	Attainment / Maintenance	100

Source: General Conformity Applicability Analysis for 2011 NASA JPL Facility Master Plan Updates PEA (NASA JPL 2011a)

a. The U.S. EPA reclassified the SOCAB as 'extreme' nonattainment for the 8-hour ozone NAAQS under 75 FR 24409 on May 5, 2010 to be effective on June 4, 2010.
b. The PM2.5 precursors in the region include Sox, NOx, VOC/ROG and ammonia.
c. Ammonia emissions are not anticipated from the Proposed Action (construction, operation or direct/indirect); therefore, no further analysis is conducted for ammonia as a PM2.5 precursor.

Pollutant transport in the SOCAB generally follows the on-shore and offshore air flow characteristic of coastal areas. The SCAQMD has divided the air basin into 38 Source Receptor Areas (SRA), each containing one or more monitoring stations. These SRAs are designated to provide a general representation of the local meteorological conditions within the particular area. NASA JPL is located within SRA 88, and the nearest monitoring station is the West San Gabriel Valley station, located 8 kilometers (5 miles) to the southeast of NASA JPL at 752 Wilson Avenue, Pasadena (station number 088). Pollutants monitored at the station include O_3, CO, total suspended particulates (TSP), SO_4, and NO_2. The station is not equipped to monitor ambient PM_{10} or $PM_{2.5}$ levels or Pb.

In the SOCAB, emissions of NO_X are heavily distributed in the western portion of the basin. Daytime wind flow, mountain barriers, a persistent temperature inversion, and intense sunlight all contribute to high O_3 concentrations in the downwind, inland valleys and coastal areas. Maximum O_3 concentrations usually are recorded during the summer. Ozone is associated with eye irritation, reduced visibility, and adverse health effects at high concentrations. In 2006, ozone levels at the West San Gabriel Valley station in Pasadena exceeded the Federal one hour standard of 0.12 parts ppm for 5 out of 365 days and exceeded the state standard of 0.09 ppm for 25 days (SCAQMD, 2006). The maximum 1-hour ozone concentration reported at the station was 0.15 ppm. Basin-wide, the highest concentration of ozone was reported to be 0.18 ppm at the East San Gabriel Valley 2 station.

CO concentrations are highest near heavily congested roadways. The monitoring station reported 0 days of violation of the Federal and state 8-hour CO standards of 9.0 ppm. The maximum 8-hour CO concentration recorded at the station during 2006 was 2.8 ppm, while the highest concentration recorded in Los Angeles County was 6.4 ppm at the South Central Los Angeles County station. The Federal annual standard for NO_2 is 0.053 ppm, while the state 1-hour standard is 0.25 ppm. There were 0 days of violation of the state standard, with 0.14 ppm recorded as the highest 1-hour NO_2 concentration at the South Central Los Angeles County Station. The annual average ambient NO_2 concentration at the station for 2006 was 0.0310 ppm, which indicates compliance with the standard.

3.4.1.3 Air Pollution Sources, Controls, and Reporting Requirements

NASA JPL submits annual emissions inventory reports to the SCAQMD, which includes emissions analysis from permitted and unpermitted sources. All sources of air pollutants and permit status are evaluated under a comprehensive air pollutant source identification and evaluation program, which includes an extensive equipment listing maintained by JPL's Environmental Affairs Program Office as part of their emissions and waste management database. **Table 3-7** lists the volumes of criteria pollutants reported to the SCAQMD in 2010.

Table 3-7. 2010 Criteria Pollutants Reported by NASA JPL to SCAQMD

Pollutant ID	Pollutant Description	Annual Emissions (Tons per Year)
CO	Carbon Monoxide	6.06
NOX	Nitrogen Oxides	10.21
ROG	Reactive Organic Gases	2.20
SOX	Sulfur Oxides	0.07
TSP	Total Suspended Particulates	0.94

Source: Personal communication with F. Chirino, NASA JPL, January 2012

NASA JPL is currently permitted by the SCAQMD as a Regional Clean Air Incentives Market facility, and as a Title V facility under the Federal Operating Permit Program because the volumes of criteria pollutants and toxic (non-criteria) pollutants exceed regulatory thresholds, respectively. NASA JPL received its initial Title V Facility Permit in September 2001 due primarily to annual emissions of NOx exceeding the threshold amount shown in Table 1 of SCAQMD Rule 3001.

The type of air emission sources that usually require SCAQMD permits to operate (Rule 201 and Rule 203) include boilers, internal combustion engines, emergency generators, painting operations, degreasers, fuel storage tanks, dispensers, and various research and development processes. Various types of these individual emissions units currently operate under SCAQMD permits at NASA JPL. Although JPL has a substantial amount of research and development activities, only one facility requires that air pollution control equipment be installed: the Microdevices Laboratory (Building 302) requires a wet scrubber to control emissions for clean room laboratory operations. NASA JPL is currently in compliance with air quality permitting regulations.

3.4.1.4 Toxic Release Inventory

NASA JPL complies with other reporting requirements, such as the Section 313 Reporting Requirements under the Emergency Planning and Community Right to Know Act (EPCRA) and toxic emission inventory reporting under Air Toxics “Hot Spots” Information and Assessment Act AB 2588. NASA JPL has submitted required inventory data; however, due to the low facility priority ranking, which is based on both toxicity and quantity of emissions, NASA JPL has not been required to submit a follow-up risk assessment of reported emissions.

3.4.2 Environmental Impacts

This section describes the potential environmental consequences for air quality associated with implementing Alternative A, Alternative B, and the No Action alternative at NASA JPL. Any of the three actions would result in a significant air quality impact if the associated demolition, construction, or operations would result in exceeding the applicable regulatory thresholds. While no significant impacts are anticipated, any potential adverse or beneficial impacts under each alternative, however insignificant, will be discussed in the following sections.

3.4.2.1 Alternative A

While short-term adverse impacts to air quality are anticipated, Alternative A would not result in any long-term adverse impacts to air quality. General Conformity under the CAA Section 176(c) was evaluated for all proposed redevelopment activities analyzed in the NASA JPL Facility Master Plan Updates PEA (NASA JPL 2011), for which Alternative A in this EA is one small part (**Appendix B**). Whereas, the actual level of construction and volume of construction under Alternative A is not changing enough at either a day, or per year rate to affect the daily or annual emissions levels produced, further conformity review is not warranted. As contained in **Table 3-8** below, the results of the general conformity review showed that the total direct and indirect emissions associated with the Master Plan redevelopment activities were below the *de minimis* threshold levels, as promulgated in 40 CFR 93.153(b) (**Appendix B**). Therefore, this proposed action is below the *de minimis* threshold levels.

Table 3-8. Comparison of Estimated NASA JPL Net Emissions to *de minimis* Thresholds

Criteria Pollutant	Ozone Attainment Status[1]	*de minimis* Threshold (tpy)	Estimated Net Emissions (Direct & Indirect) JPL Proposed Action (tpy)
NO_x (as precursor for an O_3 and $PM_{2.5}$)	Maintenance	10	8.17
VOC/ROG (as an O_3 precursor)	Maintenance	10	8.38
PM_{10}	Nonattainment	70	10.72
$PM_{2.5}$	Nonattainment	100	2.30
SO_2 (as an $PM_{2.5}$ precursor)	Nonattainment	100	0.05
CO	Nonattainment/ maintenance	100	26.92

Source: General Conformity Applicability Analysis for 2011 NASA JPL Facility Master Plan Updates Programmatic Environmental Assessment (NASA JPL 2011a)

Construction Impacts

Construction impacts include airborne dust from demolition, grading, excavation and materials hauling as well as gaseous emissions from the use of heavy equipment, delivery and dirt hauling trucks, and employee vehicles. Additionally, the use of new paints and surface coatings produce volatile organic compounds (VOCs). One example would be photo-chemically reactive VOC emissions from curing asphalt concrete. These impacts may affect regional pollutants, such as O_3, or pollutants where the impacts occur very close to the source, such as PM_{10}. There are no known sources of odors on the project site that would be released during construction.

Proposed demolition activity includes removing a corrugated metal hangar and a temporary modular office structure and hardscapes, including concrete, asphalt, and gravel including roadway coatings and cement sidewalks, and old infrastructure for utilities and sanitary sewer and storm drains. This material would be hauled away and it is anticipated that some would be ground in place and used as fill for replacement projects in the same or nearby areas. As part of the overall project, NASA JPL would also remove the asphalt surface at the existing East Arroyo Parking Lot once the City of Pasadena fulfills its requirement for environmental review under the California Environmental Quality Act.

Vacating the existing East Arroyo Parking Lot may result in short-term minor impacts due to the associated demolition and asphalt removal activities. Activities would include constructing a temporary haul road for heavy equipment to haul removed material to an approved offsite landfill. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of those activities. NASA JPL would comply with SCAQMD and other applicable requirements for dust suppression during demolition activities associated with the East Arroyo Parking Lot.

Construction impacts to air quality from PM_{10} and NO_X emissions, O_3, CO, SO_X, and VOCs would not be expected to exceed the SCAQMD threshold for significance for peak day or peak quarter. Soil would be disturbed during grading and excavation, or while storing project-related equipment. Additional negligible to minor short-term adverse impacts would occur in conjunction with new commuter traffic generated from contractor employees and it is anticipated to result in a general increase in air quality impacts at the regional level.

Operational Impacts

Implementing Alternative A would not have any adverse impacts on operational air emissions for NASA JPL. The number of vehicle trips vehicle miles traveled is anticipated to remain the same. Alternative A would not have a substantial impact on regional CO concentrations from on-site operations. Background levels of both the one-hour and eight-hour standards are well below state and national standards in the Pasadena area, even including days when the Rose Bowl is at peak capacity and the potential for high CO concentrations is high. Peak CO concentrations typically occur in areas of heavy traffic congestion during cold weather, and predominantly during December and January. Reducing impediments to truck circulation on-site and consolidating service access to Lab facilities would likely have modest emissions benefits by slightly reducing truck operating time, as well as slightly increasing travel speeds.

In conclusion, any potential impacts to air quality were determined to be less than significant.

Mitigation Measures

Short-term construction impacts will be mitigated through the use of proper control measures, including routine maintenance of all construction equipment, and regular maintenance of the emission control devices on all construction equipment to reduce fugitive dust during construction. Dust suppression and other construction-related water uses would be performed using water from tanker trucks filled from local hydrants. Use of architectural coating will be minimized and applied over an appropriate duration to avoid exceeding SCAQMD thresholds for VOCs. Architectural coating with low VOC content will be utilized as needed.

Construction contractors will be required to submit a Construction Management Plan including plans to control impacts to air quality during construction. Construction activities under Alternative A will comply with SCAQMD regulations, including SCAQMD Rule 402, which specifies that there shall be no dust impacts off-site sufficient to cause a nuisance, and SCAQMD Rule 403, which restricts visible emissions from construction.

3.4.2.2 Alternative B

Construction Impacts

Short- term adverse impacts to air quality are anticipated under Alternative B. Similar to Alternative A, air quality impacts associated with a construction project may occur at both a regional and local scale. Construction impacts include airborne dust from demolition, grading, excavation, and materials hauling as well as gaseous emissions from the use of heavy equipment, delivery and dirt hauling trucks, and employee vehicles. The use of new paints and surface coatings produce VOCs. One example would be photo-chemically reactive VOC emissions from curing asphalt concrete. These impacts may affect regional pollutants, such as O_3, or pollutants where the impacts occur very close to the source, such as PM_{10}. There are no known sources of odors on the project site that would be released during construction.

Proposed demolition activity at the project site for Alternative B would result in minor adverse short-term impacts to existing air emissions. Activities would include (1) removing three existing and occupied structures (Building 249, Visitor Control; Building 250, Main Guard Shelter; and Building 257, Main Guard Island, and hardscapes, including concrete, asphalt, and gravel including roadway coatings and cement sidewalks, and old infrastructure for utilities and sanitary sewer and storm drains; (2) removal of approximately 114 mature trees; and (3) a major utility relocation effort. Waste materials would be hauled

away and it is likely some would be ground in place and used as fill for replacement projects in the same or nearby areas.

Similar to Alternative A, vacating the existing East Arroyo Parking Lot may result in short-term minor impacts due to the associated demolition and asphalt removal activities. Activities would include constructing a temporary haul road for heavy equipment to haul removed material to an approved offsite landfill. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of those activities.

Construction impacts to air quality from PM_{10} and NO_X emissions, O_3, CO, SO_X, and VOCs would not be expected to exceed the SCAQMD threshold for significance for peak day or peak quarter. Soil would be disturbed during grading and excavation, or while storing project-related equipment. Additional negligible to minor short-term adverse impacts would occur in conjunction with new commuter traffic generated from contractor employees and it is anticipated to result in a general increase in air quality impacts at the regional level.

Operational Impacts

Similare to Alternative A, implementing Alternative B would have negligible adverse impacts on operational air emissions for NASA JPL.

In conclusion, any potential impacts to air quality were determined to be less than significant.

Mitigation Measures

Proposed mitigation measures under Alternative B would be similar to those proposed for Alternative A.

3.4.2.3 No Action Alternative

Under the No Action Alternative, NASA JPL would lose the East Arroyo Parking Lot and its 1,093 parking spaces. The resulting facility-wide parking shortfall would not be addressed. Employees would seek to park off-site on local streets in the surrounding communities, and walk into the NASA JPL facility. Specifically, the on-site workforce would park to the northwest of NASA JPL along Starlight Crest Drive, to the west along Viro Road, and southeast of the facility along Arroyo Road and El Nido Road. Over the long term, this impact may lessen as employees would seek to commute to the NASA JPL facility in multi-passenger vehicles and/or use public transportation. In conclusion, any potential impacts to air quality were determined to be less than significant.

3.5 Noise

3.5.1 Affected Environment

Noise at and surrounding NASA JPL was described in Sections 3.1.7 and 4.1.7 of the Master Plan Updates PEA and is incorporated herein by reference. Please refer to that document for a description of noise as an environmental consideration; and community noise standards. Briefly, sound pressure levels are commonly measured in a logarithmic unit called a decibel (dB). The human ear is not equally sensitive to all sound frequencies, being less sensitive to very low and very high frequency sounds. Therefore, sound levels in standard frequency bands are weighted differentially to correspond more

closely to the frequency response of the human ear and the human perception of loudness. Such weighted sound levels are designated as A-weighted and measured in units of A-weighted decibel (dBA).

For the average person, a 10-dBA increase in the measured sound level is subjectively perceived as being twice as loud, and a 10-dBA decrease is perceived as half as loud. The dB change at which the average human would indicate that the sound is just perceptibly louder, or perceptibly quieter, is 3 dBA. There is generally a 10-dBA reduction in sound level for each doubling of distance from a noise source due to spherical spreading loss (e.g., if the sound level at 7.6 m (25 ft) from a piece of construction equipment was 86 dB, the sound level at 15.2 m (50 ft) would be expected to be 76 dB, at 100 ft 66 dB, etc.). Typical sound levels experienced by people range from about 40 dBA in a quiet living room to 85 dBA on a sidewalk adjacent to heavy traffic. **Table 3-9** provides a list of typical noise levels.

Table 3-9. Typical Noise Levels

Noise Level (dBA)	Noise Source
140	Jet engine
130	Threshold of pain
115-120	Amplified rock band
105-115	Commercial jet takeoff at 200 feet
95-105	Community warning siren at 100 feet
85-95	Busy urban street
75-85	Construction equipment at 50 feet
65-75	Freeway traffic at 50 feet
55-65	Normal conversation at 6 feet
45-55	Typical office interior
35-45	Soft radio music
25-35	Typical residential interior
15-25	Typical whisper at 6 feet
5-15	Human breathing
0-5	Threshold of hearing

The general principle on which most noise acceptability criteria are based is that a perceptible change in noise is likely to cause annoyance wherever it intrudes upon the existing ambient sound; that is, annoyance depends upon the sound that exists before the introduction of the new sound. The following section describes the existing conditions that pertain to the noise environment in the NASA JPL area.

Noise sources include vehicle traffic and parking, cooling towers, pumping stations, compressors, backup generators, building ventilation and air conditioning equipment, various blowers and exhaust fans, liquid nitrogen system venting equipment, equipment fabrication and maintenance shops, laboratory and testing facilities, and grounds maintenance activities. Many mechanical equipment noise sources are housed inside buildings, a factor that reduces the equipment contribution to outdoor ambient noise levels.

Ambient Noise Levels at NASA JPL

A survey of ambient noise conditions was conducted at NASA JPL that included long-term noise monitoring at eight stations (Tetra Tech 2007a) on weekdays. Additional monitoring was conducted at five of the long-term monitoring stations on a weekend. Monitoring durations were approximately 24 hours at most of the long-term monitoring stations. The long-term monitoring stations were located around the periphery of NASA JPL. These locations provide conservative estimates of noise contributions from NASA JPL to adjacent land uses. Noise levels measured at these stations are not exclusively produced by noise sources at NASA JPL. Off-site vehicle traffic and recreational activities contribute to noise levels measured at stations along the southern and western boundaries of NASA JPL. **Figure 3-3** illustrates locations used for long-term noise monitoring. Noise levels measured at the long-term monitoring stations are summarized in **Table 3-10**.

Figure 3-3. Locations Used for Long-Term Period Noise Monitoring at NASA JPL

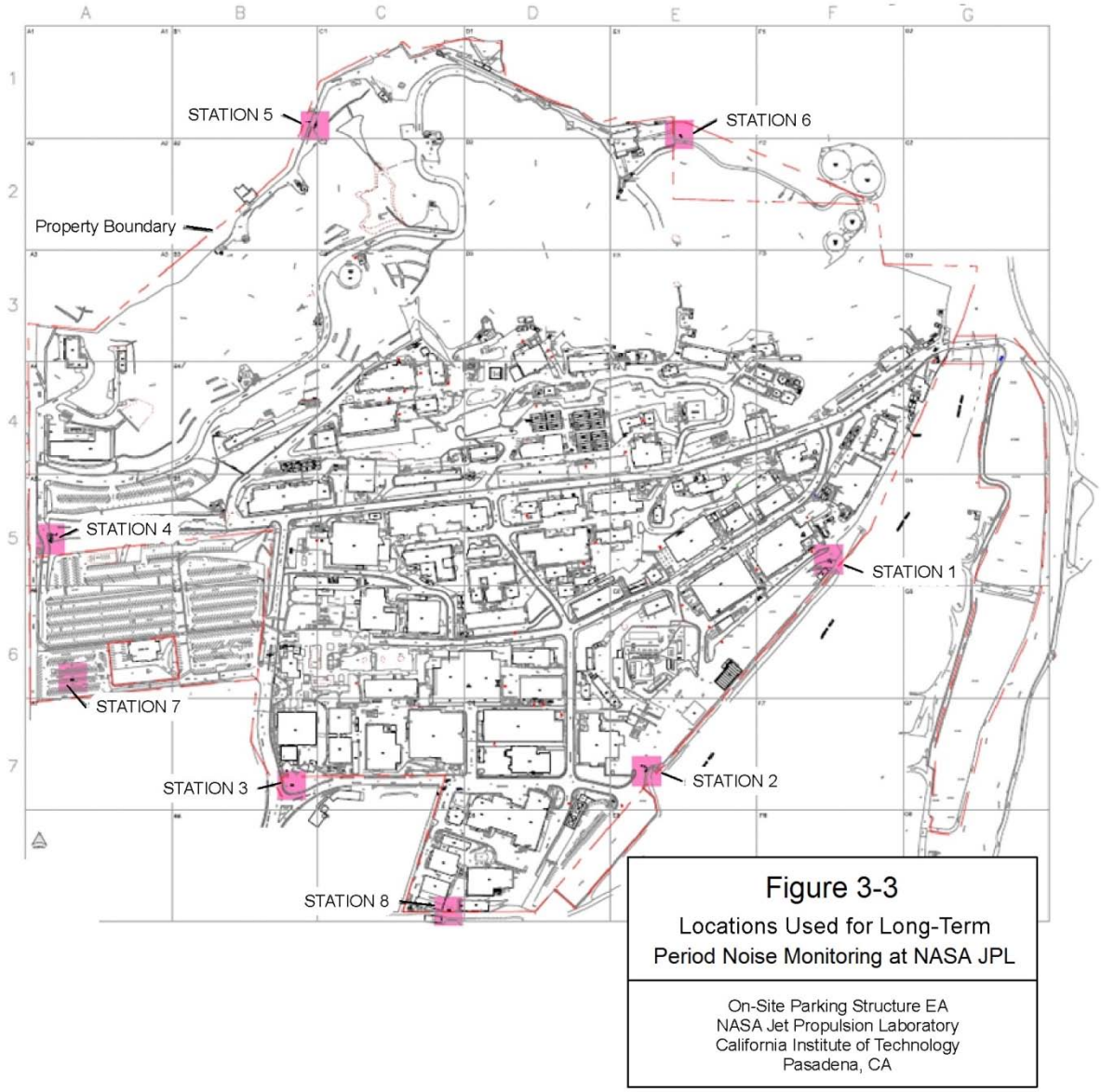


Table 3-10. Summary of Noise Levels at Long-Term Monitoring Stations near NASA JPL

Monitoring Station	Weekday/ Weekend	Monitoring Duration	CNEL dBA	Leq dBA	Lmax dBA	L10 dBA	L90 dBA	Lmin dBA
LT-1	Weekday	24.8 hrs	65.0	61.2	99.7	58.9	55.4	53.5
LT-1	Weekend	25.8 hrs	68.9	62.7	89.6	63.8	60.8	58.3
LT-2	Weekday	24 hrs	62.4	58.2	99.8	57.7	50.2	46.6
LT-3	Weekday	24 hrs	62.7	58.9	87.4	61.6	47.2	41.6
LT-3	Weekend	24.9 hrs	61.7	57.2	88.9	58.3	47.9	42.2
LT-4	Weekday	24 hrs	57.9	54.7	102.1	54.5	43.1	36.0
LT-5	Weekday	24 hrs	54.4	50.0	85.7	51.0	42.2	38.9
LT-5	Weekend	25 hrs	56.3	48.9	96.9	46.9	39.1	33.4
LT-6	Weekday	24 hrs	51.7	45.4	75.6	45.9	41.0	36.6
LT-7	Weekday	10.6 hrs	n.a.	51.4	73.6	52.7	48.0	45.9
LT-7	Weekend	20.7 hrs	57.3	53.6	91.8	52.3	48.3	46.4
LT-8	Weekend	24.4 hrs	55.3	53.1	89.7	50.7	44.3	41.9

Source: Tetra Tech 2007.

Notes:

Monitoring at stations LT-1 through LT-6 was conducted using Type 1 integrating sound level meters set to A-weighting, fast response (1/8-second data integration period).

Monitoring at stations LT-7 and LT-8 was conducted using Type 2 data logging sound level meters set to A-weighting, fast response, and a 3-second data logging interval.

Battery problems caused early termination of data logging at station LT-7 during the weekday monitoring episode.

dBA = "A-weighted" decibel scale

CNEL = a 24-hour average with annoyance penalties of 5 dBA for evening noise and 10 dBA for nighttime noise

Leq = equivalent continuous noise level (energy-averaged without annoyance penalties)

Lmax = maximum sound level

L10 = noise level exceeded 10% of the time

L90 = noise level exceeded 90% of the time

Lmin = minimum sound level

n.a. = not applicable; too few hours of data to calculate CNEL

In general, the highest noise levels around the periphery of NASA JPL were on the east side of the property. The lowest noise levels around the periphery of NASA JPL were on the north side of the property. Long-term station LT-1, located along the eastern boundary, had the highest noise levels of all the LT stations and was the only location where minimum noise levels did not drop below 50 A-weighted decibels (dBA).

LT-6, located along the northern boundary above the Mesa, had the lowest noise levels of all of the long-term stations. Stations LT-1, LT-3, LT-5 and LT-7 were monitored for 24 hours or more on a weekday and a weekend. Station LT-1 exhibited higher noise levels on the weekend than on the weekday. Station LT-3 showed lower noise levels on the weekend compared to the weekday monitoring. Station LT-5 had slightly lower overall average noise levels on the weekend compared to the weekday, but slight differences in evening and nighttime noise levels produced a higher community noise equivalent level (CNEL) for the weekend compared to the weekday.

Given the buffer provided by the Arroyo Seco open space area (approximately 0.3 km [0.2 mi] near station LT-2 and approximately 0.2 km [0.13 mi] near station LT-1), the highest CNEL level measured at station LT-1 (68.9 dBA) would be reduced to less than 65 dBA in the residential portions of Altadena. Thus, the long-term noise monitoring data collected in May 2007 indicate that NASA JPL is not causing noise levels in adjacent residential areas to exceed applicable land use compatibility standards.

3.5.2 Environmental Impacts

This section describes the potential environmental consequences associated with noise as a result of implementing Alternative A, Alternative B, or the No Action Alternative at NASA JPL. Given the buffer provided by the Arroyo Seco open space area (approximately 0.3 km [0.2 mi] near station LT-2 and approximately 0.2 km [0.13 mi] near station LT-1), the highest CNEL level measured at station LT-1 (68.9 dBA) would be reduced to less than 65 dBA in the residential portions of Altadena. Thus, the long-term noise monitoring data collected in May 2007 indicate that NASA JPL is not causing noise levels in adjacent residential areas to exceed applicable land use compatibility standards.

The actions under review would result in adverse impacts if noise conditions resulting from implementation of any of the actions exceeded established City of Pasadena noise restrictions (see Section 3.1.7.1 of the Master Plan Updates PEA), or if there were long-term increases in the number of people highly annoyed by the noise environment. Adverse impacts would also occur if there are noise-associated adverse health effects to individuals; or if there are unacceptable increases to the noise environment for sensitive receptors. While no significant impacts are anticipated, any potential adverse or beneficial impacts under each alternative, however insignificant, will be discussed in the following sections.

3.5.2.1 Alternative A

No substantial long-term impacts to noise levels in surrounding areas, or on-site locations, are anticipated. There would be short-term adverse impacts related to demolition and construction activities.

Construction Impacts

Over the short-term, there would be minor adverse effects from intermittent noises, and/or from general increases in background noise. The proposed project involves the demolition of two buildings and construction of a new parking structure. Construction activities would be of a short-term nature, and depending on the nature of the construction operations, would last from seconds (e.g., a truck passing by) to months over the planned construction period. Construction noise is also intermittent and depends on the type of operation, location, and function of the equipment, and the equipment usage cycle.

Under Alternative A, the cumulative noise from the equipment during the busiest day was estimated to determine the total impact of noise from construction and demolition activities at a given distance. Examples of expected cumulative noise during daytime hours at specified distances are shown in **Table 3-11**. These sound levels were estimated by adding the noise from several pieces of equipment and then calculating the decrease in noise levels at various distances from the source.

While the proposed project is being built, adjoining properties at NASA JPL would be exposed to noise from construction activities. These activities would result in adverse and short-term noise impacts. Construction of the Arroyo Parking Structure would be approximately 385 m (1,250 ft) away from the closest residence, which is located due east of the proposed location (i.e. directly east across the Arroyo Seco).

Table 3-11. Estimated Noise Levels from Construction and Demolition Activities

Distance from Noise Source (ft)	Estimated Noise Level
50	90-94 dBA
100	84-88 dBA
150	81-85 dBA
200	78-82 dBA
400	72-76 dBA
800	66-70 dBA
1,500	<64 dBA

Referring to **Table 3-9**, this equates to an estimated noise level of approximately 64-66 dBA for this residence. There would be no actions that move surrounding streets or increase their capacity.

There would be an increase in vehicle traffic equivalent to the number of on-site employees driving to work along the streets surrounding NASA JPL. This long-term impact would be negligible.

Vacating the existing East Arroyo Parking Lot may result in short-term minor noise impacts due to the associated demolition and asphalt removal activities. Activities would include constructing a temporary haul road for heavy equipment to haul removed material to an approved offsite landfill. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of those activities.

Operational Impacts

Once constructed and operational, the proposed parking structure is not expected to generate appreciable ground-borne vibrations at off-site locations. Noise levels at NASA JPL are not sufficient to generate major structural vibrations at off-site locations from airborne sound levels. There would be no increase in parking capacity as a result of Alternative A, therefore there would be no incremental increase in noise resulting from its implementation. Traffic associated with the site would be minor compared to the regular off-site street traffic and would have no impact on the ambient traffic noise.

In conclusion, any potential noise impacts were determined to be less than significant.

Mitigation Measures

NASA JPL is located adjacent to the residential communities of La Cañada-Flintridge, Pasadena, and Altadena. As a Federal facility, NASA JPL is not directly regulated by these jurisdictions. However, contractors at NASA JPL will adhere to work noise restriction schedules contained in municipal codes to minimize potential impacts from demolition and construction activities on the surrounding residential properties.

The following is a summary of other proposed mitigation measures under Alternative A:

- All construction equipment powered by an internal combustion engine will be equipped with a properly maintained muffler.

- Air compressors will meet current USEPA noise emission standards.
- New construction equipment will be used as much as possible since it is generally quieter than older equipment.
- Portable noise barriers within the equipment area and around stationary noise sources will be established.

3.5.2.2 Alternative B

Construction Impacts

Demolition and construction-related activities associated with the implementation of Alternative B are anticipated to produce short-term minor adverse impacts on traffic noise both on-site and in surrounding areas. Alternative B involves the demolition of three structures, and the construction of a new parking structure. On-site traffic would be affected as the Main Gate would need to be shut down until demolition and construction is complete. A portion of the West Lot would need to be utilized for construction laydown and storage purposes. This would affect on-site pedestrian and vehicle access along the western portion of the facility.

All roads around the construction site have a potential for being adversely impacted due to large-scale utility relocations required for construction of the Alternative B parking structure. This would impact on-site and off-site traffic patterns leading up to the NASA JPL facility by forcing some of the traffic to enter through the South and East gates. Some of the on-site workforce currently parking in the West Lot may have to temporarily park in the East Arroyo Lot, temporarily changing off-site traffic patterns and increasing short-term noise in that area.

Similar to Alternative A, vacating the existing East Arroyo Parking Lot may also result in short-term minor noise impacts due to the associated demolition and asphalt removal activities. Activities would include constructing a temporary haul road for heavy equipment to haul removed material to an approved offsite landfill. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of those activities.

Operational Impacts

Similar to Alternative A, no substantial long-term impacts to noise levels in surrounding areas, or on-site locations, are anticipated under Alternative B. Operational activities at NASA JPL are not expected to generate appreciable ground-borne vibrations at off-site locations. Noise levels at NASA JPL are not sufficient to generate major structural vibrations at off-site locations from airborne sound levels. Traffic associated with the site would be minor compared to the regular off-site street traffic and would have no impact on the ambient traffic noise.

In conclusion, any potential noise impacts were determined to be less than significant.

Mitigation Measures

Proposed mitigation measures under Alternative B would be similar to those measures proposed under Alternative A.

3.5.2.3 No Action Alternative

Under the No Action Alternative, NASA JPL would lose the East Arroyo Parking Lot and its 1,093 parking spaces, and the resulting facility-wide parking issues would not be addressed. The on-site workforce would seek to park off-site on local streets in the surrounding communities, and walk into the NASA JPL facility. Specifically, employees would park to the northwest of NASA JPL along Starlight Crest Drive, to the west along Viro Road, and southeast of the facility along Arroyo Road and El Nido Road. No appreciable adverse impacts are anticipated. In conclusion, any potential noise impacts were determined to be less than significant.

3.6 Water Resources

3.6.1 Affected Environment

The following sections describe water resources in the vicinity of JPL in terms of surface water, floodplains, groundwater, water quality standards, and water quality impacts. Water resources at and surrounding NASA JPL was described in Sections 3.1.9 and 4.1.9 of the Master Plan Updates PEA and is incorporated herein by reference.

3.6.1.1 Surface Water

The primary surface water feature near JPL is the Arroyo Seco, an intermittent stream in a deeply cut canyon that drains a portion of the northeastern section of the Los Angeles River Basin and links the San Gabriel Mountains to the Los Angeles River. The Arroyo Seco meanders south through the canyon and past various cities, joins the Los Angeles River, and continues on to the Pacific Ocean. The Arroyo Seco Watershed can be divided into three segments: the upper basin from JPL area to the headwaters, the HWP and Devil's Gate Dam, and the Central and Lower Arroyo Seco (City of Pasadena, 2009).

Natural flow in the Arroyo Seco is dependent on rainfall and is nonexistent during dry months. The average monthly discharge for the Arroyo Seco from 1914 to 2009 at the USGS Stream Gauging Station, located 3.2 km (2 mi) upstream of NASA JPL, is 10.11 cubic ft per second (USGS, 2010). Direct drainage to the Arroyo Seco is mostly through storm drains from local municipalities. Storm water runoff from 54.4 sq km (21 sq mi) in the ANF drains into the Arroyo Seco (City of Pasadena 2009). There are 20 main tributaries upstream of NASA JPL that discharge surface water into the Arroyo.

On-site drainage from NASA JPL is north to south. Runoff in the steep northern areas of the site is intercepted with debris basins to control the velocity of runoff and to capture debris from the mountains. Surface runoff from the northern areas is transmitted by an underground storm drain system, located throughout the developed lower portion of NASA JPL to one of nine outlet points in the Arroyo Seco. With an average rainfall of 51 centimeters [cm] (20 inches [in]) per year, this amounts to 1.5 million l (400,000 gal) per year.

Devil's Gate Dam and Reservoir is a flood control detention feature located in the Arroyo Seco Canyon, 1.6 km (1 mi) downstream from NASA JPL. The dam is owned and operated by the Los Angeles County Department of Public Works (LACDPW) for flood safety and sediment management. Under flow and sediment transport situations, the lowest elevation outlet gate is kept open until water levels behind the dam rise to either the outlet tunnel or the spillway floor (City of Pasadena, 2009). This helps minimize sediment build-up behind the dam, while maximizing storage capacity for use during major storm events.

The City of Pasadena Department of Parks and Recreation initiated a multi-use project in the Arroyo Seco, known as the Hahamongna Watershed Park Master Plan in September 2003 (City of Pasadena 2003). The project was designed to enhance water resources, improve flood control, restore native habitat, and improve recreation and infrastructure for use by the local community. It included development of hiking trails into the Arroyo, construction of an interpretive nature center, restoration of native vegetation, and the revitalization of HWP. The City of Pasadena Water and Power Department plans to increase spreading basis operations for the Hahamongna Watershed Park Master Plan project. Some of the land proposed to be used as spreading basins is currently leased by NASA JPL for its East Arroyo Parking Lot.

3.6.1.2 Floodplains

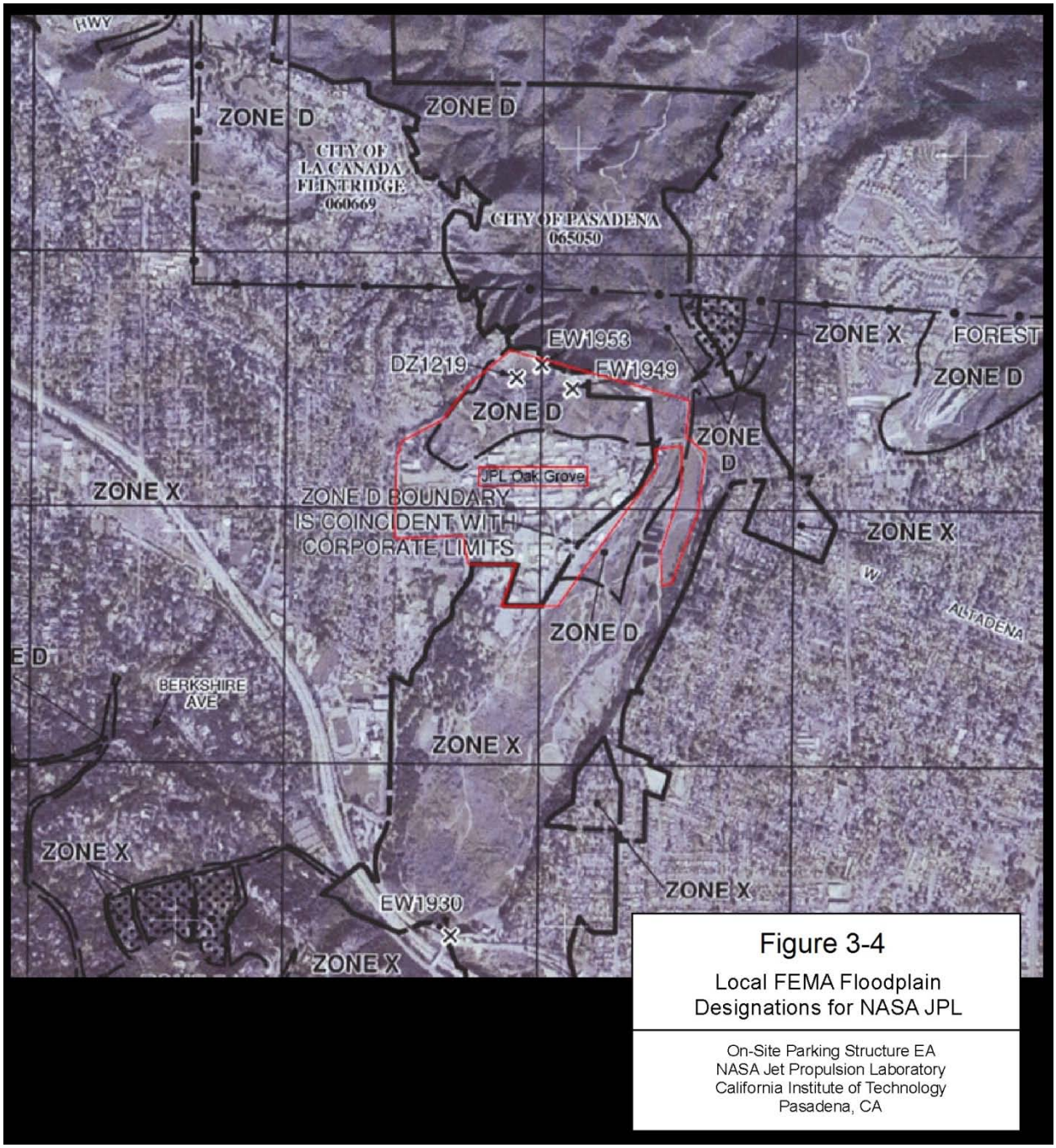
Floodplains are subject to periodic or infrequent inundation because of precipitation and melting snow collecting within a catchment basin or watershed. The risk of flooding typically hinges on local topography, the frequency and intensity of precipitation events, and the size of the watershed above the floodplain. The 100-year floodplain is the area that has a 1 percent chance of inundation by a flood event in a given year. Certain facilities inherently pose too great a risk to be in either the 100- or 500-year floodplain, such as hospitals, schools, or storage buildings for irreplaceable records. Federal, state, and local regulations often limit floodplain development to passive uses (recreational and preservation activities) to reduce risks to human health and safety.

EO 11988, Floodplain Management, required federal agencies to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve natural and beneficial values served by floodplains. If an agency has determined to, or proposes to, conduct, support, or allow an action to be located in a base floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains. FEMA defines base floodplain elevation as “the height in feet that the 100-year flood is expected to rise above mean sea level.”

The Federal Emergency Management Agency (FEMA) has not produced adjoining quadrangles mapping floodplains in the vicinity of NASA JPL and has not performed a detailed study within the quadrangle boundaries. **Figure 3-4** summarizes the area floodplain designations, and shows NASA JPL is characterized by FEMA as either ‘Zone X’, which indicates moderate to low risk areas, or ‘Zone D,’ which indicates that flood hazards have not been determined, but are possible (www.fema.gov, accessed on July 27, 2010). Although FEMA has not mapped floodplains at NASA JPL, extrapolation of aerial photography indicates 1.1 ha (2.6 ac) of floodplain associated with the Arroyo Seco adjoins the eastern boundary of NASA JPL and the East Arroyo Parking Lot.

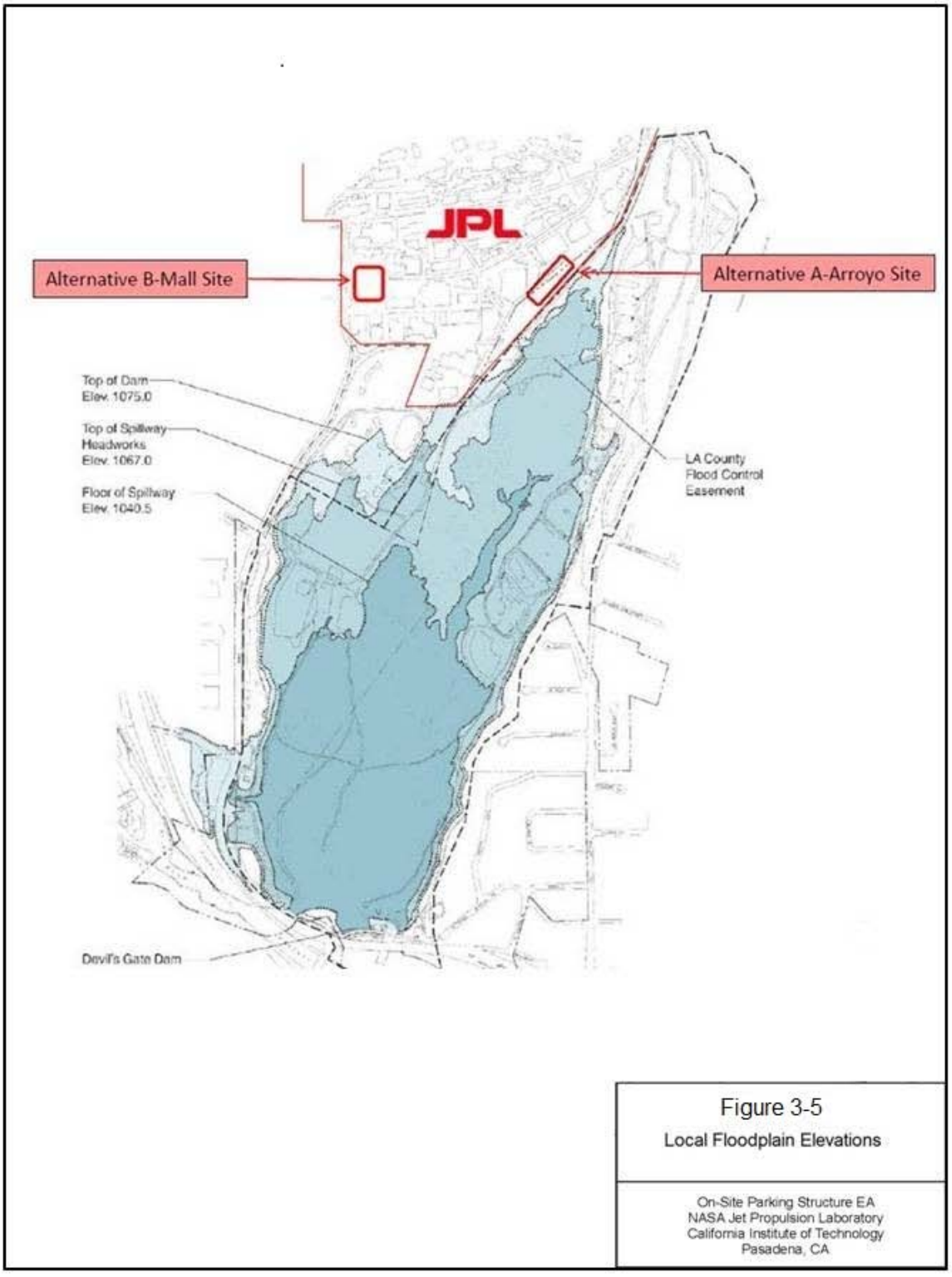
Critical to understanding the flood environment of the HWP is the impact of the Devil’s Gate Dam on flood elevations. The spillway floor elevation 317 m (1,040.5 ft) above mean sea level (amsl), the top of the head works elevation 325 m (1,067 ft) amsl, and the top of the dam elevation 328 m (1,075 ft) amsl are depicted in **Figure 3-5**. The 100-year flood plain upstream from the Devil’s Gate Dam reaches the 328 m (1,075 ft) amsl, which would include a small portion of the lower Arroyo 208-space parking lot (see **Figure 3-2**) which is leased from the City of Pasadena (AC Martin. 2011). However, the elevation of the proposed Arroyo Parking Structure site is 334 m (1,096 ft) amsl, which is outside of the base floodplain. Thus, EO 11988 does not apply.

Figure 3-4. Local FEMA Floodplain Designations for NASA JPL



Following a major flood in the area in 1969, when a substantial portion of NASA JPL was eroded and washed out, the facility was subsequently repaired by placement of up to 19 feet of fill, and a concrete berm was constructed outside the perimeter fence along the eastern boundary of NASA JPL for flood control purposes (NASA JPL. 2011c). Engineering integrity and protectiveness of this berm is not being addressed in this EA. NASA JPL would assess the integrity of this berm during Alternative A's design phase and it must be deemed fully protective prior to any proposed construction activities at the Alternative A site.

Figure 3-5. Local Floodplain Elevations



Source: NASA JPL, April 2012

The rest of NASA JPL (e.g., the proposed Mall Parking Structure site) is located at higher elevations. There are no wetlands located on the facility. The LACDPW owns and operates Devil's Gate Dam and the dam facilities, including a flood control easement to the top of the dam parapet wall at elevation 328 m (1,075 ft) amsl. Orange County operates the flood control channel from the outlet of Devil's Gate Dam, south through the Arroyo Seco, to its point of confluence with the Los Angeles River (Pasadena, 2003).

3.6.1.3 Groundwater

NASA JPL is situated over part of an unconfined groundwater aquifer called the Monk Hill Basin. The Pasadena Subarea, the Santa Anita Subarea, and the Monk Hill Basin make up the unconfined aquifer called the Raymond Basin.

The Raymond Basin is bounded to the north by the San Gabriel Mountains, to the south and east by the San Gabriel Valley, and the west by the San Rafael Hills. The Basin provides part of the potable water supply for Pasadena, La Cañada-Flintridge, San Marino, Sierra Madre, Altadena, Alhambra, and Arcadia.

The greater Raymond Basin is replenished by both natural rainfall and artificial recharge from several spreading basins on the eastern side of the Arroyo Seco, near NASA JPL. These spreading basins are operated by the City of Pasadena. The alluvial aquifer below the Arroyo Seco is predominantly characterized by relatively coarse sediment, which makes the Arroyo extremely permeable.

Surface water percolates into the groundwater fairly quickly, and groundwater flow rates are relatively high. The City of Pasadena obtains approximately 40 to 50 percent of its municipal water supply from groundwater wells.

The groundwater table below the facility is located at 61 m (200 ft) (NASA, 2006). The groundwater table and groundwater flow patterns are significantly influenced by Pasadena production wells located to the southeast. Groundwater moves from La Cañada-Flintridge to the southeast towards NASA JPL, then towards these water supply wells. The groundwater contains various chemicals, including some historically used at NASA JPL. In 1992, NASA JPL was placed on the National Priority List (NPL) of sites subject to regulation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The local water purveyors constantly monitor the water served to the public and take the necessary actions, including blending and treatment, to assure this water meets all applicable drinking water quality standards.

3.6.1.4 Water Quality Standards

The USEPA, in accordance with its authority under the Clean Water Act (CWA), has delegated to California the responsibility for administering a water pollution program consistent with the requirements of the CWA. The California Porter-Cologne Water Quality Act established the State Water Resources Control Board (SWRCB) and the nine California Regional Water Quality Control Boards (CRWQCBs) for implementing the water pollution control program including the National Pollutant Discharge Elimination System (NPDES) program and the implementation of publicly owned treatment works and pretreatment standards.

The Los Angeles CRWQCB developed the Los Angeles Basin Plan to protect beneficial uses of all water bodies in the basin. The Plan designates beneficial uses for surface and ground waters, sets objectives to be attained or maintained to protect the designated beneficial uses and conform to the state's anti-

degradation policy, and describes implementation programs to protect waters in the region. Objectives are present and will be used to set effluent limits, policies, and other conditions that become part of individual permits issued by the Board.

3.6.1.5 Storm Water Management

Storm water generated on NASA JPL discharges to the Arroyo Seco and is permitted by a NPDES Storm Water General Permit. The permit requires NASA JPL to develop and maintain a Storm Water Pollution Prevention Plan (SWPPP) to prevent storm water pollution. The SWPPP identifies best management practices (BMPs) for industrial activities that are exposed to precipitation. NASA JPL holds a Storm Water Discharge Permit for the discharge of groundwater from a well behind Building 150. Construction Storm Water Permits are required for onsite construction activities.

The existing storm drain system was designed to intercept flows from the steep slopes on the north portion of NASA JPL by the use of debris catch basins, which carry the storm water runoff in underground pipes through the developed portion of the Center, and discharge into the Arroyo Seco (City of Pasadena 2003). The major storm water drains that pass through NASA JPL are constructed of vitrified clay, RCP, and CMP, and range in size from 61 to 122 cm (24 to 48 in). The various storm water trunk lines collect surface runoff from the Center and residential properties to the west and transport the runoff directly to the Arroyo basin. Branch lines sized from 30.5 to 61 cm (12 to 24 in) collect the storm water runoff from the developed areas and carry it to major drains.

Storm water from La Cañada Flintridge also flows into the drains that cross NASA JPL and emerge in the Arroyo. The storm water runoff from all impervious surfaces (ground surface that would not allow water to soak in) flows directly into the flood control channel without treatment. According to the Arroyo Seco Master Plan Master Environmental Investigation Report prepared by the City of Pasadena in 2006, the water quality in the Arroyo is in good condition; however, control of trash will be a future focus for water quality improvement since the watershed is part of the Los Angeles River, which is listed in 303(d) by USEPA for trash, heavy metals, and bacteria.

3.6.2 Environmental Impacts

This section describes the potential environmental consequences associated with water resources (surface water, groundwater, floodplains), as a result of implementing Alternative A, Alternative B, or the No Action Alternative at NASA JPL. The actions being reviewed would result in adverse impacts to water resources if:

- Violations of Federal or state water quality regulations and standards for surface water or groundwater were to occur;
- Existing water resources were directly or indirectly impacted from water extraction activities due to increased demand. Water resource requirements of the project must be balanced with available supplies, and appropriate water rights and extraction procedures must be followed;
- Activities were located in a regulatory floodplain without appropriate flood study, FEMA map revisions, and mitigation measures;
- Activities fail to adequately address upstream drainage as it is conveyed through the study area; and

- Activities change historic drainage flows and/or patterns, potentially impacting downstream areas.

While no significant impacts are anticipated, any potential adverse or beneficial impacts under each alternative, however insignificant, will be discussed in the following sections.

3.6.2.1 Alternative A

Negligible long-term adverse impacts to surface water, groundwater, or floodplains are anticipated under Alternative A because the area would ultimately be returned to hard paved surfaces. There would be short-term adverse impacts related to demolition and construction activities.

Construction Impacts

Construction or paving activities on site under Alternative A are not expected to substantially alter on-site drainage patterns over the long-term because construction is confined to an already highly developed area of the facility. No construction activities would occur in the dry wash area of the Arroyo Seco. While demolition and construction activities would not increase storm water runoff, they would likely produce minor short-term adverse impacts with disruptions to storm water collection, flow, and transportation. Adverse impacts on surface water at NASA JPL would be minimized by employing BMPs and meeting regulatory NPDES requirements (or state equivalent).

Construction activities are not expected to require excavation into the water table and adverse impact on groundwater resources is not anticipated. Hazardous material usage would be minimal; BMPs would help to minimize the potential of contaminants to migrate through the soil to groundwater aquifers. Demolition and construction activities would result in a marginal increase in water use because of the increased number of workers at the site, and increased demand for direct construction uses, such as dust controls, equipment washing, and site cleanup. It is expected that the increase in water use by additional workers would be small compared to the overall facility water use.

Dust suppression and other construction-related water uses would be performed using water from tanker trucks filled from local hydrants. The increase in water use would be localized and limited to demolition and construction areas, and would be either intermittent in duration or directly relative to the timing of construction traffic and construction, such as for dust suppression.

Vacating the existing East Arroyo Parking Lot may also result in short-term minor impacts with disruptions to storm water collection, flow, and transportation due to the associated demolition and asphalt removal activities. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of those activities.

Although FEMA has not mapped floodplains surrounding NASA JPL, it is unlikely that the floodplain of the Arroyo Seco would be affected during construction because of the concrete-lined banks on both sides of the water course adjacent to areas currently used as parking for the on-site workforce. Whereas, extrapolation of aerial photography indicates 1.1 ha (2.6 ac) of floodplain associated with the Arroyo Seco adjoins the eastern boundary of NASA JPL and the East Arroyo Parking Lot, the elevation of the proposed Arroyo Parking Structure site is 334 m (1,096 ft) amsl, which is outside of the base floodplain. Thus, EO 11988 does not apply and negligible adverse impacts on floodplain resources would occur under Alternative A.

Operational Impacts

Current and historical NPDES permitted discharges from NASA JPL appear to have minimal impact on the water quality of the Arroyo Seco. There would be no change in the total on-site impervious surface under Alternative A, as the proposed parking structure would replace the current paved parking lot on the eastern perimeter of NASA JPL (**Figure 2-1**). There would be a net decrease in impervious surface resulting from NASA JPL vacating the existing East Arroyo Parking Lot and the associated demolition and asphalt removal activities; thus, no long-term adverse impacts to storm water are anticipated under Alternative A. Negligible long-term adverse impacts to surface water, groundwater, or floodplains are anticipated under Alternative A.

In conclusion, any potential impacts to water resources were determined to be less than significant.

Mitigation Measures

The following is a summary of proposed mitigation measures to minimize impacts to surface water, groundwater, or floodplain resources under Alternative A:

- NASA JPL will implement erosion and sediment control practices, such as sediment trapping, filtering, and other BMPs, as appropriate. The existing Storm Water Management Plan will be modified to address long-term runoff and pollutant discharge.
- NASA JPL will prepare a SWPPP to include time frames when soil would be re-stabilized after being disturbed, the type of stabilization to be used, record of weekly storm events inspections, and maintenance necessary to keep BMPs employed until the site reaches 70 percent stabilization. The SWPPP will address BMPs employed to control erosion and sediment loss at the project site.
- Contractors will avoid adverse impacts on the 100-year floodplain associated with the Arroyo Seco by limiting construction activities to the elevated ground above Arroyo Seco embankments, and ensuring coordination with the CRWQCB during and after high intensity or ongoing rainfall events if construction activities were to occur on or below the embankments.

3.6.2.2 Alternative B

Construction Impacts

Similar to Alternative A, negligible long-term adverse impacts to surface water, groundwater, or floodplains are anticipated under Alternative B. There would be short-term adverse impacts related to demolition and construction activities. Since occupied buildings would be demolished under this alternative, the on-site workforce currently housed in those buildings would need to be relocated into new or existing facilities for demolition activities to take place. Construction would commence at the completion of demolition activities. The phased process (identification of existing structures or construction of new facilities to relocate employees, demolition of occupied structures, and preparation for construction) would present a much longer time frame to implement the parking structure at this site as compared to Alternative A.

Construction or paving activities at the facility is not expected to substantially alter on-site drainage patterns over the long-term because construction is confined to an already developed area of the facility. While demolition and construction activities would not appreciably increase storm water runoff, they

would likely produce minor short-term adverse impacts with disruptions to storm water collection, flow, and transportation.

Construction activities are not expected to require excavation into the water table and adversely impact groundwater resources. Demolition and construction activities would result in a marginal increase in water use because of the increased number of workers at the site, and increased demand for direct construction uses, such as dust controls, equipment washing, and site cleanup. It is expected that the increase in water use by the additional construction workers would be small compared to the overall facility water use.

Dust suppression and other construction-related water uses would be performed using water from tanker trucks filled from local hydrants. The increase in water use would be localized and limited to demolition and construction areas, and would be either intermittent in duration or directly relative to the timing of construction traffic and construction, such as for dust suppression.

Similar to Alternative A, vacating the existing East Arroyo Parking Lot may also result in short-term minor impacts with disruptions to storm water collection, flow, and transportation due to the associated demolition and asphalt removal activities. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of those activities.

Operational Impacts

There would be a minor increase in the total on-site impervious surface under Alternative B, as the proposed parking structure would replace landscape features along with the existing structures, sidewalks, and pavement on the western perimeter of NASA JPL (**Figure 2-1**). There would be a net decrease in impervious surface resulting from NASA JPL vacating the existing East Arroyo Parking Lot and the associated demolition and asphalt removal activities; thus, negligible long-term adverse impacts to storm water are anticipated under Alternative B. No long-term adverse impacts to surface water or groundwater are anticipated under Alternative B. No adverse impacts on floodplain resources are anticipated under Alternative B as the site is not located on a floodplain.

In conclusion, any potential impacts to water resources were determined to be less than significant.

Mitigation Measures

Proposed mitigation measures under Alternative B would be similar to measures proposed under Alternative A.

3.6.2.3 No Action Alternative

Under the No Action Alternative, there would be no changes to water resources in areas surrounding NASA JPL, or on-site. Therefore, no adverse impacts to water resources are anticipated. In conclusion, any potential impacts to water resources were determined to be less than significant.

3.7 Biological Resources

3.7.1 Affected Environment

Biological resources, including local vegetation, wetlands, wildlife, and threatened and endangered species in and surrounding NASA JPL was described in Sections 3.1.10, 3.1.11, 4.1.10, and 4.1.11 of the Master Plan Updates PEA and is incorporated herein by reference.

The project areas under either Alternative A or B have been extensively altered over time and are permanently disturbed with existing facilities, landscaping, and paved roads. The vegetation of the Arroyo Seco HWP area adjacent to Alternative A site is dominated by a mixture of California terrestrial natural plant communities or vegetation series that have been subject to varying levels of disturbance from sand and gravel mining, water conservation, flood control, and recreation activities. No wetlands are located in the vicinity of the two proposed project areas.

Surveys of NASA JPL as recent as 2007 (Tetra Tech. 2007b) did not find evidence of species listed as threatened or endangered by either the state of California or Federal government. No special-status plants were detected during surveys of the facility. No critical habitat has been identified on the site. Historically, portions of the site were designated as critical habitat for the Southwestern Arroyo Toad; that designation was repealed by the USFWS in late 2002.

3.7.2 Environmental Impacts

This section evaluates the potential impacts on the biological resources under Alternatives A and B, and the No Action Alternative.

The impacts on biological resources are significant if species or habitats of high concern are negatively affected over relatively large areas. Impacts are also considered significant if disturbances cause reductions in population size or distribution of a species of high concern. While no significant impacts are anticipated, any potential adverse or beneficial impacts under each alternative, however insignificant, will be discussed in the following sections.

3.7.2.1 Alternative A

Alternative A would be constructed over an existing parking lot and the removal of two mature California Sycamore trees is anticipated. Vacating the existing East Arroyo Parking Lot may result in short-term minor noise impacts to wildlife due to the associated demolition and asphalt removal activities. Activities would include constructing a temporary haul road for heavy equipment to haul removed material to an approved offsite landfill. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of those activities.

Under Alternative A, negligible short- or long-term adverse impacts to vegetation or wildlife are anticipated during construction or during operational activities. No Federal or state-listed species have been identified at NASA JPL; therefore, under Alternative A, no short- or long-term adverse impacts to Federal or state threatened, endangered, or sensitive plant or animal species are anticipated during construction or during operational activities.

Thus, implementing Alternative A would have a negligible adverse effect on either NASA JPL's or off-site biological resources. In conclusion, any potential impacts to biological resources were determined to be less than significant.

3.7.2.2 Alternative B

Alternative B would be constructed on the west perimeter of NASA JPL in the existing mall area. Because it is the largest open area on the NASA JPL facility that contains no buildings, construction of a parking structure would require the removal of approximately 114 mature trees. The trees to be removed are predominately introduced species and they provide cover and nesting opportunities for a multitude of birds, as well as suitable habitat for local fauna including deer, raccoons, skunks, and squirrels. Replanting in other parts of JPL is not an option as enough suitable area does not currently exist on site. Construction or operational activities under Alternative B would result in short- and long-term negligible adverse impacts to vegetation or wildlife.

Similar to Alternative A, vacating the existing East Arroyo Parking Lot may result in short-term minor noise impacts to wildlife due to the associated demolition and asphalt removal activities. Activities would include constructing a temporary haul road for heavy equipment to haul removed material to an approved offsite landfill. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of those activities.

No Federal or state-listed species have been identified at NASA JPL; therefore, under Alternative B, no short- or long-term adverse impacts to Federal or state threatened, endangered, or sensitive plant or animal species are anticipated during construction or during operational activities. In conclusion, any potential impacts to biological resources were determined to be less than significant.

3.7.2.3 No Action Alternative

Under the No Action Alternative, there would be no changes to biological resources in areas surrounding JPL, or on-site; therefore, no adverse impacts to biological resources are anticipated. In conclusion, any potential impacts to biological resources were determined to be less than significant.

3.8 Hazardous Materials and Waste

3.8.1 Affected Environment

Management of hazardous materials and wastes at NASA JPL focuses on evaluation of the storage, handling and transportation capabilities for a site. Evaluation extends to the generation and disposal of hazardous wastes, and includes fuels, solvents, acids and bases, and petroleum oil and lubricants. In addition to being a threat to humans, the improper release of hazardous materials and wastes can threaten the health and well-being of wildlife species, botanical habitats, soil systems, and water resources.

In general, hazardous materials, hazardous substances, and hazardous wastes include elements, compounds, mixtures, solutions, and substances that, when released into the environment or otherwise improperly managed, could present substantial danger to the public health, welfare, or the environment. Hazardous materials and wastes at and surrounding NASA JPL were described in Sections 3.1.13 and 4.1.13 of the Master Plan Updates PEA and are incorporated herein by reference. Please refer to that document for a description of the regulatory framework for hazardous materials and wastes at NASA JPL.

An environmental site investigation consisting of soil samples taken at 14 different locations within the footprint of the Proposed Action was conducted in March and April of 201. Based on the data obtained during this investigation, fill materials in the project vicinity appear to be minimally impacted by organic and metal contaminants of potential concern (COPCs). With the exception of one soil sample collected from a boring at 5 feet below ground surface (for total chromium and lead) located approximately 15 m (50 ft) south of existing Trailer 1714, none of the other soil samples contained detectable concentrations above applicable waste screening criteria (asbestos, metals, polychlorinated biphenyls (PCBs), VOCs, and semi-volatile organic compounds (NASA JPL 2011b).

Therefore, based on the analytical results (excluding the area in the immediate vicinity of the one boring potentially impacted by COPCs), any excavated material for the new parking structure would likely be characterized as non-hazardous for waste disposal if it cannot be reused by NASA JPL. Additional screening criteria used for comparison of detected metals and COPCs included California Human Health Screening Levels and USEPA remedial screening levels. No COPC concentrations found in samples exceeded the applicable waste screening criteria for disposal (NASA JPL 2011b).

3.8.1.1 JPL Hazardous Waste Generation and Handling

JPL generates 1,000 kilograms [kg] (2,204 pounds) or more hazardous wastes per year and is therefore classified as a large quantity generator. Research and development activities generate different types of laboratory chemical wastes, which are generated in small quantities and are commonly chemicals that have either exceeded their shelf life, are excess after project completion, or are spent after being used in a given project. In most cases, the quantity of a laboratory waste is less than 3.78 liters (1 gallon) of liquid or 0.9 kg (2 pounds) of solid material. These are transported offsite for disposal. Hazardous wastes are moved from the point of generation to the Hazardous Waste Accumulation Facility (Building 305) for consolidation prior to transport for recycling/disposal off-site.

Building 305 includes four separate areas for accumulation of compatible materials and a fenced outside area with sloped, epoxy-coated floors for packing laboratory wastes. The facility is designed to contain spills. Inspections of the hazardous waste accumulation facility are conducted weekly per state and Federal regulations.

Materials are removed from Building 305 by a licensed hazardous waste hauler and transported to permitted hazardous waste disposal or recycling facilities. The actual type and quantity can vary daily, and from week to week. Before any waste is accepted at the 90th day for disposal, it must be appropriately containerized, and labeled with a Hazardous Waste Disposal Form. Decisions about whether a particular material is hazardous or non-hazardous are made by JPL in accordance with applicable state and Federal hazardous waste regulations. This system is designed to maintain a complete and precise waste inventory.

3.8.1.2 Pollution Prevention and Waste Minimization

JPL has an established strategy to provide a systematic approach to pollution prevention as presented in its Pollution Prevention Plan. Plan objectives are to develop a program for preventing, reducing, reusing, and recycling waste and emissions. The plan builds on existing programs and activities that currently meet compliance requirements, as well as identifying additional activities while trying to reduce costs associated with pollution prevention programs. The plan also encourages pollution prevention concepts to be implemented in daily business processes to aid the on-site workforce in understanding pollution prevention and environmentally related activities.

An objective of the plan is to measure performance of facility-wide activities in reducing chemical use, increasing efficiency of raw materials, energy, water, waste and other resources and conserving natural resources. NASA set a goal of 50 percent reduction of targeted releases by 2000, and NASA JPL met this goal. Included in the targeted releases are ozone-depleting substances and SARA 313 toxic releases inventory chemicals (SARA 313 TRI). NASA JPL identifies all routinely generated waste streams that result from ongoing processes. Waste minimization measures that have been implemented include:

- Waste stream characterization;
- Source reduction;
- Materials Management through computerized tracking systems;
- Centralized purchase of chemicals;
- Use of *iProcurement* style purchasing, enabling rapid procurement of materials needed in quantities that do not exceed what is needed for the task, thus reducing waste generation of excess chemicals and the need to stockpile extra chemicals; and,
- Hazardous Waste Generator Training classes including instruction on hazardous waste source reduction principals.

Since 1992, NASA JPL has reduced hazardous waste by 94 percent, toxic chemicals by 98 percent, and ozone depleting chemicals by 97 percent. As a result, NASA JPL has recognized cost savings for the period 1992-2009 of $1,312,731 (measured as reduced toxic chemical purchase cost and reduced Hazardous Waste Disposal Fees).

3.8.1.3 Non-Hazardous Wastes

Non-hazardous waste (garbage and recycling) generated at NASA JPL is collected in containers/barrels and disposed of daily by a contractor. A large construction materials container is also provided and removed as needed. Non-hazardous waste materials such as scrap metal, metal drums, scrap paper, pallets, and toner cartridges are periodically recovered and recycled. NASA JPL has an aggressive recycling program with recycling bins distributed throughout the facility for white paper, toner cartridges, and cardboard. Newspaper recycling bins are in all cafeterias. Bound materials, scrap metal and wooden pallets are recycled. Recycling has resulted in a 73 percent landfill diversion. In 2006, over 1,200 tons of non-hazardous materials were recycled.

3.8.1.4 Toxic Substances

Excluding laboratory chemicals, other toxic or hazardous substances that are or were present at NASA JPL include PCBs, asbestos, pesticides, and radiation sources. The status of these, as well as information regarding chemical safety and reporting requirements, is discussed below.

PCBs

Through the 1980s up to 1993, NASA JPL conducted a lab-wide program to identify and remove all PCB transformers and capacitors from the facility. A PCB transformer or capacitor is defined as an item containing more than 500 ppm PCBs. A PCB-contaminated item contains 50 to 500 ppm PCBs. Items may contain up to 500 ppm PCB per Federal definition and be classified as a non-PCB item. As part of

the program, PCB transformers were either removed from the facility and disposed of or had the PCB's removed and then reclassified as non-PCB transformers. In both cases, the PCB oil removed from the transformers was sent off-site for disposal by incineration.

Asbestos

Asbestos is the only substance currently in use at NASA JPL that is regulated by the Federal government under the Toxic Substances Control Act (TSCA). Asbestos removal or abatement is dictated by the renovation or remodeling needs of JPL. Asbestos is found in spray-applied fireproofing and piping insulation. Non-friable asbestos may be contained in flooring tile and adhesive. Asbestos is removed by a licensed contractor in accordance with the asbestos standard of Occupational Safety and Health Administration, 29 C.F.R., 1926-58. Asbestos containing materials (ACM) are handled and disposed of off-site consistent with TSCA.

Pesticides

Use of insecticides, fungicides, herbicides, and rodenticides is regulated by the California Department of Food and Agriculture (CDFA) and the Federal Insecticide, Fungicide, and Rodenticide Act, (FIFRA). A range of pesticides are used at JPL for rodent control and grounds maintenance, and are applied by licensed contractors, who are overseen by certified advisors and applicators. JPL reduces potential environmental impacts of pesticides in use by controlled applications, inventory inspection, and monitoring. All insecticides, fungicides, herbicides, and rodenticides are handled, applied, and disposed of consistent with the CDFA and FIFRA requirements.

Radiation

The possession and use of radioactive materials is governed by a broad-scope radioactive materials license issued by the State of California. A radiation safety committee, composed of staff members experienced in handling and safeguarding radiation sources and radioactive materials, administers JPL's responsibilities under this license. The committee authorizes use, prepares hazard analyses, establishes safety practices, approves facilities in which radiation sources will be used, and monitors activities in which radiation hazards may be a factor. A radiation safety officer appointed by the Director of the Office of Safety and Mission Success supervises and directs personnel in performing radiation safety duties. Ionizing radiation sources are licensed/registered as required.

JPL radiation sources include ionizing (e.g., x-rays, gamma rays, alpha and beta particles, neutrons, protons, high-speed electrons) and non-ionizing emitters (e.g., lasers and radio frequency radiation). Large ionizing radiation sources are few and fixed in location, but small sources are used in varying locations throughout the site. There are fewer than 300 sources of ionizing radiation, most used in equipment calibration. Non-ionizing radiation sources include visible and near-visible infrared lasers, electromagnetic radiation (microwave and radio frequency transmitters) and ultraviolet radiation from ultraviolet lamps. Source controls include occupational safety evaluations of new sources and checks for correct operation and adherence to safety procedures. Storage and disposal is consistent with JPL's radioactive material license conditions.

Chemical Safety and Reporting Requirements

JPL complies with EPCRA and the more strict State of California community right-to-know requirements. JPL is in compliance with Title 19 of the California Code of Regulations (CCR) and

California Business Plan requirements, and provides a California Business Plan annually to the LACFD. As part of the plan, JPL submits a facility inventory of hazardous materials that contains reportable quantities of materials. All acutely hazardous materials stored at JPL are below threshold quantities for Accidental Release Prevention (November 2007). Accidental releases are unanticipated emissions of a regulated substance or other extremely hazardous substance into the ambient air from a stationary source.

3.8.1.5 NASA CERCLA Cleanup

During historical operations at the JPL site, various chemicals and other materials were used. In the 1940s and 1950s, liquid wastes from materials used and produced at JPL, such as solvents, solid and liquid rocket propellants, cooling tower chemicals, and analytical laboratory chemicals, were disposed of into seepage pits, a disposal practice common at that time. By 1958**,** a sanitary sewage system was installed to handle sewage and wastewater, and the use of seepage pits for sanitary and chemical wastes was discontinued. Some of these chemicals, including perchlorate and chlorinated solvents, eventually reached the groundwater hundreds of feet beneath JPL and was subsequently carried by groundwater flow to areas adjacent to the Lab.

In 1992, NASA JPL was placed on the NPL by the USEPA. As the responsible agency, NASA has conducted a number of detailed investigations and studies on the facility and adjacent areas since the early 1990s. As part of the CERCLA cleanup, NASA divided the facility into three separate areas referred to as OUs. Please refer to Section 3.1.13 the Master Plan Updates PEA for a description of the three OUs at NASA JPL. The following were conducted as part of NASA's CERCLA responsibilities:

- Conducted a Remedial Investigation (RI) from 1994 to 1998. The RI report, which characterized the nature and extent of the chemicals in the groundwater, was completed in 1999. The RI for Operable Unit (OU)-1, OU-2, and OU-3 contained human health and ecological risk assessments which look at the possible effects to human health and the environment in the absence of any cleanup action.
- Initiated a groundwater monitoring program in 1996 analyzing for VOCs and other chemicals, including perchlorate, metals, anions, cations, and other field parameters. Analytical results are summarized in quarterly reports and technical memoranda that are available in the Information Repositories and on the project website.
- Conducted modeling and aquifer testing at and adjacent to NASA JPL to characterize the complex groundwater conditions and groundwater flow.
- Completed a draft Feasibility Study in 2000 that identified and evaluated various groundwater cleanup alternatives for the source area and in areas adjacent to NASA JPL.

In addition to these studies, NASA funded treatment facilities for Lincoln Avenue Water Company in Altadena and for Pasadena in the early 1990s to remove VOCs from drinking water wells that were affected by chemicals from NASA JPL. In 2004, NASA implemented a Removal Action directed at the off-facility groundwater to achieve quick, protective results. For that Removal Action, NASA funded additional treatment facilities at Lincoln Avenue Water Company to remove perchlorate in addition to VOCs. This removal action is part of Alternative A for OU-3.

NASA has also conducted studies to determine the best technologies to use to treat groundwater. In the late 1990s and early 2000s, NASA conducted pilot testing of several technologies to address dissolved

perchlorate in source area groundwater, including a study that evaluated the effectiveness of a biological reactor technology called a fluidized bed reactor. Based on these studies, NASA installed a demonstration treatment plant on NASA JPL in the source area in 2005. This system, which consists of liquid-phase granular activated carbon treatment to remove VOCs and a fluidized bed biological reactor to remove perchlorate, was successful in the demonstration phase. All CERCLA documentation associated with NASA JPL can be found in the Information Repository section of the NASA CERCLA website http://jplwater.nasa.gov.

3.8.2 Environmental Impacts

This section describes the potential environmental consequences associated with hazardous materials and waste, as a result of implementing Alternative A, Alternative B, or the No Action Alternative at NASA JPL. Impacts to hazardous material management would be considered adverse if any of the three alternatives resulted in noncompliance with applicable Federal and state regulations, or increased the amounts of hazardous materials/wastes generated or procured beyond current NASA waste management procedures and capacities.

Impacts on pollution prevention would be considered adverse if any of the three alternatives resulted in worker, resident, or visitor exposure to these materials, or if the action generated quantities of these materials beyond the capability of current management procedures. Impacts on the JPL/NASA CERCLA Program would be considered adverse if any of the three alternatives disturbed (or created) contaminated sites resulting in negative effects on human health or the environment, or hindered the ongoing remedial efforts of NASA's CERCLA program.

While no significant impacts are anticipated, any potential adverse or beneficial impacts under each alternative, however insignificant, will be discussed in the following sections.

3.8.2.1 Alternative A

Construction Impacts

Since Building 322 was built in 2003 and Trailer 1714 was built in 1997, no wastes containing hazardous materials or substances such as ACM, lead-based paint (LBP), pesticides, and herbicides would be produced during demolition activities; therefore, negligible adverse impacts from facility demolition are anticipated.

Vacating the existing East Arroyo Parking Lot may result in short-term minor impacts due to the associated demolition and asphalt removal activities. Activities would include constructing a temporary haul road for heavy equipment to haul removed material to an approved offsite landfill. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of those activities.

Products containing hazardous materials or substances such as fuels, oils and lubricants would be procured and used during deconstruction and construction activities. It is anticipated that the quantity of such hazardous materials used would be minimal.

Accidental spills could occur as a result of the construction and demolition activities. A spill could potentially result in adverse effects on wildlife, soils, water, and vegetation. However, the amount of hazardous materials at construction sites would be limited and the equipment necessary to quickly contain

any spill would be present at all times. Contractors would coordinate the management of hazardous materials and wastes with NASA JPL.

Operational Impacts

Under Alternative A, it is anticipated that procurement of products containing hazardous materials would be comparable with existing conditions. Therefore, it is estimated that hazardous material procurement would remain comparable to the baseline condition. It is anticipated that the volume, type, classifications, and sources of hazardous wastes associated with Alternative A itself would be negligible. Overall hazardous material use and hazardous waste disposal would be similar in nature with the baseline condition waste streams. Hazardous waste would be handled, stored, transported, disposed of, or recycled in accordance with applicable federal, state and local laws and ordinances.

In conclusion, any hazardous materials or hazardous waste impacts were determined to be less than significant.

Mitigation Measures

Removal of contaminated building structures, equipment, and soil will be consistent with NASA policies and Federal, state, and local requirements, and include both BMPs and appropriate construction management practices.

Because one localized area of the project site contains impacted soil (NASA JPL 2011b), proper inspection and monitoring requirements will be included as part of project controls to ensure proper protection of the health and safety of on-site workers during any proposed construction and/or excavation activities. Additional provisions for environmental compliance (health and safety plan, soil/waste management plan, etc.) will be identified to address future utility or incidental earthwork involving limited or shallow soil excavation in areas where impacted soil may be present.

3.8.2.2 Alternative B

Negligible adverse construction or operational impacts on the existing NPL sites are anticipated.

Construction Impacts

Because of the age of the existing buildings, many of the facility buildings and equipment may contain hazardous substances, such as ACM, LBP, PCBs, and mercury. It is anticipated that the hazardous and chemical wastes generated from facility demolition would result in short-term minor adverse effects.

Similar to Alternative A, vacating the existing East Arroyo Parking Lot may result in short-term minor impacts due to the associated demolition and asphalt removal activities. Activities would include constructing a temporary haul road for heavy equipment to haul removed material to an approved offsite landfill. These effects would be localized and occur only when demolition activities actually occur and would continue for the duration of those activities.

Products containing hazardous materials or substances such as fuels, oils and lubricants would be procured and used during deconstruction and construction activities. It is anticipated that the quantity of such hazardous materials used would be minimal. Accidental spills could occur as a result of the construction. A spill could potentially result in adverse effects on wildlife, soils, water, and vegetation. Contractors would coordinate the management of hazardous materials and wastes with NASA JPL.

Operational Impacts

Similar to Alternative A, it is anticipated that procurement of products containing hazardous materials would be comparable with existing conditions under Alternative B. Therefore, it is estimated that changes in hazardous material procurement itself would be negligible. Overall, hazardous material use and hazardous waste disposal would be similar in nature with the baseline condition. Hazardous waste would be handled, stored, transported, disposed of, or recycled in accordance with applicable federal, state and local laws and ordinances.

In conclusion, any hazardous materials or hazardous waste impacts were determined to be less than significant.

3.8.2.3 No Action Alternative

Under the No Action Alternative, there would be no changes to hazardous materials and wastes in areas surrounding JPL, or on-site. Therefore, no adverse impacts to hazardous materials and wastes are anticipated. In conclusion, any hazardous materials or hazardous waste impacts were determined to be less than significant.

3.9 Visual Resources

3.9.1 Affected Environment

Visual resources within the study area are representative of a highly industrial area. NASA JPL consists of 138 buildings and other minor ancillary structures, totaling over 233,000 gross sq m (2.5 million gross SF) in area. The primary land use near NASA JPL is residential along with undeveloped areas of the ANF to the north. The communities of La Cañada Flintridge, Pasadena, and Altadena exist to the west, south, and east, respectively. The ANF is largely undeveloped and improved with hiking/equestrian trails and service roads. No state forests or parks exist in the surrounding area. **Figure 3-1** depicts current land use. Visual sensitivity of the site is considered high due to the large number of viewers from surrounding communities who can see NASA JPL and the proposed parking structure's location within NASA JPL facility.

3.9.2 Environmental Impacts

The proposed alternatives would result in an adverse impact if the alternatives were to substantially degrade the scenic quality of the site or the immediate surrounding area. The extent to which the proposed project may affect the visual resource depends on the amount of visual contrast created between the proposed new parking structure and the visual characteristics of the surrounding area. Impacts would occur if the project resulted in visual contrasts that had a negative impact on the visual setting of the site or surrounding area, or impacted the viewshed from the surrounding communities or any other nearby sensitive land uses.

Implementation of Alternatives A or B would not substantially change the existing view shed for either location.

3.9.2.1 Alternative A

The proposed site for Alternative A is already industrial in nature and the fact that this site is the lowest point in the topography of NASA JPL which results in the skyline of the existing buildings being higher than the proposed seven-level structure. This also minimizes effects of the hills behind the existing structures. NASA JPL would attempt to minimize any potential impacts to visual resources on the HWP and neighboring community east of the Arroyo Seco by developing a pleasing eastern façade for the structure that blends well with the existing buildings, the natural surroundings of the HWP, or both. NASA JPL is planning to make the parking structure aesthetics one of the selection criteria for the design/builder of the parking structure. Any required nighttime lighting would be safe and aesthetically pleasing to nearby residences.

In conclusion, any impacts to visual resources were determined to be less than significant.

3.9.2.2 Alternative B

Under Alternative B, there are already numerous existing buildings in the mall area of similar size to the proposed nine-story parking structure. For example, adjacent Building 180 is higher up in topography and is nine levels, Building 238 is eight levels, and Building 183 is nine levels and includes a penthouse. While the proposed parking structure would be a relatively large structure, it is similar in vertical scale to Buildings 180, 264, and 183. This similarity in vertical size does not appreciably alter the current JPL skyline or the view of the hills behind the existing buildings. NASA JPL would treat the western facade in a similar fashion as Alternative A's eastern facade in order to minimize any visual effects to the residences located to the west of the existing west parking lot. In conclusion, any impacts to visual resources were determined to be less than significant.

3.9.2.3 No Action Alternative

Under the No Action Alternative, there would be no changes to visual resources in areas surrounding JPL, or on-site. Therefore, no adverse impacts to visual resources are anticipated. In conclusion, any visual resources impacts were determined to be less than significant.

3.10 Cumulative Impacts

The CEQ regulations require assessment of cumulative impacts in the decision-making process for Federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions" (40 CFR 1508.7). Cumulative impacts were determined by combining the incremental impacts of each alternative with other past, present, and reasonably foreseeable future actions.

3.10.1 Past Actions

NASA JPL was developed over many years, beginning in the late 1930s and continuing to the present. The area that is now NASA JPL was originally open fields. NASA JPL first used these fields for experimentation in propulsion, which lead to the construction of a few small shacks and some buried bunkers used to test propellants and other fuels. In 1940, the facility was acquired by the U.S. Army and construction of permanent/semi-permanent buildings began. The first permanent structure, described as an engineering building was added to the facility in 1942 with the start of activities supporting World

War II efforts. At least 97 additional buildings/structures were constructed during the remainder of the 1940s. Some of the earlier, temporary buildings or inadequate facilities were replaced at this time with more permanent structures.

During the 1950s, another 60 buildings/structures were completed as either new construction or to replace outdated facilities. During the 1960s, 78 buildings/structures were constructed. Some of these replaced older, outdated structures. During the period 1970 to 1980, 51 additional buildings/structures were constructed at the facility as either new construction or to replace outdated facilities. In the 1980s, ten buildings were added to the facility.

From 1990 to 2010, an additional 49 buildings/structures were constructed. A significant number of these structures were temporary trailer offices. Over the life of NASA JPL, more than 325 facilities have been constructed on site. Of these, 222 buildings/structures are still standing.

From a cumulative perspective, past development of NASA JPL from its initial appearance as open fields to the urban setting that exists at the current time has been a major impact. However, the existing footprint of the Laboratory has been in place for approximately 50 years. The construction of a new parking structure at NASA JPL does not create a major impact in relation to the overall impact of the Laboratory.

3.10.2 Planned or Reasonable Foreseeable Projects

3.10.2.1 On-Site

The NASA JPL Master Plan Update (AC Martin 2011) proposes and describes several Recapitalization Buildings/Projects over a 20-year time horizon. One reasonably foreseeable project is the Flight Electronics Facility. This 85,000 sq ft facility would be located west of the intersection of Mariner Road and Explorer Road in an existing built up industrial area, and would require the demolition of existing Trailers 1722 and 1723. It would be a 4-story facility with clean rooms for the fabrication, assembly, and functional testing of flight hardware. The fabrication and assembly areas would be a mix of low and high bays. A small portion of the building would be allocated to general offices for fabrication and Q&A. There would also be a small, box level, Thermal Vacuum and Dynamics test area on site to eliminate the current practice of the transporting of components back and forth from test facilities.

A key feature of this facility would be direct vehicular service access to Explorer road. This would reduce the need for service vehicles to use Mariner Road. The Flight Electronics Facility would consolidate many of the laboratories working with flight science which currently are spread throughout NASA JPL. This would allow a better discourse between affiliated programs currently located in Buildings 300 and 302. Furthermore, the Flight Electronics Facility should allow pedestrians who require assistance to use the circulation systems to ascend from Mariner Road to Explorer Road.

While NASA JPL expects minor construction impacts on existing air quality and noise, it does not anticipate any traffic-related or visual resources impacts, or any other long-term impacts on the human environment. The proposed project is not expected to result in any cumulative impacts associated with either Alternative A or Alternative B. In conclusion, any cumulative impacts were determined to be less than significant.

3.10.2.2 Off-Site

Tehachapi Renewable Transmission Project - The major regional project planned for the Pasadena area is the Tehachapi Renewable Transmission Project (TRTP), an approximately $2 billion effort by SCE to develop electric transmission lines and substations that will deliver electricity from renewable sources such as wind farms, solar arrays and geothermal generation stations in the Tehachapi area to the California transmission grid. The California Public Utilities Commission approved TRTP in March 2007, and was the first major effort to meet California's renewable energy goals. Construction is now underway on segments 1 through 3. Segments 4 through 11 of the TRTP are scheduled for construction in 2015 and involve construction projects throughout multiple Los Angeles County municipalities, including La Canada Flintridge, Pasadena, and Altadena (**Figure 3-6**).

Figure 3-6 depicts the location of two substations and two transmission lines to be constructed as Segment 11 in the immediate vicinity of NASA JPL. A 500-kV line will be constructed through the San Gabriel Mountains, running south from Tehachapi into La Canada Flintridge where it will connect with a power substation located adjacent to the HWP 2.35 km (1.46 mi) northwest of NASA JPL. A 220-kV transmission line would run from this substation east across the Arroyo Seco and along the northern boundary of Altadena, before heading south through Pasadena adjacent to the Eaton Canyon Creek. The second local substation will be constructed in Pasadena, 9.25 km (5.75 mi) southeast of the NASA JPL, adjacent to West Foothills Boulevard and I 210.

In summary, the proposed project is not expected to result in any cumulative impacts associated with either Alternative A or Alternative B. In conclusion, any cumulative impacts were determined to be less than significant.

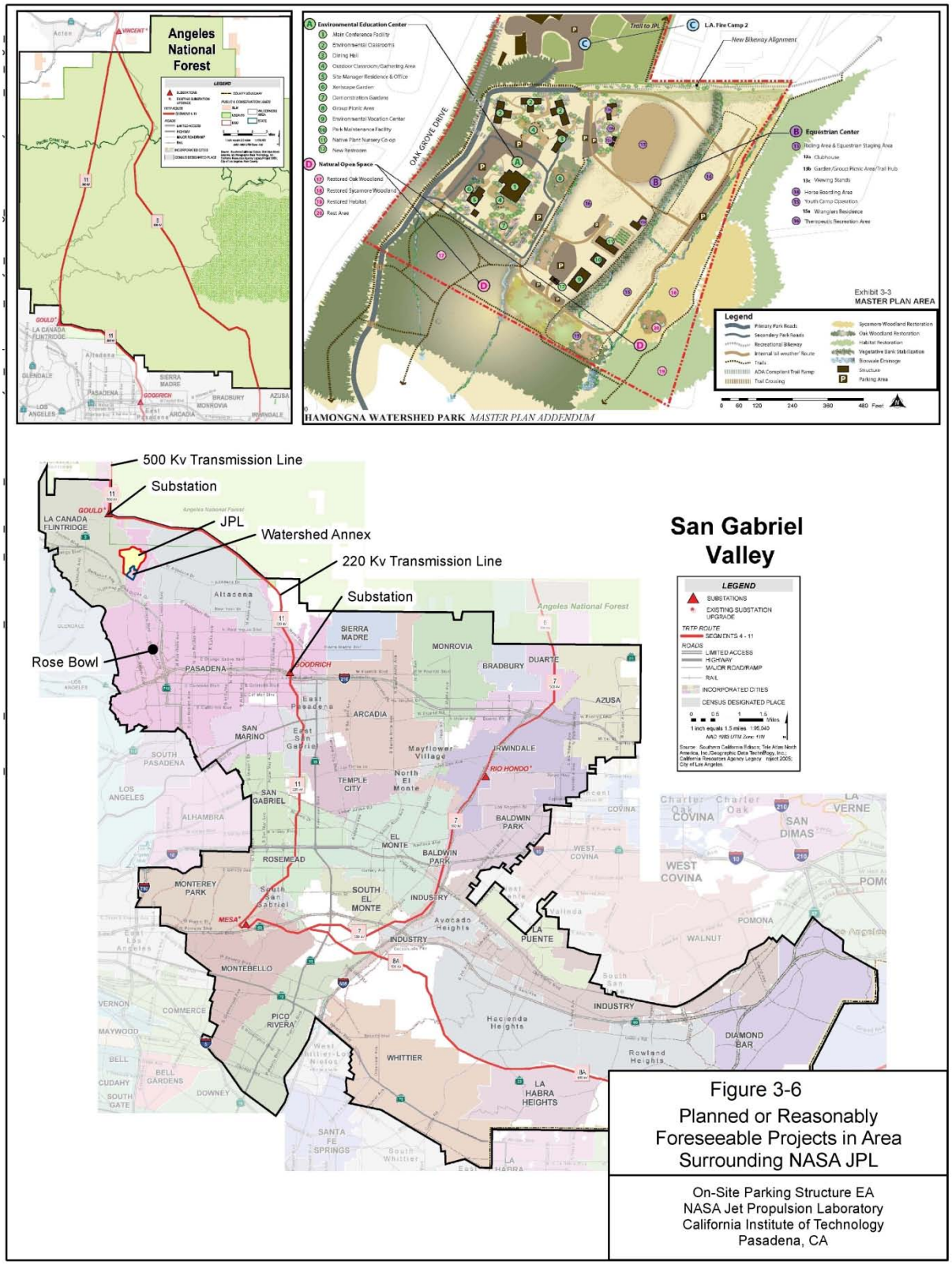
Devil's Gate Reservoir Sediment Removal and Management Project – Deemed vital to the health of the Arroyo Seco flood control system, Los Angeles County's upcoming sediment removal project in Hahamongna Watershed Park anticipates excavating up to 4.0 million cubic yards of sediment from an area of up to 175 acres behind Devil's Gate Dam. The goal of this project is to restore flood control capacity to the facility and establish a reservoir configuration more suitable for routine maintenance activities including sediment management. An Environmental Impact Report is being prepared pursuant to the California Environmental Quality Act to consider alternative ways of handling the sediment, assess the potential environmental impacts, and propose adequate mitigation for any anticipated environmental damage. The project is expected to occur between Spring 2014 and Winter 2019.

This large project could have significant adverse impacts on air quality, biological resources, greenhouse gas emissions, transportation, noise and recreation. The anticipated $35 million project estimates moving 300 to 400 truckloads a day, five days a week for three years during the dry season from May to December. In contrast, under Alternatives A or B, NASA JPL anticipates no more than 400 truckloads over a 20-day period to haul the material off site, for an estimated 20 truckloads per day.

The proposed project is not expected to result in any cumulative impacts associated with either Alternative A or B. In conclusion, any cumulative impacts were determined to be less than significant.

City of Pasadena 2011–2015 Capital Improvements Program - The majority of local projects planned for the area surrounding NASA JPL area are municipal projects created under the City of Pasadena 2011–2015 Capital Improvements Program (CIP).

Figure 3-6. Planned or Reasonably Foreseeable Projects in Area Surrounding NASA JPL



On June 14, 2010 the City of Pasadena released their CIP with plans to invest more than $1.3 billion during the five fiscal years to 2015. The Pasadena CIP is a regional collaborative effort to create a long-range plan, integrating multiple public works, infrastructure, transportation and municipal redevelopment projects. The following two projects in particular face heightened visibility with respect to NASA JPL, due to proximity and location within the Arroyo Seco which is located immediately adjacent to the NASA JPL facility.

Rose Bowl Improvements - The Rose Bowl is 3.65 km (2.25 mi) south of NASA JPL, and therefore would not be anticipated to produce cumulative impacts if construction occurred concurrently with either Alternative A or Alternative B. However, the proximity of the HWP, and in particular the location of the Hahamongna Annex immediately adjacent to the southern NASA JPL boundary, are anticipated to produce minor cumulative impacts due to increased volumes of traffic along Oak Grove Drive, between the North Arroyo exit from the Interstate 210 and NASA JPL. The proposed project is not expected to result in any cumulative impacts associated with either Alternative A or B. In conclusion, any cumulative impacts were determined to be less than significant.

Arroyo Seco Projects – The City of Pasadena has allotted $162,220,094 across three sets of project areas in the Arroyo Seco. The HWP and Hahamongna Annex redevelopments are located immediately adjacent to the eastern and southern boundaries of NASA JPL, and will receive the majority of funding, forecast to be $7,599,088. The proposed project is not expected to result in any cumulative impacts associated with either Alternative A or Alternative B. In conclusion, any cumulative impacts were determined to be less than significant.

Other Pasadena CIP Projects - proposed for the reasonably foreseeable future that are relevant to the study area, are listed below together with forecast funding to indicate relative size of the projects:

- Pasadena Water System Improvements - $598,915,334;
- Pasadena Transportation and Parking facilities - $56,317,123;
- Pasadena Electric System Improvements $589,915,334;
- Pasadena Street and Streetscape Upgrades- $47,525,937;
- Street Lighting and Electric Undergrounding - $58,719,420; and
- Pasadena Municipal Buildings & Systems - $40,081,506.

These projects, should they be constructed as anticipated, are not expected to result in any cumulative impacts associated with either Alternative A or Alternative B. In conclusion, any cumulative impacts were determined to be less than significant.

4.0 CONSULTATION AND COORDINATION

4.1 Agencies and Organizations

Agencies and organizations contacted for information, or that assisted in identifying important issues or analyzing impacts, or that will review and comment upon the EA include:

4.1.1 Federal Agencies

Advisory Council on Historic Preservation
National Aeronautics and Space Administration
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
U.S. Geological Survey

4.1.2 State Agencies

California Air Resources Board
California Department of Resources Recycling and Recovery
California Department of Toxic Substances Control
California Department of Transportation
California Environmental Protection Agency
California Office of Historic Preservation
California Public Utilities Commission
California State Water Resources Control Board
Los Angeles Regional Water Quality Control Board
South Coast Air Quality Management District

4.1.3 City and County Agencies

City of Pasadena Department of Public Works
City of Pasadena Department of Water and Power
Los Angeles County Department of Public Works
Los Angeles County Health Department
Los Angeles County Metropolitan Transit Authority
Los Angeles County Sanitation District

4.1.4 Other Organizations

Southern California Edison
Southern California Gas Company

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6.0 LIST OF PREPARERS

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APPENDIX A

Agency Coordination

PASADENA WATER AND POWER

October 24, 2007

Mr. Gary R. Gray
Lease Facilities Administrator
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, California 91109-8099

Subject: Installation of Percolation Ponds

Dear Mr. Gray:

This letter is to inform you of Pasadena Water and Power's (PWP) timing on the installation of percolation ponds (spreading basins) where the Jet Propulsion Laboratory (JPL) leases parking from the City of Pasadena on the northeast side of the Hahamongna Watershed Park. PWP has tentatively scheduled construction of the spreading basins for the summer of 2013. Removal of the asphalt and parking structures will need to occur before this time.

The following are reasons to move ahead with the construction of spreading basins:

- As imported water supplies continue to be limited, it is imperative that PWP maximize its local water resources. Enlarging and adding to the current spreading basins will allow for more capture of stream water flows during wet seasons. This will increase recharge of the groundwater basin and provide water during drought years.

- Spring of 2009 is the schedule startup of a new groundwater treatment plant near JPL. The operation of the treatment plant is limited by the amount of water PWP has a right to extract from the groundwater basin. By increasing the spreading basin this will increase PWP's pumping rights, thus allowing more contaminated groundwater to be treated.

- Removal of the JPL east parking lot has always been part of the Hahamongna Watershed Park Master Plan to better naturalize the area. The parking lot is an important area for natural habitat and a corridor for animal movement.

While the summer of 2013 is over five years away, staff is hopeful that this information will assist you with your planning at JPL.

If you have any questions, please contact Mr. Brad Boman, Engineering Manager, at (626) 744-4278.

Sincerely,

for

Phyllis Currie
General Manager

BB/hs

c: Martin Pastucha, Director of Public Works

Jet Propulsion Laboratory
California Institute of Technology
4800 Oak Grove Drive
Pasadena, California 91109-8099
(818) 354-4321

February 27, 2012

Reply To 280/03-12:GG:gg

Phyllis E. Currie
Pasadena Water and Power
General Manager
150 S. Los Robles Ave., Suite 200
Pasadena, CA 91101

Subject: Restoration of the East Arroyo Parking Lot by JPL at the end of the lease term.

Dear Ms Currie:

As you are aware, when JPL vacates the East Arroyo Parking Lot, the lease provides that JPL restore the property to its natural condition as outlined in the following lease clause

> (f) Restoration:
> Upon expiration of this Lease, the Tenant, unless otherwise advised by the Landlord shall remove all structures and other improvements made by the Tenant and restore the Property to its natural condition. Such work shall not include paving on the Lower Road as described in Article 1 nor the northernmost approximate 200 spaces of the East Arroyo parking lot. Such work shall be completed no later than 120 days after the termination date. In the event JPL exercises its option to extend the Lease through June 30, 2013, said restoration work shall be completed by June 30, 2013, absent a force majeure event. The Landlord reserves the right to unilaterally extend tenant restoration work completion dates up to a period of no longer than six months or, in the alternative, to undertake such work on its own at Tenant's reasonable expense, in which event, Landlord will be reimbursed by JPL within 30 days from receipt of an invoice from the Landlord.

As a Federally Funded Research and Development Center (FFRDC), located on NASA owned property, JPL is subject to the requirements of the National Environmental Policy Act (NEPA). Moreover, JPL is fulfilling the NASA environmental review requirement by completing a site specific Environmental Assessment (EA) for a proposed on-site parking structure that also address the near-term need associated with vacating of the East Arroyo Parking Lot and its 1,093 parking spaces.

Although the current lease termination date is more than one year away, for budget purposes, we desire to have an agreement on what is expected of JPL in order to satisfy the restoration clause in the current lease. I have discussed this matter with Brad Boman of your department and we jointly compiled the following list of improvements to be removed by JPL.

1. Remove the guard structure at the southern end of the leased parking area.
2. Remove all JPL bus stops and their foundations.
3. Remove all chain link fencing and gates surrounding the leased parking lot area.
4. Remove chain link fencing on north and south side of bridle trail crossing the parking lot area.
5. Remove all bollards located in the leased parking lot area.
6. Remove all sign posts and other signage located in the leased parking lot area.
7. Remove all poles and lighting in the leased parking lot area.
8. Fill and compact soil in holes left from the removal of the aforementioned foundations, footings, poles or other structures in the leased parking area.

9. There is 357,347 square feet of paved area in the 9.58 acres leased from the City.
    a. Allowing 47,164 square feet of paving to remain for a 26 foot wide roadway from the southern end of the parking lot to the JPL Bridge and an allowance of 64,061 square feet of paving to remain to accommodate a 200 vehicle parking area, JPL will remove 246,122 square feet of paving in the leased parking area.
    b. The City will provide to JPL the location of the roadway and parking area prior to JPL removing any paving.
    c. No improvements to the remaining roadway or parking area will be made by JPL.
    d. The paving and any base material will be removed to the existing grade and no finish grading or changes to the existing grade will be made. The removed pavement will be sent off site to be managed in an environmentally sound manner and according to Federal, State and local requirements
    e. No planting, restoration of vegetation or irrigation system will be provided by JPL
10. The City will notify JPL if City Permits are required for any of the aforementioned work.
11. Prior to the removal of any improvements by JPL, the City will notify JPL that all CEQA requirements have been met.

The foregoing list is intended to be all inclusive for removing any and all improvements made by JPL. At any time, before the actual removal, the City has the option to modify the list by requesting that specific items not be removed. For example, if the City desires to retain a portion of the perimeter fencing the City may notify JPL of this fact and JPL will not remove the fencing.

As mentioned previously, the intent of this letter is to indentify "all" improvements made by JPL subject to the restoration clause of the lease. If you agree that this letter has accomplished that goal, please acknowledge and return the letter to me.

If this is not the case, JPL is open to a discussion leading to a mutual understanding of JPL restoration requirements at the end of the East Arroyo Parking Lot Lease,

Best Regards,

Gary Gray
JPL Facilities
Leased Facilities Administrator

_____

Concur Date
Phyllis E. Currie

APPENDIX B

General Conformity Applicability Analysis for NASA JPL

EXECUTIVE SUMMARY

Agencies: National Aeronautics and Space Administration (NASA), Jet Propulsion Laboratory (JPL)

Designation: Clean Air Act General Conformity Analysis

Affected Location: JPL Oak Grove Campus, Pasadena, CA

Proposed Action: Implement Master Plan

Abstract: Section 176 (c) of the Clean Air Act (CAA) (42 U.S.C. § 7506(c)) requires any entity of the Federal Government that engages in, supports, or in any way provides financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable State Implementation Plan (SIP) required under Section 110 (a) of the CAA before the action is otherwise approved. In this context, conformity means that such Federal actions must be consistent with a SIP's purpose of eliminating or reducing the severity and number of violations of national ambient air quality standards (NAAQS) and achieving expeditious attainment of national ambient air quality standards.

JPL is currently undertaking analysis of existing facilities and infrastructure, while simultaneously forecasting future needs and objectives to enable NASA to continue to meet its mission. JPL is proposing the development of a comprehensive planning strategy through the implementation of a Master Plan which would cover development at the JPL Oak Grove facility in Pasadena, California over the next two decades. This document represents the General Conformity Analysis completed by NASA/JPL, including analysis of potential impacts to air quality as a result of implementing the proposed Master Plan; analysis of the General Conformity applicability; and documentation of the findings.

Conformity

Analysis: After careful and thorough consideration of the conformity analysis contained herein, the project proponent finds that the total direct and indirect emissions associated with the Proposed Action at the JPL Oak Grove Campus would not exceed the applicable *de minimis* thresholds, and that the Proposed Action would therefore be exempt from the requirements of the Federal Conformity Rule consistent with the objectives as set forth in Section 176(c) of the CAA, as amended, and its implementing regulation, 40 CFR Part 93, Subpart B, Determining Conformity of General Federal Actions to State and Local Implementation Plans.

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B 1.0 INTRODUCTION

Section 176 (c) of the Clean Air Act (CAA) (42 U.S.C. § 7506(c)) requires any entity of the Federal Government that engages in, supports, or in any way provides financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable State Implementation Plan (SIP) required under Section 110 (a) of the CAA before the action is otherwise approved. In establishing the Final General Conformity Rule, the U.S. Environmental Protection Agency (USEPA) requires Federal agencies to evaluate a proposed Federal action and ensure that it does not:

- Cause a new violation of a national ambient air quality standards (NAAQS)
- Contribute to an increase in the frequency or severity of violations of NAAQS
- Delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS

The General Conformity Rule requires that Federal agencies consider total direct and indirect emissions of criteria pollutants. Conformity must be shown for those pollutants (or precursors of those pollutants) emitted in areas designated as nonattainment, as well as for those pollutants which an area has been redesignated from nonattainment to attainment (i.e., a maintenance area). In this context, conformity means that such Federal actions must be consistent with a SIP's purpose of eliminating or reducing the severity and number of violations of NAAQS and achieving expeditious attainment of national ambient air quality standards. Each Federal agency must determine that any action that is proposed by the agency and that is subject to the regulations implementing the conformity requirements will, in fact, confirm to the applicable SIP before the action is taken.

NASA JPL is currently undertaking analysis of existing facilities and infrastructure, while simultaneously forecasting future needs and objectives to enable NASA to continue meeting its mission. NASA JPL is proposing the development of a comprehensive planning strategy through the implementation of a Master Plan which would cover development at the NASA JPL facility in Pasadena, California over the next two decades. This document represents the General Conformity Analysis completed by NASA JPL, including analysis of potential impacts to air quality as a result of implementing the proposed Master Plan; analysis of the General Conformity applicability; and documentation of the findings.

B 1.1 Document Organization

Section B 1.0 of this document serves as a general introduction to the Proposed Action, and the applicable requirements associated with air quality regulations that must be fulfilled in order for the project proponent (NASA JPL) to approve and commence the action. The section includes an outline of this document; the regulatory background and regulatory requirements of the General Conformity Rule; the General Conformity Exemptions & Applicability; CAA General Conformity Criteria; and other potentially applicable SIP Implementation Plan Consistency Requirements.

Section B 2.0 of this document completes an applicability analysis for the Proposed Project in terms of the General Conformity rules, and examines the Proposed Action within the regional air quality scenario. The section includes the purpose of the Conformity Analysis; a description of the NASA JPL facility and the Proposed Action; existing air quality conditions in the region, and their relationships to this Conformity Analysis; and the

applicability of the conformity rule to the proposed implementation of the Master Plan at the NASA JPL facility. Section B 3.0 provides the emissions estimations attached to this analysis; details the calculation methodologies; and provides the conformity analysis results for the Proposed Action. The section identifies the sources included in the conformity analysis; provides the total direct and indirect emissions calculations; and provides the applicability analysis results. Finally, Section B 4.0 provides the conclusion and findings of the conformity review and applicability analysis.

B 1.2 Background

The CAA and Clean Air Act Amendments (CAAA) were passed by Congress and corresponding rules were promulgated by USEPA because it was determined that certain pollutants have the potential to cause an adverse effect on public health and the environment when certain concentrations are exceeded in ambient air. In order to control and regulate the main air pollutants and better maintain air quality levels, NAAQS were established for seven 'criteria pollutants'. These pollutants included carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), sulfur oxides (SO_x), and lead (Pb). The USEPA then established a set of 'primary' NAAQS to protect the public health with an adequate margin of safety, and a 'secondary' set of NAAQS to protect public welfare.

Air quality 'conformity' provisions first appeared in the CAA of 1977. These provisions stated that no Federal agency could engage in; support in any way; provide financial assistance for; license, permit, or approve any activity that did not conform to a SIP after approval and promulgation. Section 176 of the CAA (42 United States Code 7506c) as amended in 1990, further explained conformity to an implementation plan as meaning conformity to the plan's purpose of eliminating or reducing the severity of violations of the NAAQS, and achieving timely attainment of these standards.

In November 1993, the USEPA promulgated regulations and requirements that clarified the applicability, procedures, and analyses necessary to ensure that Federal facilities comply with the CAA. Then in 1997, the USEPA initiated work on new General Conformity rules and guidance to reflect the new 8-hour O_3, $PM_{2.5}$, and regional haze standards that were also promulgated that year. However as a result of litigation, implementation of the new O_3 and $PM_{2.5}$ ambient air quality standards were delayed and these new conformity requirements were not completed by the USEPA until 2006 when the $PM_{2.5}$ *de minimis* levels were added.

The latest revision of the General Conformity rules occurred on April 5, 2010 (USEPA 2010). In this revision the USEPA sought to clear up identified issues, reduce specific regulatory burdens, and modify the rules to be helpful to states revising their SIP for implementing the revised NAAQS while assuring Federal agency actions continue to conform. Several of the burden reduction measures changes made to the General Conformity applicability in 40 CFR 93.153 included the following four items:

1. Deleting the provision that requires Federal agencies to conduct a conformity determination for regionally significant actions under (40 CFR 93-153) where the direct and indirect emission of any pollutant represent 10 percent or more of a nonattainment or maintenance area's emission inventory for that pollutant, even though the total direct and indirect emissions are below *de minimis* levels. This provision previously applied even though the total direct and indirect emissions from the actions were below the *de minimis* emission levels, or if the actions were otherwise "presumed to conform."

2. Adding new types of actions that Federal Agencies can include in their "presumed to conform" lists and permitting States to establish in their General Conformity SIPs "presumed to conform" lists for actions within their State.

3. Finalizing an exemption for the emissions from stationary sources permitted under the minor source New Source Review (NSR) programs similar to the USEPA's existing General Conformity regulation which already provides for exemptions for emissions from major NSR sources.

4. Establishing procedures to follow in extending the 6-month conformity exemption for actions taken in response to an emergency.

B 1.3 General Conformity Exemptions and Applicability

Source Exemptions

The general conformity provisions identify specific Federal actions or portions of actions that are exempt from the conformity procedural requirement, because the USEPA has deemed these actions to conform. These actions include those that must undergo thorough air quality analysis to comply with other statutory requirements; actions that would result in no emission increase or an increase in emissions that is *clearly de minimis*; or actions presumed to conform by the agency through separate rule-making actions.

De minimis Emission Thresholds

The Conformity Rule requires that Federal agencies complete a conformity applicability analysis to determine whether a formal conformity determination is required. The primary criteria used in an applicability analysis are the *de minimis* threshold levels promulgated in 40 CFR 93.153(b). The total direct and indirect emissions associated with a proposed action are quantified, to enable comparison to the *de minimis* thresholds.

The conformity rule defines direct and indirect emissions based upon the timing and location of the emissions. "Direct" emissions are those that are caused or initiated by the Federal actions, and occur at the same time and place as the action and are reasonably foreseeable. "Indirect" emissions are those that originate in the same nonattainment or maintenance area, but occur at a different time or place from the Federal action. In addition, the conformity rule limits the scope of indirect emissions to those that are ***reasonably foreseeable*** by the agency at the time of analysis, and those emissions that the Federal agency can practicably control and maintain control of through its continuing program responsibility.

The definitions of direct and indirect emissions do not distinguish among specific source categories; point, area, and mobile sources are given equal consideration in the conformity requirements. All substantive procedural requirements of the General Conformity Rule apply to the total of the net increases and decreases in direct and indirect emissions resulting from the action.

The applicability determination procedures presented in the rule include the following elements:

- Define the applicable emission sources for the Federal action
- Calculate the total direct and indirect emissions of nonattainment pollutants from these sources
- Compare these emission rates against the appropriate *de minimis* emission levels

Table B-1 below presents the applicable *de minimis* thresholds promulgated for use under the General Conformity Rule. If the total of direct and indirect emissions of pollutants in nonattainment or maintenance status produced by the action reach or exceed the *de minimis* applicability threshold values, the Federal agency must perform a Conformity Determination to demonstrate the positive conformity of the action with the applicable SIP. The *de minimis* emission levels vary by criteria pollutant and severity of the region's nonattainment conditions.

Table B-1. Conformity *de minimis* Emission Thresholds

Pollutant	Status	Classification	*de minimis* Limit (tpy)
Ozone (measured as NO_x or VOCs)	Nonattainment	Extreme	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 (NO_x)
		All others	100
	Maintenance	Inside ozone transport region	50 (VOCs)/100 (NO_x)
		Outside ozone transport region	100
Carbon Monoxide (CO)	Nonattainment/ maintenance	All	100
Particulate Matter (PM_{10})	Nonattainment/ maintenance	Serious	70
		Moderate	100
		Not applicable	100
Sulfur Dioxide (SO_2)	Nonattainment/ maintenance	Not applicable	100
Nitrogen Oxides (NO_2)	Nonattainment/ maintenance	Not applicable	100
Lead (PB)	Nonattainment/ maintenance	All	25

Source: 40 CFR 93.153
tpy: tons per year

B 1.4 CAA General Conformity Criteria

If the Proposed Action is not exempt from the conformity demonstration requirements, the General Conformity Rule defines conformity and provides five basic criteria to determine whether a Federal action conforms to an applicable SIP. These criteria assess conformity based upon emission analyses and/or dispersion modeling for the nonattainment pollutants. If the Federal action meets the conformity criteria and requirements, the action is demonstrated to conform to the applicable SIP. If the action cannot meet the criteria and requirements, the agency must develop an enforceable implementation plan to mitigate effectively (e.g., completely offset) the increased emissions from the Proposed Action to meet the conformity requirements. The Federal action cannot proceed unless positive conformity can be demonstrated.

The General Conformity Rule provides the option to select any one of several criteria to analyze the conformity of the Proposed Action. Presented in 40 CFR 93.158, the criteria are primarily based upon the type of pollutant and the status of the applicable SIP. If the applicability analysis concludes that further conformity analyses are required to demonstrate positive conformity (i.e., *de minimis* thresholds are exceeded), the following conformity criteria (paraphrased below) can be used to demonstrate conformity for a proposed action in a nonattainment area:

- The total direct and indirect emissions for the Proposed Action are specifically identified and accounted for in the SIP's attainment or maintenance demonstration. [40 CFR 93.158(a) (1)].

- The total direct and indirect emissions of O_3 precursors are fully offset within the same nonattainment or maintenance area through a revision to the applicable SIP or a similarly enforceable measure so that there is a no net increase in emissions [40 CFR 93.158(a)(2)].

- State made a revision to the area's attainment or maintenance demonstration after 1990 and either:

  - Determines and documents that the action, together with all other emissions in the nonattainment (or maintenance) area, *would not* exceed the emissions budget specified in the applicable SIP.

  - Determines that the action, together with all other emissions in the nonattainment (or maintenance) area, *would* exceed the emissions budget specified in the applicable SIP but the State's Governor or designee for SIP actions makes a written commitment to the USEPA to demonstrate CAA conformity through specific measures and scheduled actions [40 CFR 93.158(a)(5)(i)(A & B)].

- The Federal action fully offsets its entire emissions within the same nonattainment area through a revision to the SIP or a similar measure so that there is no net increase in nonattainment pollutant emissions [40 CFR 93.158(a)(5)(iii)].

- The State has not made a revision to the approved SIP since 1990, and the total emissions from the action do not increase emissions above the baseline emissions which are either:

  - Calendar Year 1990 (CY 90) emissions or another calendar year that was the basis for the nonattainment area designation) [40 CFR 93.158(a) (5)(iv)(A)].

  - Historic activity levels and emissions calculated for future years using appropriate emission factors and methods for future years.

- Dispersion modeling analysis demonstrates that direct and indirect emissions from the Federal action will not cause or contribute to violations of Federal ambient air quality standards [40 CFR 93.158(b)].

B 1.5 Other State Implementation Plan Consistency Requirements

The conformity analysis must also demonstrate that total direct and indirect emissions from the Proposed Action will be consistent with the applicable SIP requirements and milestones, including reasonable further progress schedules; assumptions specified in the attainment or maintenance demonstration; and SIP prohibitions, numerical emissions limits, and work practice requirements

Comparison of the Federal action's emissions to any existing SIP emission budgets that have been specifically established may be required for the Federal facility or the affected region. If the action would cause an increase in emissions such that the established SIP emissions budgets would be exceeded, a formal conformity determination and other applicable rule requirements would apply.

B 2.0 APPLICABILITY ANALYSIS

The following subsections describe the NASA JPL facility, the Proposed Action and criteria, and how the General Conformity procedures pertain to this conformity analysis.

B 2.1 Purpose

The purpose of this General Conformity Analysis is to document JPL's compliance with CAA requirements in accordance with 40 CFR 93 Subpart B and South Coast Air Quality Management District Rules and Regulations, Regulation XIX (Federal Conformity Regulations) Rule 1901 (General Conformity). This conformity analysis will analyze the air quality impact for emissions of the criteria pollutants resulting from the proposed Federal action that are in nonattainment status or have completed changes in maintenance designation(s), in order to determine whether the Proposed Action will be subject to the Federal conformity rules.

B 2.2 Facility Description & Proposed Action

NASA JPL is located in the northern metropolitan Los Angeles (LA) area, between the cities of Pasadena and La Cañada Flintridge, and the unincorporated community of Altadena in Los Angeles County. Situated on the south-facing slope of the San Gabriel foothills, NASA JPL is surrounded by natural settings on the northern, eastern, and southern boundaries. JPL is situated above the surrounding community and is a prominent visual feature in the area. Built on sloping terrain, its buildings and roads are terraced into the hillside.

The purpose of the current Master Plan initiative is to affirm NASA's mission at NASA JPL and provide a physical framework for implementing this mission over the next 20 years. Facilities at NASA JPL are deteriorating because of age. The Master Plan identifies facility and infrastructure needs and develops an implementation strategy that helps guide facilities renewal related to research, building construction, administrative services, parking, and circulation at JPL. The master planning process provides the opportunity for the transformation of NASA JPL's infrastructure and facilities to reflect long-range plan and mission, and NASA-wide goals and objectives. The Master Plan emphasizes five primary objectives:

1. Replace scattered aging, obsolete, and inefficient facilities with fewer modern facilities designed to match current and future mission requirements;

2. Achieve work-flow efficiencies, synergies, and added safety through the consolidation of related activities into singular structures and building groups;

3. Where possible, group similar facilities, such as clean rooms and data centers, to achieve energy, maintenance, and other operational savings;

4. Build new facilities to state-of-the art standards in order to properly house high-tech equipment owned by NASA, fully support fabrication, assembly and testing of robotic spacecraft, achieve high levels of workplace health, and attain high levels of sustainability; and

5. Create facilities that inspire space exploration activities among employees and visitors, and promote the learning of science, technology, engineering, and mathematics.

As outlined in **Table B-2**, the individual projects which collectively fulfill the eight objectives, and together comprise the Master Plan developments will be completed between 2012 and 2032. **Table B-2** also summarizes how NASA JPL plans to conduct a phased and sequential redevelopment approach for the implementation of proposed Master Plan activities over those 20-years.

The Master Plan divides the Proposed Action into six main 'phases' of construction, each completing one functional component of the new NASA JPL facility. Removal of the thirty three sub-standard buildings slated for demolition, and upgrades and rehabilitation to seventeen others is not only anticipated to increase the efficiency of overall operations at JPL, but to result in reductions of operations emissions.

The Master Plan also calls for four phases of utility and infrastructure upgrades. Attachment B-1 summarizes the temporal distribution of these ten phases across each calendar year. On average, one project is proposed to take place every second year, based on ten projects across a twenty year time period. However, all four utility and infrastructure phases are scheduled to occur between 2013 and 2017. As a result, construction of the Flight Electronics Center (between January 2014 and December 2015), and the Advanced Robotics Center (between June 2017 and 2018) will overlap with phases of utility and infrastructure redevelopment. The completion of the fourth phase of utility upgrades will coincide with the first six months of Phase 3 (Advanced Robotics facility). The second set of utility upgrades will coincide with the second year of Phase 2 (Flight Electronics facility) for a period of 12 months. Construction is slated to occur for 6 months in 2019, 2021, and no construction is slated for any of the seven years of 2022, 2025, 2026, 2027, 2030, 2031 and 2032. The remaining periods of construction will see one project undertaken at a time. The level of construction is therefore anticipated to be the most intense during CY 2015.

Table B-2. Proposed Project Phasing Under Master Plan

Phase	Proposed Activities	Timeframe
1	New Parking Structure: • Relocate existing surface parking • Demolition of Buildings 322, 1714, and 1715 • Construction of new Parking Structure • Parking Relocation	2012-2013
2	New Flight Electronics Facility & Advanced Robotics R&D Facility • Relocate employees to temporary quarters • Demolition of Buildings 18, 280, 288, 277, 1722, and 1723 • Construction of new Flight Electronics Facility and Advanced Robotics R&D Facility • Relocate to new Flight Electronics Facility and Advanced Robotics R&D Facility • Integration of localized Infrastructure and Utility Upgrades (1 – 4)	2013-2017
3	New Mechanical Development Facility: • Demolition of Buildings 82, 83, 226, 296, 122, and 125 • Construction of new Mechanical Development Facility • Relocation to new Mechanical Development Facility	2018-2022

Phase	Proposed Activities	Timeframe
4	New R&TD Facility: • Demolition of Buildings 189, 199, and 1720 • Construction of new R&TD Facility • Relocate to new R&TD Facility	2023-2027
5	Advanced Optical Development Test Facility • Construction of new Advanced Optical Development Test Facility • Relocate to new Advanced Optical Development Test Facility	2028-2032
6	• Demolition of Buildings 180, 161/184, 198, and 177 for Build-Out Plan • Full Build-out Plan • Relocate to Full Build-Out Plan • Other buildings to be Removed	TBD

Source: Information obtained from JPL Preliminary 5-Year Recapitalization Plan, Implementation Plan, dated August 16, 2010.

B 2.3 Existing Air Quality

Air Basins/Air Quality Control Regions and the SIP

The NASA JPL facility is located within Los Angeles County in the South Coast Air Basin (SCAB) of southern California. The regulatory agencies with primary responsibility for air quality management in the SCAB include the South Coast Air Quality Management District (SCAQMD) and California Air Resources Board (CARB), with oversight by the USEPA. The USEPA has delegated authority to SCAQMD to implement and enforce the NAAQS in the SCAB. As the district agency, the SCAQMD must prepare regional plans [Air Quality management District Plans (AQMPs)] to support the broader state SIP, as well as to meet the goals of the California Clean Air Act (CCAA).

Every three years the SCAQMD must prepare and submit to CARB an AQMP to demonstrate how the SOCAB will attain and maintain the NAAQS and the California Air Quality Standards. These AQMPs also form the basis for SIP and attainment status designations. In the case of NASA JPL, the currently approved SIPs for the SOCAB are summarized below:

- O_3 – SIP approved by the USEPA on April 10, 2000 (65 FR 18903), based on the 1997 AQMP and a 1999 amendment to the 1997 AQMP.
- PM_{10} – SIP approved by the USEPA on April 18, 2003 (68 19315), based on the 1997 AQMP, amendments to the 1997 AQMP submitted in 1998 and 1999, and further modifications to the 19997 AQMP submitted in a status report to the EPA in 2002.
- $PM_{2.5}$ – There is no USEPA-approved SIP.
- CO – SIP approved by the USEPA on May 11, 2007 (72 FR 26718), based on 2005 redesignation request and maintenance plan. In this SIP approval, the EPA also redesignated the SOCAB from nonattainment to attainment/maintenance for CO.

- NO_2 – SIP approved by the USEPA on July 24, 1998 (3 FR 39747), based on the 1997 AQMP. In this SIP approval, the USEPA also re-designated the SOCAB from nonattainment to attainment/maintenance for NO_2.

Ambient Air Quality Attainment Designations for Affected Air Quality Control Region

The portion of the SCAB where NASA JPL is located is in an area that is currently designated as attainment of the NAAQS for SO_2 and Pb, and nonattainment of the NAAQS for O_3 (eight-hour average), PM_{10}, and $PM_{2.5}$. In addition, the severity of the nonattainment status for this areas has been classified as 'extreme' for O_3 and 'serious' for PM_{10}. It is not classified for $PM_{2.5}$. On July 24, 1998 this area was redesignated from nonattainment/maintenance status for NO_2 by the EPA (63 FR 39747). More recently the area was redesignated by the EPA from nonattainment to attainment/maintenance for CO (72 FR 2678), effective June 11, 2007. On June 4, 2010 the SOCAB was reclassified from 'severe' to 'extreme' nonattainment area for the eight-hour O_3 NAAQS (75 FR 24409, May 5th, 2010). This reclassification lowered the general conformity de minimis emission threshold for NOx and VOCs/ROG from 25 tpy to 10 tpy.

$PM_{2.5}$ & O_3 Precursors in Nonattainment or Maintenance Status

$PM_{2.5}$ can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter typically forming nitrate and sulfate compounds. The pollutant $PM_{2.5}$ consists of primary particulate matter (directly emitted) and secondary particulate matter (formed in the atmosphere from precursor compounds) and may ultimately be composed of many separate chemical compounds. Secondary (indirect) emissions vary by region depending upon the predominant emission sources, thus the precursors that are considered significant for $PM_{2.5}$ formation or are identified for ultimate control will also vary.

Based on SCAQMD data released for the SOCAB (http://www.aqmd.gov/Default.htm, 2010) the total mass of $PM_{2.5}$ is more likely associated with combustion related sources and secondary particles formed through combustion or incomplete combustion, than primary particles which represent a relatively small proportion of total $PM_{2.5}$ mass. SCAQMD data also indicates ammonium nitrates and ammonium sulfates represent a dominant fraction of $PM_{2.5}$ components in the SOCAB.

Generally, the main precursors of secondary $PM_{2.5}$ include oxides of nitrogen (NO_x), oxides of sulfur (SO_x), and ammonia. However, organic carbon compounds (VOC) also contribute to the formation of $PM_{2.5}$. Dynamic reactions between these precursor compounds emitted into the atmosphere by the sources of interest will affect the amount of $PM_{2.5}$ attributable to the Federal Actions. If net emissions of any of these precursor compounds exceed the *de minimis* emission thresholds for $PM_{2.5}$, then the Federal action is subject to a general conformity evaluation for $PM_{2.5}$. Ammonia emissions are not associated with the sources that are included in the proposed Federal action, therefore no further analysis has been conducted for ammonia as a $PM_{2.5}$ precursor.

Ozone is a brown odorless gas, O_3 can cause irritation of the respiratory tract in humans and animals, and can damage vegetation. The maximum effect of the precursor emissions on O_3 formation may be many miles from the source because O_3 is a by-product of a photochemical reaction.

Ozone is not typically emitted directly from emission sources, but rather is formed in the atmosphere by photochemical reactions involving sunlight and other emitted pollutants, or "ozone precursors." These ozone precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs), which are emitted directly from a wide range of stationary and mobile sources. Therefore, O_3 concentrations in the atmosphere are

controlled through limiting the emissions of NO_x and VOCs. For this reason, regulatory agencies attempt to limit atmospheric O_3 concentrations by controlling NO_x and VOC pollutants [also identified as reactive organic gases (ROG) in the State of California]. The *de minimis* emission threshold for O_3 is therefore based on the primary emissions of its precursor pollutants (VOC/ROG and NOx), so if the net emissions of either VOC/ROC or NO_x exceed the threshold *de minimis* emission rate then the Federal action would be subject to a general conformity evaluation for O_3.

B 2.4 General Conformity as Applies to Proposed Action at NASA JPL

The General Conformity Rule applies to Federal actions in areas that are failing to meet one or more of the Federal air quality standards (designated as nonattainment areas), and/or areas that are or have been subject to attainment maintenance plans (designated as maintenance areas).

As a result of the current nonattainment status, and the history of maintenance designations in the region affected by NASA JPL operations this conformity analysis will address the following criteria pollutants for the purposes of the conformity applicability criteria requirements:

- O_3 (eight-hour average), and the applicable O_3 precursors [VOCs (ROGs) and $NO_{x]}$;
- PM_{10}
- $PM_{2.5}$ direct emissions, and applicable $PM_{2.5}$ precursors [SO_2 and NO_x];
- NO_2
- CO

This analysis does not address the pollutants for which affected areas are in 'attainment' - sulfur oxides (SO_x) and Lead (Pb). The applicable *de minimis* emissions thresholds for the Proposed Action at NASA JPL are shown in **Table B-3** below, in relation to the attainment designation for the South Coast Air Basin.

Table B-3. *De minimis* Emission Thresholds for NASA JPL Applicability Analysis

Pollutant	SOCAB Attainment Designation	*De minimis* Threshold (tpy)
Ozone (measured as NO_x or VOCs/ROG)	Nonattainment / Severe – 17[a]	10[a]
Particulate Matter - PM_{10}	Nonattainment / Serious	70
Particulate Matter – $PM_{2.5}$ (and each separate precursor)[b/c]	Nonattainment	100
Nitrogen Dioxide (NO_2)	Attainment / Maintenance	100
Carbon Monoxide (CO)	Attainment / Maintenance	100

a. The U.S. EPA reclassified the SOCAB as 'extreme' nonattainment for the 8-hour ozone NAAQS under 75 FR 24409 on May 5th, 2010 to be effective on June 4, 2010.
b. The PM2.5 precursors in the region include Sox, NOx, VOC/ROG and ammonia.
c. Ammonia emissions are not anticipated from the Proposed Action (construction, operation or direct/indirect); therefore, no further analysis is conducted for ammonia as a PM2.5 precursor.

B 3.0 GENERAL CONFORMITY ANALYSIS & RESULTS

This section of the conformity analysis describes the applicability analysis of the Proposed Action (implementation of the Master Plan at the NASA JPL facility) to the General Conformity Rule requirements.

B 3.1 Sources Included in the Conformity Analysis

In accordance with the General Conformity Rule, total direct and indirect emissions resulting from proposed Federal action includes several types of stationary and mobile sources. These emissions would occur during construction [Proposed Action] and operational conditions [routine facility operations]. As defined by the rule and applied to the Proposed Action at the NASA JPL facility, direct emissions would result from emissions sources not subject to air permitting as well as operations at the proposed redeveloped facility. Examples of direct emissions sources include demolition and construction activities, and routine facility operations. Indirect pollutant emissions for the proposed project include activities that JPL can control as part of the Federal action, and include privately-owned vehicles, and government-owned vehicles that provide transportation to and from, and/or provide services or complete support activities that occur at the facility.

B 3.2 Analysis Methodology

Air modeling analysis was performed using Urban Emissions 2007 (URBEMIS) Version 9.2.4 to estimate direct and indirect emissions at JPL. URBEMIS is a California-specific computer model that estimates construction, area, mobile, and CO2 emissions based on land uses. Both the CARB and the USEPA have approved use of URBEMIS air modeling program for use in NEPA environmental documents involving air quality analysis. Version 9.2.4 is the most recent version of the URBEMIS software, and it uses current South Coast Air Basin and Los Angeles County specific emission factors and emission reductions. The URBEMIS input data is based on the 'Emfac2007 V2.3 [Nov 1, 2006] version of On-Road Vehicle Emissions, and incorporates the 'OFFROAD2007' version of Off-Road Vehicle Emissions. The URBEMIS program then provides data output summarizing emissions resulting from construction phase of the Proposed Action, alongside area source emissions summarizing routine facility operations.

For the construction phase, pollutants of concern are considered NO_x, VOC/ROG, PM_{10} and $PM_{2.5}$. During construction PM_{10} and $PM_{2.5}$ are primarily produced during mass and fine grading activities. NO_x, VOC/ROG, PM_{10} and $PM_{2.5}$ are produced during the combustion of diesel and gasoline fuels by heavy duty construction equipment and contactor vehicles. Operational emissions consist of area and vehicle emissions. Operational pollutants of concern are the same as with construction, with the addition of CO, a typically localized pollutant which dissipates rapidly.

The level of construction activities undertaken during CY 2015 were anticipated to be significantly higher than any other single year, due to the overlap of two Master Plan phases comprising construction of the new Flight Electronics Facility, and the secondary utility and infrastructure upgrades. The Flight Electronics facility represents removal of twenty of the oldest and NASA JPL buildings, in conjunction with the second largest section of the existing facility. Furthermore, a large part of the Master Planning effort has either seen a reduction in planned project operations due to relocation, or an inability to complete routine operations in temporary housing. This is expected to produce two main results. Firstly, the level of operational emissions produced at

NASA JPL is anticipated to decrease due to a draw-down in operations during construction. Secondly, with completion of the first two facilities constructed under the Master Plan effort is anticipated to signify a gradual reduction in operational emissions at NASA JPL. In consideration of these scenarios, the CY 2015 period was therefore deemed the 'worst case' scenario for construction related emissions. Data inputs for the emissions modeling was then based on twelve months of construction activities for two over-lapping phases, both to be initiated at the beginning of January of CY 2015, and to be completed at the of December 2015.

B 3.3 Total Direct and Indirect Emission Calculations

The estimates of the net changes in nonattainment pollutant emissions that would result from implementation of the Proposed Action at the NASA JPL Facility are presented in the spreadsheet attachment of this Appendix. These calculations are based on CY 2015, which is anticipated to produce the worst case scenario of emissions produced at NASA JPL, and integrates both construction and operations of the new facilities proposed under the Master Plan together with existing area source data. The resulting analyses indicate that the majority of the potential pollutant impacts would result from three elements of the Proposed Action: (1) routine facility operations at NASA JPL, including from regular NASA JPL commuter traffic from full-time employees, (2) 'direct' demolition and construction activities at NASA JPL, and (3) vehicle emissions, from construction-specific equipment, and construction-contractor motor vehicles. The net changes in direct and indirect O_3 (eight-hour average), and the applicable O_3 precursors [VOCs (ROGs) and $NO_{x]}$; PM_{10}; $PM_{2.5}$ direct emissions, and applicable $PM_{2.5}$ precursors [SO_2 and NO_x]; $NO_{2;}$ and CO emissions from these elements of the Proposed Action are presented below.

NASA JPL Routine Operations

NASA JPL air emission sources include boilers, internal combustion engines as emergency generators, painting operations, degreasers, fuel storage tanks, dispensers, and various other research and development processes. Various types of these individual emissions units currently operate under SCAQMD permits.

Construction Activities

PM_{10} and PM2.5 emissions would be generated in the form of fugitive dust from concrete demolition, material transfer, and truck/equipment movement. All criteria pollutants would also be emitted during construction as combustion by-products from diesel-fueled construction equipment and truck hauling vehicles. VOC evaporative emissions would occur due to equipment and building interior painting. Additional emissions would result from construction worker commuter traffic that would occur during the entire execution of the Proposed Action. The construction worker commuter emissions are accounted for in the following section.

Motor Vehicle Emissions

Motor vehicle emissions include commuter emissions associated with the routine operations at NASA JPL (i.e., NMO staff, and all Caltech and NASA JPL operations, contractors and support staff), and with anticipated levels of onsite contractors associated with the construction projects (i.e. demolition, site grading, utility and construction crews) proposed under the Master Plan. Commuter vehicle emissions associated with temporary construction workers and activities are included in the construction emissions in **Table B-4** below.

The Proposed Action is expected to require approximately 150 to 200 onsite contractors during peak periods of construction activities. The NASA JPL facility is not expected to see increased levels of employees due to changes in facility or operational capability as a result of implementing the Master Plan. Commuter traffic levels

are therefore not expected to increase. Over the longer term, in with increases in public transportation options as a result of the City of Pasadena CIP it is anticipated both commuter levels to NASA JPL, and pass-by trips will decrease over the longer term after CY 2015.

Table B-4 presents the estimated annual emissions of the nonattainment pollutants generated during construction activities at NASA JPL, with mitigation factors included. As shown, the greatest total annual pollutant emission rates for construction activities are projected to occur during CY 2013.

Table B-4. Construction Activity Emissions - Proposed Action at NASA JPL (tpy)

CY	VOC/ ROG	NO_x	CO	SO_2	PM_{10}	PM_{10} (Dust)	PM_{10} (Exhaust)	$PM_{2.5}$	$PM_{2.5}$ (Dust)	$PM_{2.5}$ (Exhaust)
2015	5.84	6.77	9.63	0.02	2.50	2.23	0.27	0.72	0.48	0.24

CY: Calendar Year
tpy: tons per year

B 3.4 Applicability Analysis Results

NASA JPL Net Emissions

Table B-5 summarizes the net Proposed Action emissions and compares those impacts to the applicable General Conformity *de minimis* thresholds. The results of the applicability analysis indicate that net peak year direct and indirect emissions at NASA JPL (i.e., the sum of construction and facility operations) within the SOCAB (and SCAQMD) would *not* exceed the 10, 70 and 100 tpy *de minimis* levels for any of the criteria pollutants of concern, or for the applicable precursors of criteria pollutants. Therefore, state and Federal General Conformity rules are not applicable, and no conformity determination is required for this Proposed Action.

Table B-5. Comparison of Estimated NASA JPL Net Emissions to *de minimis* Thresholds

Criteria Pollutant	Ozone Attainment Status [1]	*de minimis* Threshold (tpy)	Estimated Net Emissions (Direct & Indirect) JPL Proposed Action (tpy)
NO_x (as precursor for an O_3 and $PM_{2.5}$)	Maintenance	10	8.17
VOC/ROG (as an O_3 precursor)	Maintenance	10	8.38
PM_{10}	Nonattainment	70	10.72
$PM_{2.5}$	Nonattainment	100	2.30
SO_2 (as an $PM_{2.5}$ precursor)	Nonattainment	100	0.05
CO	Nonattainment/maintenance	100	26.92

B 4.0 FINDINGS & CONCLUSION

The purpose of this analysis is to determine whether implementation of the Master Plan at NASA JPL would conform to the applicable SIP, based upon the criteria established in the General Conformity Rule and promulgated in 40 CFR 93.158. Emissions produced through construction of new buildings, and/or as a result of routine operations at the existing NASA JPL facility will not reach levels anticipated in CY 2015. CY 2015 emissions are considered 'worst case', and annual emissions from other years will be lower than 2015. Because the direct and indirect emissions from the worst year, 2015, are below the *de minimis* thresholds and it was shown that the project emissions will not exacerbate air quality, increase violations of non-attainment pollutants, or delay the region from attaining the NAAQS in a timely manner the Proposed Action is considered to be conforming with the SIP.

The regulatory basis and specific criteria for this analysis were presented in Section C 1.0 above. Section C 2 presented the applicability analysis. Section E 3 provided the conformity analysis and emissions calculations generated under the Proposed Action, indicating that the reasonably foreseeable project emissions of NO_2, VOC, $PM_{2.5}$, and SO_2 would not exceed the General Conformity Rule *de minimis* levels. This conclusion is supported by the calculations attached to this analysis. This Section, E 4.0 presents the following findings and conclusion for the conformity analysis for the Proposed Action at NASA JPL:

After careful and thorough consideration of the conformity analysis contained herein, the project proponent finds that the total direct and indirect emissions associated with the Proposed Action at NASA JPL would not exceed the applicable *de minimis* thresholds, and that the Proposed Action would therefore be exempt from the requirements of the Federal Conformity Rule consistent with the objectives as set forth in Section 176(c) of the CAA, as amended, and its implementing regulation, 40 CFR Part 93, Subpart B, Determining Conformity of General Federal Actions to State and Local Implementation Plans.

Reference LIST

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USEPA 2010a — Federal Register. 2010. "Primary National Ambient Air Quality Standards for Nitrogen Dioxide." Federal Register, February 9, 2010, Volume 75, Number 26, pages 6474.

USEPA 2010b — Federal Register. 2010. "Revisions to General Conformity Regulations." Federal Register, April 5, 2010, Volume 75, Number 64, pages 17254-17257.

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