Draft Environmental Impact Report/Environmental Impact Statement

Rio del Oro Specific Plan Project

State Clearinghouse #2003122057

Volume III: Appendices G–M

Prepared for:

City of Rancho Cordova
and
U.S. Army Corps of Engineers,
Sacramento District

Prepared by:

EDAW
2022 J Street
Sacramento, CA 95814

December 8, 2006

EDAW

Draft Environmental Impact Report/Environmental Impact Statement

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Volume III: Appendices G–M

Prepared for:

City of Rancho Cordova
2729 Prospect Park Drive
Rancho Cordova, CA 95670

Attn: Patrick Angell
916/361-8384

U.S. Army Corps of Engineers,
Sacramento District
Regulatory Branch
1325 J Street, Room 1480
Sacramento, CA 95814-2922

Attn: Anna Sutton
916/557-7759

Prepared by:

EDAW
2022 J Street
Sacramento, CA 95814

Contact:

Francine Dunn
Project Manager
916/414-5800

December 8, 2006

EDAW

P 3T089.01

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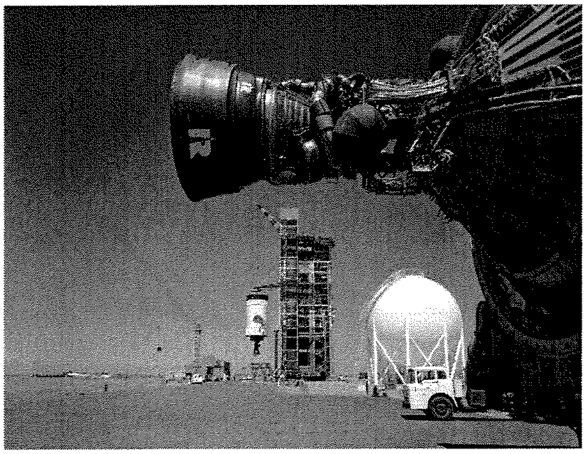
APPENDIX G

DRAFT HISTORIC BUILDING AND STRUCTURES INVENTORY

Draft

Historic Buildings and Structures Inventory
Douglas Missile Test Facility
Rio del Oro Specific Plan Project



Prepared for:
City of Rancho Cordova
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Sacramento District

Prepared by:
EDAW
2022 J Street
Sacramento, CA 95814

Karen J. Weitze, PhD
Weitze Research

July 20, 2005

EDAW

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HISTORIC BUILDINGS AND STRUCTURES INVENTORY DOUGLAS MISSILE TEST FACILITY

Rancho Cordova
California

Prepared for:

City of Rancho Cordova
and
U.S. Army Corps of Engineers,
Sacramento District

Prepared by:

EDAW, Inc.
2022 J Street
Sacramento, California 95814

Karen J. Weitze, PhD
Weitze Research

June 2005

June 2005

Historic Buildings and Structures Inventory
Douglas Missile Test Facility

Rancho Cordova, California

DRAFT

EDAW, Inc.

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Acknowledgments

The author wishes to thank several individuals for their assistance during the historic architectural inventory at the former Douglas Missile Test Facility at Rancho Cordova, California. Aerojet environmental manager Rodney A. Fricke coordinated two day-long visits to the site during April and May 2005. Mr. Fricke also made Aerojet's collection of historic architectural-engineering drawings, maps, and plans available to support the inventory. Two missile and booster-vehicle test reports from 1962-1966 were accessible to the author at Aerojet's archives, as were environmental documents summarizing previous interpretations of the former Douglas Missile Test Facility during 1996-2004. The National Aeronautics and Space Administration's (NASA's) Marshall Space Flight Center in Huntsville, Alabama, graciously offered the author copies of the agency's 1966-1968 master plans for the former Douglas Missile Test Facility (then named the NASA S-IVB Stage Test Facility), and made tif images of more than 30 historic photographs of the Rancho Cordova site. The author especially thanks landscape architect and cultural resource manager Ralph Allen at Marshall for his time and effort. A website maintained by the Marshall Space Flight Center history office was additionally useful for selecting rare images of 1960-1968 test activities at the former Douglas Missile Test Facility. The author acknowledges her gratitude to the Marshall Image Exchange (MIX) website, and to NASA historian Mike Wright. EDAW project manager Charlane Gross oversaw the author's work, and provided much appreciated assistance in making arrangements with Aerojet.

List of Acronyms

ABM	antiballistic missile
ACC	Air Combat Command
ACHP	Advisory Council on Historic Preservation
AFCEE	Air Force Center for Environmental Excellence
AFP	Air Force Plant
ASSET	Aero-thermodynamic Elastic Structural Systems Environmental Tests
ASV	aero-thermodynamic structural test vehicle
BP	boilerplate
CFR	Code of Federal Regulations
DM	defense missile
DoD	Department of Defense
EES	Engineering Evaluation Site
GALCIT	Guggenheim Aeronautical Laboratory at the California Institute of Technology
GOCO	government-owned, contractor-operated [industrial plant / site]
GOGO	government-owned, government-operated [industrial plant / site]
ICBM	intercontinental ballistic missile
IM	interceptor missile
IRBM	intermediate range ballistic missile
JPL	Jet Propulsion Laboratory [at the California Institute of Technology]
LN2	liquid nitrogen
LOX	liquid oxygen
MIX	Marshall Image Exchange
NASA	National Aeronautics and Space Administration
NPS	National Park Service
NRHP	National Register of Historic Places
RATO	Rocket-Assisted Take-Off
R&D	research and development
USACERL	United States Army Construction and Engineering Research Laboratory

ABSTRACT

EDAW, Inc., contracted with Weitze Research to conduct a historic architectural inventory of buildings and structures within the boundaries of the former Douglas Missile Test Facility at Rancho Cordova, California. The inventory included six test areas of 1956-1969: the Solid Propellant Assembly Area, the Sigma Test Area, the Alpha Test Complex, the Beta Test Complex, the Gamma Test Area, and the Kappa Test Area. Weitze Research inventoried 62 properties at these locations. Field work included building assessments, digital photography, and records review. Subsumed within the inventory are preliminary National Register of Historic Places (NRHP) evaluations for the former Douglas Missile Test Facility properties.

The Solid Propellant Assembly Area (6 inventoried properties)

Four of the buildings and structures in the Solid Propellant Assembly Area, including their surrounding earthworks, define the assembly site for the developmental Nike Hercules and Nike Zeus missiles of 1956-1962. These properties are little altered and are interpreted as potentially eligible for the NRHP as a district under criteria A and C.

The Sigma Test Area

Four of the buildings and structures in the Sigma Test Area, including their surrounding earthworks, define the test complex for the developmental Nike Hercules and Nike Zeus missiles of 1956-1962. These properties are little altered and are interpreted as potentially eligible for the NRHP as a district under criteria A and C.

The Alpha and Beta Test Complexes (39 inventoried properties)

The test stands of the Alpha Test Complex (two) and the Beta Test Complex (two) no longer have their multi-story, steel superstructure (captive-firing towers), and remain on their sites only as one-story, reinforced concrete remnants. The test control centers (blockhouses) for the complexes are derelict today, with all control equipment removed. The test stands and blockhouses are character-defining for the Alpha and Beta Test Complexes. No support structures within the Alpha and Beta Test Complexes are interpreted as sufficiently significant for individual consideration to the NRHP.

The Gamma and Kappa Test Areas (9 inventoried properties)

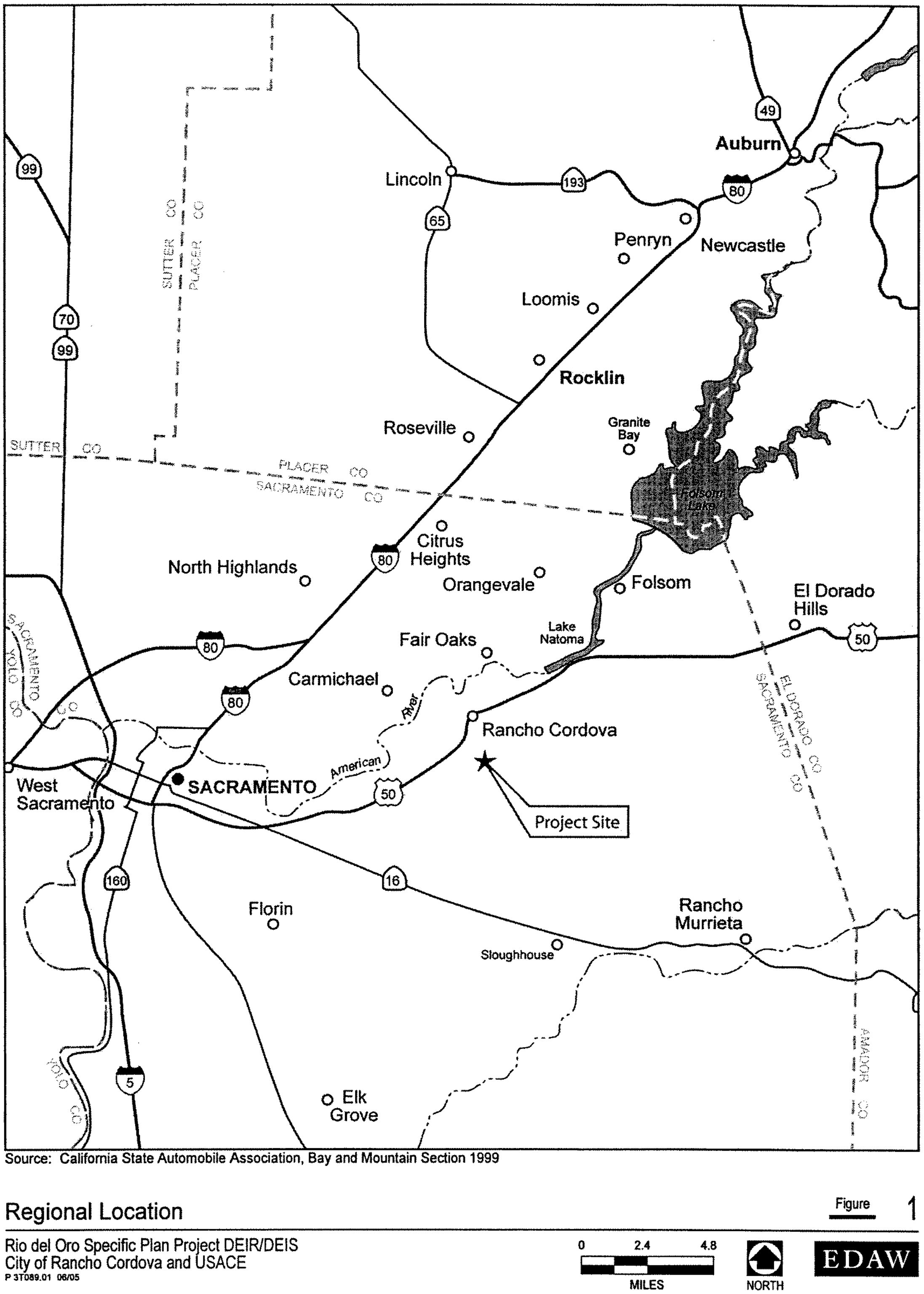
The test structures and test cells in the Gamma Test Area (one) and the Kappa Test Area (six) exist in a varied state of intactness. The three-bay test structure in the Gamma Test Area is the key building for the site. Only one of its captive-firing stands is intact. In the Kappa Test Area, one of six test cells is intact. Three others remain as remnants or are gone, while two are partially collapsed. The Gamma and Kappa Test Areas were component test locations, essentially adjunct sites for the Alpha and Beta Test Complexes. No support structures within the Gamma and Kappa Test Areas are interpreted as sufficiently significant for individual consideration to the NRHP.

METHODOLOGY

Field Assessment and Real Property Research

At the request of EDAW, Inc., Weitze Research conducted an inventory and National Register of Historic Places (NRHP) evaluation of the former Douglas Missile Test Facility in Rancho Cordova, California (Figures 1-2). Dr. Karen J. Weitze served as the principal investigator for the effort. On 11 April and 31 May 2005, Dr. Weitze conducted field analysis at the former test facility and a review of drawings and documents held by the facility's owner Aerojet. Drawings and documents' review occurred at Aerojet's Rancho Cordova location. She inspected 62 extant buildings, structures, and structure remnants during her analysis, taking digital photographs of all accessible real property at the site. In the inventory document, Dr. Weitze includes historic photographs and maps of the former Douglas Missile Test Facility, and supports discussion with a brief contextual history of similar aerospace test sites in California. She also provides a broad overview of the industrial plant program established for the United States military services, referencing the government-owned, contractor-operated (GOCO) plants, government-owned, government-operated (GOGO) plants, and privately owned and operated sites. Plants conducted research, testing, and production activities for the American government. The Douglas Missile Test Facility was a privately owned and operated site, located on property in the Folsom-Rancho Cordova area. In 1956, the Douglas Aircraft Company leased 1,700 acres from the Aerojet General Corporation for its first facilities at the location. Aerojet General operated Air Force Plants (AFPs) 70 and 71 adjacent, both established during 1956-1957. In 1961, the Douglas Missile & Space Division bought the property from Aerojet, expanding the size of it operations to about 4,000 acres. Within this acreage, about 2,800 acres housed the test complexes and administration area—the Douglas Missile Test Facility—with 1,100 acres remaining unused for aerospace facilities. Douglas immediately began using portions of the test facility to support the Saturn program of the National Aeronautics and Space Administration (NASA). NASA continued to oversee activities at the former Douglas Missile Test Facility until 1969. The former Douglas Missile Test Facility became dormant during 1969-1972, and subsequently deactivated during 1973-1977. The Douglas Missile Test Facility lost a substantial portion of its integrity as a potential NRHP resource in the late 1970s, due to the dismantlement of test stand superstructure. In 1977, McDonnell Douglas developed the Administration Area as an industrial park (Security Park), selling and leasing parcels in the southeastern corner of the former test facility. In the middle 1980s, Aerojet repurchased its original property from McDonnell Douglas. Security Park was not included in the sale.

The inventory and NRHP evaluations of the former Douglas Missile Test Facility are focused on six individual test areas: the Solid Propellant Assembly Area, the Sigma Test Area, the Alpha Test Complex, the Beta Test Complex, the Gamma Test Area, and the Kappa Test Area. White Rock Road and Aerojet border the former the Douglas Missile Test Facility on the north; Aerojet, on the east; Douglas Road, on the south; and, the former Mather Air Force Base and gold dredgings, on the west. The Administrative Area, in the southeast corner of the former Douglas Missile Test Facility, is not included



Source: California State Automobile Association, Bay and Mountain Section 1999

Regional Location

Figure 1

Rio del Oro Specific Plan Project DEIR/DEIS
City of Rancho Cordova and USACE
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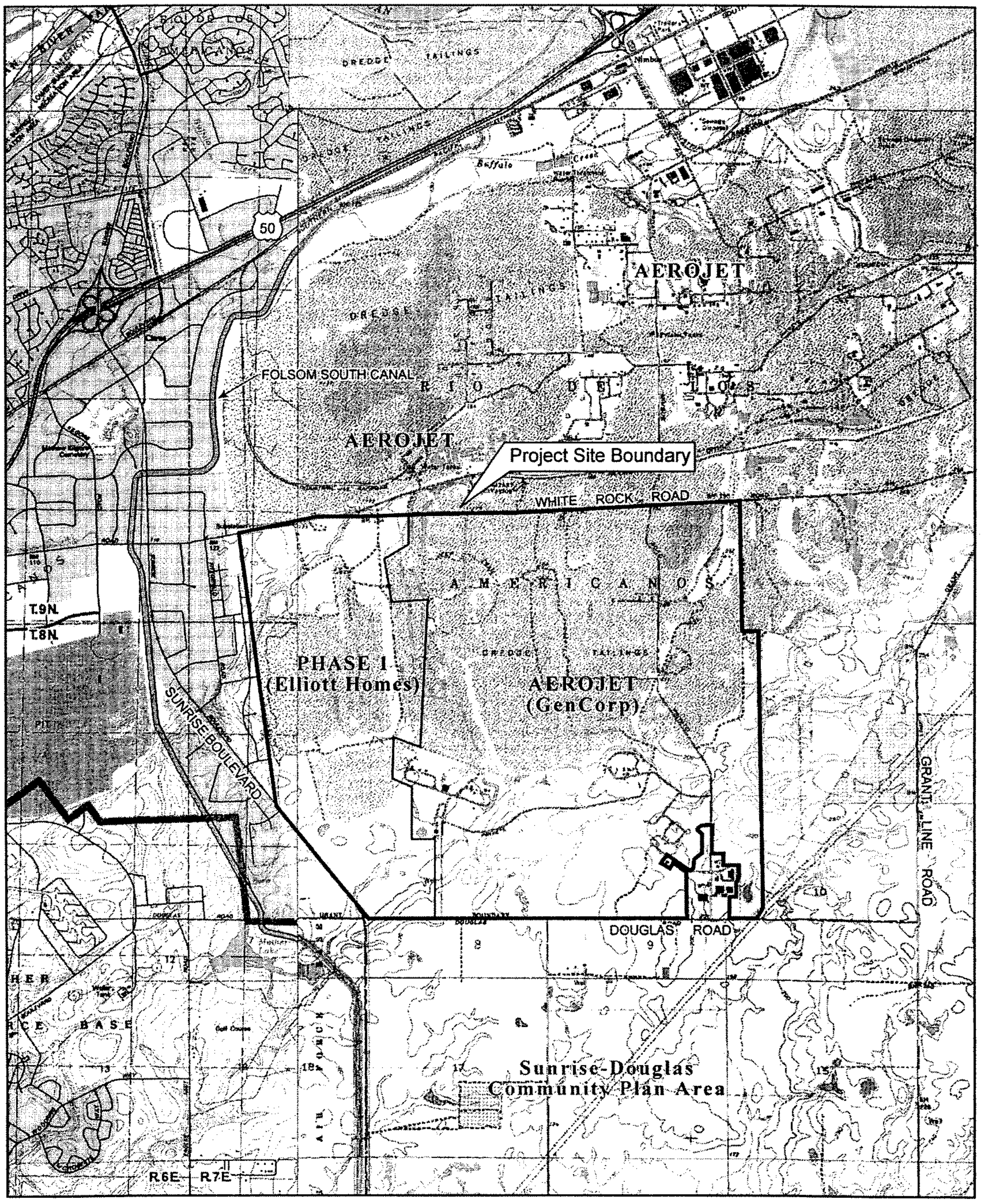
Figure 1: Vicinity Map, former Douglas Missile Test Facility, Rancho Cordova, California.



Source: USGS Citrus Heights/Carmichael Quads 1992, USGS Folsom/Buffalo Creek Quads 1980

Project Location

EXHIBIT 2

Rio del Oro Specific Plan Project DEIR/DEIS
City of Rancho Cordova and USACE
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NORTH

EDAW

Figure 2: Location Map, former Douglas Missile Test Facility, Rancho Cordova, California.

in the inventory or NRHP evaluations, but is discussed in the contextual history section of the document (see below). The inventory and NRHP evaluations are restricted to the individual test areas that remain in Aerojet ownership in 2005. Also not included in the inventory and NRHP evaluations are isolated ancillary sites within the boundaries of the former Douglas Missile Test Facility. The omitted ancillary sites were primarily small land-use areas that did not contain infrastructure.

Approximately 50% of the original Units 1-152 of the former Douglas Missile Test Facility exist today, with about 1% of these properties no longer in Aerojet ownership.

Criteria of the National Register of Historic Places (NRHP)

The NHPA of 1966, as amended in 1986 and 1992, mandates the Secretary of the Interior to maintain and augment the NRHP. The National Register is the United States' honorary list of valued districts, sites, buildings, structures, and objects interpreted as significant in American history, culture, archaeology, architecture, and engineering at the national, state, and local levels (36 Code of Federal Regulations [CFR] 60.1). The National Park Service (NPS) administers the NRHP. NPS cultural resources managers and specialists have articulated two areas requiring analysis for NRHP consideration: historic integrity and significance. Varying within individual state jurisdictions—and again through agency and professional interpretations—districts, sites, buildings, structures, and objects must possess a physical integrity related to the proposed historic significance. That is, they must convey historic time and place. Most often, districts, sites, buildings, structures, and objects that retain sufficient integrity to be considered for the NRHP have been modified only in minor ways. In some instances, modifications to historic resources fall within the interpreted period of significance. For example, a missile test stand might be significant for research, development, test, and evaluation conducted over decades, and thus additions and changes of later years are subsumed within its original integrity. In counterpoint, follow-on property use might have necessitated that the majority of a test stand be dismantled. In the second instance, NRHP integrity would likely have been severely compromised or lost.

Seven aspects of integrity help to refine its evaluation: integrity of location, setting, feeling, association, design, materials, and workmanship. Integrity of location most often indicates that buildings, structures, and objects have not been moved from one site to another. Buildings and structures resited more than 50 years ago are often interpreted as fully possessing integrity of (re-established) location. Setting, feeling, and association are always strongest when a minimum of unrelated properties have intruded within, or immediately adjacent to, the original physical boundaries of a potential resource. In simple terms, setting, feeling, and association are also affirmed when a continuity of function or purpose occurs throughout the lifetime of a property. The final three aspects of NRHP integrity focus on the intactness of the physical fabric of the resource, again pertinent to the possible period of significance. Is the original design (through its comparison with architectural-engineering drawings) or the original workmanship (through construction detailing) still visually readable (sometimes inclusive of additions)? Is a substantial percentage of the original materials present? Interpretation of the seven aspects of NRHP integrity varies widely across the United States. Not surprisingly, interpretations of integrity have also changed from time to time during the life of the NRHP. An assessment of NRHP integrity is flexible, rather than formulaic.

Evaluations of potential historic significance for NRHP eligibility, in counterpoint, have been more consistent over the decades. To establish significance, NRHP guidelines suggest that a reviewer establish the historic context for the resource(s). The presented district, site, building, structure, and/or object must meet at least one of four NRHP significance criteria. The criteria are defined as:

Criterion A: an association with events significant to the broad patterns of history;
Criterion B: an association with the lives of persons significant in the past;
Criterion C: an embodiment of the characteristics of a type, period, or method of construction; a representation of the work of a master or one that possesses highly artistic values; or a distinguishable entity with components individually undistinguished; and,
Criterion D: the ability to yield information important in prehistory or history.

At the former Douglas Missile Test Facility, the applicable NRHP criteria are Criteria A, B, and C, with an emphasis on Criterion A. The broad patterns of history represented are those associated with important missile and space booster research, development, test, and evaluation during the first half of the Cold War. The lives of persons significant in the past are embodied in potential NRHP resources at the former Douglas Missile Test Facility only indirectly. Two of the test complexes, Alpha and Beta, are the work of architectural-engineering firms important in Cold War aerospace-military structures design. These firms are Aerojet General Corporation (for the design and engineering of the Alpha Test Complex) and Ralph M. Parsons (for the design and engineering of the Beta Test Complex). The two firms often worked together during the 1950s and 1960s as Parsons-Aerojet of Los Angeles. A third key Cold War architectural-engineering firm renowned for its innovative aerospace-military structures also designed an assembly building in the Administrative Area at the former Douglas Missile Test Facility: Holmes & Narver of Los Angeles. These three firms were also responsible for major buildings and structures for the United States Army and Air Force during the Cold War.

The NPS excludes some types of properties from potential NRHP listing or eligibility, including religious properties (Criteria Consideration A); moved properties (Criteria Consideration B); birthplaces or graves (Criteria Consideration C); cemeteries (Criteria Consideration D); reconstructed properties (Criteria Consideration E); commemorative properties (Criteria Consideration F); and, properties that have achieved significance within the past 50 years (Criteria Consideration G). Each of these criteria considerations has exceptions. For properties less than 50 years in age, and in particular for highly specialized military, industrial, and scientific properties, the 50-year age requirement increasingly has been found to be inadequate. The NPS publication *National Register Bulletin No. 22: Guidelines for Evaluating and Nominating Properties that have*

Achieved Significance within the Last Fifty Years (1991) provides general references for establishing whether or not a property possesses the *exceptional significance* required if it is less than 50 years in age. A second publication, published by the Advisory Council on Historic Preservation (ACHP), complements the guidance of NPS: *Balancing Historic Preservation Needs with the Operation of Highly Technical or Scientific Facilities* (1991).

In addition, both the Air Force and the Army have developed formal guidance for the assessment of Cold War properties based on the existing NRHP criteria, again focused on the need to evaluate and establish *exceptional significance.* The *Interim Guidance Treatment of Cold War Historic Properties for U.S. Air Force Installations* of June 1993 supplements both the available NPS and ACHP guidance. Written by Dr. Paul Green, Cultural Resource Manager for Headquarters Air Combat Command (ACC) at Langley Air Force Base in Virginia, the Air Force *Interim Guidance* remains one of the primary military guidance documents for evaluating Cold War buildings and structures nationwide. ACC plans to update and finalize the Air Force guidance for evaluating Cold War properties. In 1998, the U.S. Army Environmental Center at the Aberdeen Proving Ground in Maryland also published guidance for assessing Cold War historic resources: *Thematic Study and Guidelines: Identification and Evaluation of U.S. Army Cold War Era Military-Industrial Historic Properties.* The Army guidance provides both a context for the agency during the Cold War and a discussion of primary Cold War property types within the agency. Not surprisingly, Air Force and Army Cold War facilities for missile and rocket booster research, development, test, and evaluation are parallel in type to those at the former Douglas Missile Test Facility. Examples pertinent to this study include static test stands, test control centers (blockhouses), missile and component assembly structures (typically, high-bay), specialized laboratories, and test cells. The Army emphasizes that historic resources eligible for the NRHP that are less than 50 years old must be assessed against the most detailed context possible, inclusive of a consideration of resources of parallel type located at multiple sites, and, must be important at a national (rather than state or local) level. Potential resources that are truly unique (one of a kind) can be clearly identified—not always an easy task for aerospace-military infrastructure.

Between 1991 and today, a large, and increasingly sophisticated, body of historic structures inventories and detailed historic contexts support the decisions of the Air Force and Army. During the middle 1990s, late into the decade, the agencies undertook multiple studies as a part of the Legacy Resource Management Program funded through Congress. A Department of Defense (DoD) special cultural resources newsletter, *In from the Cold,* has abstracted a number of the Cold War inventories, assessments, and contextual histories in its six issues of 1996-1998. Headquarters ACC at Langley; the Office of Air Force History at Bolling Air Force Base in Washington, D.C.; the Air Force Center for Environmental Excellence (AFCEE) at Brooks Air Force Base in San Antonio; the Army Environmental Center at Aberdeen; the U.S. Army Construction and Engineering Research Laboratory (USACERL) in Champaign, Illinois; and, the U.S. Army Corps of Engineers, Fort Worth District, continue to be involved in assessing Cold War material culture against NRHP criteria and standards. These agencies have posted key studies on their internet web sites.

Within the boundaries of the former Douglas Missile Test Facility (excluding the Administrative Area no longer part of the property), the assessment of potential historic buildings and structures includes 62 individual properties (Figure 3). Of these, none are 50 years or older—although 27 buildings and structures are within five years of meeting the 50-year threshold (that is, have a design date of 1956-1960). These resources are considered as functionally at the 50-year mark, in order to allow an appropriate process of review. Of the 10 buildings and structures interpreted as eligible for the NRHP through this study (as two small districts), all date to 1956, and are considered as 50 years old, without the requirement to meet exceptional significance. The buildings and structures (and structure remnants) inventoried in 2005 at the former Douglas Missile Test Facility are summarized as:

- 1956-1957: 25 properties

  in the Solid Propellant Assembly Area (1956)

  in the Sigma Test Area (1956)

  in the Alpha Test Complex (1956-1957)

- 1959: 2 properties

  in the Kappa Test Area, originating as the Initial Operational Capability (IOC) Site 2 for the Thor missile (1959)

- 1961-1962: 3 properties

  in the Sigma Test Area (1961)

  in the Kappa Test Area (1962)

- 1964-1966: 32 properties

  in the Solid Propellant Assembly Area (1966)

  in the Sigma Test Area (1964)

  in the Beta Test Complex (1963-1964)

  in the Gamma Test Area (1964)

  in the Kappa Test Area (1964)

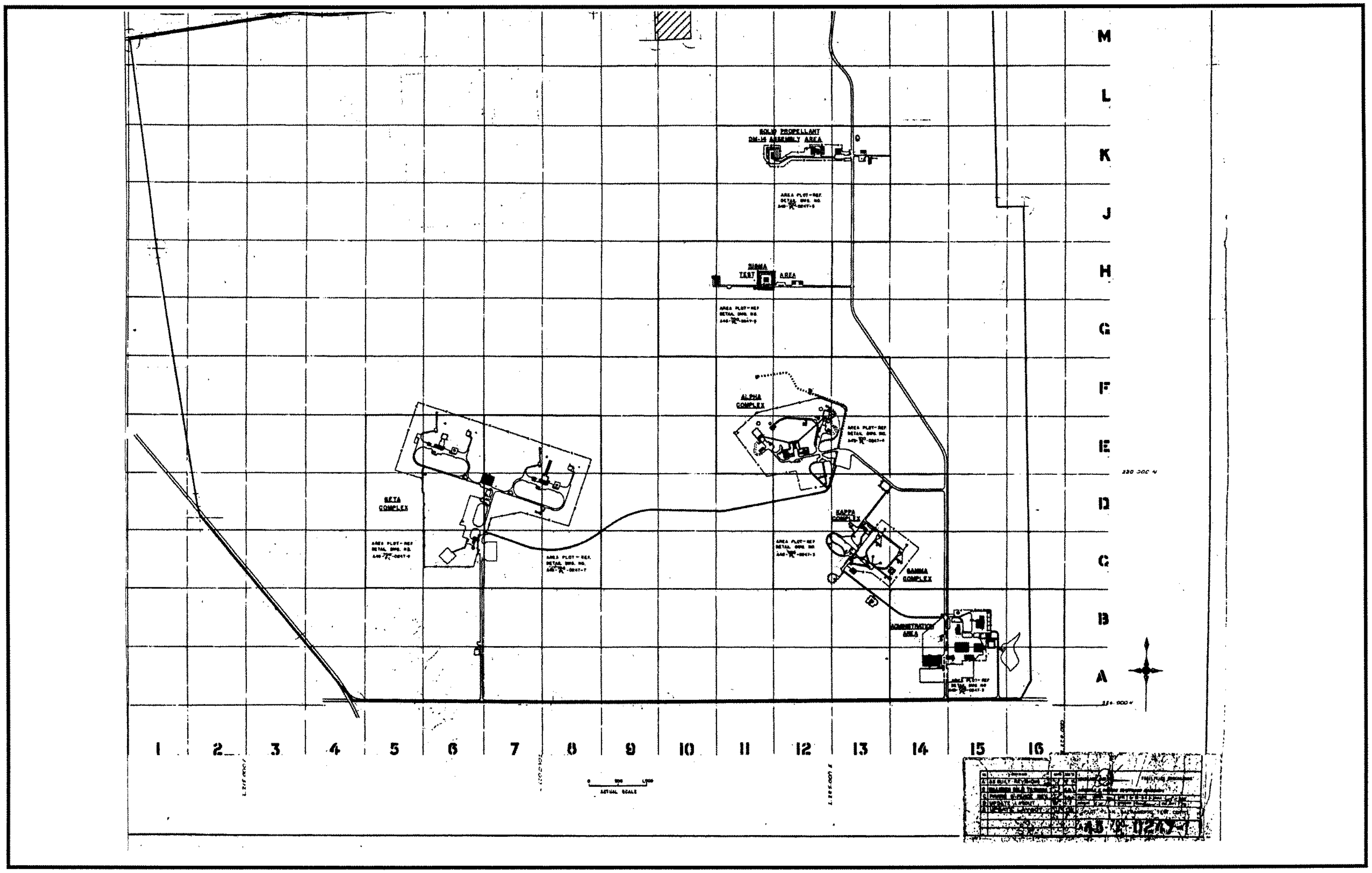

Figure 3: Douglas Facilities Engineering, Solid Propellant Assembly Area, Sigma Test Area, Alpha Test Complex, Beta Test Complex, Gamma Test Area, Kappa Test Area, and Administrative Area, Douglas Missile Test Facility, Rancho Cordova, California, 1964.

EXECUTIVE SUMMARY OF INVENTORIED STRUCTURES

Lineage of the Douglas Missile Test Facility

Initial activities at the Douglas Missile Test Facility are interpreted as supporting tests of solid-propellant rocket booster engines for the Nike Hercules interceptor missile at the Solid Propellant Assembly Area and the Sigma Test Area, and captive firings of the Thor intermediate range ballistic missile (IRBM) on the test stands in the Alpha Test Complex. The developmental Nike Hercules was the DM-14; the developmental Thor, the DM-18.

The 1956-1958 configuration of the Douglas Missile Test Facility included:

- the west half of the Solid Propellant Assembly Area (known as the DM-14 area);
- the Sigma Test Area;
- the Alpha Test Complex; and,
- the Administration Area (today, in private ownership).

By the late 1950s, Douglas had expanded its test areas to include:

- the Engineering Evaluation Site (EES), part of the later Kappa Test Area; and,
- a large missile maintenance and checkout facility in the Administration Area.

Between mid-1958 and 1960, the Douglas Missile Test Facility also included Thor Initial Operational Capability (IOC) Sites (1 and 2). These locations coexisted within the Alpha Test Complex (IOC 1) and the EES of the subsequent Kappa Test Area (IOC 2). In 1961, Douglas adapted the Solid Propellant Assembly Area for tests supporting the Nike Zeus (DM-15) program. Douglas added tests for the Skybolt (DM-20) at the location in 1962.

A second era of expansion occurred during 1963-1965. At this time, the Douglas Missile Test Facility became known as the National Aeronautics and Space Administration (NASA) S-IVB Stage Test Facility. Douglas added several large test areas for NASA, also augmenting facilities at existing sites. Ralph M. Parsons is interpreted as the master architectural-engineering firm for the dedicated NASA facility. Added for NASA in the early and middle 1960s were:

- the east half of the Solid Propellant Assembly Area (the DM-14 area);
- expanded facilities in the Sigma Test Area;
- the Beta Test Complex;
- the Gamma Test Area;
- expanded facilities in the Kappa Test Area; and,
- expanded facilities in the Administration Area.

The last static test of a NASA upper-stage booster occurred at the NASA S-IVB Stage Test Facility (the Douglas Missile Test Facility) in 1969. Between 1969 and late 1972, McDonnell Douglas maintained the site in a readiness state for NASA. During the following five years, the NASA S-IVB Stage Test Facility (the Douglas Missile Test

Facility) deactivated. By 1977, personnel had removed the multi-story, steel superstructure of the large test stands in the Alpha and Beta Test Complexes. The Douglas Missile Test Facility lost a substantial portion of its integrity as a potential National Register of Historic Places (NRHP) resource between 1972 and 1977. In 1977, McDonnell Douglas developed the Administration Area of its former test facility into an industrial park (Security Park), selling and leasing parcels within this section. Final changes in the real estate lineage of the Douglas Missile Test Facility occurred in the middle 1980s. In 1984, Aerojet repurchased its original property from McDonnell Douglas. The only exceptions in the reverse transfer were those parcels already sold to other parties in Security Park (the former Administration Area).

Buildings, Structures, and Major Site Remnants

No building (real property) numbers are available for the structures at the Douglas Missile Test Facility. During 1963-1964, when the Douglas Missile Test Facility became the NASA S-IVB Stage Test Facility, Douglas produced master plans for each test area within the facility. On these plans, individual buildings and structures are assigned numbers: Units 1-152. Many small ancillary structures remained unnumbered. The summary assessments of the buildings and structures standing within the Solid Propellant Assembly Area, Sigma Test Area, Alpha Test Complex, Beta Test Complex, Gamma Test Area, and Kappa Test Area are provided below, inclusive of their middle-1960s assigned unit number. Buildings within the Administration Area, no longer owned by Aerojet, are not listed. With the exception of the Kappa Test Area, properties are listed west to east.

Solid Propellant Assembly Area

Six buildings and structures remain in the Solid Propellant Assembly Area in May 2005:

Motor Storage Building (Unit 104):	Metal prefabricated structure of 1956. Associated with development of the Nike Hercules. Minor alterations.
Assembly Building (Unit 103):	Metal prefabricated structure of 1956. Associated with development of the Nike Hercules. Nearly unaltered.
Paint Shed (Unit 109):	Metal prefabricated structure of 1956. Associated with development of the Nike Hercules. Exterior unaltered.
Storage Building (Unit 102):	Metal prefabricated structure of 1956. Associated with development of the Nike Hercules. Unaltered.
A.S.V. Building (Unit 106):	Steel-arch structure of 1966. Storage facility for a NASA aero-thermodynamic structural test vehicle (ASV). Unaltered.
Quonset Hut (Unit 105):	Quonset hut placed on site in ca.1964 as a storage structure. Unaltered.

NRHP Evaluation Summary:	The four buildings of 1956, Units 102, 103, 104, and 109, are interpreted as eligible for the NRHP as a district under criteria A and C for their association with the developmental Nike Hercules missile. The distinctive earthen bermwork surrounding Units 103 and 104 is included as a contributing feature of the property. Complements a second developmental Nike Hercules test site, the Sigma Test Area.

Sigma Test Area

Parts of eight buildings and structures remain in the Sigma Test Area in May 2005:

Support Building (Unit 95):	Structure remnants and test pad of 1956. First associated with development of the Nike Hercules.
Destruct Pad (unnumbered):	Reinforced concrete pad, 31 by 20 feet, with four pairs of embedded rail segments. Added in 1961. Associated with tests of Nike Zeus and Skybolt.
Concrete Pad (unnumbered):	Small reinforced concrete pad of ca.1963-1964. Unidentified historic use.
Personnel Bunker (unnumbered):	Small reinforced concrete structure of 1956. First associated with development of the Nike Hercules. Adapted for storage of high-explosives. Unaltered, but moved a short distance.
Test Control Center (Unit 94):	Windowless reinforced concrete blockhouse of 1956. First associated with development of the Nike Hercules. Unaltered, with vacant interior.
Assembly Building (Unit 93):	Metal prefabricated structure of 1956. Associated with development of the Nike Hercules. Unaltered exterior, with interior derelict.
Conditioning Chamber (Unit 92):	Metal-paneled conditioning chamber of 1964. Constructed for hot-conditioning of solid-propellant motors, prior to static-test firing. Unaltered.
Conditioning Chamber (Unit 91):	Metal-paneled conditioning chamber of 1964. Constructed for cold-conditioning of solid-propellant motors, prior to static-test firing. Collapsed in place.

NRHP Evaluation Summary:	The four buildings of 1956, Units 93, 94, 95, and an unnumbered personnel bunker, are interpreted as eligible for the NRHP as a district under criteria A and C for their association with the developmental Nike Hercules missile. The distinctive earthen bermwork surrounding Unit 93 is included as a contributing feature of the property. Complements

a second developmental Nike Hercules test site, the Solid Propellant Assembly Area.

Alpha Test Complex

Seventeen buildings and large structural remnants stood in the Alpha Test Complex in May 2005:

LOX Tanks (Units 82-83):	Reinforced concrete barricade wall of 1956-1957. Constructed to support Test Stand No.2.
Steam Accumulators (Units 84-85):	Reinforced concrete pedestal foundations of 1956-1957. Constructed to support Test Stand No.2 .
Test Stand No.2 (Unit 80):	Reinforced concrete base (terminal and power rooms) and deluge pit intact, with derelict interior. Multi-story steel superstructure and flame deflector completely removed. Constructed in 1956-1957 as a dual-position test stand for Thor static firings.
Observation Shelter No.2 (Unit 88):	Three-sided, reinforced concrete shelter of 1956-1957. Observation post for static firings at Test Stand No.2. Unaltered.
Helium Storage Area (Unit 68):	Reinforced concrete barricade wall of 1956-1957. Constructed to support Test Stands No.1 and No.2.
LN2 Tank (Unit 67):	Reinforced concrete pedestal foundations of 1956-1957. Built to support Test Stands No.1 and No.2.
Generator & Compressor (Unit 62):	Metal prefabricated structure of 1956-1957. Housed generators and compressors for the Alpha Test Complex. Unaltered exterior. Interior derelict.
Control Center (Unit 61):	Windowless, reinforced concrete blockhouse for Test Stands No. 1 and No.2, constructed in 1956-1957. Instrumentation tunnels to test stands. Unaltered exterior. Interior derelict.
Pump House (Unit 63):	Metal prefabricated structure of 1956-1957. Housed pump equipment for the Alpha Test Complex.
Water Tank (Unit 65):	Steel storage tank for the Alpha Test Complex. Constructed in 1956-1957 to support static (deluge) firings on Alpha Test Stands No.1 and No.2.
Observation Shelter No.1 (Unit 79):	Three-sided, reinforced concrete shelter of 1956-1957. Observation post for static firings at Test Stand No.1. Unaltered.
Test Stand No.1 (Unit 72):	Reinforced concrete base (terminal and power rooms) and deluge pit intact, with derelict interior. Multi-story steel superstructure and flame deflector completely removed. Constructed in 1956-1957 as a single-position test stand for Thor static firings.

LOX Tanks (Units 74-75): Reinforced concrete barricade of 1956-1957. Constructed to support Test Stand No.1.

Test Cell (Unit 60): Three-sided, metal-framed test cell of 1956-1957. Interior paneling likely asbestos. Unaltered.

NRHP Evaluation Summary: No buildings and structures in the Alpha Test Complex are interpreted as eligible to the NRHP, either individually or as a district.

Beta Test Complex

Twenty-two buildings and large structural remnants stood in the Beta Test Complex in May 2005:

Observation Shelter No.3 (Unit 152): Reinforced concrete shelter of 1963-1964. Observation post for static firings at Beta Test Stand No.3. Unaltered.

LOX Tank (Unit 134): Steel tank of 1963-1964. Constructed to support Beta Test Stand No.3. Unaltered, with cap adjacent.

Fan Room (Unit 137): Small underground structure accessed by surface-level turn valve. Constructed in 1963-1964 to support Beta Test Stand No.3. Unaltered.

Observation Shelter No.4 (Unit 135): Reinforced concrete shelter of 1963-1964. Observation post for static firings at Beta Test Stand No.3. Unaltered.

Terminal Equipment Rm (Unit 132): Reinforced concrete terminal and power rooms for Beta Test Stand No.3, constructed in 1963-1964. Unaltered, with derelict interior.

Test Stand No.3 (Unit 131): Reinforced concrete base and deluge pit intact. Multi-story steel superstructure and flame deflector completely removed. Constructed in 1963-1964 for static firings of NASA's S-IVB.

Shop Building (Unit 133): Steel-frame structure of 1963-1964. Constructed to support Beta Test Stand No.3. Unaltered, with derelict interior.

Liquid Hydrogen Tank (Unit 136): Concrete perimeter wall and footings of 1963-1964. Constructed to support Beta Test Stand No.3.

Test Control Center (Unit 121): Windowless, reinforced concrete blockhouse of 1963-1964. Constructed for Beta Test Stands No.1 and No.3. Instrumentation tunnels to test stands. Unaltered exterior, with derelict interior.

Liquid Hydrogen Tank (Unit 147): Concrete perimeter wall and footings of 1963-1964. Constructed to support the Beta Test Complex.

Facilities Shop (Unit 145): Metal prefabricated structure of 1963-1964. Constructed to support the Beta Test Complex. Unaltered, with derelict interior.

Beta Support Office No.2 (Unit 141):	Metal prefabricated structure of 1963-1964. Constructed as a calibration tower for the Beta Test Complex. Unaltered.
Beta Support Office No.1 (Unit 141):	Metal prefabricated structure of 1963-1964. Constructed to support the Beta Test Complex. Unaltered, with derelict interior.
Pump House (Unit 143):	Reinforced concrete structure of 1963-1964. Constructed to support the Beta Test Complex. Unaltered, with derelict interior.
Water Tank (Unit 144):	Steel storage tank for the Beta Test Complex. Constructed in 1963-1964 to support static (deluge) firings on Beta Test Stands No.1 and No.3.
Guard Post No.7 (Unit 148):	Wood-frame guard station of 1963-1964. Beta Test Complex. Unaltered.
Fan Room (Unit 127):	Small underground structure accessed by surface-level turn valve. Constructed in 1963-1964 to support Beta Test Stand No.1. Unaltered.
Observation Shelter No.1 (Unit 126):	Reinforced concrete shelter of 1963-1964. Observation post for static firings at Beta Test Stand No.1. Unaltered.
Terminal Equipment Rm (Unit 123):	Reinforced concrete terminal and power rooms for Beta Test Stand No.1, constructed in 1963-1964. Unaltered exterior. Interior inaccessible.
Test Stand No.1 (Unit 122):	Reinforced concrete base and deluge pit intact. Multi-story steel superstructure and flame deflector completely removed. Constructed in 1963-1964 for static firings of NASA's S-IVB.
Shop Building (Unit 124):	Steel-frame structure of 1963-1964. Constructed to support Beta Test Stand No.3. Unaltered, with derelict interior.
Liquid Hydrogen Tank (Unit 128):	Steel tank of 1963-1964. Constructed to support Beta Test Stand No.3. Unaltered, with cap nearby.

NRHP Evaluation Summary:	No buildings and structures in the Beta Test Complex are interpreted as eligible to the NRHP, either individually or as a district.

Gamma Test Area

Four buildings and large structural remnants stood in the Gamma Test Area in May 2005. The maintenance and assembly building for the Gamma Test Area is located outside the security fence to the southwest. West to east, buildings and structures are:

Instrumentation Center (Unit 34):	Windowless, reinforced concrete building of 1964-1965. Raised cable tray to the test control center.

	Constructed to support the Test Structure (Unit 32). Exterior unaltered. Interior inaccessible.
Test Control Center (Unit 31):	Reinforced concrete building of 1964-1965, with viewports. Raised cable tray to the instrumentation center. Constructed to support the Test Structure (Unit 32). Exterior unaltered. Interior inaccessible.
Test Structure (Unit 32):	Reinforced concrete and steel, three-bay test structure of 1964-1965. Used for static tests of NASA subsystems. One test stand intact.
Maintenance & Assembly (Unit 37):	Metal prefabricated building of 1964-1965. Constructed to support the Gamma Test Area. No longer in Aerojet ownership.
NRHP Evaluation Summary:	No buildings and structures in the Gamma Test Area are interpreted as eligible to the NRHP, either individually or as a district.

<u>Kappa Test Area</u>

Five buildings and large structural remnants stood in the Kappa Test Area in May 2005:

Test Cell B:	Three-sided, wood-framed test cell of 1962. Used for NASA subsystem development and testing. Partially collapsed.
Test Cell C:	Three-sided, steel-framed and -paneled test cell of 1962. Used for NASA subsystem development and testing. Unaltered.
Test Area D:	Interpreted as the center location of IOC 2, 1959. Supported engineering evaluation tests for Thor. Remnants extant.
Test Area E:	Raised reinforced concrete pad, connected to deluge channel. Interpreted as the west location of IOC 2, 1959. Remnants extant.
Cryostat Laboratory (Unit 42):	Concrete-block building with viewports facing a test area. Constructed in 1964. Used for NASA subsystem development and testing. Exterior unaltered. Interior inaccessible.
NRHP Evaluation Summary:	No buildings and structures in the Kappa Test Area are interpreted as eligible to the NRHP, either individually or as a district.

CONTEXTUAL HISTORY

Aerojet General purchased acreage at the Folsom-Rancho Cordova location during the early 1950s. Still only a young company, Aerojet had grown into a major manufacturer for the developing American guided missile program. Aerojet had originated during World War II as a research firm affiliated with Dr. Theodore von Karman and the Guggenheim Aeronautical Laboratory (GALCIT) at the California Institute of Technology (Cal Tech) in Pasadena. Hungarian by birth and educated in Germany, Dr. von Karman had immigrated to the United States in 1929, invited to become the director at GALCIT. In 1940, GALCIT constructed its first captive-firing rocket engine test stands in the Arroyo Seco near the Cal Tech campus. In 1942, Dr. von Karman and his students organized the Aerojet Engineering Corporation to fabricate liquid-and solid-fueled small rocket engines. By 1944, Dr. von Karman had garnered an Army contract for GALCIT to develop tactical ballistic missiles. The rocket science laboratory at Cal Tech rapidly emerged as an important military research and development (R&D) facility, and after 1944 became known as the Jet Propulsion Laboratory (JPL). JPL and Aerojet erected more elaborate test stands in 1945 at a larger, isolated location at Muroc Army Air Field (the later Edwards Air Force Base). Static rocket tests at Muroc were among the earliest in the United States, complementing those undertaken by the group of captured German rocket scientists led by Werner von Braun at the White Sands Proving Ground in New Mexico. The first Army-Aerojet facilities at Muroc covered about 40 acres at JPL's test site. In mid-1947, the newly formed United States Air Force selected Leuhman Ridge at Muroc as the location for a new group of captive-firing test stands required to develop the Atlas intercontinental ballistic missile (ICBM). Air Materiel Command chose Aerojet Engineering to build and operate the test stands on Leuhman Ridge. In July 1952, Aerojet conducted the first static test on the ridge, with two test stands fully operational in 1953. During 1954-1955, the Air Force added more test stands at the rocket R&D station (Plate 1). By the middle 1950s, the stands were jointly designed by Aerojet and Ralph M. Parsons, a Los Angeles engineering firm that rose rapidly in prominence after World War II and often worked on the design of aerospace technical facilities with Aerojet. Ralph M. Parsons, for example, was the architectural-engineering firm responsible for the major early captive-firing test stands and blockhouses at the Redstone Arsenal in Huntsville, Alabama (Weitze, Cleland, Gregory, and Lilburn 2003). Redstone was the forerunner of today's Marshall Space Flight Center of the National Aeronautics and Space Administration (NASA). The static test stands at Redstone (Plate 2) were contemporary with those on Leuhman Ridge in southern California (1952-1956). At an unidentified date, Ralph M. Parsons became formally affiliated with Aerojet for selected commissions (Weitze 2003). Parsons-Aerojet won the contract for the Naval Air Missile Test Center at Point Mugu by 1954 (Coughlin 1954).

By early 1954, Aerojet operated a liquid propellant production plant on 8,400 acres at the Rancho Cordova site. Aerojet produced Rocket-Assisted Take-Off (RATO) units at its northern California plant for several Navy aircraft of the period, including the P2V and the B-45. The RATO units used liquid and solid propellants, and were small, recoverable rocket boosters (Coughlin 1954). During 1956-1957, Aerojet transitioned some of its operations to become Air Force Plants (AFPs) 70 and 71. Aerojet had announced a $2.1-

Plate 1: Atlas ICBM in Test Stand 1-A, Leuhman Ridge, Edwards Air Force Base, California, 1 August 1957. Courtesy of the History Office, Edwards Air Force Base.

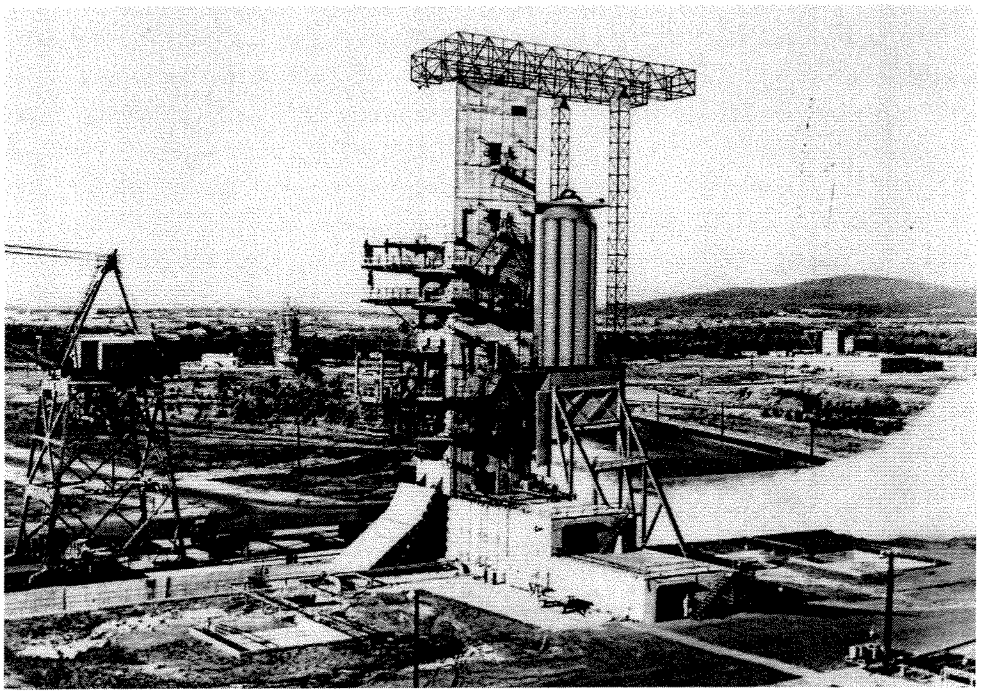

Plate 2: Juno V booster in the dual-position static test stand, Redstone Arsenal, Huntsville, Alabama, 8 October 1958. Courtesy of the History Office, Redstone Arsenal.

million expansion at the Folsom-Rancho Cordova site in February 1954. Financed by the Federal government, the expansion of the Aerojet facilities supported the manufacture of engines and boosters for Nike and Regulus missiles—Army and Navy weapons, respectively. When constructed, AFPs 70 and 71 were liquid-fuel, rocket engine production sites. In early 1956, Aerojet announced a second major expansion of its Folsom-Rancho Cordova facilities. At that time, the size of the Aerojet test and manufacturing site approached 14,000 acres, with a $9-million liquid propellant plant producing RATO units. The 1956 augmentation of the site featured a $35-million solid propellant plant (*Aviation Week* 1956).

The Aerojet General Corporation bought the acreage that would become the Douglas Missile Test Facility in 1956, as part of an expansion of its property in the Folsom-Rancho Cordova area. Prior to its acquisition by Aerojet, the parcel had been owned by the Natomas Company and had supported gold dredging activities between 1915 and 1956. Shortly after the purchase of the property, Aerojet leased a portion of the acreage to the Douglas Aircraft Company. Douglas built selected buildings in the Solid Propellant Test Area before October 1956, following with construction at the Sigma Test Area to its immediate south. By the close of the year, both the Alpha Test Complex and the Administration Area were also under construction. The first four areas of the Douglas Missile Test Facility are interpreted as designed by Aerojet, as noted in existing drawings for the Alpha Test Complex. The internal Douglas name for the facility was Site A-45. Alternate early names for the location were the Sacramento Missile Field Station and the Douglas Sacramento Test Center.

AFPs 70 and 71, and the Douglas Missile Test Facility, were part of the industrial plant and test site program of the United States Air Force. During World War II, the Army sponsored two types of industrial facilities in the United States that linked the military closely to private industry: the government-owned, government-operated (GOGO) plant and the government-owned, contractor-operated (GOCO) plant. The GOCO was the key paradigm for the "Army aircraft plant." These plants included a huge government investment in their infrastructure. By the end of the war, Army and Navy government-funded aircraft plants totaled 350. After the surrender of Japan in September 1945, the aircraft and weapons systems procurement mission abruptly changed, with most contracts cancelled and plant production mothballed. The federal government first sought to transition to a peacetime economy by offering the plants for sale to their wartime users, but such plant conversion was typically not cost-effective. In 1946, with the Cold War unfolding, the War Department foresaw a need for sustained future industrial preparedness and a reserve of standby plants. That year, the Army Air Forces had jurisdiction over just nine industrial plants—each an aircraft or aircraft-components manufacturing site held on standby. Headquarters Air Materiel Command managed the emerging program. Industrial mobilization and plant management planning continued in the late 1940s in the Air Force, Army, and Navy, with a projection of 159 GOCOs for the Air Force alone. The Air Force GOCO program included plants for the manufacture of aircraft, missiles, weapons systems, and all types of component parts. The National Industrial Reserve Act of 1948 simultaneously formalized a National Industrial Reserve, with particular use restrictions for some GOCOs managed by all service arms.

Complementing the industrial manufacturing plants, such as Aerojet's AFPs 70 and 71 at Folsom, were the closely related test sites of aerospace companies such as Douglas. These facilities were not government owned or operated, but did directly support research, development, test, and evaluations required during the manufacturing process. Corporate test sites, such as the Douglas Missile Test Facility, existed across the United States. California examples of rocket-engine, missile, and space booster corporate test facilities of the middle and late 1950s include a North American Aviation (NAA) site in Santa Susana Canyon near Los Angeles, where the company captive-fired Atlas engines in 1955 (Plate 3); a Convair test-stand complex for Atlas at Point Loma near San Diego, of 1957 (Plate 4); and, the Aerojet rocket-engine static test complex associated with AFP 70 near the Douglas Missile Test Facility, of 1956 (Plates 5-6). At some of these locations, including the NAA site at Santa Susana Canyon and the Douglas Missile Test Facility, NASA followed the Air Force as the true user of the test facilities (Weitze 2003; NASA 1966). (Among NASA test managers, the NAA site became known as Santa Sue.)

Initial activities at the Douglas Missile Test Facility are interpreted as supporting tests of solid-propellant rocket booster engines for the Nike Hercules interceptor missile at the Solid Propellant Assembly Area and the Sigma Test Area, and captive firings of early production-line Thor intermediate range ballistic missiles (IRBMs) and Thor engines on the test stands in the Alpha Test Complex. Components tests for the Thor also took place at two smaller sites at the Douglas Missile Test Facility: Initial Operational Capability (IOC) Site 1, collocated at the Alpha Test Complex, and IOC Site 2, the genesis of the later Kappa Test Area. The developmental Nike Hercules was Defense Missile (DM)-14; the developmental Thor, the DM-18.

Nike Hercules

The Nike Hercules was the second-generation Nike surface-to-air missile. The Hercules was 41 feet long, 31.5 inches in diameter, used solid rocket fuel, and had a range of 75 miles up to altitudes of 150,000 feet. The missile was a two-stage weapons system. Its predecessor, the Nike Ajax, was also a two-stage missile, but was smaller than the Hercules and used liquid propellant. The Nike Ajax deployed during 1954-1958, and was the first operational guided, surface-to-air missile in the world. The prime subcontractor for the Nike Ajax was Douglas Aircraft, who manufactured 13,714 large airframes for the missile at its plant in Santa Monica, California, and at the Army Ordnance Missile Plant in Charlotte, North Carolina. The Army established nearly 200 Nike Ajax batteries ringing the continental United States by 1958. A single Nike rocket engine powered the Ajax, while a cluster of four Nike engines powered the Hercules. The Army initiated development of the Nike Hercules in 1953, with deployment of the missile underway in 1958. Douglas was also the prime subcontractor for the Hercules, a nuclear-capable missile. The Army deployed 145 Nike Hercules batteries (110 of these converted from pre-existing Nike Ajax installations). Nike Ajax / Nike Hercules batteries in California were located around Los Angeles (16) and San Francisco (16). The Nike Hercules ceased to be an operational missile in the United States by 1975, although was still deployed internationally thereafter (Lonnquest and Winkler 1996).

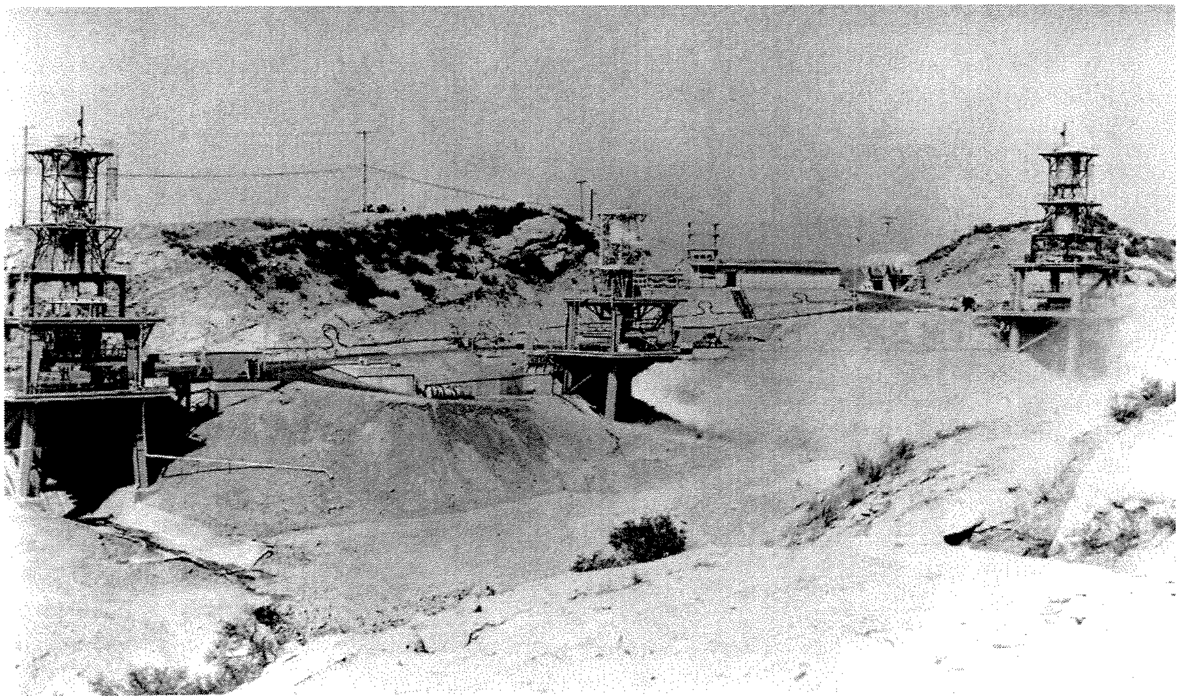

Plate 3: NAA Test Site, Santa Susana Canyon, California. Firing of an Atlas single booster engine. In *History of Air Research and Development Command July-December 1955.*

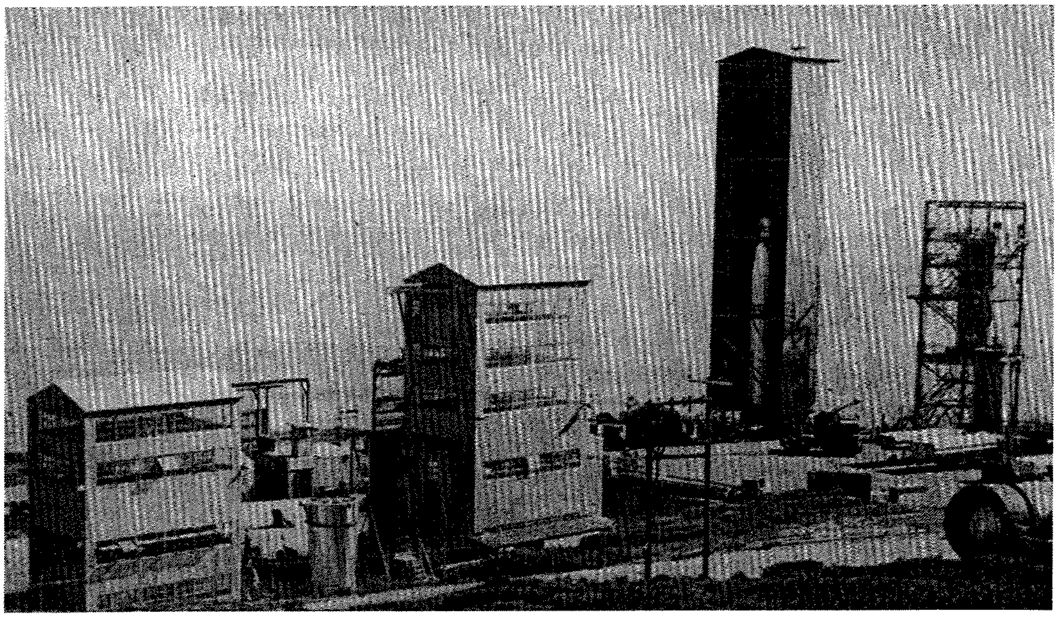

Plate 4: Convair Test Site, Point Loma, California. Atlas in test stand. In *Aviation Week*, 9 December 1957.

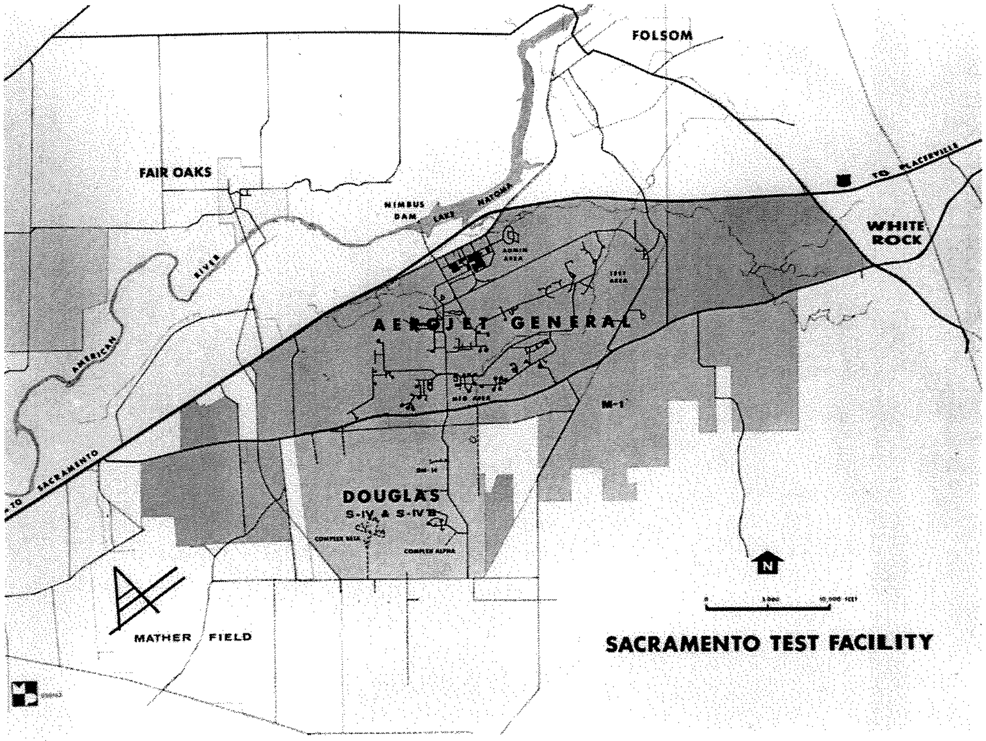

Plate 5: Aerojet General M-1 Test Complex and Douglas Missile Test Facility, ca.1964. Courtesy of NASA.

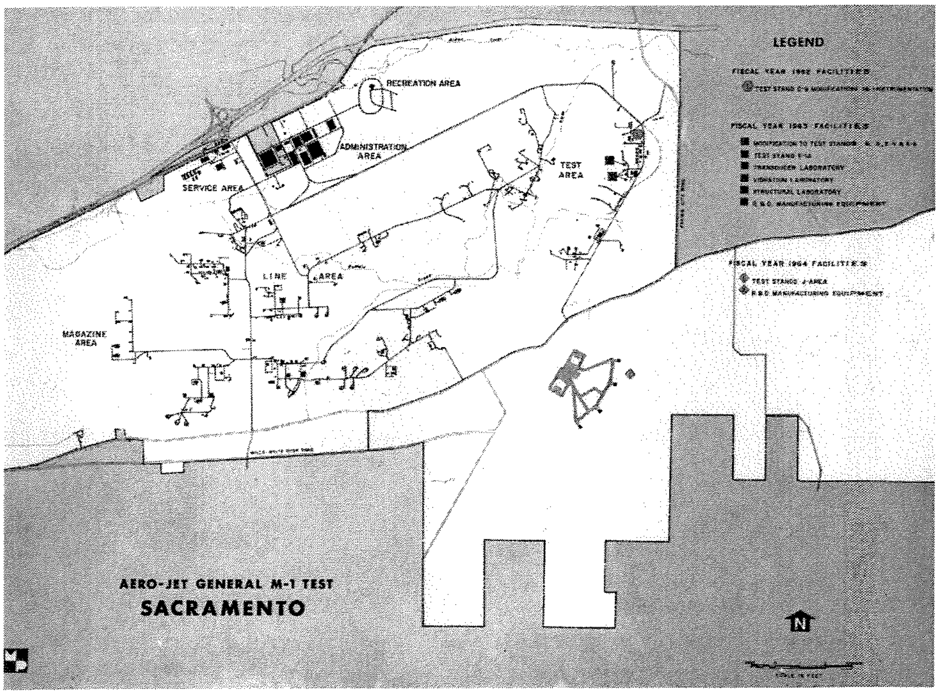

Plate 6: Aerojet General M-1 Test Complex, ca.1964. Courtesy of NASA.

Note: An oral tradition exists that the Solid Propellant Assembly Area accommodated tests of the MB-1 Genie, a nuclear-tipped air-to-air missile contracted to Douglas Aircraft for development in 1954. Douglas delivered the first inventories of the Genie to the Air Force in January 1957—with the weapons system placed at Hamilton Air Force Base near San Francisco and Wurtsmith Air Force Base near Detroit (Schaffel 1991). The Kansas City architectural-engineering firm Black & Veatch designed the special munitions igloo for the Genie in mid-1956, with its buildout matching deployment of the Genie during 1957-1958 at selected Air Defense Command fighter-interceptor alert compounds across the nation (Weitze 2003). If work on the Genie occurred at the Solid Propellant Assembly Area and/or the Sigma Test Area, such activity was confined to 1957, and preceded a full shift to work on the Nike Hercules by 1958. The likelihood of work on the Genie at a contractor site, *after* its deployment to Air Force installations as an operational weapons system, is unlikely. One possibility is that a portion of the Solid Propellant Test Area was operational very quickly in 1956, as is indicated by existing drawings of the site, and that for a brief period supported Douglas' work on the Genie in the assembly building at that location. (See the discussion for Unit 109, in the inventory for the Solid Propellant Test Area.)

Thor

Thor was an Air Force IRBM, developed to complement the Army's Redstone shorter-range ballistic missile, the Redstone. While the Redstone had a range of 500 miles, the Thor and its complementary Army IRBM, the Jupiter, could it deliver their payloads 1,500 miles. The Department of Defense desired a truly long-range ballistic-missile capability, and planned toward the Atlas and Titan ICBMs. The Atlas I and Titan I each had a range of more than 6,300 miles. Military engineers calculated that an IRBM would be easier to bring to operational status than would an ICBM. The Thor and the Jupiter were also rushed through development and test to counterbalance similar IRBM programs thought to be in progress in the Soviet Union. Douglas Aircraft was the manufacturer of the Thor IRBM. The Thor was a stop-gap ballistic missile, deployed as four, 15-missile squadrons in Britain during 1959-1960. Thor was 65 feet long, and unlike the Nike Hercules was a liquid-propellant weapons system. Aerojet engineers designed the Alpha Test Complex on the Douglas Missile Test Facility in 1956-1957 for early Thor evaluation testing. Thor was also in test for the Air Force in the captive-firing stands on Leuhman Ridge at Edwards Air Force Base in southern California, a facility managed by Aerojet. In mid-1960, after two years of tests at Douglas Missile Test Facility and on Leuhman Ridge, the Air Force moved the final process of Thor IOC testing to Vandenberg Air Force Base near Santa Barbara. The training of British personnel for the Thor occurred at Vandenberg. The three Thor launch complexes constructed for Thor at Vandenberg retained potential operational capability during the early 1960s (Lonnquest and Winkler 1996; Weitze 1991).

Douglas operated its test site at Rancho Cordova-Folsom as a sequence of expanding activities. The work on the developmental Nike Hercules at the Solid Propellant Assembly Area and the Sigma Test Area was likely underway by 1957, and is interpreted as including significant Aerojet participation. Captive firings of the Thor at the Alpha

Test Complex began in January 1958, with activation of IOC Site 1 in July 1958 and IOC Site 2 in July 1959. In 1960, Douglas completed Thor tests at its test facility, and began supporting the Aerojet second-stage engine test program for the Titan ICBM on one of the test stands in the Alpha Test Complex. Douglas also initiated tests of the developmental DSV-IV Saturn booster for NASA at IOC Site 2 (with the location renamed the Component Test Site). Beginning in 1961, Douglas increased its contracting to NASA, although continued to support tests of the Titan second-stage engine. In 1961, Douglas conducted more developmental tests for the Nike weapons system at the Solid Propellant Test Area and at the Sigma Test Area. As of this year, tests were for the third-generation Nike, the Nike Zeus (DM-15). During 1962, Douglas continued tests of the Nike Zeus at the two locations, and also added tests for the Skybolt air-launched ICBM (DM-20). For NASA, tests for the DSV-IV Program continued at the Alpha Test Complex, with the addition of static firings of RL 10 A-1 and RL 10 A-3 engines configured in the battleship S-IV (Douglas 1958-1962). The battleship launch vehicle was a non-flight test version, fabricated from stainless steel for heavy, repeated usage.

Nike Zeus

The Army developed the Nike Zeus as an anti-missile missile, a weapon planned for an antiballistic missile (ABM) system and one that included a nuclear warhead. The first contract for the Nike Zeus occurred in early 1957. Douglas was again the prime subcontractor for the missile's large airframe. Although the Army lobbied Congress for funding of the Nike Zeus as a full-blown ABM weapon, the Nike Zeus received only sufficient monies to carry the missile through R&D during 1959-1962. Douglas conducted activities for the Nike Zeus in the Solid Propellant Assembly Area and in the Sigma Test Area of its missile test facility at Rancho Cordova during 1961-1962—possibly running tests for the Nike Zeus at the locations before this date, after transitioning from work on the Nike Hercules (Douglas 1958-1962). In July 1962, the Army fired a Nike Zeus (with a dummy warhead) from launch facilities on the Kwajalein Atoll in the Marshall Islands at an Atlas ICBM fired from Vandenberg Air Force Base. The Army counted the test mission a success, although the Nike Zeus warhead missed the inbound Atlas by two kilometers. In a second test, a Nike Zeus fired from Kwajalein came within 22 meters of the Atlas launched from Vandenberg. Despite the prominence of the Nike Zeus tests and their positive receipt, the Department of Defense decided not to deploy the Nike Zeus as an ABM, and instead shifted toward a more sophisticated defense missile first named the Nike X. The Nike X was the first step toward the later Safeguard ABM system developed during 1964-1975 (Lonnquest and Winkler 1996).

Skybolt

Douglas Aircraft was also responsible for development of the Skybolt ballistic missile, with early development of the weapon beginning in 1959. The Skybolt was an air-to-surface missile nearly 40 feet long, planned for launch from a B-52. The weapon was the first ballistic missile to be fired from a bomber, and had a target distance of 950 nautical miles. The Skybolt, like both the Nike Hercules and Nike Zeus, had a nuclear warhead. Strategic Air Command (SAC) planned to deploy the Skybolt to selected of its alert facilities in 1961 as a follow-on weapon to the Hound Dog, a nuclear-tipped cruise missile of the late 1950s. Program goals were 1,000 Skybolt missiles, equipping 22 squadrons at SAC bases. Douglas fabricated full-scale dummy Skybolt missiles, which the Air Force used in drop tests from both American and British aircraft, but never went into production for the weapons system. The Air Force cancelled the Skybolt program in December 1962 (Weitze 2003).

Note: Each of the identified missiles associated with tests in the Solid Propellant Assembly Area and the Sigma Test Area during 1956/1957-1962 were Douglas-developed and –manufactured weapons systems with nuclear warheads: the Nike Hercules, Nike Zeus, and Skybolt (and also, the MB-1 Genie, if tested at the locations). In 1962, Douglas also conducted a "Special Test Series 'A'" in the Solids Area. The Special Test Series "A" were a classified test series that included an igniter test and three propellant evaluation tests (Douglas 1958-1962). The Special Test Series "A" likely also involved tests related to a weapons system with a nuclear warhead. The significance of the focus on nuclear-warhead weapons in the Solid Propellant Assembly Area and the Sigma Test Area remains undetermined.

During 1960-1962, even as the company supported tests of the Nike Zeus and Skybolt, Douglas moved toward a dedicated use of its missile test facilities at Rancho Cordova for NASA's S-IVB program. Initially, Douglas tested the S-IV in the Alpha Test Complex. By 1966, NASA had redesignated the Douglas site the NASA S-IVB Stage Test Facility—a name that replaced that of the Douglas Missile Test Facility. Ralph M. Parsons designed the Beta Test Complex for tests of the S-IVB in 1963, with construction of the complex during 1964. Douglas also expanded its facilities at the IOC Site 2 (Component Test Site / Engineering Services Site) to support the needs of the S-IVB test program. The IOC Site 2 evolved into the Kappa Test Area, with the Gamma Test Area added adjacent. Douglas conducted battleship tests for the S-IVB in the Beta Test Area, subsequently running acceptance tests of S-IVBs and of its power-plant, the J-2 engine.

Saturn S-IV and S-IVB Boosters

The S-IV and S-IVB were second-stage boosters for the Saturn I and Saturn IB, NASA's launch platforms for placing man in space. The Saturn launch vehicles advanced through increasingly sophisticated models (Plate 7). The Saturn I was a two-stage launch vehicle (first called the Juno V—see Plate 2) used to qualify Apollo spacecraft. The Saturn IB was also a two-stage launch vehicle, but featured improved upper-stage engines. NASA used the Saturn IB for earth-orbital missions, including Apollo and Skylab. The first-stage booster of the Saturn I was the S-I, developed within the Army Ballistic Missile Agency at the Redstone Arsenal during the late 1950s. The second-stage booster of the Saturn I was the S-IV. The configuration of the Saturn IB included an S-1B as the first-stage booster, and the S-IVB as the second-stage booster. NASA engineers developed the propulsion systems for the Saturn I and the Saturn IB using liquid-fuel engines, rather than solid-rocket engines. Engineers could shut down liquid-fuel engines after ignition, whereas solid-rocket boosters would continue burning. Liquid-fuel engines for the Saturn I were eight H-1 engines in the S-I (first stage booster), and six RL 10 engines in the S-IV (second stage). As true for the Saturn I, propulsion for the first stage of the Saturn IB was also eight H-1 engines. For the second-stage S-IVB booster, however, NASA turned to a single J-2 engine (Weitze, Cleland, Gregory, and Lilburn 2003). In the final version of the Saturn, the Saturn V, NASA configured the launch vehicle as three stages: a first-stage S-IC (with five F-1 engines), a second-stage S-II (with five J-2 engines), and a third-stage S-IVB (with one J-2 engine). McDonnell Douglas manufactured the S-IV and S-IVB for NASA. The S-IVB was 58 feet long and 21.5 feet in diameter. The J-2 engine had a 200,000-pound thrust, with a restart capability (NASA 2005).

NASA conducted tests of the RL 10 and the J-2 engines in battleship configurations of the S-IV and S-IVB boosters on captive-firing stands in the Alpha Test Complex (the RL 10) and in the Beta Test Complex (the J-2) during 1962-1968 (Plates 8-14). Tests of the RL 10 focused on very early versions of the engine during 1962. Tests of the J-2 at Rancho Cordova illustrate the important interactive relationships between corporate test facilities and those maintained by NASA to develop a new engine for a launch vehicle. Rocketdyne contracted to manufacture 55 J-2 engines for NASA by August 1965, and delivered the first production J-2 engine in April 1964. Rocketdyne, a division of NAA, ran an intensive test program for the J-2 engine at the Santa Susana test site (see Plate 1). NASA followed with qualification tests of the J-2 engine at its Marshall Space Flight Center in Huntsville, Alabama, during 1965-1966. NASA conducted acceptance tests of the J-2 engine in the battleship S-IVB at the Beta Test Complex in Rancho Cordova during 196_. In mid-1966, NASA increased its contract for J-2 to 155 engines, including an uprated version (Weitze 2004). Douglas ran acceptance tests of the J-2 engine, including its uprated version, at the S-IVB Stage Test Facility in Rancho Cordova from mid-decade into about 1968. After acceptance tests, NASA transported the individual J-2 engines from California to Cape Canaveral for installation on second- or third-stage S-IVB boosters configured in the Saturn IB and Saturn V.

McDonnell Douglas ceased using its facilities at the Rancho Cordova site in 1969, thereafter maintaining the S-IVB Stage Test Facility in a state of readiness for NASA until late 1972. Between 1973 and 1977, McDonnell Douglas dismantled the majority of the steel superstructure on the four test stands in the Alpha Test Complex (two stands) and in the Beta Test Complex (two stands). The company sold the steel as scrap. In 1977, McDonnell Douglas also initiated sales of parcels and buildings in the Administration Area of the former Douglas Missile Test Facility / S-IVB Stage Test Facility. The divested real estate became part of an industrial park (Security Park). Final changes took place in the middle 1980s. In 1984, Aerojet bought back its original property from McDonnell Douglas. The only exceptions in the sale was real estate in third-party ownership located in Security Park (the former Administration Area). The lineage of AFP 70 and AFP 71, neighboring the Douglas property, also went through major changes. The Air Force sold AFP 71 in 1969. AFP 70, owned jointly by Aerojet and the Air Force, became fully Aerojet-owned in 1999. (The majority of AFP 70 was Aerojet-owned from its beginnings, but with direct oversight and record-keeping by the Air Force.)

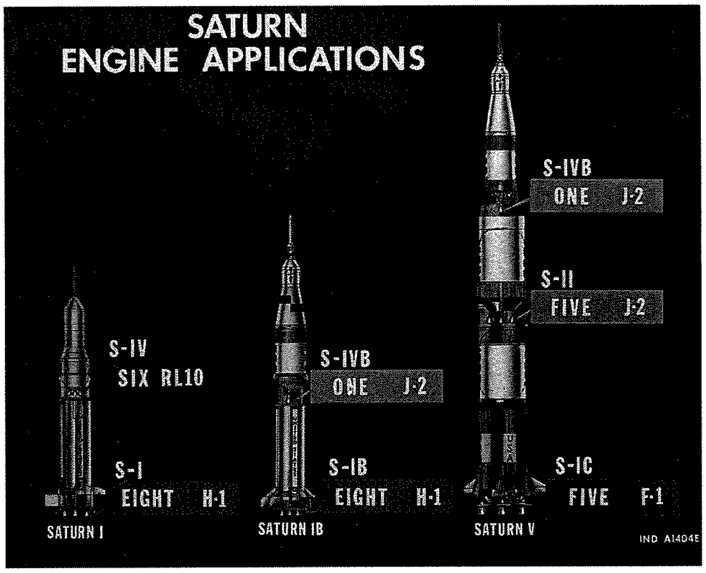

Plate 7: First-, second-, and third-stage booster configurations for the Saturn I, Saturn IB, and Saturn V. Courtesy of NASA, Marshall Space Flight Center MIX Archives.

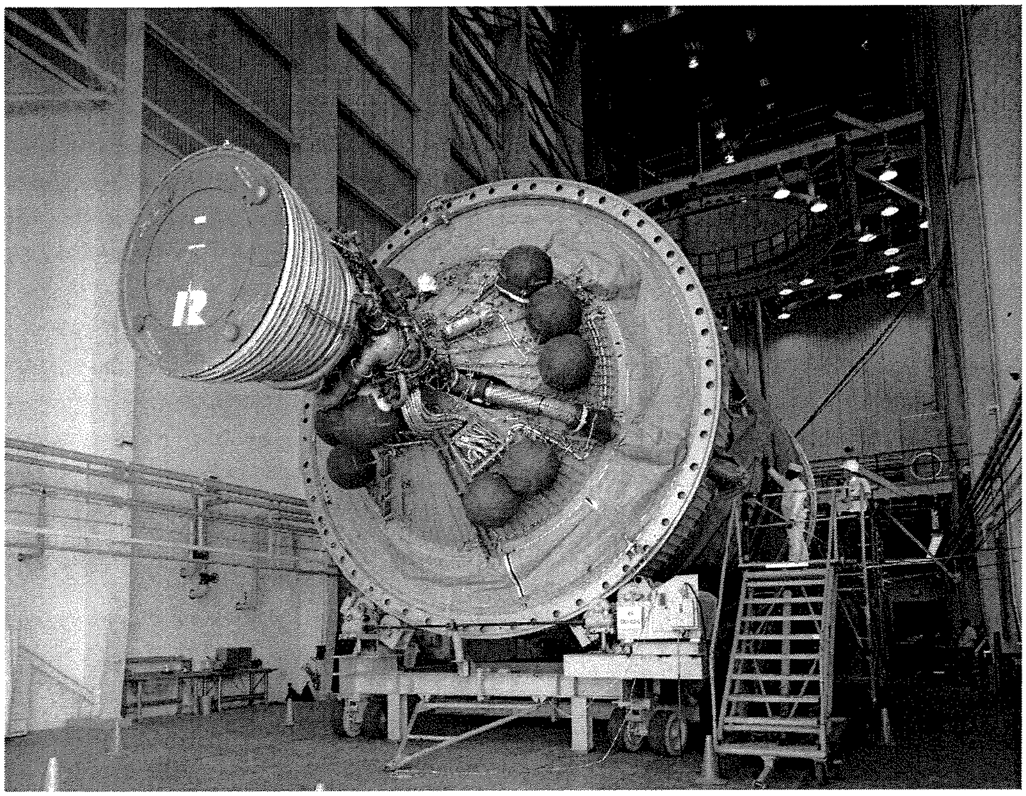

Plate 8: Fully assembled S-IVB, third-stage booster for the Saturn V (AS-503). Used in the Apollo 8 mission. In the Vehicle Checkout Laboratory, Administration Area, S-IVB Stage Test Facility (Douglas Missile Test Facility), January 1967. Marshall Space Flight Center MIX Archives.

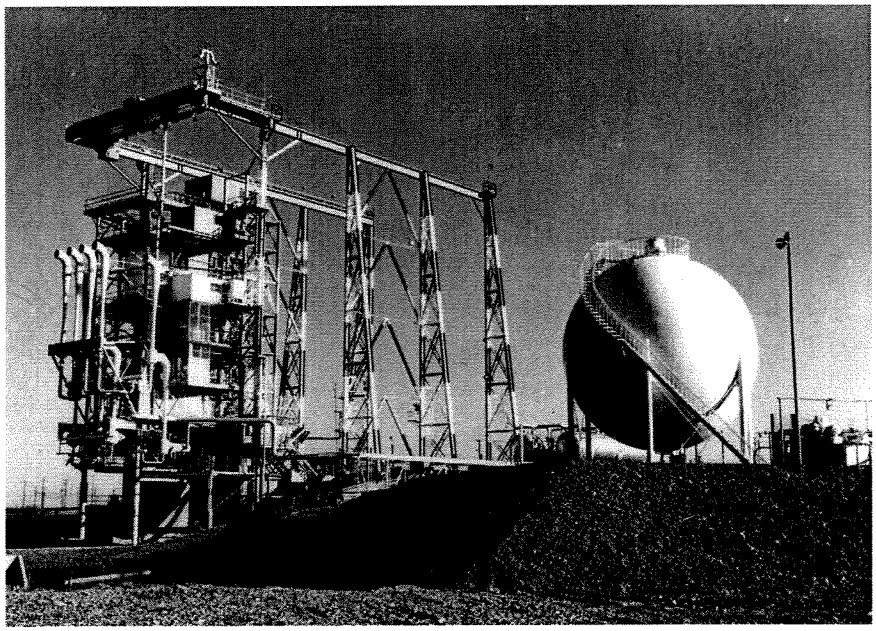

Plate 9: Battleship S-IV, in Test Stand No. 1, Alpha Test Complex, Douglas Missile Test Facility, ca.1961-1962. Bank of six steam ejectors visible left edge of the test stand. Steam ejectors and accumulators supported altitude simulation capabilities at Test Stands No. 1 and No. 2, Alpha Test Complex. Courtesy of NASA.

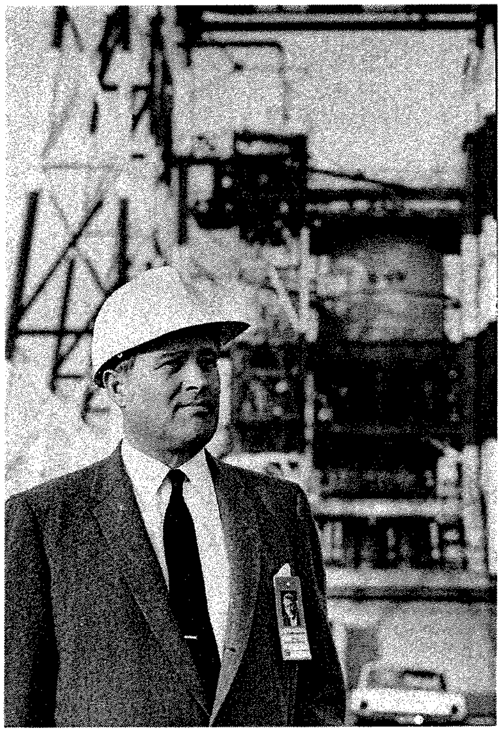

Plate 10: Werhner von Braun, visiting Test Stand No. 1, Alpha Test Complex, Douglas Missile Test Facility, early 1960s. Marshall Space Flight Center MIX Archives.

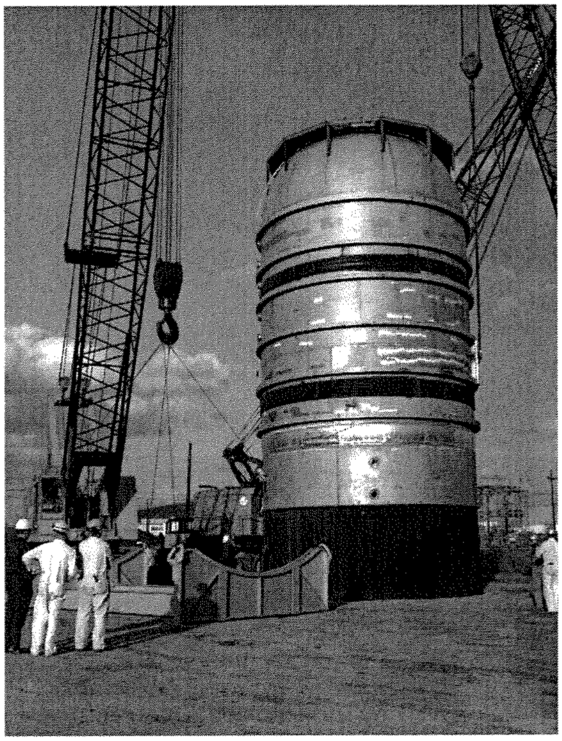

Plate 11: Battleship S-IVB at the S-IVB Stage Test Facility (Douglas Missile Test Facility), 1 February 1965. Marshall Space Flight Center MIX Archives.

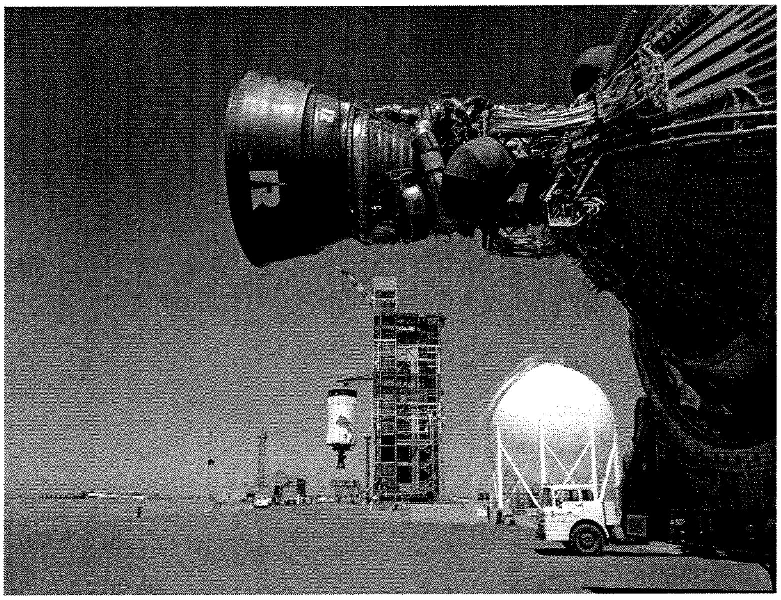

Plate 12: Saturn V S-IVB (AS-209), on transporter in foreground, with S-IVB for the Apollo 9 mission being installed in Test Stand No. 1, Beta Test Complex, S-IVB Stage Test Facility (Douglas Missile Test Facility), 1 January 1967. Marshall Space Flight Center MIX Archives.

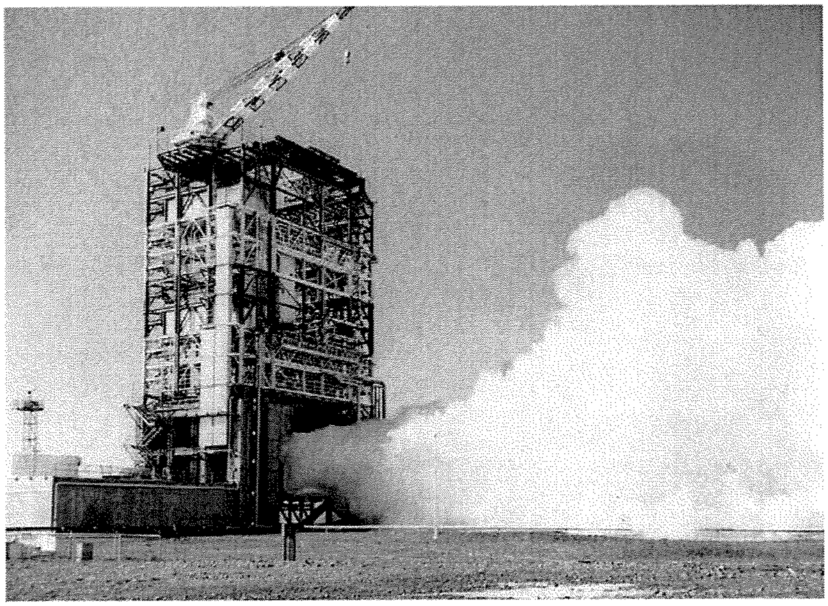

Plate 13: Acceptance test for a J-2 engine, in a third-stage S-IVB configuration for Saturn V, Test Stand No. 1, Beta Test Complex, S-IVB Stage Test Facility (Douglas Missile Test Facility),undated (ca.1967-1968). Marshall Space Flight Center MIX Archives.

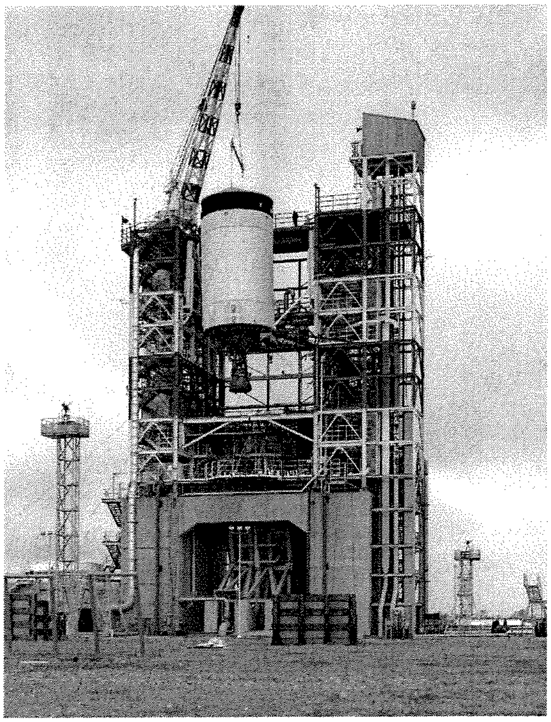

Plate 14: Acceptance test for Saturn V S-IVB, Apollo 10 mission. Test Stand No. 1, Beta Test Complex, S-IVB Stage Test Facility (Douglas Missile Test Facility), 1 January 1968. Marshall Space Flight Center MIX Archives.

INVENTORY ASSESSMENT

Weitze Research inventoried buildings, structures, and site remnants in six historic test complexes of the Douglas Missile Test Facility. The Administration Area for the Douglas Missile Test Facility (today's Security Park) is a seventh historic location, but is outside the project area. The contextual history above addresses the relationship of the Administration Area to the six inventoried test complexes.

Solid Propellant Assembly Area

The Solid Propellant Assembly Area is a small, partially fenced compound laid out east-west along a single road in the northern part of the overall historic Douglas test site (Figure 4). The area includes two distinct clusters of buildings that bracket a larger north-south road. The western cluster of buildings lies within a security fence, while those east of the road have open access. The fenced western building group dates to 1956. The unfenced eastern building group dates to 1964-1966. Reviewed materials indicate that McDonnell Douglas constructed the western half of the Solid Propellant Assembly Area to support its early development work on the Nike Hercules interceptor missile, the IM-14. Also known as Site DM-14 (which stands for Defense Missile 14), the Solid Propellant Assembly Area may have acquired this alternate name from its early association with the Nike Hercules. McDonnell Douglas added the eastern cluster of buildings as a part of an expansion of facilities during the early 1960s for NASA.

Aerojet manufactured the liquid-fueled sustainer engine and the solid-fueled rocket booster for the Nike Ajax during the late 1940s and early 1950s. The experimental Nike Hercules program was underway in late 1953, with test firings beginning at the White Sands Proving Ground in New Mexico by 1955. The developmental Nike Hercules of the middle 1950s reused the existing Nike Ajax propulsion system. Design engineers quadrupled the engine components, using four solid-rocket boosters to lift the missile into its initial flight. Four liquid-rocket boosters fired next to propel the Nike Hercules to its target. A serious test firing accident at White Sands in late September 1955 led design engineers to replace the liquid-fueled rocket booster with a solid-fueled sustainer engine for the Nike Hercules. Nike Hercules development work conducted in the western half of the Solid Propellant Assembly Area is interpreted to have included only solid-propellant rocket engines.

Minor ancillary structures that are no longer standing within the assembly area include the following:

- a small water tank at the southwestern corner of the assembly building;
- a clock station (Unit 108) at the entrance gate to the fenced group of buildings west of the north-south road;
- a guard station (Unit 101) coupled with the clock station;
- a pair of storage sheds south of the ASV building and west of the Quonset hut;
- a large storage shed; and,
- an impound storage facility immediately east of the Quonset hut.

A discussion of the existing components of the solid propellant assembly area is presented below.

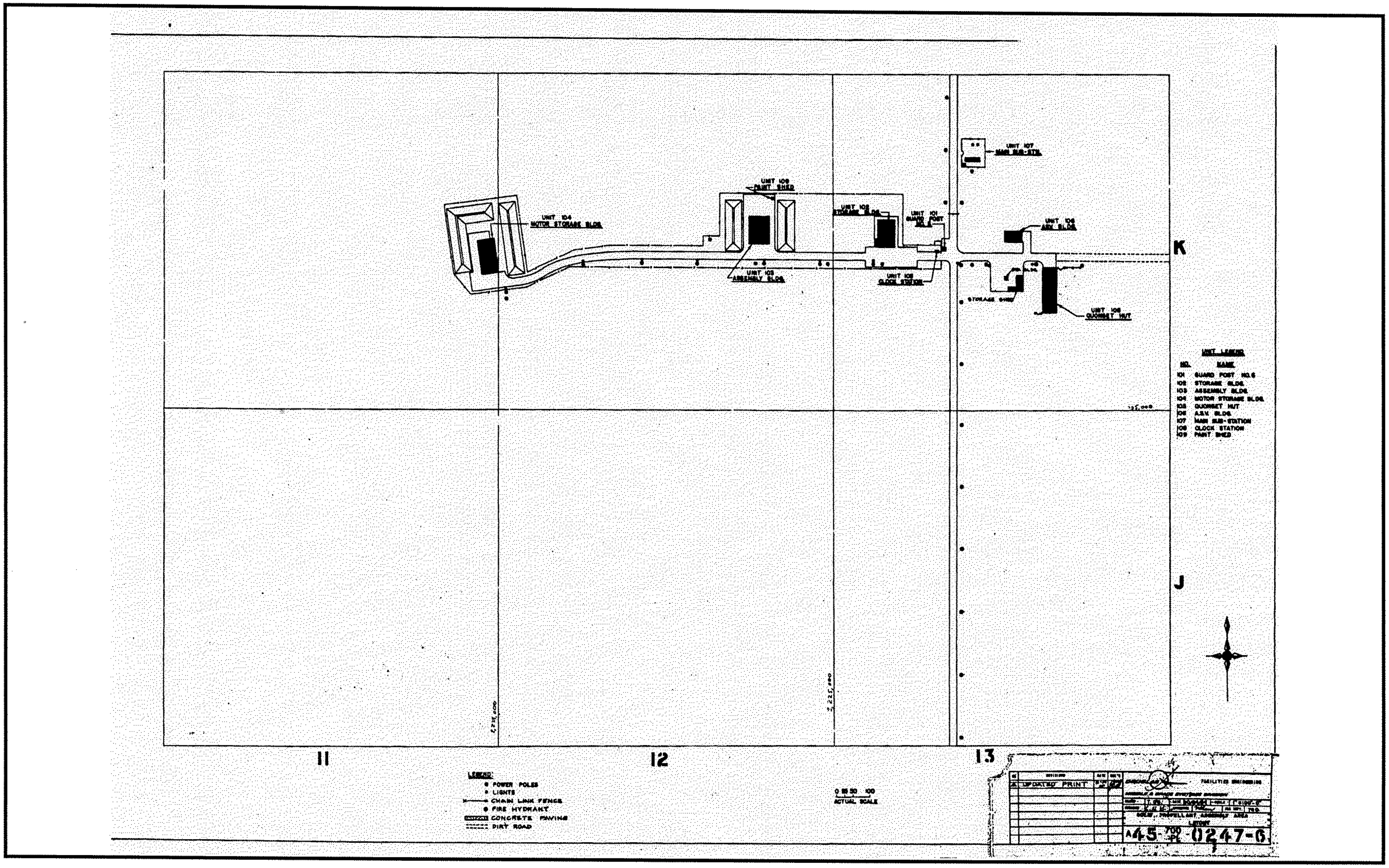

Figure 4: Douglas Facilities Engineering, Solid Propellant Assembly Area, Douglas Missile Test Facility, Rancho Cordova, California, 1964.

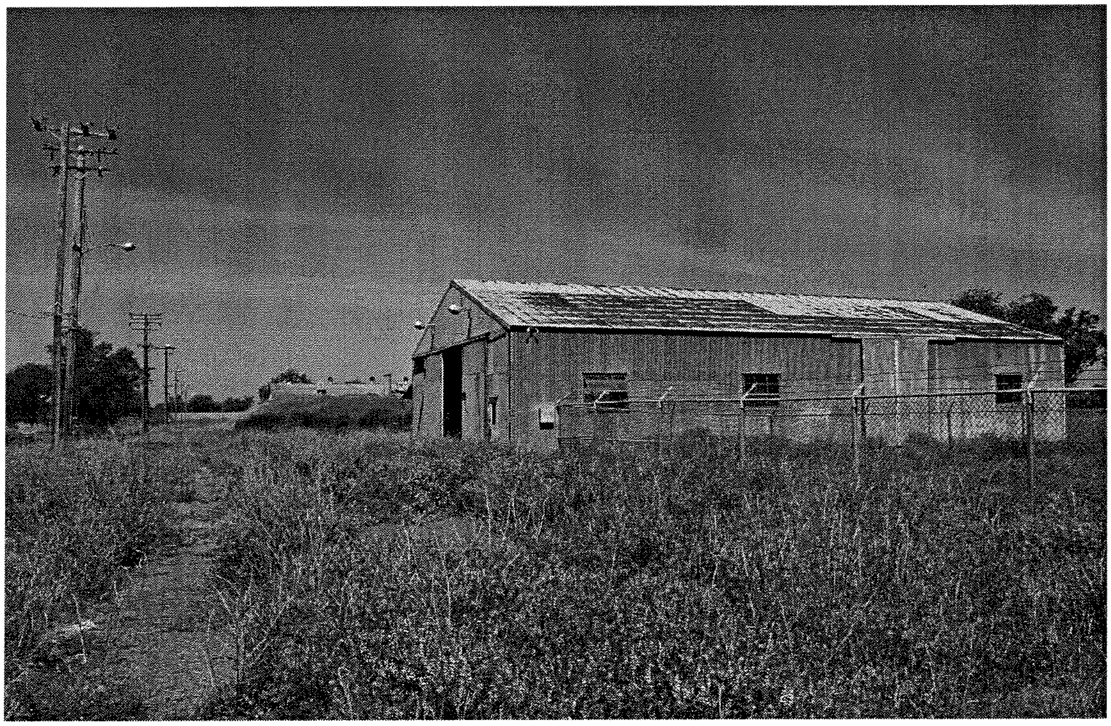

Plate 15: Storage Building (Unit 102), Assembly Building (Unit 103), and Motor Storage Building (Unit 104), Solid Propellant Assembly Area, 1956. East to west overview. Looking west. View of May 2005.

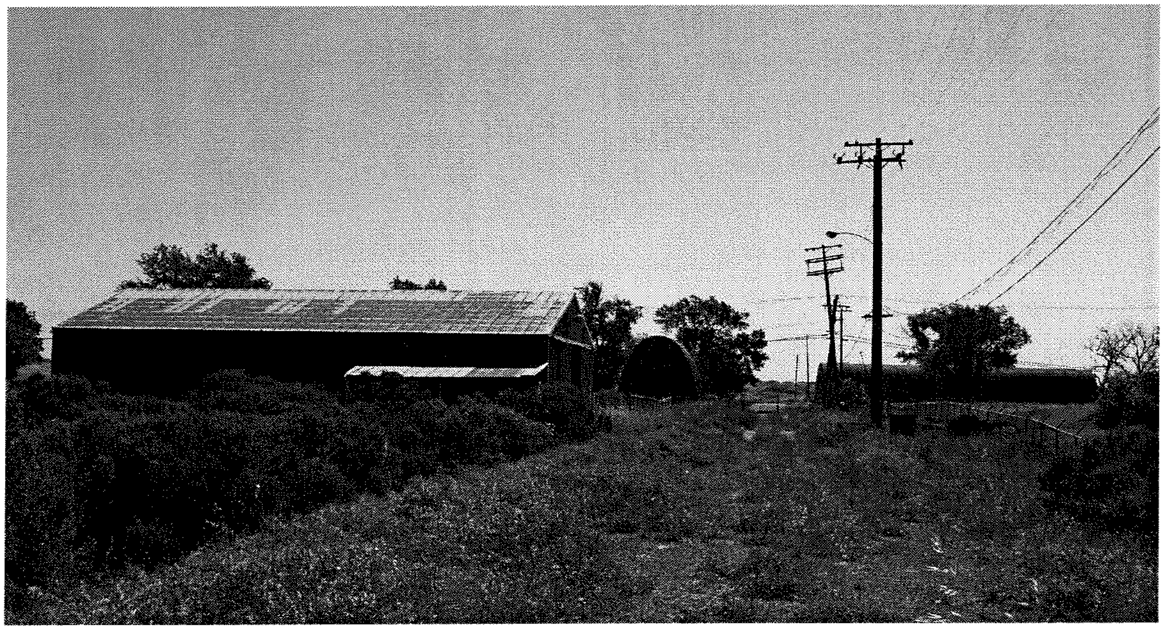

Plate 16: Storage Building (Unit 102), ASV Building (Unit 106), and Quonset Hut (Unit 105), Solid Propellant Assembly Area, 1956. West to east overview. Looking east. View of May 2005.

Motor Storage Building

Also known as Unit 104, the motor storage building is a one-story, prefabricated metal structure erected in the Solid Propellant Assembly Area in October 1956. The motor storage building is rigid-frame construction, sheathed in corrugated siding. Windowless, the building features center-opening, track-mounted front and rear doors and a gable roof. Several rooms now augment the interior of the motor storage building, configured primarily along the west side. The interior of the motor storage building was likely open when built. A large earthen berm buffers the two sides and rear of the motor storage building from its surroundings. The berm is rock-stabilized, presently overgrown with grass. The earthen berm is an original feature of the building.

Douglas added the motor storage building to the Solid Propellant Assembly Area after construction of the assembly building (Unit 103) to the east. The Solid Propellant Assembly Area, alternately known as the DM-14 Site, first accommodated assembly of solid-rocket boosters for the developmental Nike Hercules (DM-14). During 1960, Douglas used the location for assembly of the follow-on Nike Zeus (DM-15). Work supporting the Nike Zeus continued during 1962 in the Solid Propellant Assembly Area. In addition, Douglas used the area for assembly of the developmental Skybolt (DM-20), as well a support compound for Special Test Series "A." The special series tests were classified. (Douglas 1958-1962.) The Solid Propellant Assembly Area completed the Sigma Test Area (first known as the Solid Test Area) to the south.

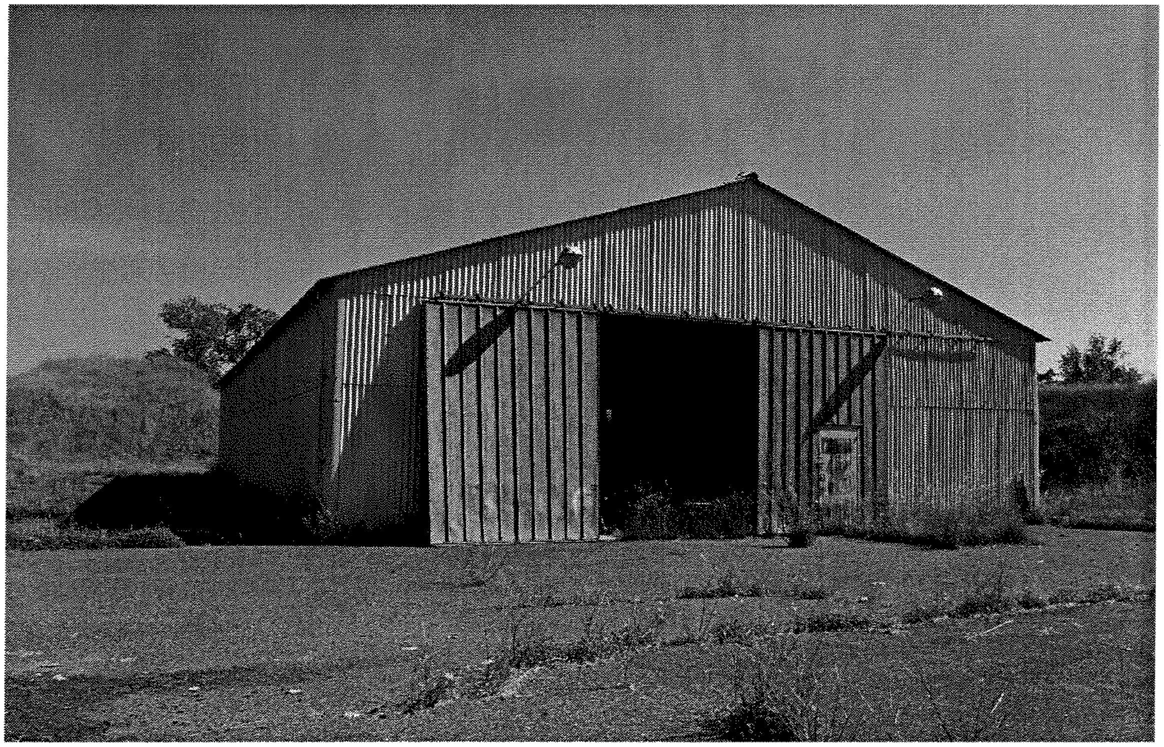

Plate 17: Motor Storage Building (Unit 104), Solid Propellant Assembly Area, 1956. Looking north/northeast. View of May 2005.

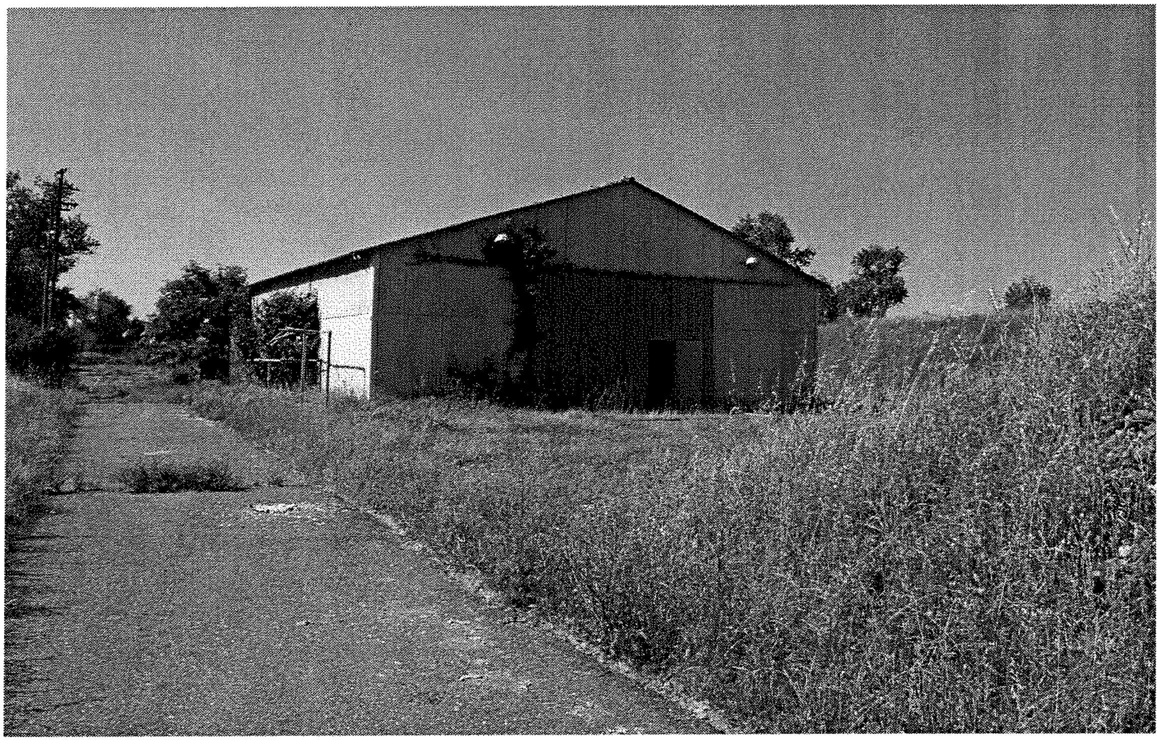

Plate 18: Motor Storage Building (Unit 104), Solid Propellant Assembly Area, 1956. Looking south/southwest. View of May 2005.

Plate 19: Motor Storage Building (Unit 104), Solid Propellant Assembly Area, 1956. Interior, looking north. View of May 2005.

Assembly Building

Also known as Unit 103, the assembly building is a one-story, prefabricated metal structure erected in the Solid Propellant Assembly Area before October 1956. The assembly building is rigid-frame construction, sheathed in corrugated siding. Windowless, the building features center-opening, track-mounted front and rear doors and a gable roof. Shed-roof rooms line the west façade, as built. A corner office and boiler equipment augment the interior of the assembly building, and are also likely original. Doors on the east façade are non-historic. A large earthen berm buffers the two sides of the assembly building from its surroundings. The berm is rock-stabilized, presently overgrown with grass. The earthen berm is an original feature of the building. A paint shed stands behind the building on the northeastern corner of the property.

Douglas constructed the assembly building as the primary facility for in the Solid Propellant Assembly Area. Alternately known as the DM-14 Site, the Solid Propellant Assembly Area first accommodated assembly of solid-rocket boosters for the developmental Nike Hercules (DM-14). During 1960, Douglas used the location for assembly of the follow-on Nike Zeus (DM-15). Work supporting the Nike Zeus continued during 1962 in the Solid Propellant Assembly Area. In addition, Douglas used the area for assembly of the developmental Skybolt (DM-20), as well a support compound for Special Test Series "A." The special series tests were classified. (Douglas 1958-1962.) The Solid Propellant Assembly Area completed the Sigma Test Area (first known as the Solid Test Area) to the south.

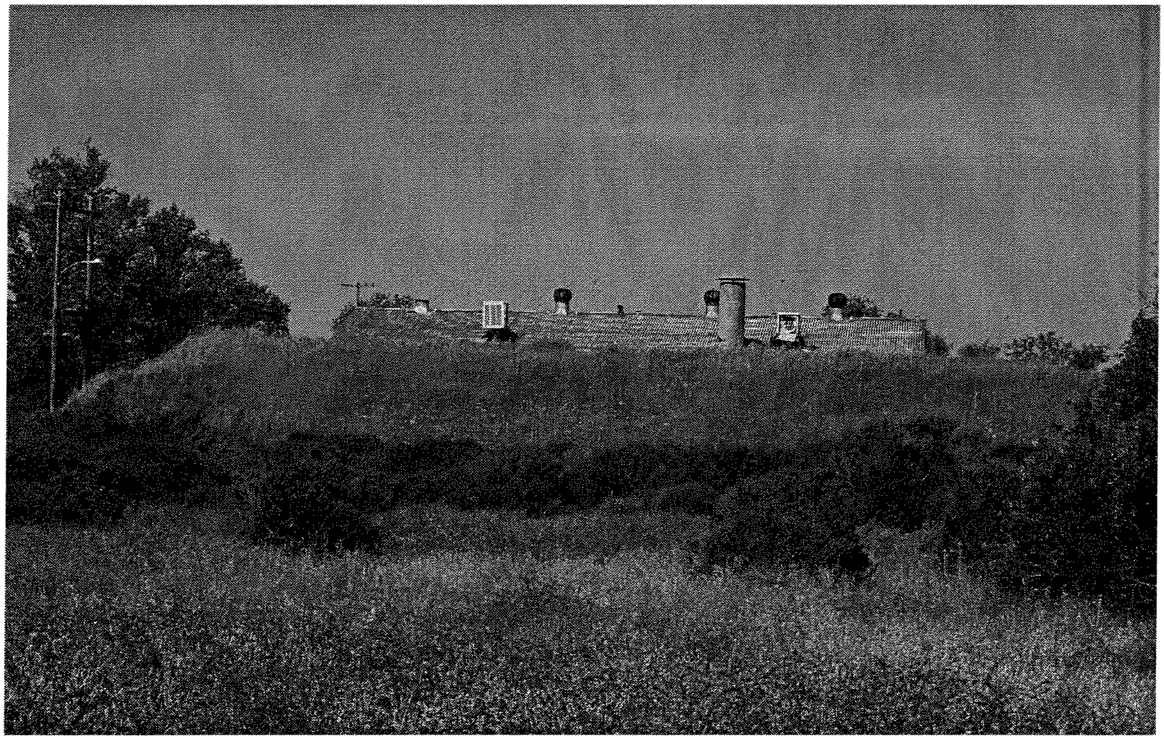

Plate 20: Assembly Building (Unit 103), Solid Propellant Assembly Area, 1956. Bermwork. Looking west. View of May 2005.

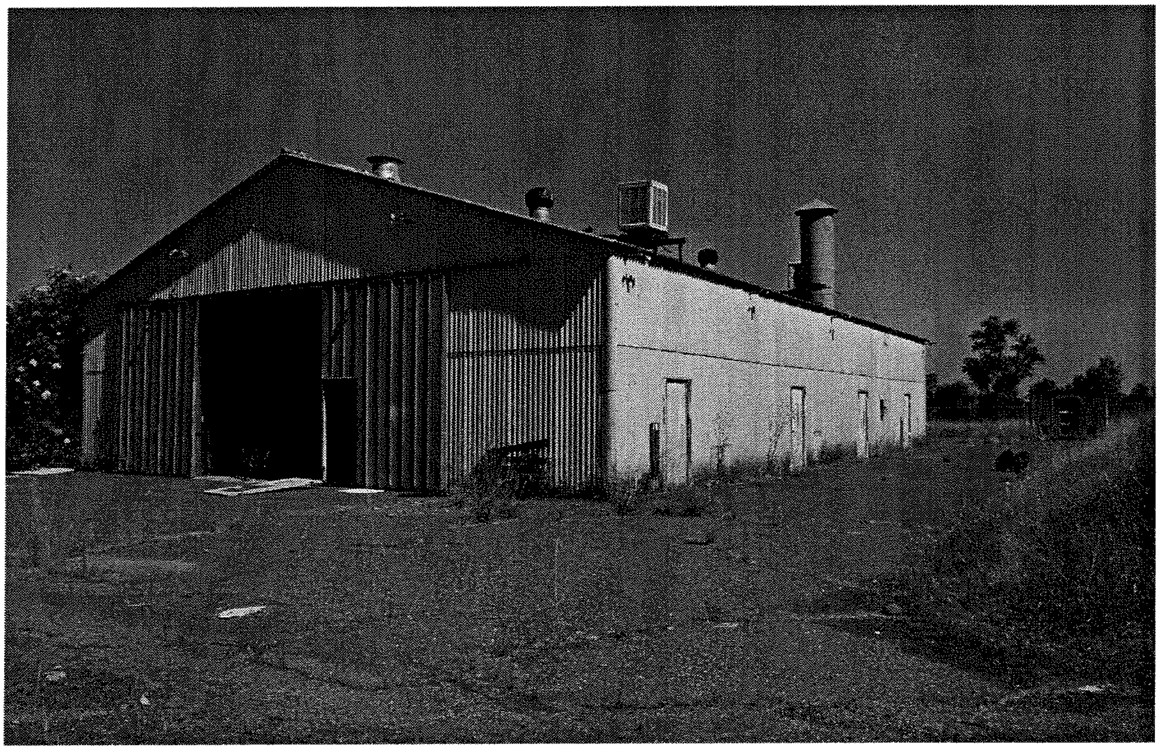

Plate 21: Assembly Building (Unit 103), Solid Propellant Assembly Area, 1956. Looking northwest. View of May 2005.

Plate 22: Assembly Building (Unit 103), Solid Propellant Assembly Area, 1956. Looking south/southeast. View of May 2005.

Plate 23: Assembly Building (Unit 103), Solid Propellant Assembly Area, 1956. Interior, looking southwest. View of May 2005.

Plate 24: Assembly Building (Unit 103), Solid Propellant Assembly Area, 1956. Interior, looking northeast. View of May 2005.

Paint Shed

Also known as Unit 109, the paint shed is a small, one-story prefabricated metal structure erected in the Solid Propellant Assembly Area in 1956. The paint shed is sheathed in corrugated siding. Windowless, the building features a single door bracketed by low wall vents and a clipped-eave shed roof. The paint shed is unaltered on its exterior. The small shed stands behind the assembly building on the northeastern corner of the property.

Douglas constructed the paint shed as an ancillary structure for the assembly building in the Solid Propellant Assembly Area. Alternately known as the DM-14 Site, the Solid Propellant Assembly Area first accommodated assembly of solid-rocket boosters for the developmental Nike Hercules (DM-14). During 1960, Douglas used the location for assembly of the follow-on Nike Zeus (DM-15). Work supporting the Nike Zeus continued during 1962 in the Solid Propellant Assembly Area. In addition, Douglas used the area for assembly of the developmental Skybolt (DM-20), as well a support compound for Special Test Series "A." The special series tests were classified. (Douglas 1958-1962.) The Solid Propellant Assembly Area completed the Sigma Test Area (first known as the Solid Test Area) to the south.

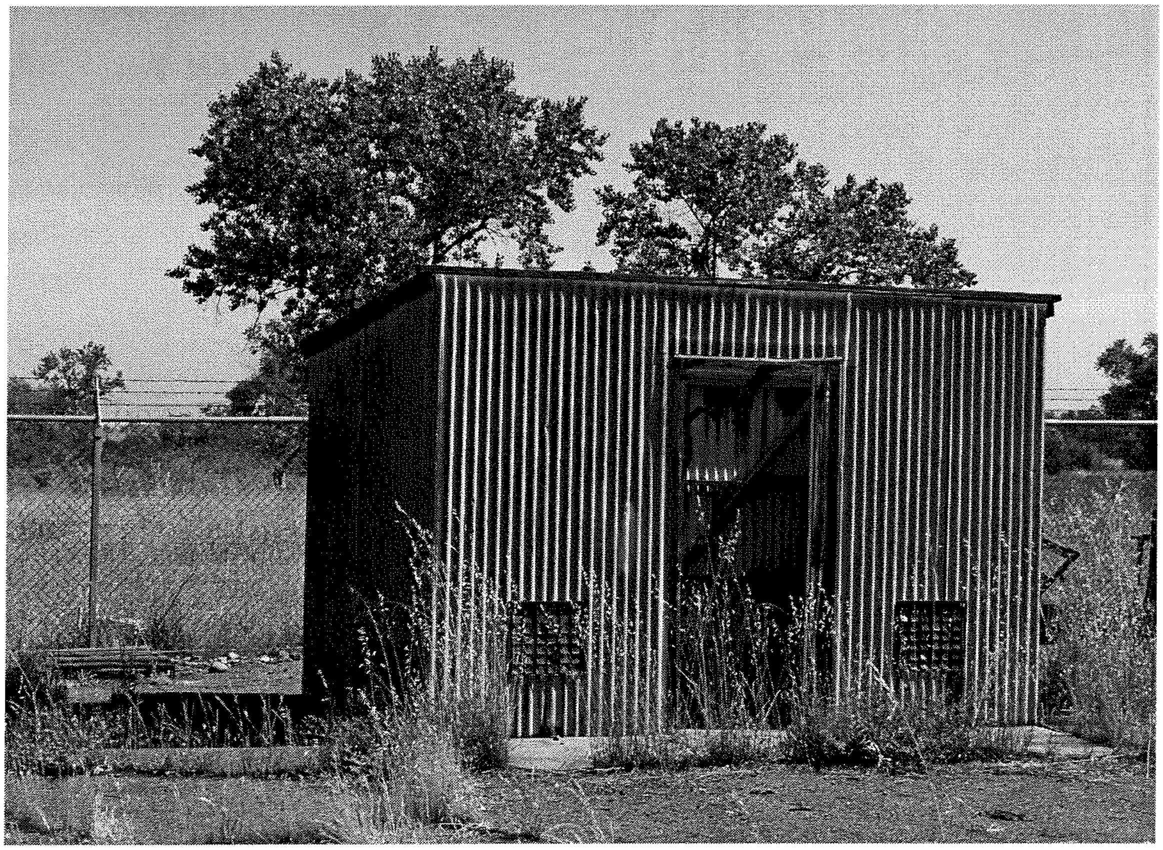

Plate 25: Paint Shed (Unit 109), located to the rear of the Assembly Building, Solid Propellant Assembly Area, 1956. Looking north/northeast. View of May 2005.

Storage Building

Also known as Unit 102, the storage building is a one-story, prefabricated metal structure erected in the Solid Propellant Assembly Area in 1956. The storage building is rigid-frame construction, sheathed in corrugated siding. Sparsely articulated by 6/3 factory windows, the building features center-opening, track-mounted front and side doors, and a gable roof. A shed-roof addition augments the east façade, interpreted as original construction. The interior of the storage building includes a small corner office, also original. No earthen berm surrounds the storage building.

Douglas likely constructed the storage building in the Solid Propellant Assembly Area simultaneously with the assembly building (Unit 103) to the west. Exterior mounted security lights are identical for both the assembly and storage buildings. The Solid Propellant Assembly Area, alternately known as the DM-14 Site, first accommodated assembly of solid-rocket boosters for the developmental Nike Hercules (DM-14). During 1960, Douglas used the location for assembly of the follow-on Nike Zeus (DM-15). Work supporting the Nike Zeus continued during 1962 in the Solid Propellant Assembly Area. In addition, Douglas used the area for assembly of the developmental Skybolt (DM-20), as well a support compound for Special Test Series "A." The special series tests were classified. (Douglas 1958-1962.) The Solid Propellant Assembly Area completed the Sigma Test Area (first known as the Solid Test Area) to the south.

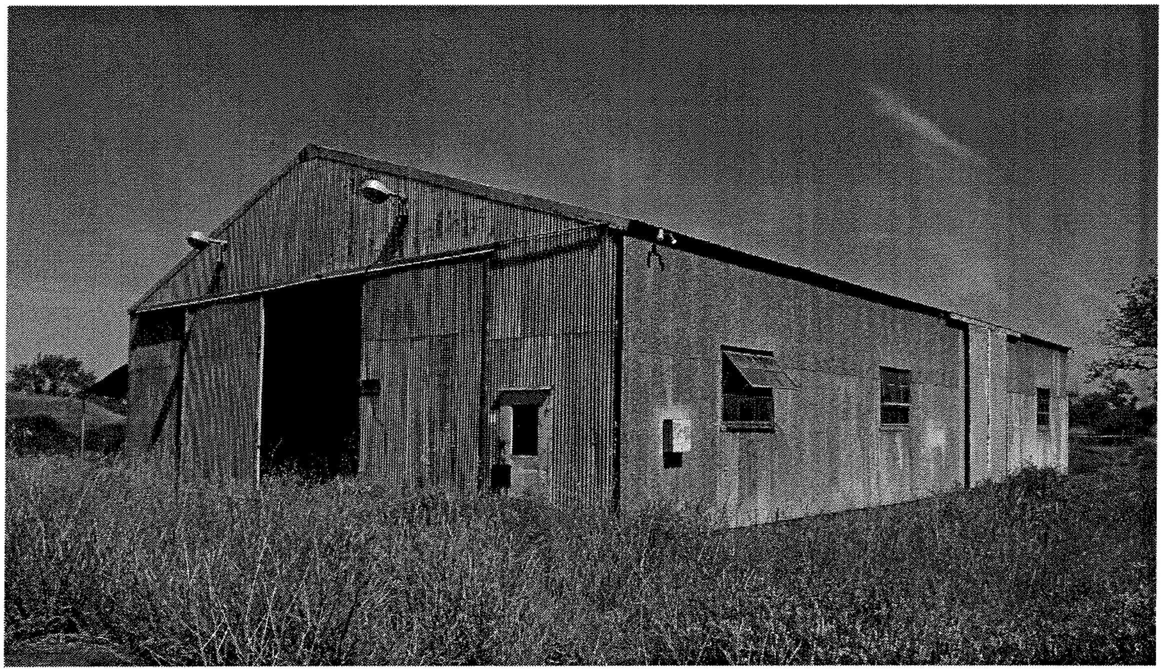

Plate 26: Storage Building (Unit 102), Solid Propellant Assembly Area, 1956.
Looking northwest. View of May 2005.

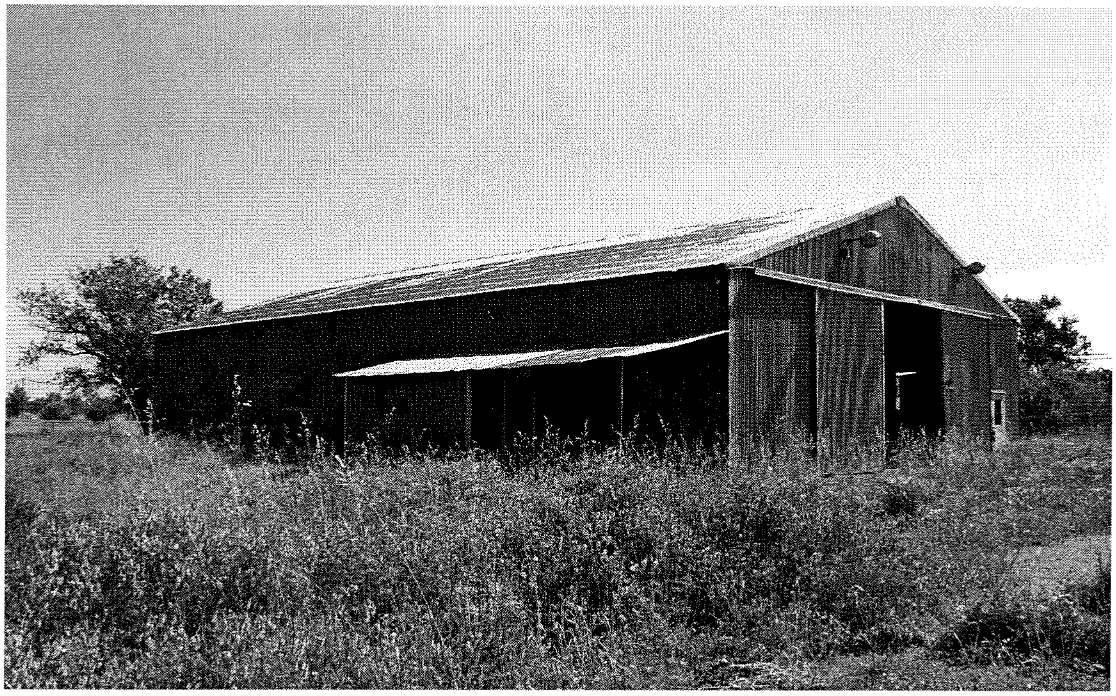

Plate 27: Storage Building (Unit 102), Solid Propellant Assembly Area, 1956. Looking northeast. View of May 2005.

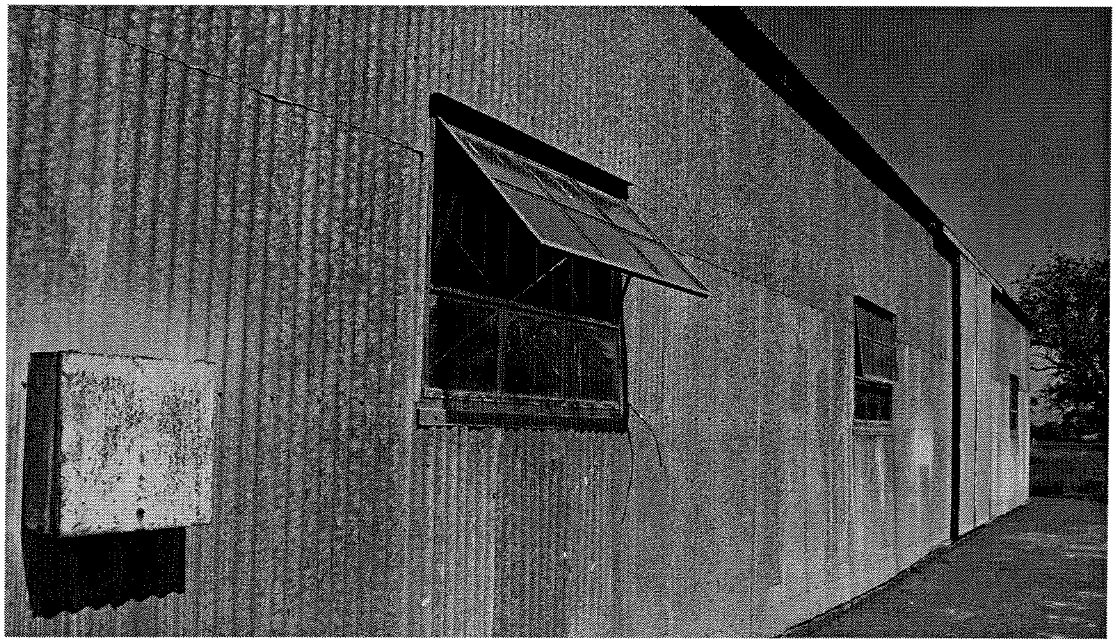

Plate 28: Storage Building (Unit 102), Solid Propellant Assembly Area, 1956. Window details. Looking north/northwest. View of May 2005.

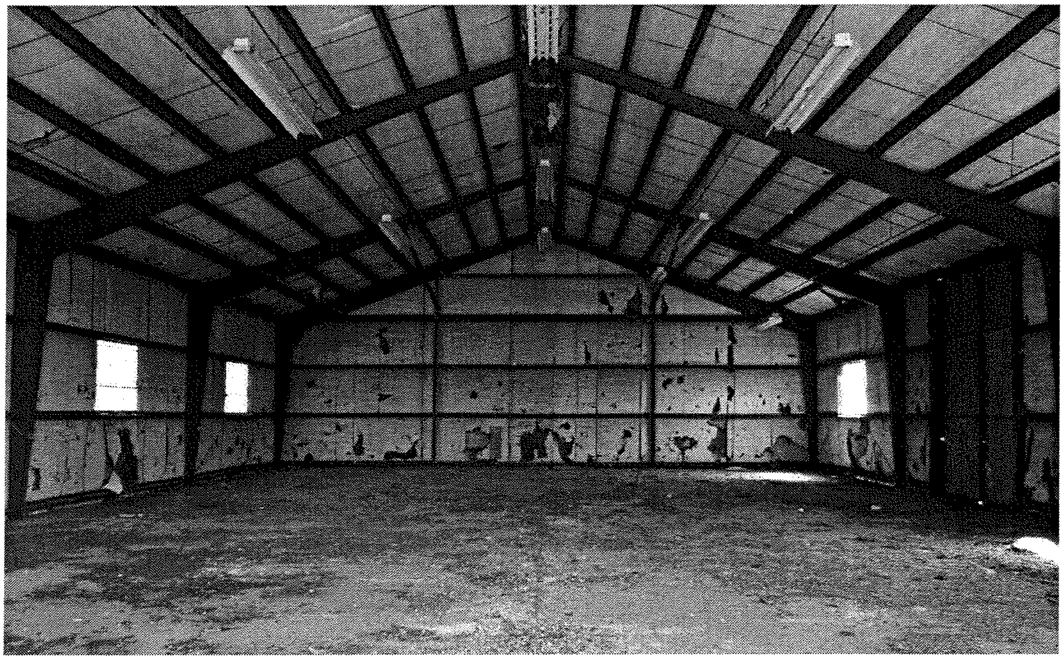

Plate 29: Storage Building (Unit 102), Solid Propellant Assembly Area, 1956. Interior, looking north. View of May 2005.

Plate 30: Storage Building (Unit 102), Solid Propellant Assembly Area, 1956. Interior, looking southeast. View of May 2005.

A.S.V. Building

Erected as storage for NASA's Aero-Thermodynamic Structural Test Vehicle in 1966, the ASV Building was alternately known as Unit 106 and the "Wonder Building" (Douglas 1966). The ASV Building is a self-supporting, steel-arch structure manufactured by the Wonder Trussless Building Company of Chicago. Peter S. Pederson had purchased the building's patent in 1949, and had founded the Wonder Company in 1950 to prefabricate the arched structure. Wonder Buildings complemented other prefabricated structures sold in the United States such as those manufactured by Butler, IDECO, and ARMCO. In widespread use for storing agricultural equipment, harvested crops, and livestock, Wonder Buildings were also desirable as high-load structures. The Air Force, NASA, and the aerospace contractors turned to Wonder Buildings for special uses during the 1960s. Military and aerospace engineering firms adapted Wonder Buildings for earth-covered bomb shelters and hardened aircraft shelters (Arch Technology Corporation 2001). The ASV Building features a parabolic profile, steel arches, and standing-seam steel siding. The structure is windowless, with a center-opening door on its east façade.

The Solid Propellant Assembly Area, alternately known as the DM-14 Site, first accommodated assembly of solid-rocket boosters for the developmental Nike Hercules (DM-14). During 1960, Douglas used the location for assembly of the follow-on Nike Zeus (DM-15). Work supporting the Nike Zeus continued during 1962 in the Solid Propellant Assembly Area. In addition, Douglas used the area for assembly of the developmental Skybolt (DM-20), as well a support compound for Special Test Series "A." The special series tests were classified. (Douglas 1958-1962.) The Solid Propellant Assembly Area completed the Sigma Test Area (first known as the Solid Test Area) to the south.

Douglas added the clustered storage structures east of the original solid propellant area during 1964-1966. The north-south access road through the Douglas Missile Test Facility separated the storage area from the primary compound of the Solid Propellant Assembly Area. Beginning in 1960, Douglas used portions of its missile test facilities at Rancho Cordova to support NASA. The company adapted the Kappa Test Complex for components testing of the developmental Saturn (the DSV-IV Saturn), conducting related tests for the program on Test Stand 1 in the Alpha Test Complex in 1961. Simultaneously, NASA initiated its Aero-thermodynamic Elastic Structural Systems Environmental Tests (ASSET) program. ASVs were test vehicles for manned units. The vehicles were similar to the command modules of the Apollo program, and were in test throughout the 1960s. NASA engineers evaluated materials required for the manned space program through the ASSET program. Heat-shield tests were among the experiments run within ASSET. Surplus Thor missiles became the launch vehicles for ASVs fired during ASSET (Astronautix 2005). The ASV Building is interpreted as a storage structure for one or more test ASVs—either of boilerplate (numbered BP) or battleship type. ASVs were scaled test units, fabricated as nose cones (Weitze 2004).

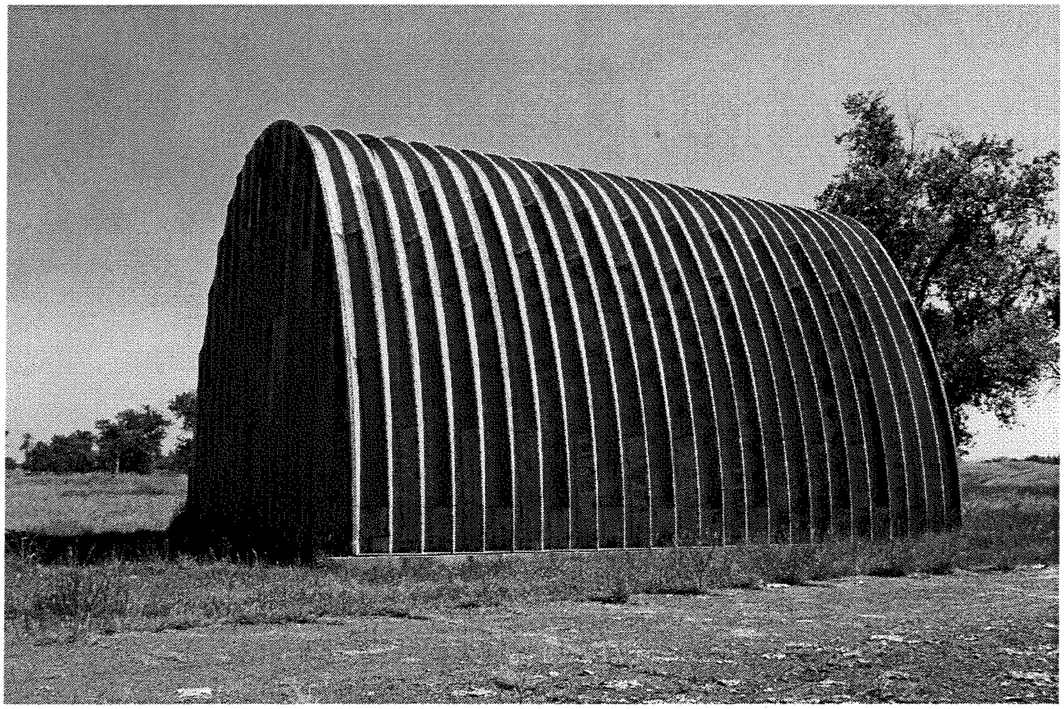

Plate 31: ASV Building (Unit 106), Solid Propellant Assembly Area, 1966. Looking north/northeast. View of May 2005.

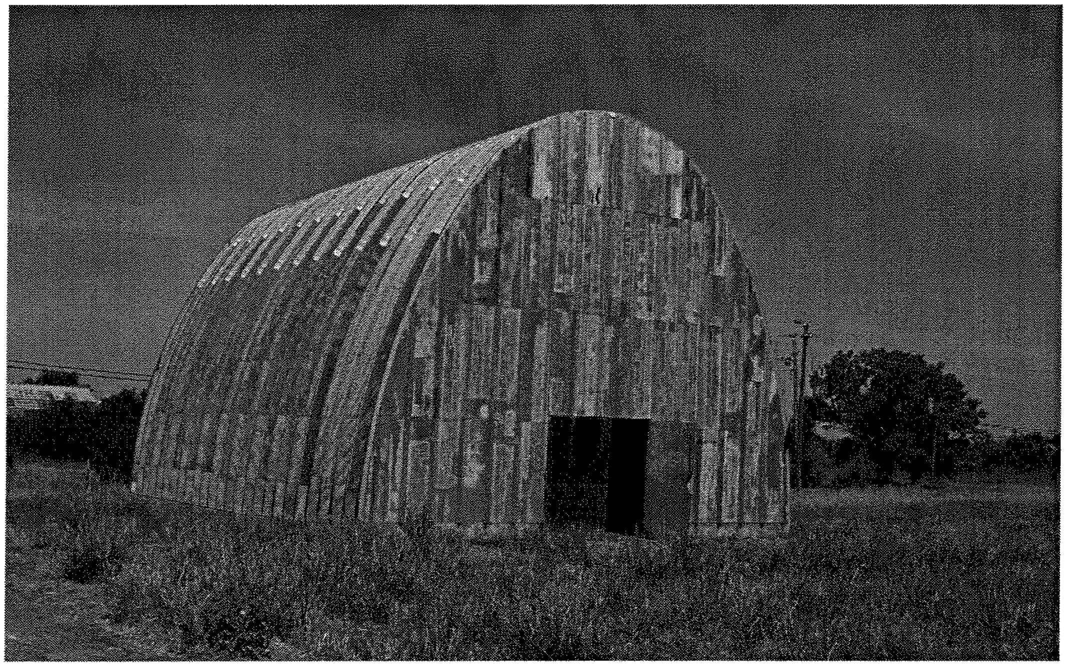

Plate 32: ASV Building (Unit 106), Solid Propellant Assembly Area, 1966. Looking west/northwest. View of May 2005.

Plate 33: ASV Building (Unit 106), Solid Propellant Assembly Area, 1966. Detail of sheathing. Looking west. View of May 2005.

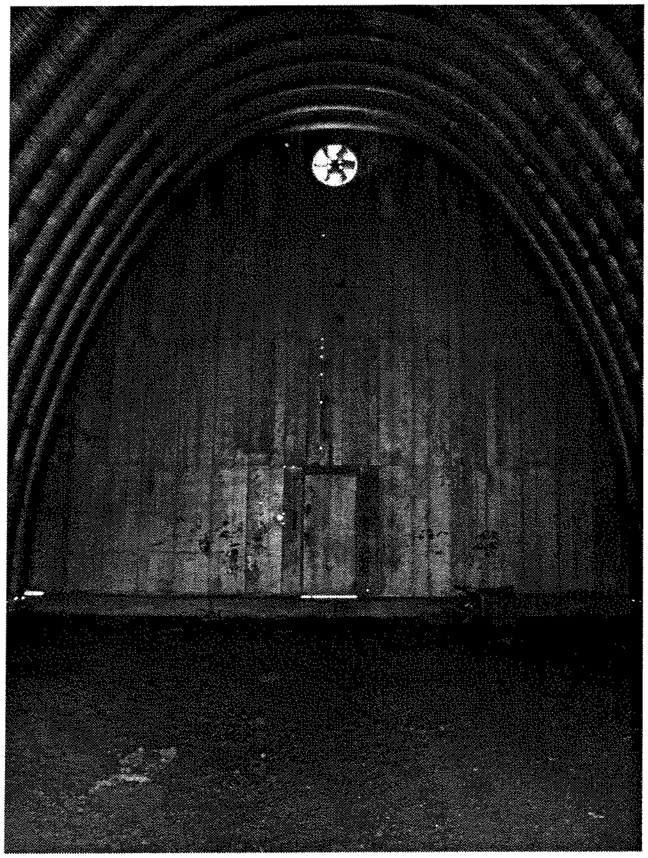

Plate 34: ASV Building (Unit 106), Solid Propellant Assembly Area, 1966. Interior. Looking west. View of May 2005.

Quonset Hut

Also known as Unit 105, the Quonset Hut is a prefabricated metal storage structure erected on site in ca.1964. Derived from the wood-and-metal Nissan Bow Hut of World War I, the Quonset Hut was a portable, arched metal building designed in early World War II by George A. Fuller & Company for the Army Signal Corps. The stock structure acquired the name "Quonset Hut" from its first place of manufacture, the Davisville Construction Battalion Center at Quonset Point Naval Air Station, North Kingston, Rhode Island (Garner 1993). The Quonset Hut in the storage compound of the Solid Propellant Assembly Area features the steel framing and curved, corrugated sheet-metal sheathing typical of the building type. A small, plywood office in the northwest corner of the Quonset Hut is of undetermined date, but may have been added when Douglas placed the structure at its present location in the early 1960s.

The Solid Propellant Assembly Area, alternately known as the DM-14 Site, first accommodated assembly of solid-rocket boosters for the developmental Nike Hercules (DM-14). During 1960, Douglas used the location for assembly of the follow-on Nike Zeus (DM-15). Work supporting the Nike Zeus continued during 1962 in the Solid Propellant Assembly Area. In addition, Douglas used the area for assembly of the developmental Skybolt (DM-20), as well a support compound for classified Special Test Series "A" (Douglas 1958-1962). The Solid Propellant Assembly Area completed the Sigma Test Area (first known as the Solid Test Area) to the south. Douglas added the clustered storage structures east of the original solid propellant area during 1964-1966, locating the group across the north-south access road through the test facilities.

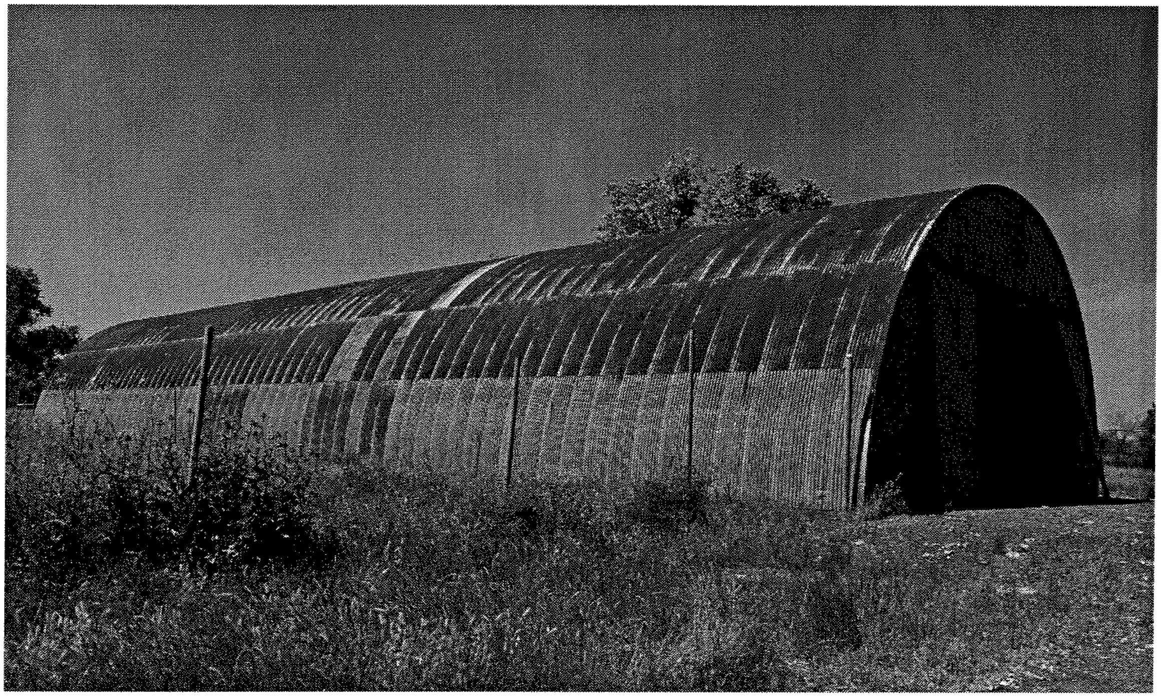

Plate 35: Quonset Hut (Unit 105), Solid Propellant Assembly Area, ca.1964. Looking southwest. View of May 2005.

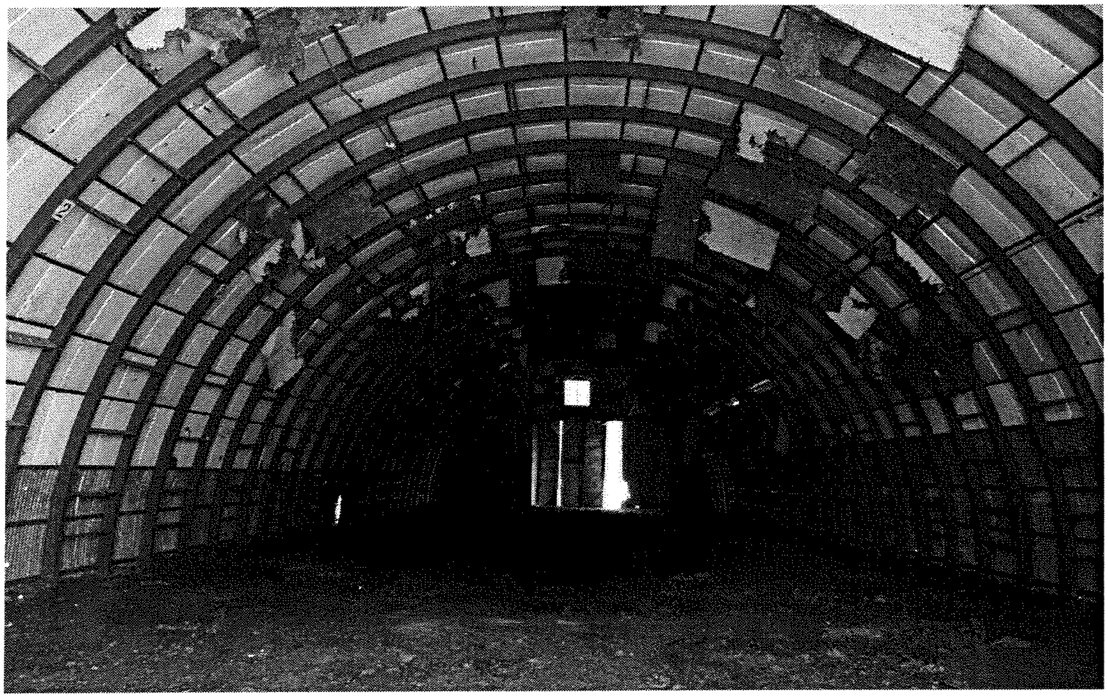

Plate 36: Quonset Hut (Unit 105), Solid Propellant Assembly Area, ca.1964. Interior. Looking south. View of May 2005.

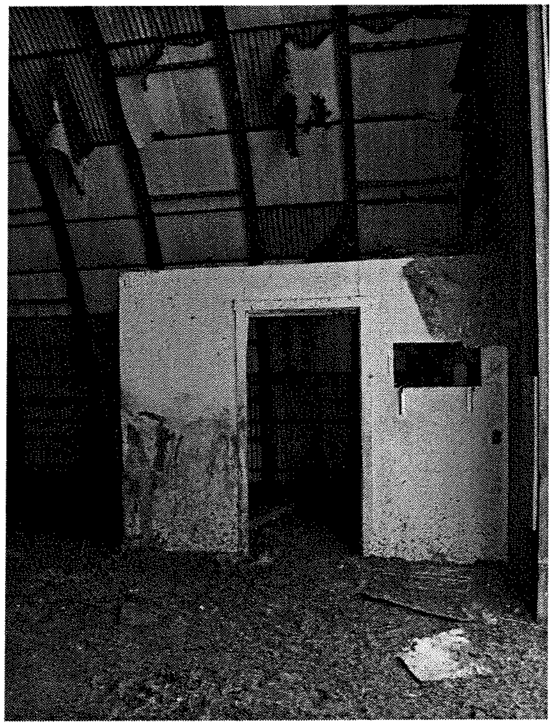

Plate 37: Quonset Hut (Unit 105), Solid Propellant Assembly Area, ca.1964. Interior. Corner Office. Looking west. View of May 2005.

Sigma Test Area

The Sigma Test Area is a small compound laid out east-west, approximately one-half mile south of the Solid Propellant Assembly west of the north-south road (Figure 5). The area is open access, with a security fence surrounding the assembly building. The western half of the Sigma Test Area dates to 1956. In mid-1961, Douglas added a destruct pad at the western end of the group of structures (Douglas 1963). In about 1964, site managers added two environmental test chambers east of the original assembly building. A map made prior to the construction of the test chambers labels the site "Existing Nike Test Area" (Ralph M. Parsons 1963). The Sigma Test Area is interpreted as complementing the Solid Propellant Assembly Area, first in use for developmental testing of the Nike Hercules solid-rocket boosters. In April 1965, Douglas changed the official name of the area from Solid Test Area to Sigma Test Area (Douglas 1965). From about 1961 into 1964, the Sigma Test Area supported tests of the developmental Skybolt and Nike Zeus. Douglas was the primary military contractor for both missile systems.

The following two minor ancillary structures are no longer standing within the Sigma Test Area:

- a small storage building (Unit 96) northwest of the test control center, west of the assembly building; and,
- an unnumbered water tank and well north of the test control center, located between the storage structure and the assembly building.

Existing components of the Sigma Test area are discussed below.

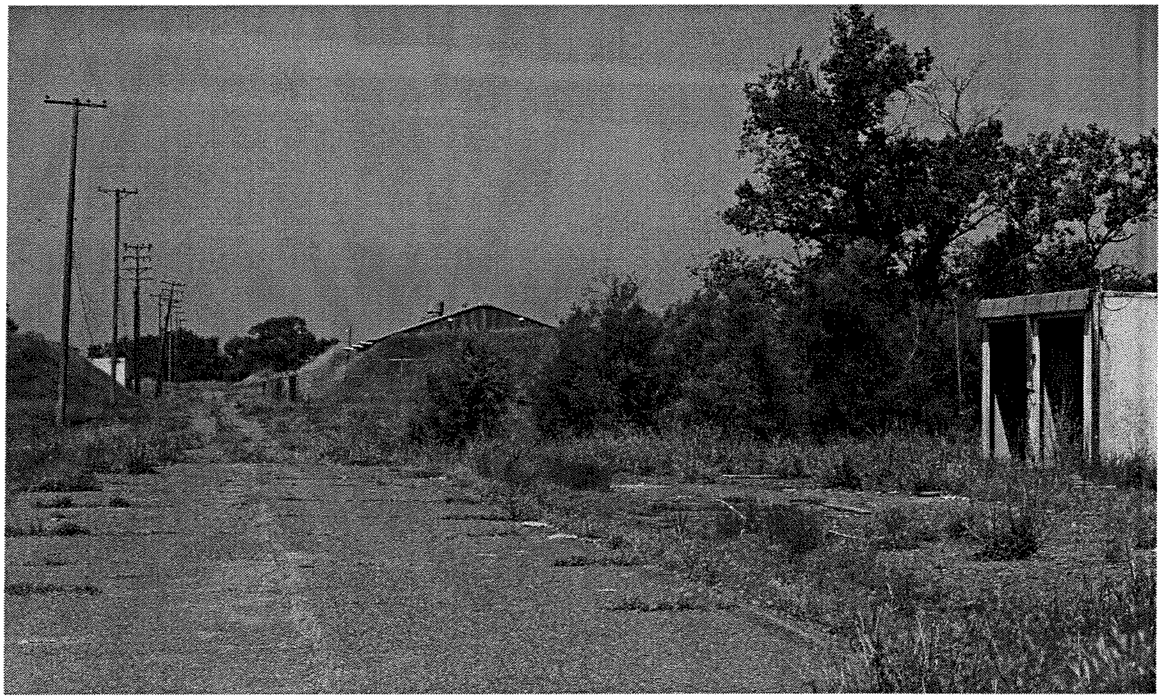

Plate 38: Hot Conditioning Chamber (Unit 92), Assembly Building (Unit 93), Test Control Center (Unit 94), and Test Area (Support Building/Unit 95 and Destruct Pad), Sigma Test Area, 1956-1965. East to west overview. Looking west. View of May 2005.

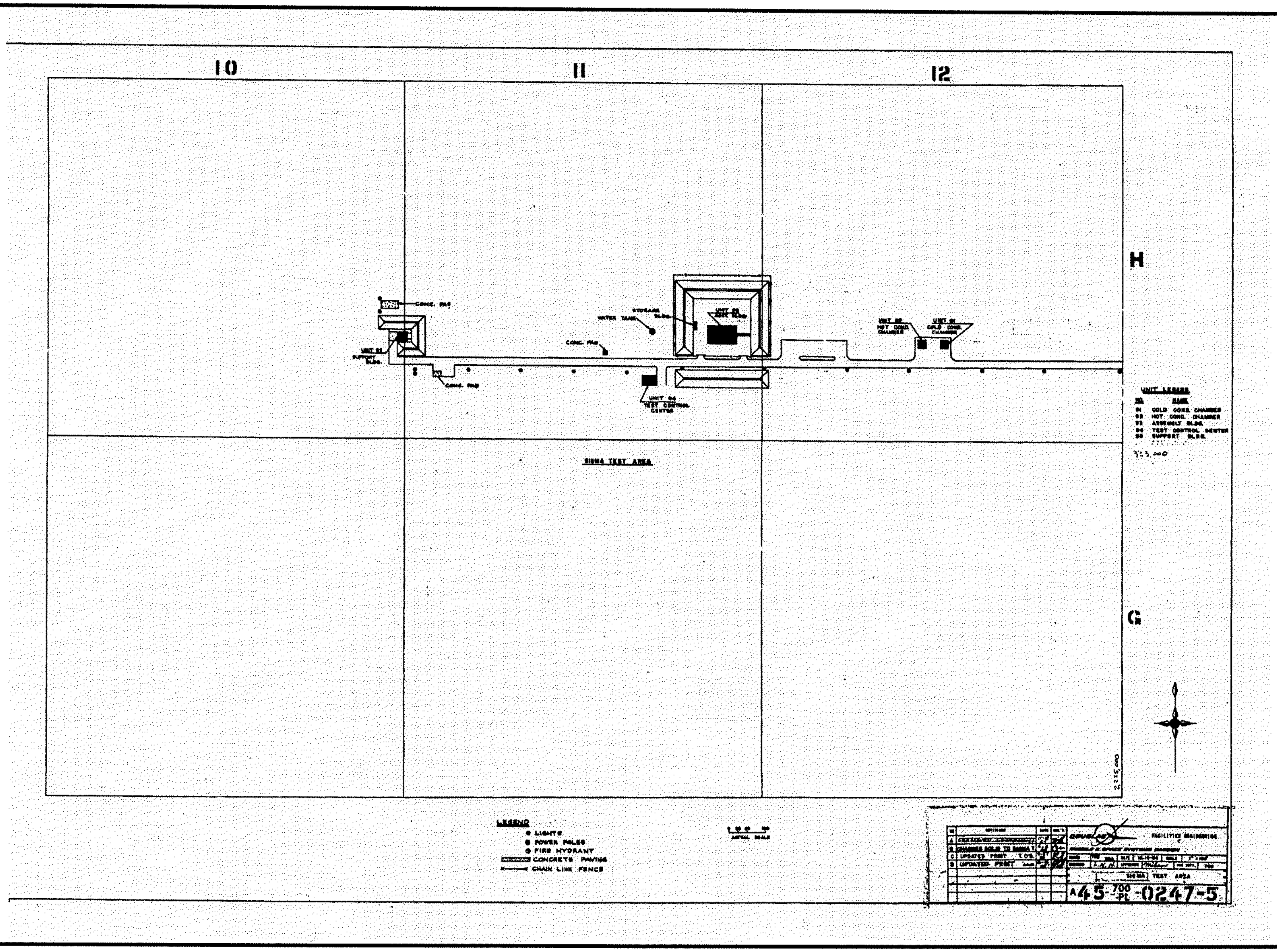

Figure 5: Douglas Facilities Engineering, Sigma Test Area, Douglas Missile Test Facility, Rancho Cordova, California, 1964.

Test Area and Support Building

Douglas configured the test area and support building at the western terminus of the Sigma Test Area in 1956 and 1961 for Nike Hercules (DM-14) and Nike Zeus (DM-15) testing. The support building, also known as Unit 95, was a small rectangular structure surrounded on three sides by an earthen berm. Today, it remains undetermined if the support building is intact, or exists only as a remnant. Standing on the site is a reinforced concrete wall, bracketed by shed-roofed wings. Two wooden utility poles, mounted with lights and wiring, further frame the support building. The debris from a wooden staircase exists on the exterior face of the southern arm of the surrounding berm. The earthen berm itself is unaltered, although was constructed in two phases. As originally mapped, the earthen berm featured northern and southern arms of equal length, each connected to a longer western arm. The protective structure first shielded the western end of an open test area. A small structure, interpreted as a personnel bunker, sat to the immediate south of the test area and is now relocated a short distance to the southeast (see below). In 1961, Douglas constructed a destructive pad (see below) to the immediate north of the original Nike Hercules test area. To accommodate tests on the pad, Douglas simultaneously extended the northern arm of the earthen berm to the west.

After construction of the destruct pad in 1961, Douglas used the area to run 46 tests for Nike Zeus. The next year, the company expanded work at the location to support the Skybolt (DM-20), also conducting a series of classified tests ("Series A"). Engineered as a bomber-launched ICBM with a nuclear warhead, Skybolt was in test until cancellation of the program in December 1962. Nike tests included a full-scale firing of a third-stage manifold of the Nike Zeus; firings of the third-stage swivel nozzle, swivel elbow, and blast tube; and firings of a sub-scale second-stage and its nozzle. Later in the 1960s, Douglas modified the test area to remove "aged, spent, or unburned solid propellant from rocket casings." Personnel reamed out rocket boosters with high-pressure water (known as "hogout" operations) toward a catchment pond west of the Sigma Test Area.

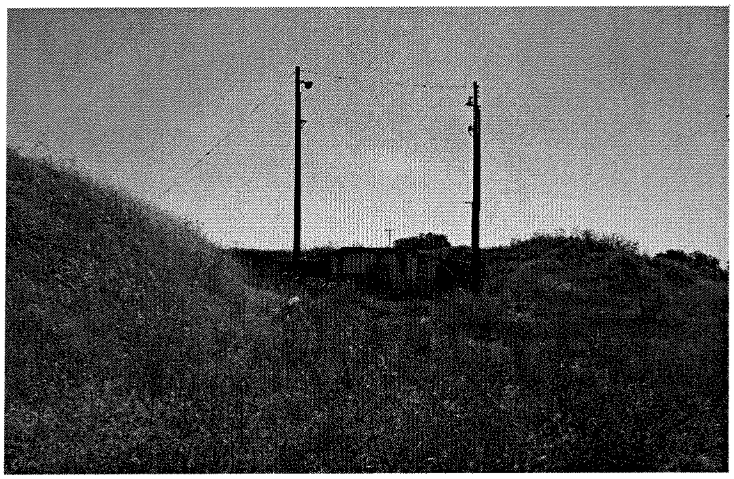

Plate 39: Test Area and Support Building (Unit 95), surrounded by earthen berm, Sigma Test Area, 1956-1961. Looking east. View of May 2005.

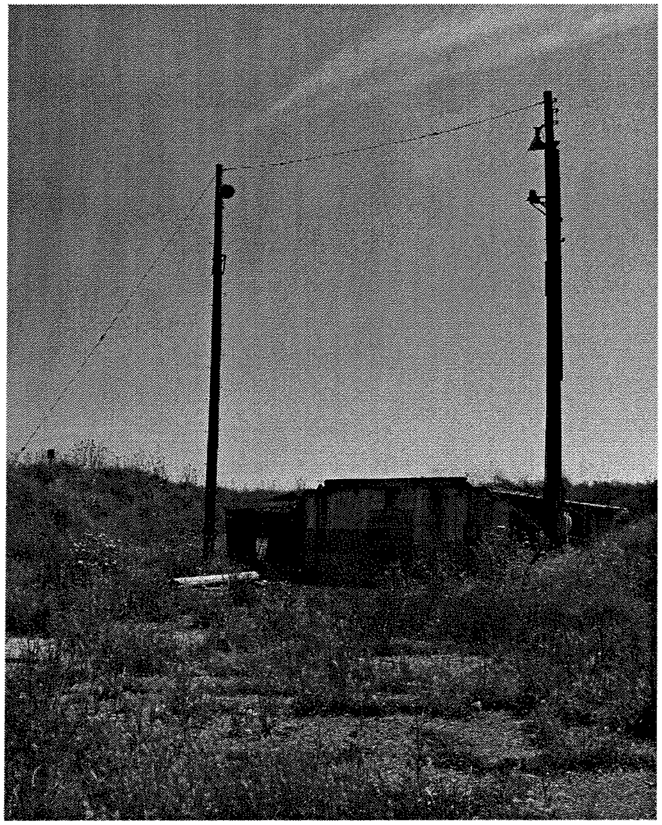

Plate 40: Support Building (Unit 95), Sigma Test Area, 1956-1961. Looking east. View of May 2005.

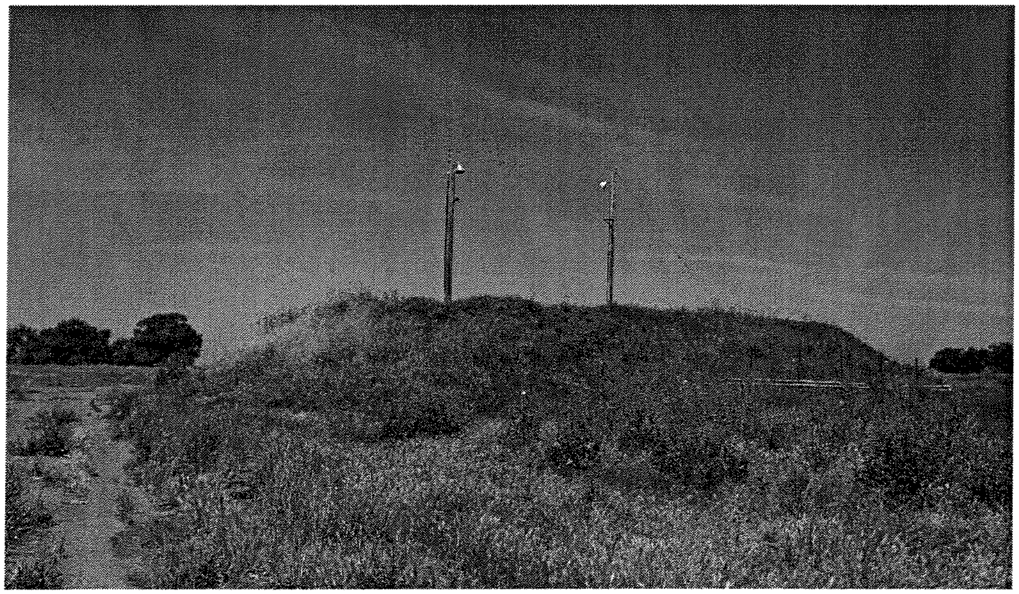

Plate 41: Test Area and Support Building (Unit 95), surrounded by earthen berm, Sigma Test Area, 1956-1961. Looking west. View of May 2005.

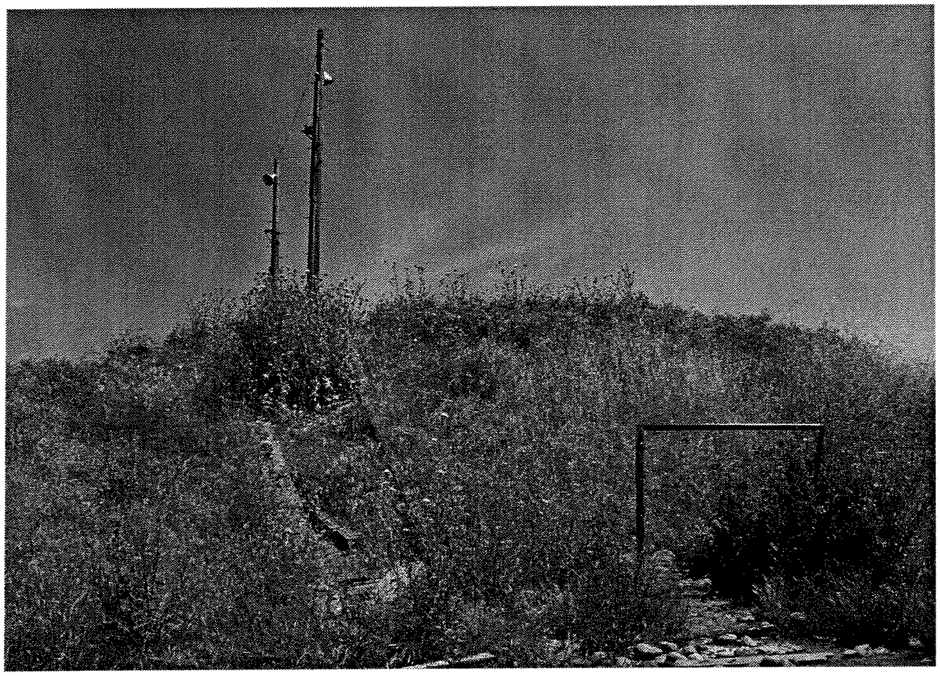

Plate 42: Test Area and Support Building (Unit 95), surrounded by earthen berm, Sigma Test Area, 1956-1961. Looking north. View of May 2005.

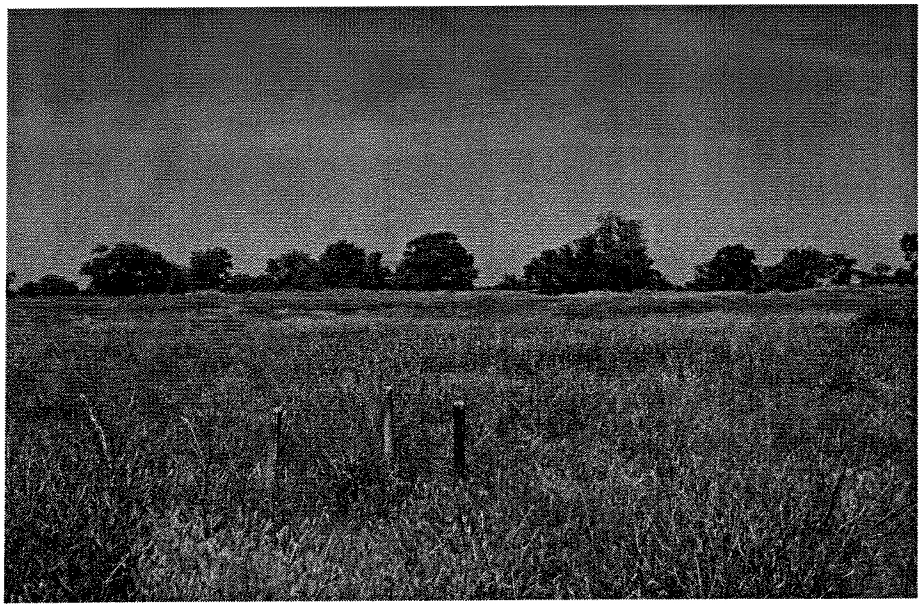

Plate 43: Catchment Pond west of Test Area and Support Building (Unit 95), Sigma Test Area, 1960s. Looking north. View of May 2005.

Destruct Pad

Douglas constructed a destruct pad immediately north of the original test pad in the Sigma Test Area in mid-1961. Dimensions of the reinforced concrete pad were approximately 31 by 20 feet, as built. A 17- by 10.75-foot section of the pad was 3.5 feet thick, tapered to about 1 foot along the outer edges and at one end. The center section featured four pairs of embedded steel rails, placed at right angles to one another. Rail pairs were 3, 4, and 6 feet long, respectively, with two pairs of the 6-foot segments (Douglas 1961). The destruct pad lay to the north of the northern arm of the earthen berm surrounding the Nike Hercules test area of 1956.

After construction of the destruct pad in 1961, Douglas used the area to run 46 tests for Nike Zeus. The next year, the company expanded work at the location to support the Skybolt (DM-20), also conducting a series of classified tests ("Series A"). Engineered as a bomber-launched ICBM with a nuclear warhead, Skybolt was in test until cancellation of the program in December 1962. Nike tests included a full-scale firing of a third-stage manifold of the Nike Zeus, firings of the third-stage swivel nozzle, swivel elbow, and blast tube, and firings of a sub-scale second-stage and its nozzle. Later in the 1960s, Douglas modified the test area to remove "aged, spent, or unburned solid propellant from rocket casings." Personnel reamed out rocket boosters with high-pressure water ("hogout"), directing the material toward a catchment pond west of the Sigma Test Area.

Plate 44: Destruct Pad, bracketed to the south by the earthen berm of the original test site, Sigma Test Area, 1961. Looking east/southeast. View of May 2005.

Concrete Pad

A small, reinforced concrete pad, of rectangular footprint, exists to the southeast of the test area and support building. Not mapped in early 1963, but present by late 1964, the pad is interpreted as one of the final features added to the Sigma Test Area. The pad is of undetermined historic use.

The concrete pad post-dates tests of Nike Hercules and Nike Zeus solid-rocket boosters at the Sigma Test Area. The pad also is unrelated to tests run for the Skybolt ICBM, or the classified Series A tests. During the 1960s, Douglas modified the Sigma Test Area to remove "aged, spent, or unburned solid propellant from rocket casings." The pad is likely a support facility for this mission. Personnel reamed out rocket boosters with high-pressure water ("hogout"), directing the material toward a catchment pond west of the Sigma Test Area.

Plate 45: Concrete Pad, southeast of the original test site, Sigma Test Area, ca.1963-1964. Looking southeast. View of May 2005.

Personnel Bunker

A small, reinforced concrete structure currently sits to the south/southeast of the concrete pad. The structure is windowless, and has painted signage indicating its use to store high-explosives. Unnumbered, the structure is not mapped at its current site on any available documentation of 1956-1966. The structure strongly resembles a "launch barricade," a type of protective personnel bunker found on the armament test ranges at Eglin Air Force Base in Florida during 1952-1956. The launch barricade functioned as shelter for personnel during rail-launched small missile tests. Personnel retreated to the launch barricade as a safety precaution. A separate, larger building functioned as the blockhouse for the test area—a function of the test control center in the Sigma Test Area (see below). The small, reinforced concrete structure in the Sigma Test Area is interpreted as a personnel bunker of launch-barricade type. A map of early 1963 shows a structure of its size and footprint immediately south of the southern arm of the earthen barricade around the test area. Douglas may have moved the structure to its present location for a subsequent use storing explosives. (The launch barricades at Eglin were moveable units.)

The small, reinforced concrete structure is interpreted as supporting tests of the Nike Hercules, Nike Zeus, and Skybolt during 1956-1963, with a secondary use as a storage facility for high-explosives.

Plate 46: Personnel bunker, south/southeast of the original test site, Sigma Test Area, 1956. Looking southwest. View of May 2005.

Assembly Building

Also known as Unit 93, the assembly building is a one-story, prefabricated metal structure erected in the Solid Propellant Assembly Area before October 1956. The assembly building is rigid-frame construction, sheathed in corrugated siding. The building features center-opening, track-mounted east- and west-façade doors and a gable roof. Several small, shed-roof rooms line the north (rear) façade, as built. The east, west, and south facades include pairs of wood-frame personnel doors, set near the building's corners and each articulated with a window. Distinctive outdoor security lights are mounted at the roofline on all sides of the building. The interior of the assembly building is open. A large earthen berm buffers all four sides of the assembly building from its surroundings. The berm is rock-stabilized, presently overgrown with grass. On three sides of the assembly building the berm is continuous. On the south side of the building, the berm is free-standing and sits across the access road through the Sigma Test Area. The earthen berm is an original feature of the building. Although derelict today, the assembly building is unaltered.

Douglas configured the Sigma Test Area in 1956, pairing it with the Solid Propellant Assembly Area one-half mile to the north. In early 1963, the Sigma Test Area was alternately named the Nike Test Area, and during 1963-1964 as the Solid Test Area. The assembly building was one of three original structures mapped for the area. The structure first supported developmental work on the Nike Hercules, followed by similar efforts for the Nike Zeus and Skybolt. In late 1964, Douglas added two temperature conditioning chambers at the eastern end of the Sigma Test Area to support NASA, the follow-on user of the location.

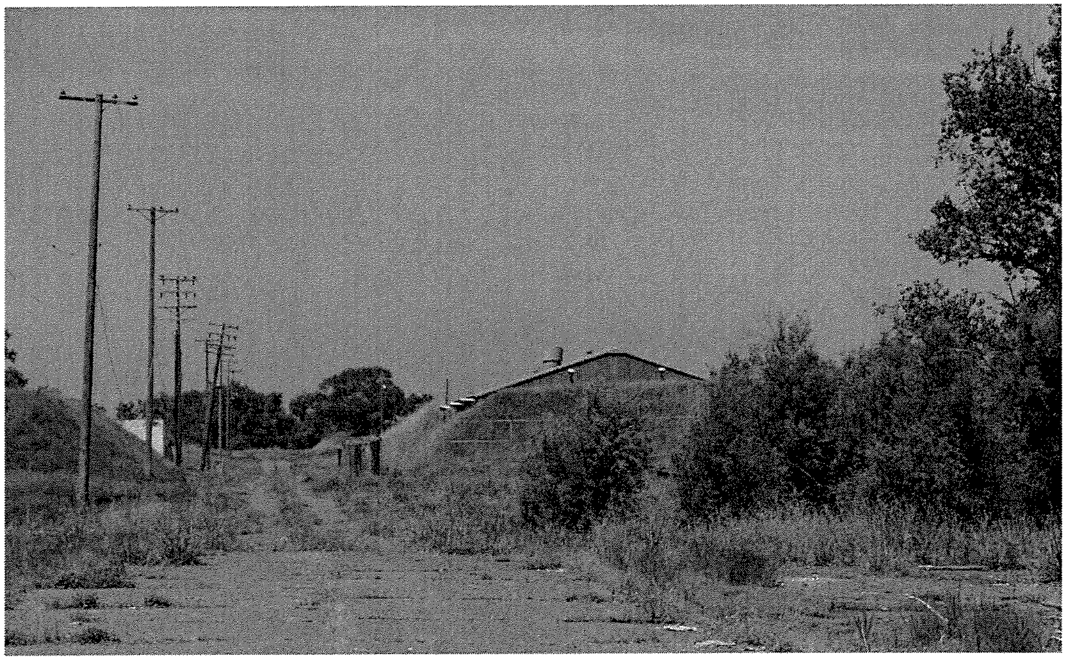

Plate 50: Assembly Building (Unit 93) surrounded by earthen berms, Sigma Test Area, 1956. Test control center left. Looking southeast. View of May 2005.

Plate 51: Assembly Building (Unit 93), Sigma Test Area, 1956. Looking northeast. View of May 2005.

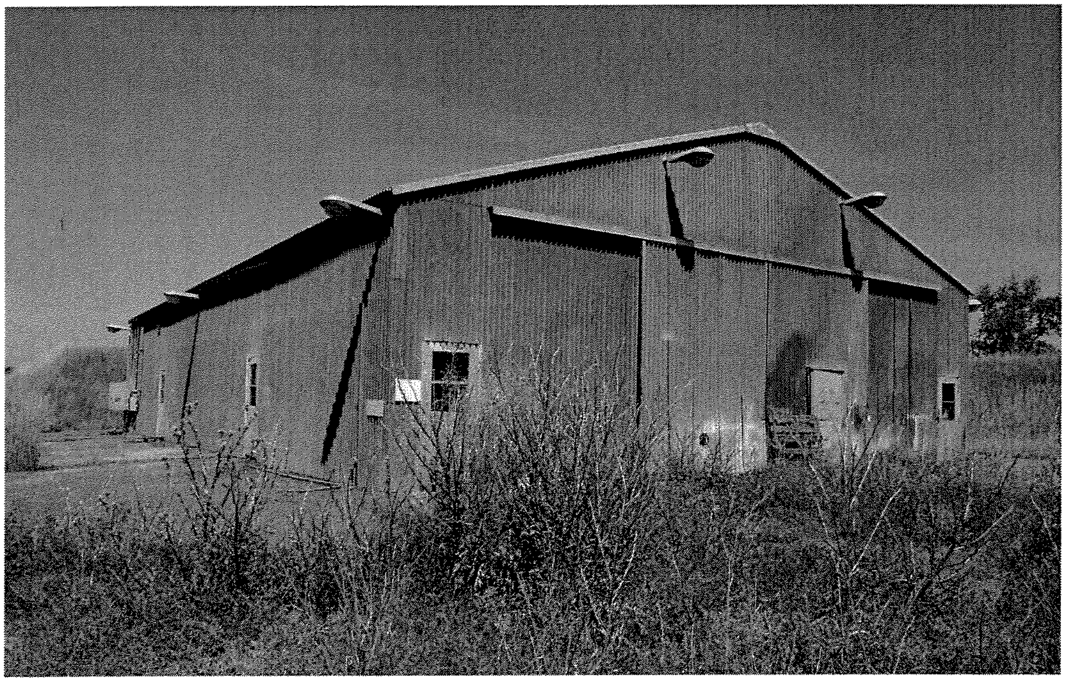

Plate 52: Assembly Building (Unit 93), Sigma Test Area, 1956. Looking northwest. View of May 2005.

Plate 53: Assembly Building (Unit 93), rear façade, Sigma Test Area, 1956. Looking southwest. View of May 2005.

Plate 54: Assembly Building (Unit 93), interior, Sigma Test Area, 1956. Looking east. View of May 2005.

Hot Conditioning Chamber

Also known as Unit 92, the hot conditioning chamber is a two-bay, steel-frame structure sheathed in metal paneling. The chambers are open on their south façade today, but originally featured metal doors. At least one of the doors lies on the ground adjacent to the chamber. The hot conditioning chamber supported high-temperature environmental conditioning for solid-rocket motors in test by NASA during the middle and late 1960s. Motors went through a period of conditioning before being static-fired in the Alpha, Beta, and Gamma Test Complexes. Immediately west of the hot conditioning chamber, a second similar facility accommodated cold conditioning of motors. The aerospace and armaments industries, as well as military test centers located throughout the United States, used environmental test chambers of all types and sizes to condition armament, space vehicles, and component parts during the research, development, test, and evaluation phases of systems selection and acquisition.

Douglas originally configured the Sigma Test Area in 1956, pairing it with the Solid Propellant Assembly Area one-half mile to the north. In early 1963, the Sigma Test Area was alternately named the Nike Test Area, and during 1963-1964 as the Solid Test Area. In late 1964, Douglas added the two temperature conditioning chambers at the eastern end of the Sigma Test Area to support NASA, the follow-on user of the location.

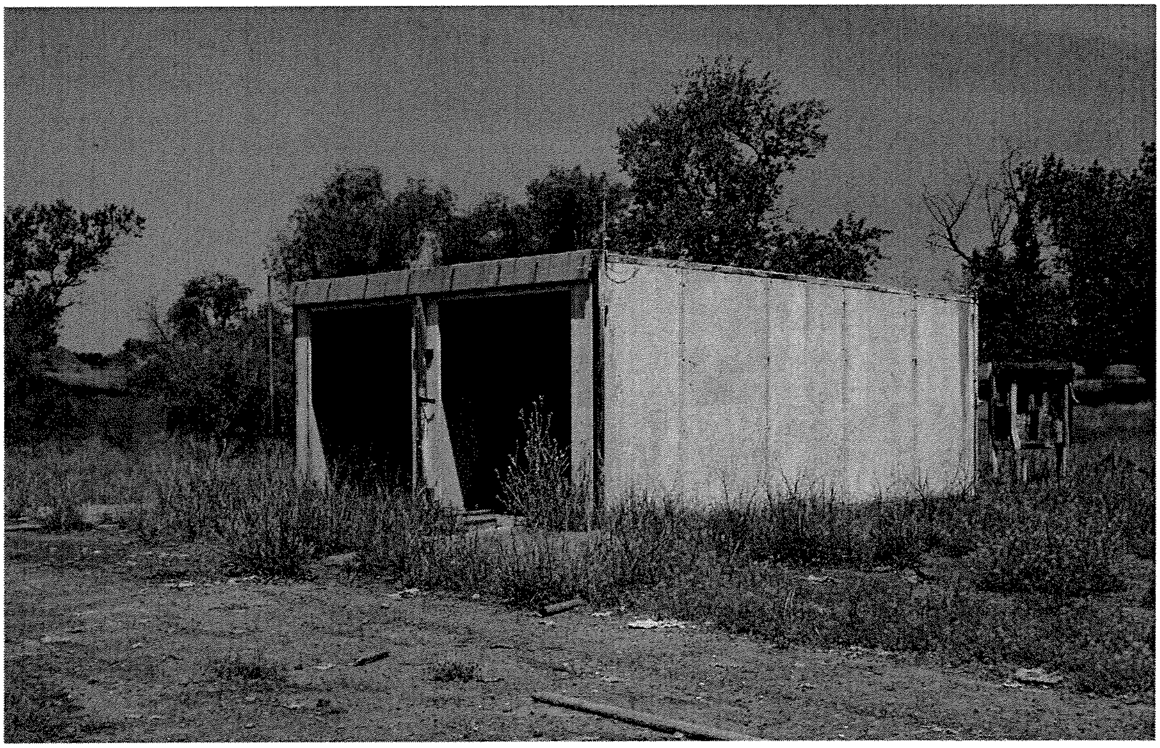

Plate 55: Hot Conditioning Chamber (Unit 92), Sigma Test Area, 1956. Looking northwest. View of May 2005.

Cold Conditioning Chamber

Also known as Unit 91, the cold conditioning chamber was a two-bay, steel-frame structure sheathed in metal paneling, interpreted as similar in design to the hot conditioning chamber to the immediate west. The cold conditioning chamber is collapsed in place today. The hot and cold conditioning chambers supported environmental conditioning for solid-rocket motors in test by NASA during the middle and late 1960s. Motors went through a period of conditioning before being static-fired in the Alpha, Beta, and Gamma Test Complexes. The aerospace and armaments industries, as well as military test centers located throughout the United States, used environmental test chambers of all types and sizes to condition armament, space vehicles, and component parts during the research, development, test, and evaluation phases of systems selection and acquisition.

Douglas originally configured the Sigma Test Area in 1956, pairing it with the Solid Propellant Assembly Area one-half mile to the north. In early 1963, the Sigma Test Area was alternately named the Nike Test Area, and during 1963-1964 as the Solid Test Area. In late 1964, Douglas added the two temperature conditioning chambers at the eastern end of the Sigma Test Area to support NASA, the follow-on user of the location.

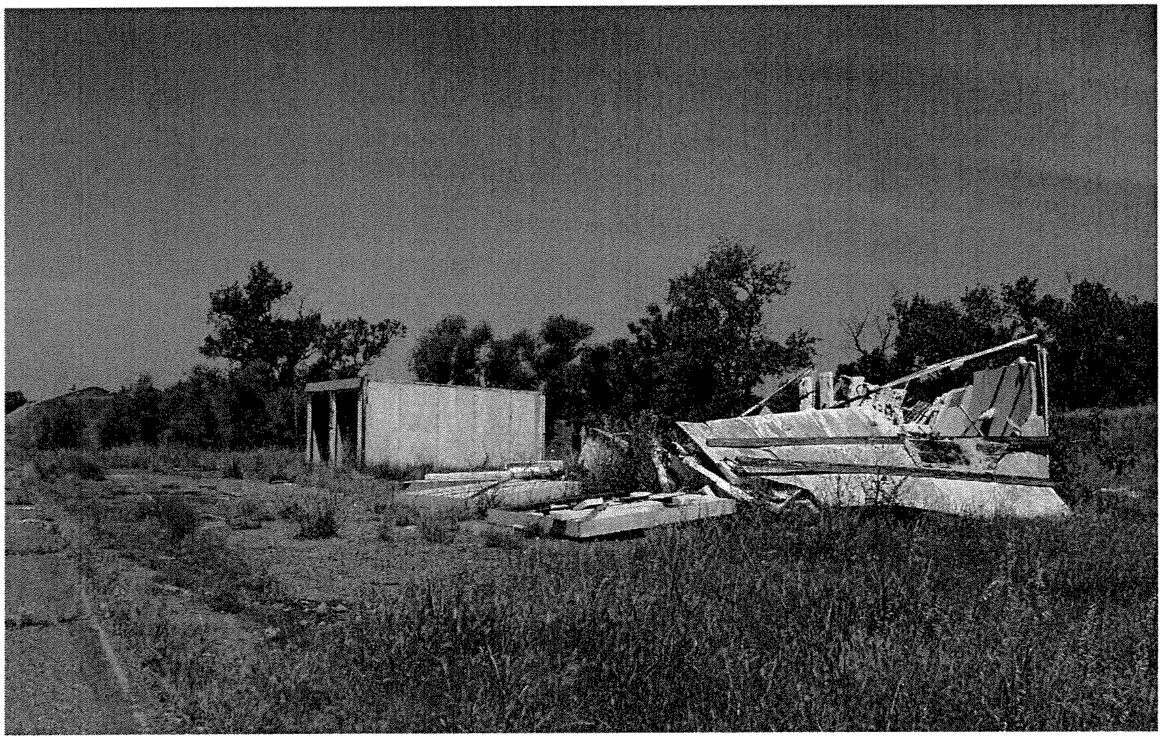

Plate 56: Cold Conditioning Chamber (Unit 91) (right), Sigma Test Area, 1956. Hot conditioning chamber adjacent (left). Looking northwest. View of May 2005.

Alpha Test Complex

The Alpha Test Complex is a large, fenced compound laid out south of the Sigma Test Area. The complex includes a central blockhouse and the remains of two static test stands. Originally configured with 31 numbered structures and several unnumbered support units and pads, the Alpha Test Complex exists as 14 buildings, structures, and structural remnants in 2005 (Figure 6). The character-defining components within the complex are its blockhouse and test stands. Underground instrumentation tunnels connect the blockhouse to the terminal control rooms beneath both test stands. Test Stand No. 1 is a single-position structure, while Test Stand No. 2 is a dual-position structure. Ancillary buildings and structures vary from the larger secondary support facilities such as the generator-compressor building, test stand shops, and the pumphouse, to the critical, but smaller equipment units and test observation shelters. Equipment, sometimes with permanent raised foundations, included liquid hydrogen tanks, liquid oxygen (LOX) tanks, central water and fuel tanks, a liquid nitrogen tank, storage areas for helium tanks and for hydrogen gas tanks, steam accumulators, and a boiler. Also on the site were a small power substation, weather station, time clock, and guard post at the entrance to the complex. Two observation shelters are separately located along an access road north of the Alpha Test Complex. The shelters overlook the two test stands. In the southeast corner of the Alpha Test Complex a large tee-shaped set of reinforced concrete foundations is interpreted as Initial Operational Capability (IOC) Site No. 1. IOC No. 1 was the location of individual tests that supported development of the full missile systems in test at the complex.

The Alpha Test Complex featured the first large-scale test stands erected for the Douglas Missile Test Facility at Rancho Cordova. The engineers of Aerojet General designed the facilities within the Alpha Test Complex in 1956, with construction underway in 1957. Douglas initiated static firings at the Alpha Test Complex in January 1958. In this period, the overall test facility was known as the Sacramento Missile Field Station of the Douglas corporate enterprise. The first missile in test was the Thor IRBM. Both test stands in the Alpha Test Complex were captive firing stands, and both used deluge systems. Douglas used Test Stand No. 1 to static-fire early production line Thor missiles selected from those manufactured in the company's Santa Monica facilities. Test Stand No. 2 included two positions, Test Stand No. 2A and Test Stand No. 2B. Douglas fired battleship versions of Rocketdyne's Thor engines on Test Stand No. 2A. (A "battleship missile" is a developmental model partially made of less expensive, robust materials for repeated captive tests—sometimes alternately called the "boilerplate" version of a missile in early test. Components of the missile in actual test are real, while much of the missile is fabricated as a type of placeholder.) Douglas completed its research-and-development tests of Thor at the Alpha Test Complex in December 1959, and in mid-1960 full-scale IOC testing of Thor moved to Vandenberg Air Force Base in southern California. Douglas next used Test Stand No. 2A for battleship tests of the Aerojet Titan ICBM second-stage engine. In 1960 also, Douglas initiated activities for NASA at its Rancho Cordova location, beginning with tests for a developmental Saturn booster, the DSV-IV, on Test Stand No. 1. By 1962, activities conducted on Test Stand No. 1 were also focused on the Saturn DSV-IV, and included static firings of the A-1 and A-3 versions of

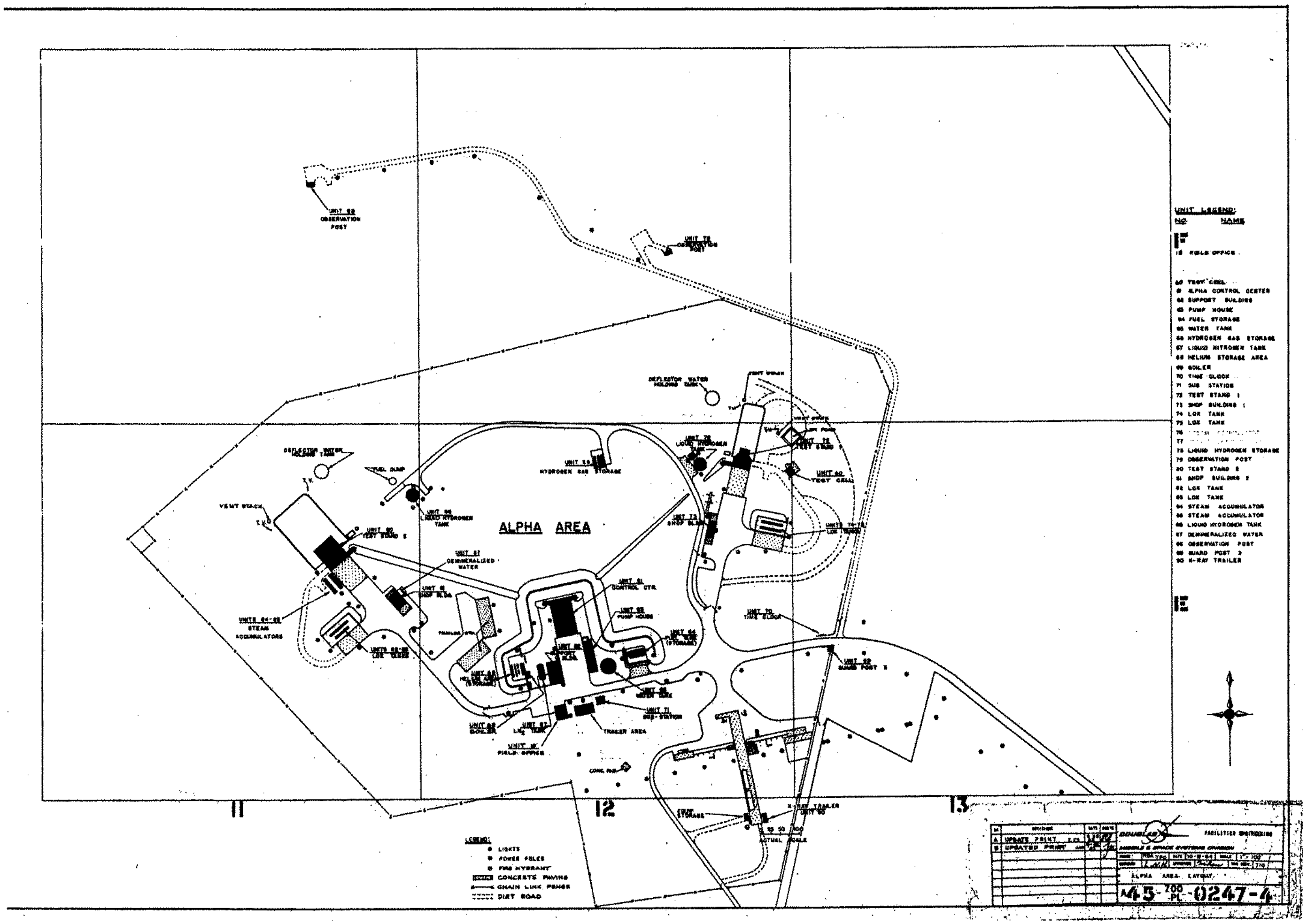

Figure 6: Douglas Facilities Engineering, Alpha Test Complex, Douglas Missile Test Facilities, Rancho Cordova, California, 1964.

the RL-10 liquid hydrogen engine placed in a battleship version of the booster (Douglas: 1958-1962). During the 1965-1968 years, Douglas conducted acceptance testing of Saturn S-IV boosters on Test Stand No. 2B for NASA. The company shipped S-IV boosters from its plant in Santa Monica for check-out, firing, and post-firing checks at the missile test facility in Rancho Cordova. After completion of the acceptance testing, Douglas shipped the Saturn S-IV boosters by air to NASA's facilities at Cape Kennedy in Florida for "mating with the Saturn S-I booster for exploratory 'Man on the Moon' feasibility studies" (NASA 1965). All static testing ended in 1969, although Douglas maintained the test stands in the complex in a state of readiness into late 1972. After deactivation of the Alpha Test Complex, Douglas dismantled the superstructure of the test stands later in the decade (ENSR Consulting and Engineering 1993).

Ancillary structures no longer standing within the Alpha Test Complex include:

- a large fuel tank (Unit 64) immediately east of the water tank;
- the hydrogen gas storage area (Unit 66) west of Test Stand No. 1;
- a boiler (Unit 69) immediately west of the generator-compressor building;
- a time clock (the first Unit 70) near the entrance to the test area;
- a weather station (the second Unit 70) south of the pumphouse;
- a power substation (Unit 71) south of the pumphouse;
- two shop buildings, one at each test stand (Units 73 and 81);
- two steam accumulators (Units 76-77) southwest of Test Stand No. 1;
- a liquid hydrogen tank (Unit 78) immediately west of Test Stand No. 1;
- a liquid hydrogen tank (Unit 86) immediately northeast of Test Stand No. 2;
- a demineralized water facility (Unit 87) near the shop at Test Stand No. 2; and,
- the guard post (Unit 89) at the entrance to the area.

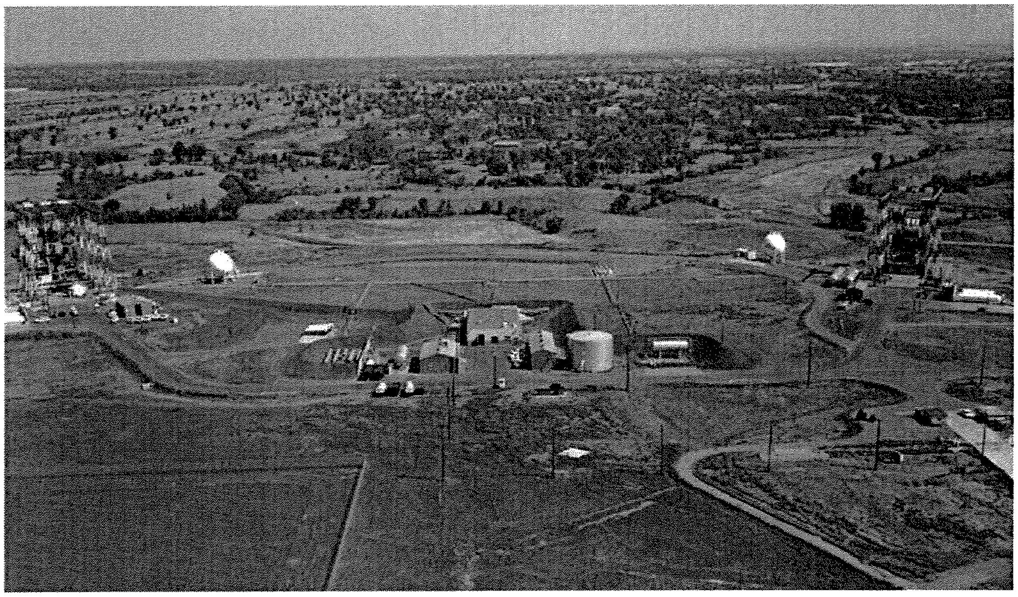

Plate 57: Alpha Test Complex, ca.1965. Blockhouse with generator-compressor building and pumphouse, center. Test Stand No. 2, left. Test Stand No. 1, right. NASA.

LOX Tanks for Test Stand No. 2

Also known as Units 82 and 83, the two LOX tanks for Test Stand No. 2 sat within a protected area to the near southwest of the test stand. Today, the reinforced, ell-shaped barricade wall, surrounding earthen berm, and the raised pedestal foundations for the tanks remain at the site. Placed at the location in 1956-1957, the LOX tanks are no longer present.

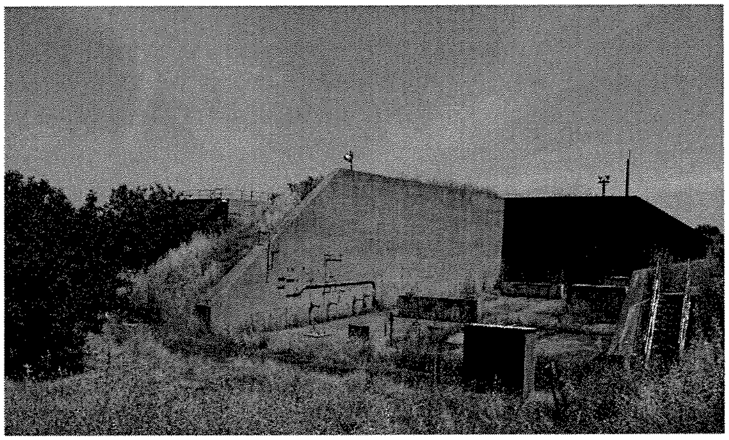

Plate 58: LOX Tank Area (Units 82 and 83), Test Stand No. 2, Alpha Test Complex, 1956-1957. Looking north/northeast. View of May 2005.

Steam Accumulators for Test Stand No. 2

Also known as Units 84 and 85, the two steam accumulators for Test Stand No. 2 sat to the immediate southwest of the test stand. Today, the reinforced concrete, raised pedestal foundations for the accumulators remain at the site. Placed at the site in 1956-1957, the steam accumulator equipment is no longer present. The accumulators supported the altitude simulation system engineering for the test stand.

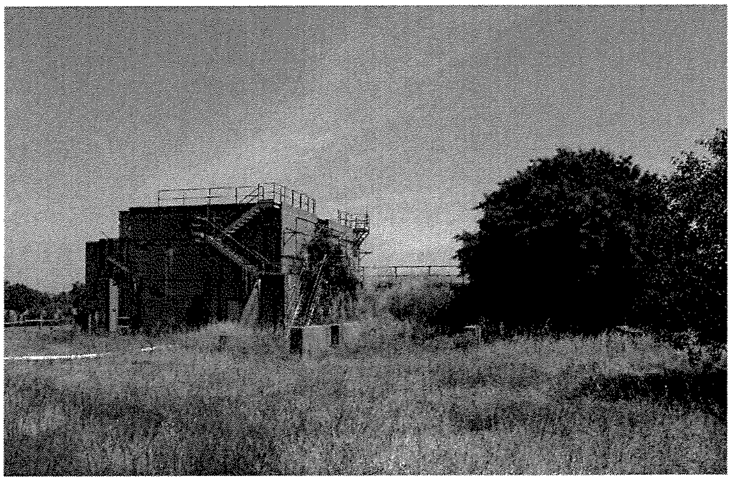

Plate 59: Raised pedestal foundations for steam accumulators (Units 84 and 85), Test Stand No. 2, Alpha Test Complex. Foundations present in the middleground, center to right edge of the photograph. Looking northeast. View of May 2005.

Test Stand No. 2

Also known as Unit 80, Test Stand No. 2 featured a steel-beam tower with two side captive-firing positions, a north-facing flame deflector, and a ground-level, reinforced concrete terminal room. The terminal room also functioned as the base of the test stand. Test Stand No. 2 is 700 feet from the blockhouse for the Alpha Test Complex. An underground instrumentation tunnel connects Test Stand No. 2 to the blockhouse, in a layout identical to the tunnelworks for Test Stand No. 1. The steel superstructure of Test Stand No. 2A accommodated a test item 63 feet long and 8 feet in diameter. Douglas initially operated Test Stand No. 2A p to run static firing tests on liquid-propellant engines for the Thor IRBM and the Titan ICBM during 1958-1960. Test Stand No. 2B accommodated a larger test item, initially a full-scale Thor missile. Dimensions for a test item placed on Test Stand No. 2B were 40 by 19 feet (length and diameter). Test Stand No. 2 could withstand up to a 300,000-pound thrust during captive firings. A deluge system flooded the flame deflector (bucket) in a standard configuration for static tests. Test Stand No. 2 also included a 10-ton crane used to position test items in the two captive-firing positions (Douglas 1966).

Aerojet General designed Test Stand No. 2 during 1956-1957 as a major component of its overall engineering for the Alpha Test Complex. Today, only the reinforced concrete terminal room at the base of the test stand remains at the site. Douglas removed the steel superstructure of the tower and of the flame deflector in 1977. All equipment formerly in the terminal room is also no longer extant, with the rooms partially open to the elements. The terminal room is in derelict condition in 2005. The instrumentation tunnel to the Alpha Test Complex blockhouse is intact, with electric cables removed. The reinforced concrete catchment basin at the base of the flame deflector is present, overgrown in weeds. Miscellaneous camera and light stands sit at the periphery of the test stand.

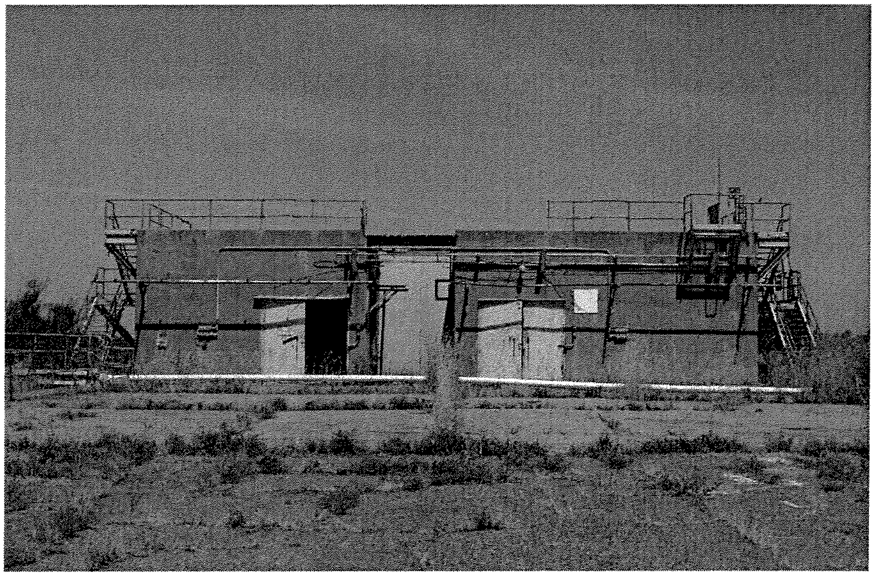

Plate 60: Test Stand No. 2, Alpha Test Complex, 1956-1957. Looking northwest. View of May 2005.

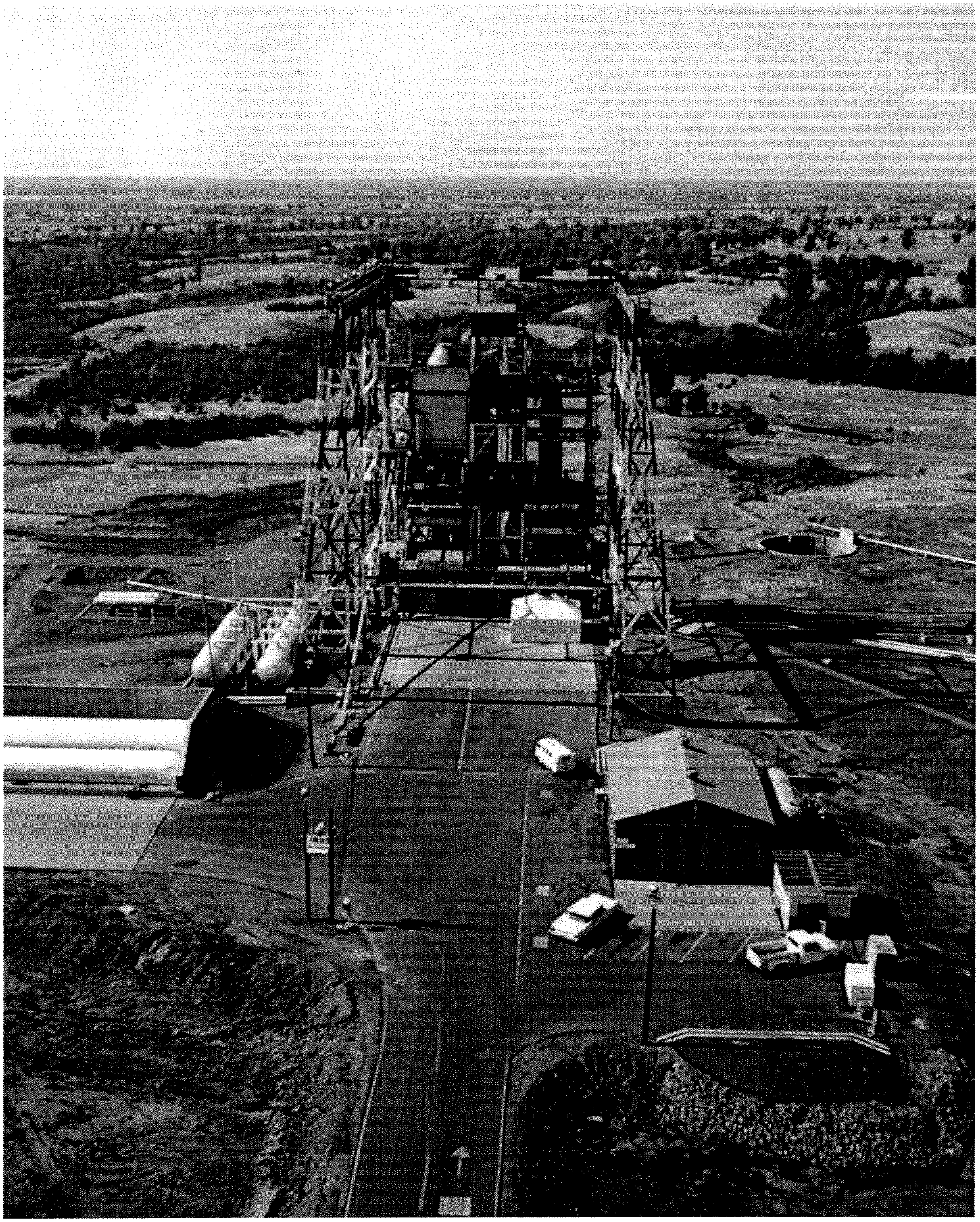

Plate 61: Test Stand No. 2, Alpha Test Complex, 1956-1957. Left to right in photograph: LOX tanks with barricade wall, steam accumulator tanks, test stand, shop (foreground), and deflector-water containment tank (background). Looking northwest. View of ca.1965. Courtesy of NASA.

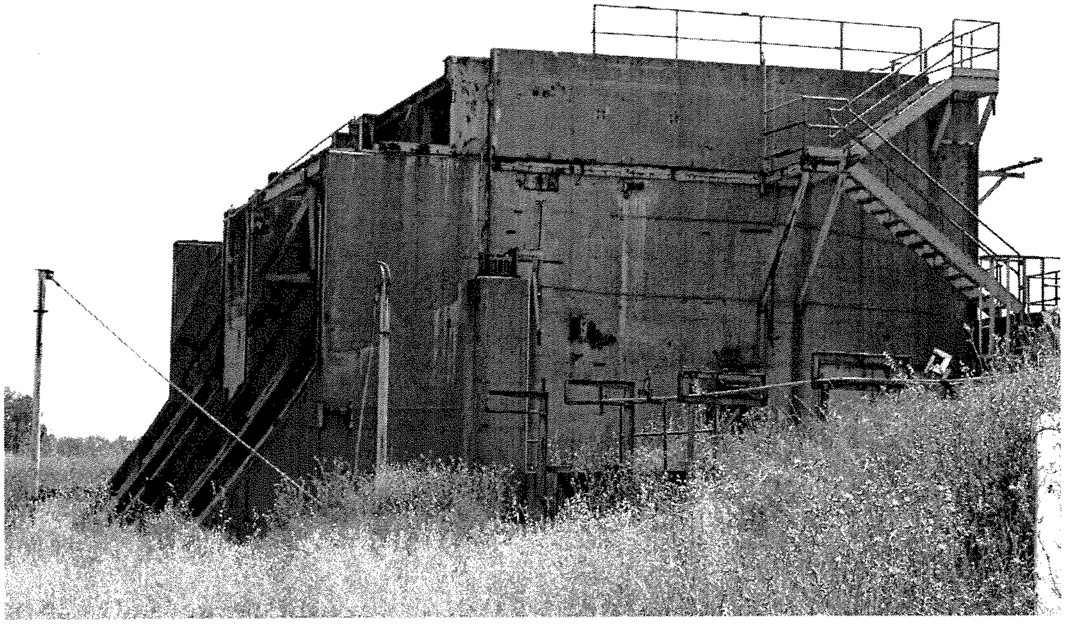

Plate 62: Test Stand No. 2, Alpha Test Complex, 1956-1957. Looking east. View of May 2005.

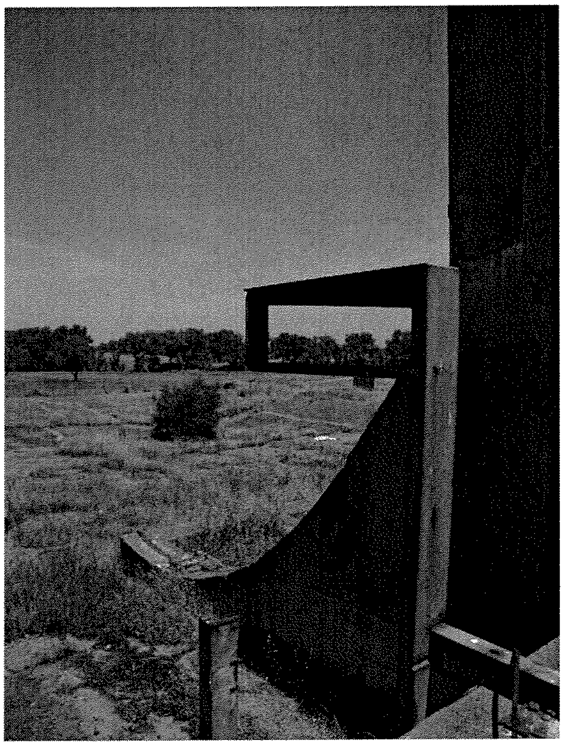

Plate 63: Test Stand No. 2, Alpha Test Complex, 1956-1957. Flame deflector catchment area. Looking north. View of May 2005.

Plate 64: Test Stand No. 2, Alpha Test Complex, 1956-1957. Terminal room. Looking north. View of May 2005.

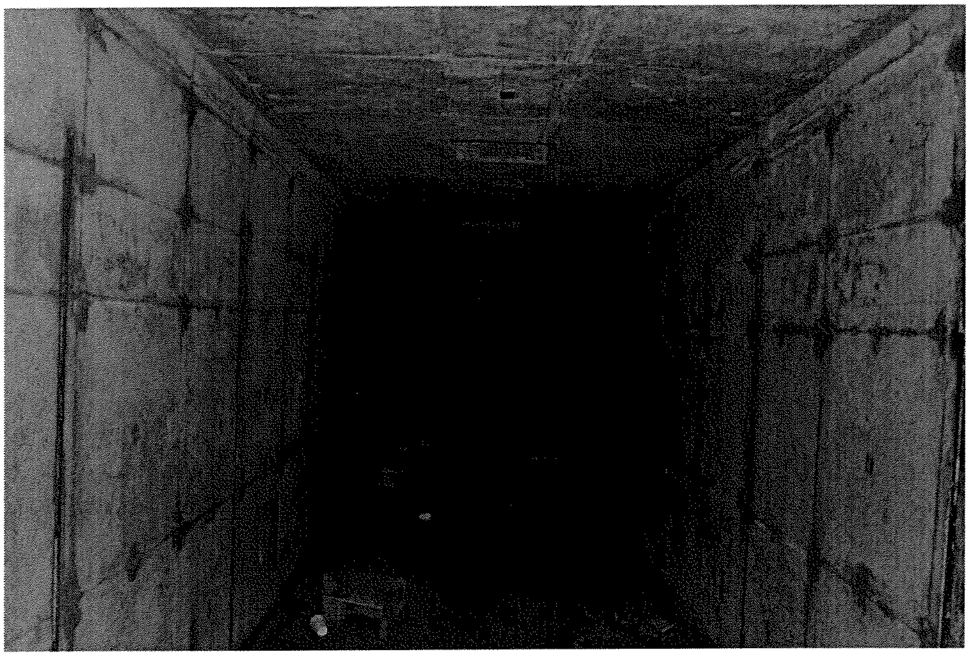

Plate 65: Test Stand No. 2, Alpha Test Complex, 1956-1957. Instrumentation tunnel. Looking northwest. View of May 2005.

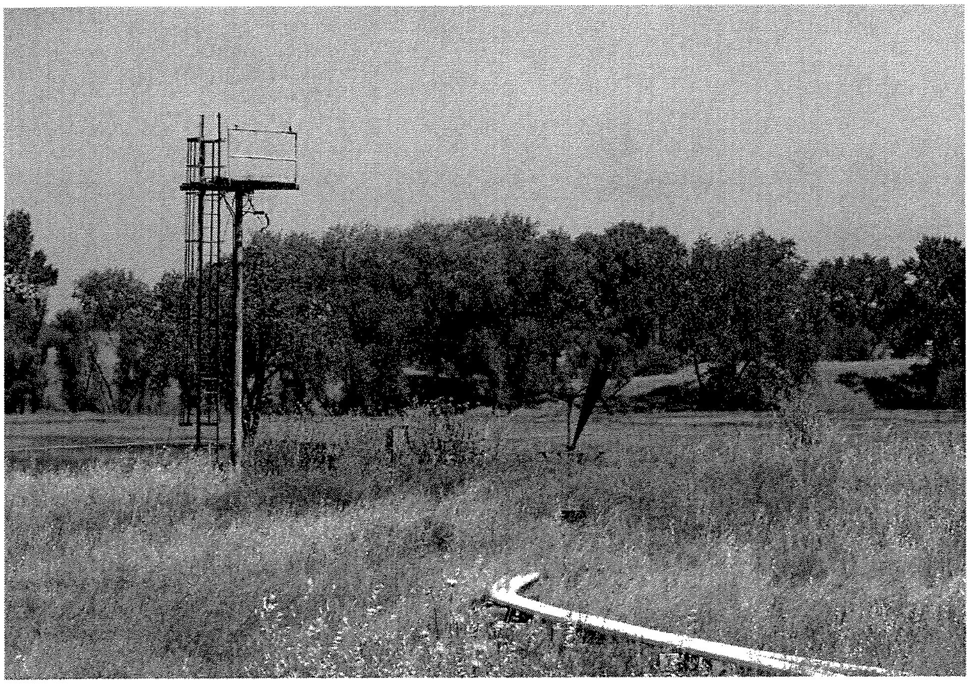

Plate 66: Test Stand No. 2, Alpha Test Complex, 1956-1957. TV camera stand, northwest corner of flame deflector basin. Looking northwest. View of May 2005.

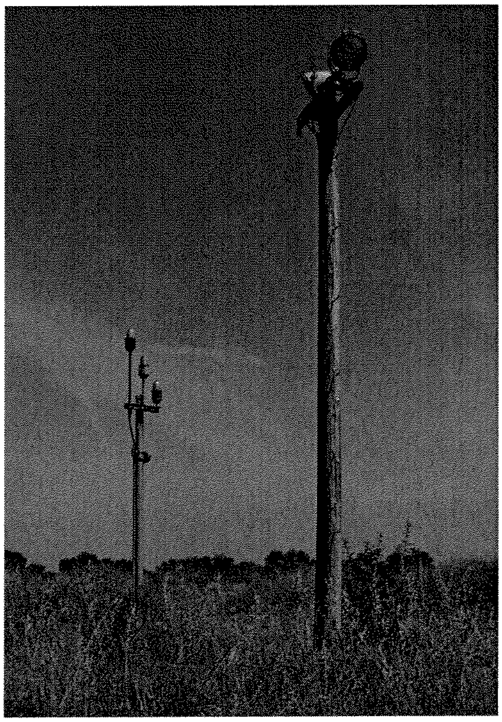

Plate 67: Test Stand No. 2, Alpha Test Complex, 1956-1957. Test-in-progress light (left) and floodlight (right). Looking north. View of May 2005.

Observation Shelter No. 2

Also known as Unit 88, the observation shelter for captive firings at Test Stand No. 2 is located north of the test stand at the end of an access road. The shelter is a small, flat-roofed, reinforced concrete structure, open on its rear face. The shelter features a bank of six viewing windows, each with thick, inset glass panes. The fenestration is typical of that found in blockhouses and observation posts at missile test facilities and launch sites. A chimney-like element sits on the roof of the shelter in its southeast corner. The historic function of this element remains undetermined.

Designed by Aerojet General and constructed in 1956-1957, the observation shelter is one of two shelters on the access road. Observation Shelter No. 2 is unaltered today.

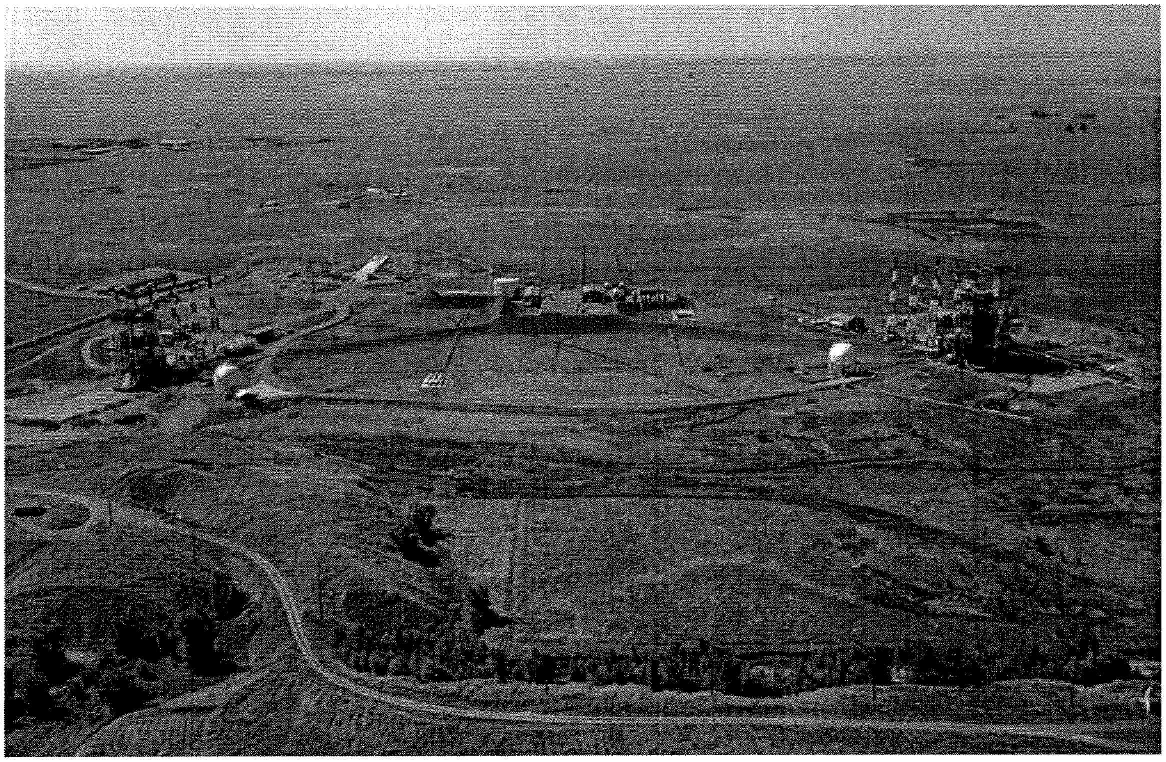

Plate 68: Alpha Test Complex, ca.1965. Observation Shelter No. 2, lower right corner of the photograph. Observation Shelter No. 1, left edge of the photograph. Blockhouse with generator-compressor building and pumphouse, center, surrounded by large earthen berm. Test Stand No. 2, right. Test Stand No. 1, left. Looking south. Courtesy of NASA.

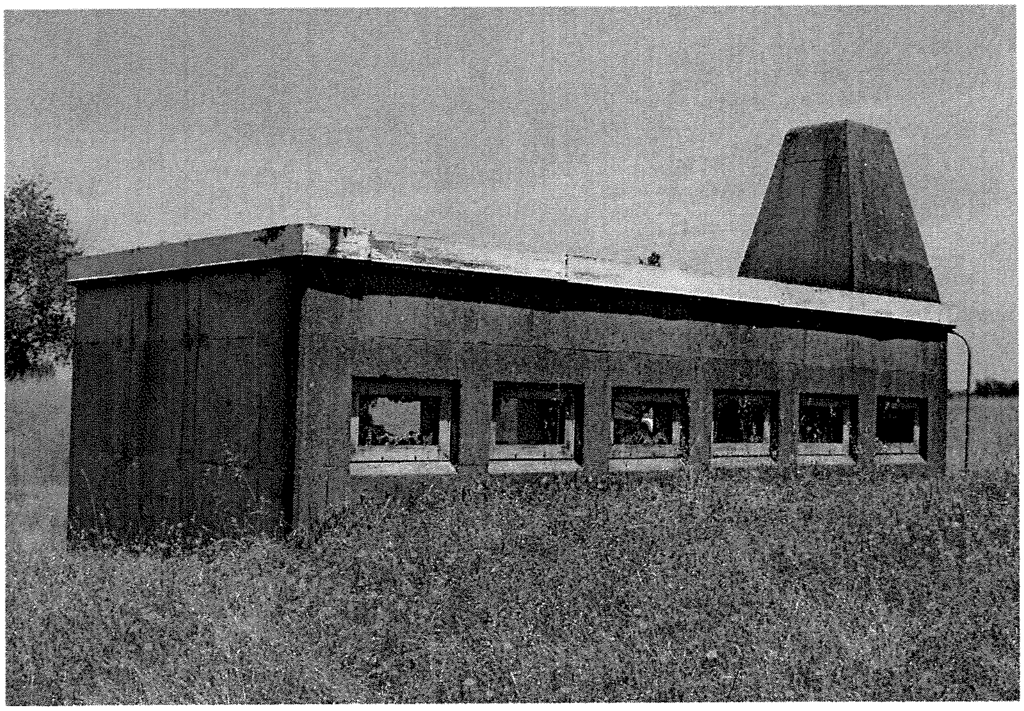

Plate 69: Observation Shelter No. 2, Alpha Test Complex, 1956-1957. Looking northeast. View of May 2005.

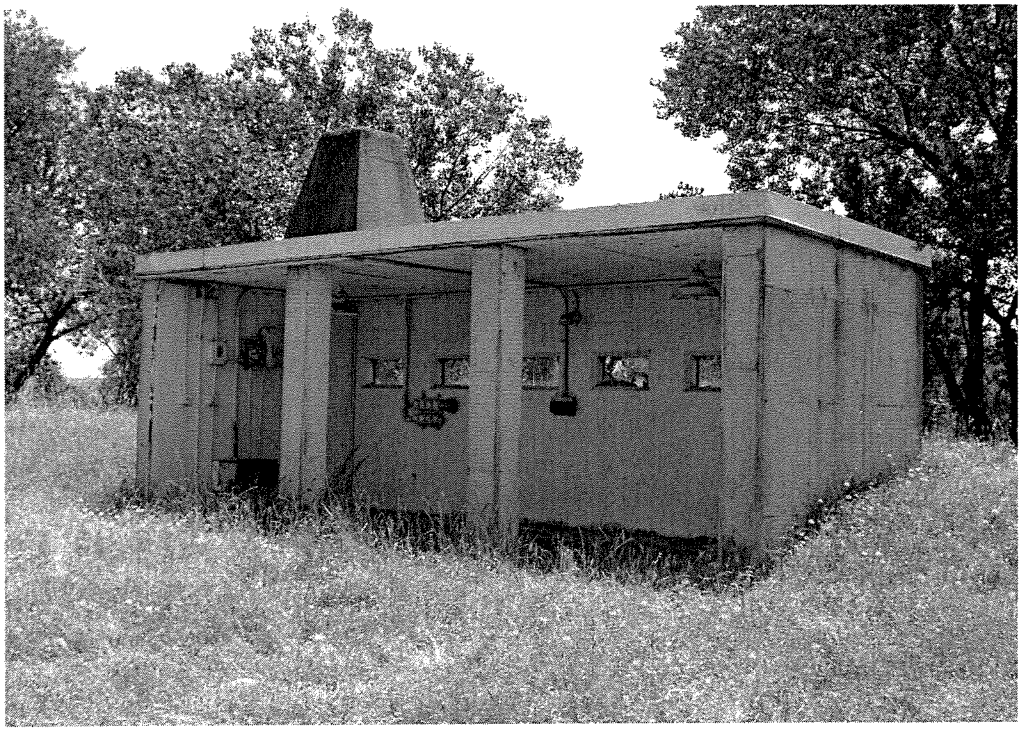

Plate 70: Observation Shelter No. 2, Alpha Test Complex, 1956-1957. Looking southeast. View of May 2005.

Helium Storage Area

Also known as Unit 68, the storage area for helium tanks is located to the immediate west of the generator-compressor building. The paved area featured a reinforced concrete barricade wall on its eastern periphery, placed between the stored tanks and a boiler. The helium storage area historically contained three large tanks and two small tanks of helium gas. A large earthen berm buffered the north, west, and south sides of the storage area. The bermworks were part of a larger protective earthen unit that surrounded the central blockhouse area of the Alpha Test Complex.

Aerojet General designed the helium storage area during 1956-1957 as a component of its overall engineering for the Alpha Test Complex. Today, only the reinforced barricade wall remains on the site. Douglas constructed the helium storage area to support static firings at Test Stands No. 1 and No. 2.

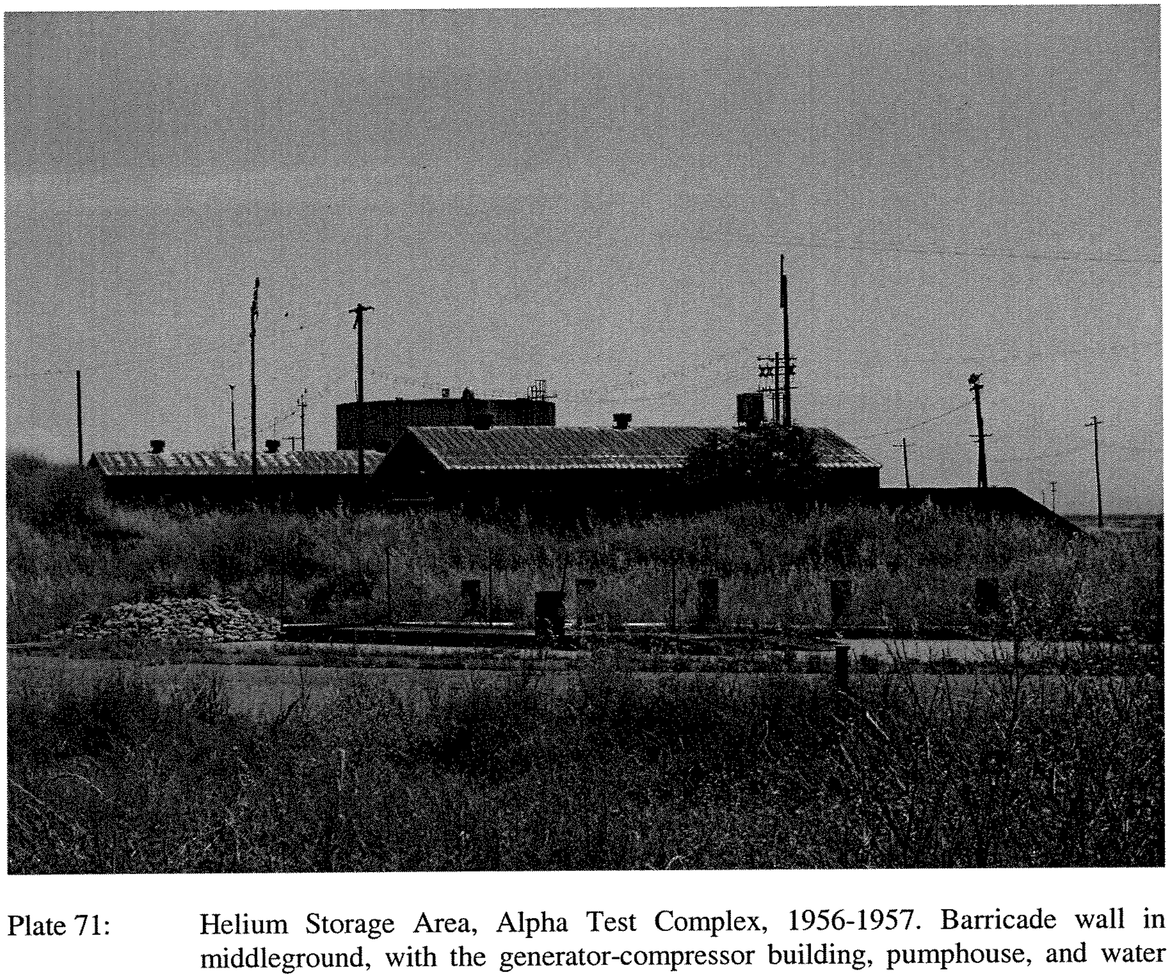

Plate 71: Helium Storage Area, Alpha Test Complex, 1956-1957. Barricade wall in middleground, with the generator-compressor building, pumphouse, and water tank in the background. Former equipment trailer parking area in the foreground. Looking east. View of May 2005.

Liquid Nitrogen (LN2) Tank

Also known as Unit 67, the LN2 tank sat west of the generator-compressor building in the Alpha Test Complex. When placed on site in 1957, raised concrete pedestals supported a cylindrical LN2 tank. Only the pedestal mounts remain today.

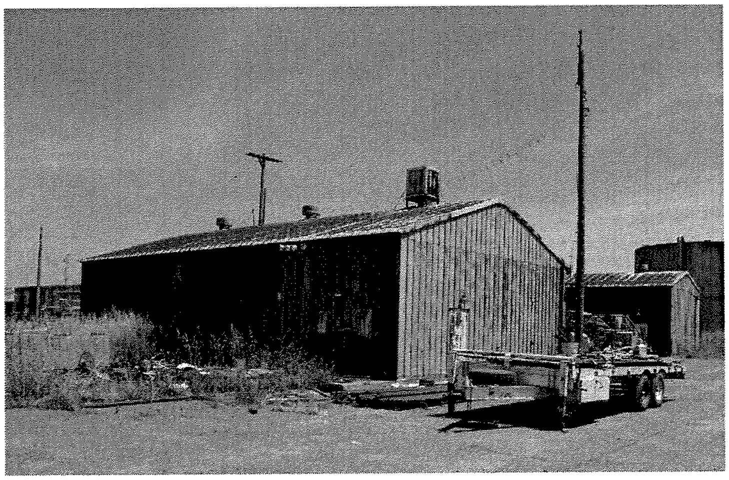

Plate 72: Generator-Compressor Building, with the foundation of the LN2 tank (Unit 67) (left), Alpha Test Complex, 1956-1957. Looking northeast. View of May 2005.

Generator and Compressor Building

Also known as Unit 62, the generator-compressor building is a one-story, prefabricated metal structure erected in center of the Alpha Test Complex in 1957. The windowless building features corrugated metal sheathing and a gable roof. Two center-opening shop doors articulate the east façade. The interior of the generator- compressor building is divided into several rooms, and is in an altered, derelict condition today.

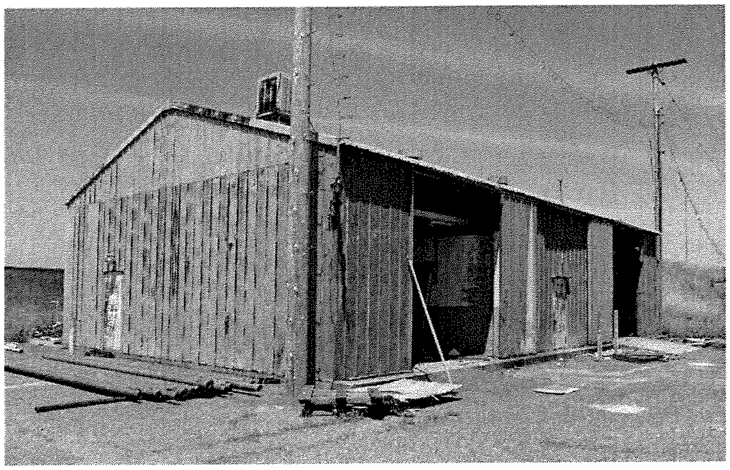

Plate 73: Generator-Compressor Building, Alpha Test Complex, 1956-1957. Looking northwest. View of May 2005.

Plate 74: Generator-Compressor Building (Unit 62), Alpha Test Complex, 1956-1957. Interior. View of May 2005.

Plate 75: Generator-Compressor Building (Unit 62), Alpha Test Complex, 1956-1957. Interior. View of May 2005.

Control Center

Also known as Unit 61, the control center for the Alpha Test Complex is a one-story, reinforced concrete structure. Operational as the blockhouse for Test Stands No. 1 and No. 2, the control center is windowless. Rectangular, louvered vents articulate several facades of the building. The control center features steel doors and is flat-roofed. Underground instrumentation tunnels connect the control center to the test stands.

Aerojet General designed the control center during 1956-1957 as a key component of its overall engineering for the Alpha Test Complex. Today, the control center remains unaltered on its exterior. Interior rooms are open to the elements, and are in a derelict condition. Historically, a large earthen berm buffered the control center and its surrounding buildings at the center of the Alpha Test Complex. Only sections of the berm are extant in 2005. (See Plates 57 and 68.)

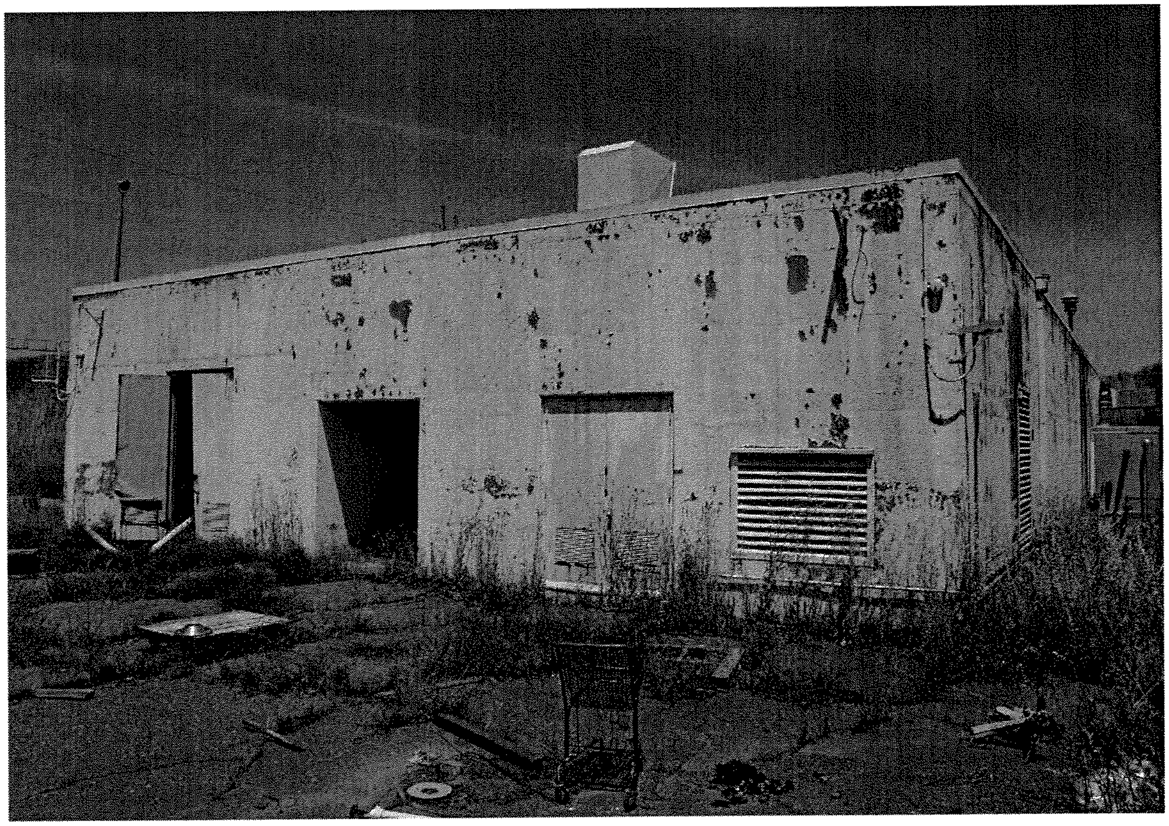

Plate 76: Control Center (Unit 61), Alpha Test Complex, 1956-1957. Looking northwest. View of May 2005.

Plate 77: Control Center (Unit 61), Alpha Test Complex, 1956-1957. Interior of operations room. View of May 2005.

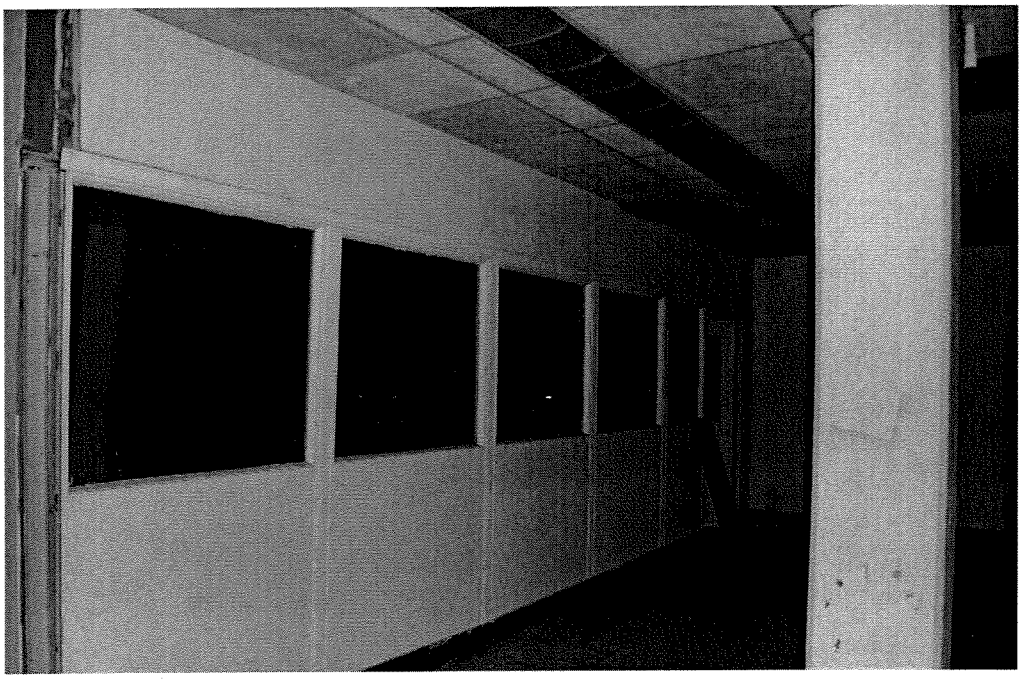

Plate 78: Control Center (Unit 61), Alpha Test Complex, 1956-1957. Interior of operations room, looking toward observation room. View of May 2005.

Pump House

Also known as Unit 63, the pump house is a one-story, prefabricated metal structure erected in center of the Alpha Test Complex in 1957. The building features rigid-frame construction, standing-seam metal sheathing, 6/3 factory windows, and a gable roof. A single entrance articulates the west façade. The interior of the pump house is a single room, and is in derelict condition today.

Historically, a large earthen berm buffered the pump house, control center, and generator-compressor building, with their ancillary water, fuel, helium, and liquid nitrogen tanks, at the center of the Alpha Test Complex. Only sections of the berm are extant in 2005. (See Plates 57 and 68.)

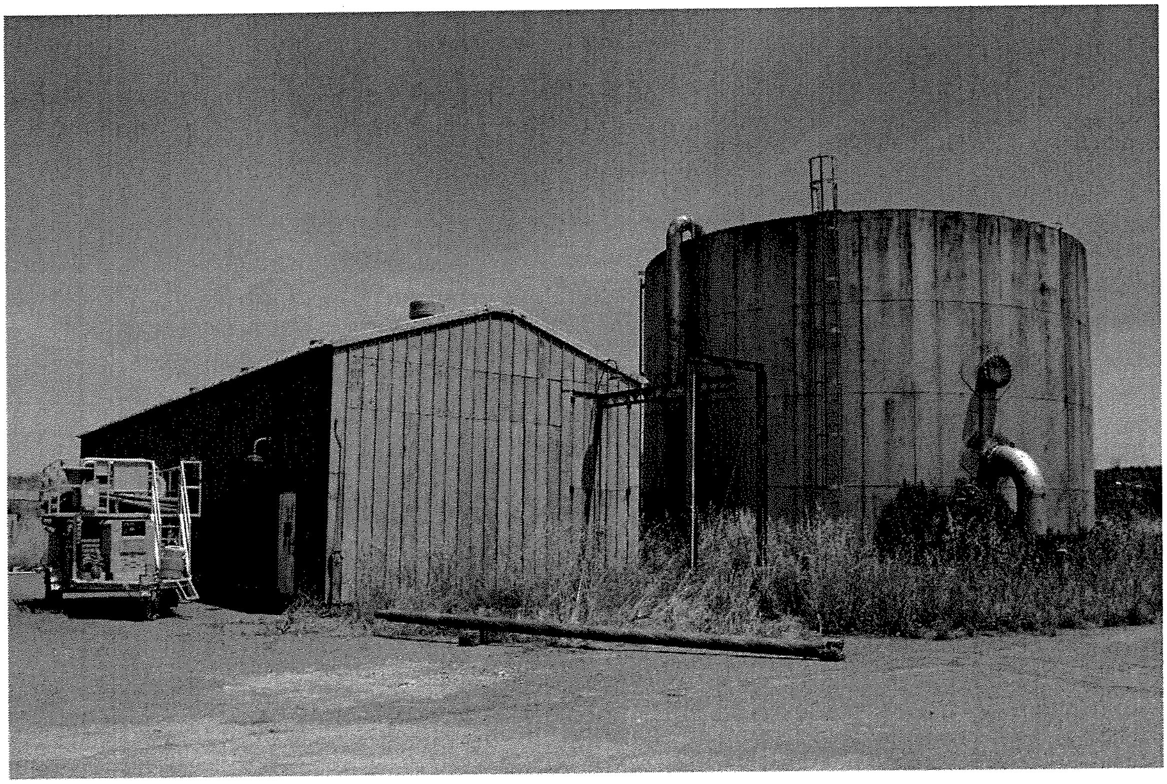

Plate 79: Pump House (Unit 63), Alpha Test Complex, 1956-1957. Water tank adjacent. Looking northeast. View of May 2005.

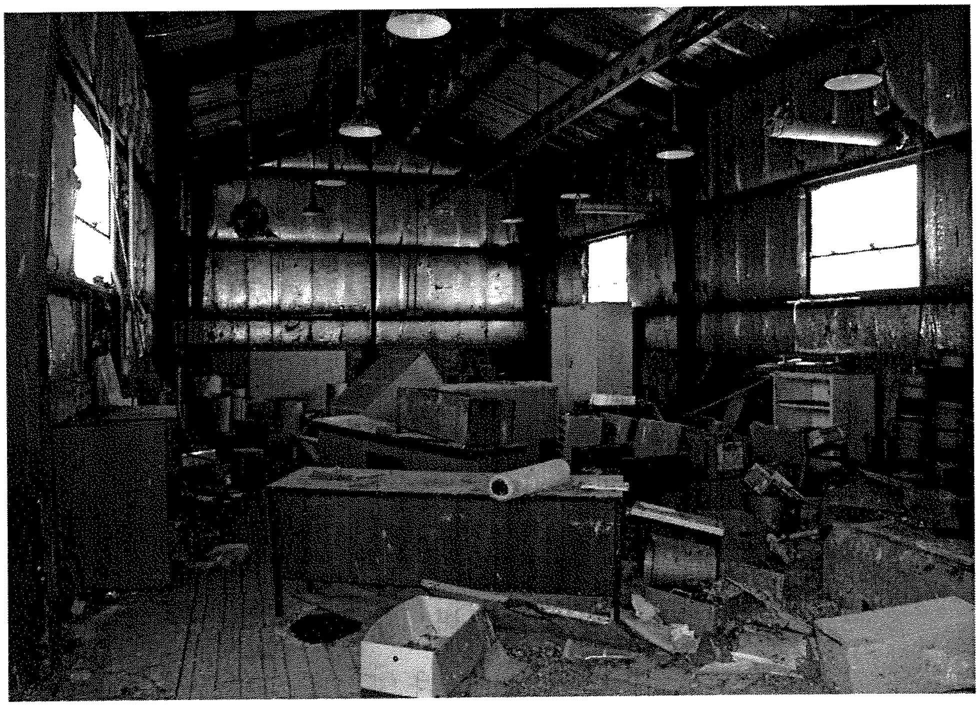

Plate 80: Pump House (Unit 63), Alpha Test Complex, 1956-1957. Interior, looking north. View of May 2005.

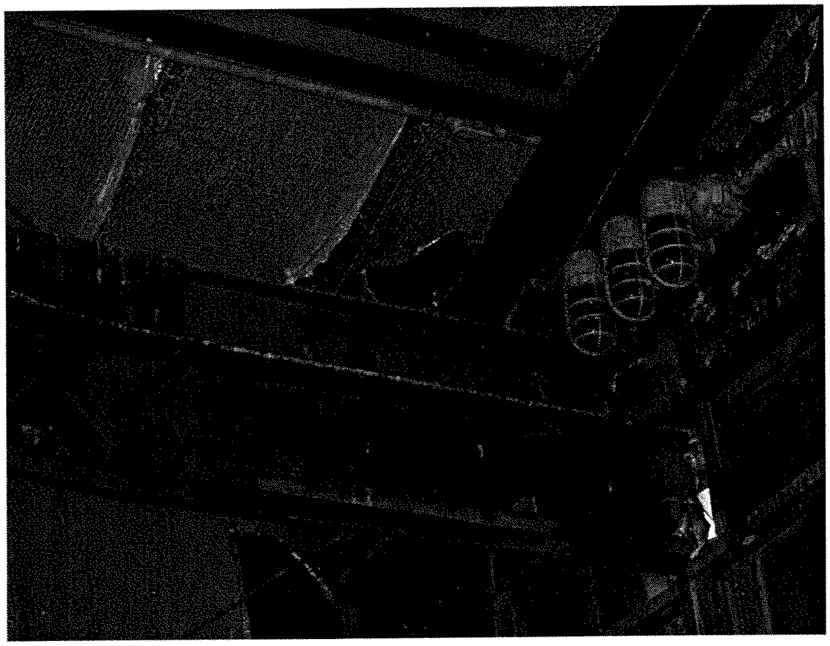

Plate 81: Pump House (Unit 63), Alpha Test Complex, 1956-1957. Interior, upper southeast corner: test-status light fixture. View of May 2005.

Water Tank

Also known as Unit 65, the water storage tank for the Alpha Test Complex is located at the southeastern corner of the pump house. The tank is a large steel structure fabricated from riveted panels. The water tank and pump house worked as a unit to provide the deluge system for the Alpha Test Complex. Large amounts of water were required for captive missile and missile-engine firings on Test Stands No. 1 and No. 2.

Aerojet General designed the deluge system during 1956-1957 as a major component of its overall engineering for the Alpha Test Complex. Today, the water tank remains unaltered on its exterior. Historically, a large earthen berm buffered the water tank, pump house, control center, and generator-compressor building at the center of the Alpha Test Complex. Only sections of the berm are present at the site in 2005. (See Plates 57 and 68.) When the test complex was operational, a large cylindrical fuel tank stood to the near east of the water tank. The fuel tank is no longer extant.

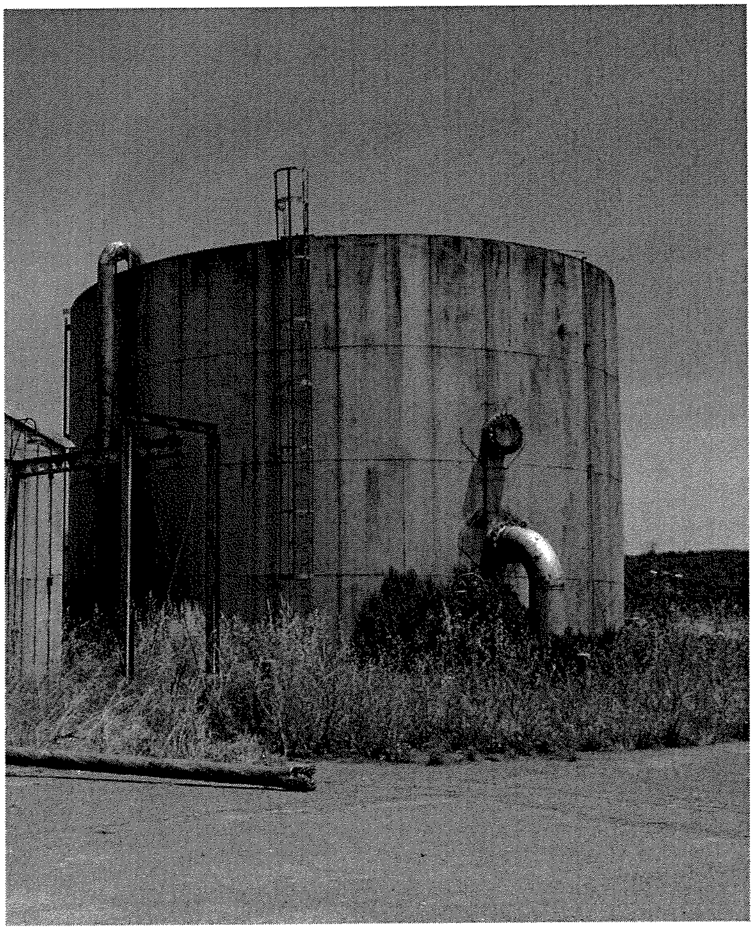

Plate 82: Water Tank (Unit 65), Alpha Test Complex, 1956-1957. Looking northeast. View of May 2005.

Observation Shelter No. 1

Also known as Unit 79, the observation shelter for captive firings at Test Stand No. 1 is located northwest of the test stand at the midpoint of its access road. The shelter is a small, flat-roofed, reinforced concrete structure, open on its rear face. The shelter features a bank of six viewing windows, each with thick, inset glass panes. The fenestration is typical of that found in blockhouses and observation posts at missile test facilities and launch sites. Constructed in 1956-1957, the observation shelter is one of two shelters on the access road. Observation Shelter No. 1 is unaltered today.

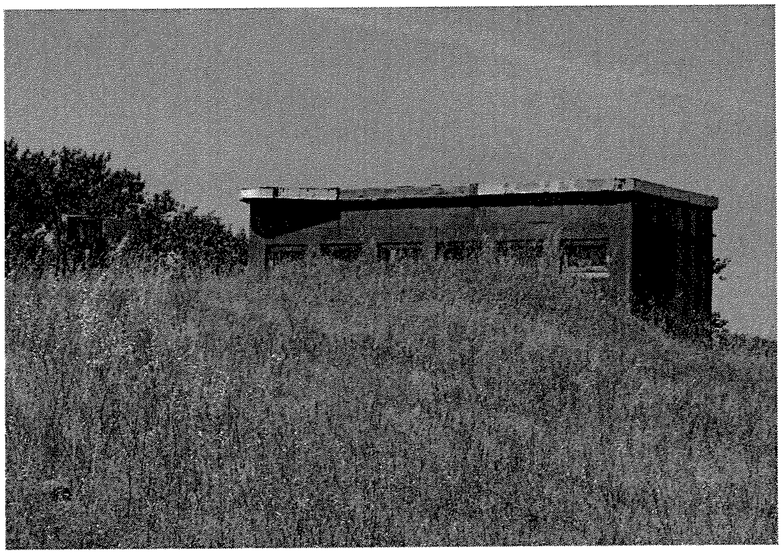

Plate 83: Observation Shelter No. 1, Alpha Test Complex, 1956-1957. Looking northwest. View of May 2005.

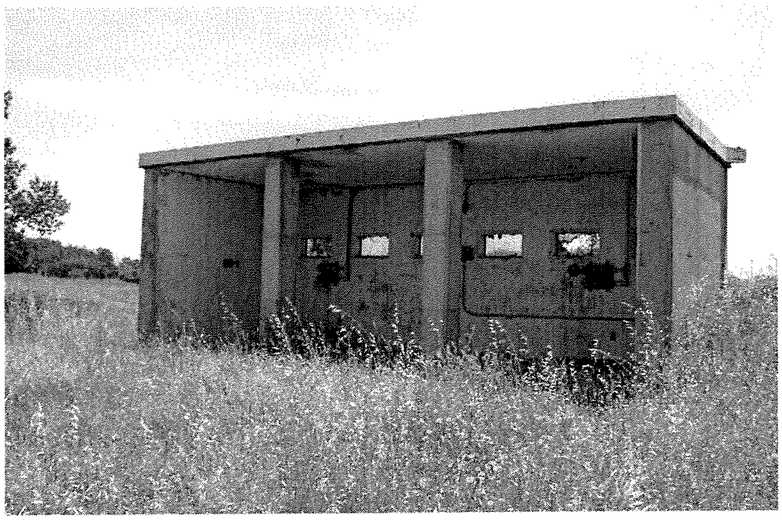

Plate 84: Observation Shelter No. 1, Alpha Test Complex, 1956-1957. Looking southeast. View of May 2005.

Test Stand No. 1

Also known as Unit 72, Test Stand No. 1 featured a steel-beam tower with a single captive-firing position, a north-facing flame deflector, and a ground-level, reinforced concrete terminal room. The terminal room also functioned as the base of the test stand. Test Stand No. 1 is 700 feet from the blockhouse for the Alpha Test Complex. An underground instrumentation tunnel connects Test Stand No. 1 to the blockhouse, in a layout identical to the tunnelworks for Test Stand No. 2. The steel superstructure of Test Stand No. 1 accommodated a test item 40 feet long and 19 feet in diameter. Douglas initially operated Test Stand No. 1 p to run static firing acceptance tests on the Thor IRBM during 1958-1960. The captive-firing position in Test Stand No. 1 was identical in its dimensions to that of Test Stand No. 2B. Test Stand No. 1 could withstand up to a 300,000-pound thrust during captive firings. A deluge system flooded the flame deflector (bucket) in a standard configuration for static tests. Test Stand No. 1 also included a 10-ton crane used to position test items (Douglas 1966).

Aerojet General designed Test Stand No. 1 during 1956-1957 as a major component of its overall engineering for the Alpha Test Complex. Today, only the reinforced concrete terminal room at the base of the test stand remains at the site. Douglas removed the steel superstructure of the tower and of the flame deflector in 1977. All equipment formerly in the terminal room is also no longer extant, with the rooms partially open to the elements. The terminal room is in derelict condition in 2005. A car, visually identical to one shown in a photograph of Wernher von Braun's visit to the site in the early 1960s, is currently stored in the base of the test stand (see Plate 10). The instrumentation tunnel to the Alpha Test Complex blockhouse is intact, with electric cables removed. The reinforced concrete catchment basin at the base of the flame deflector is present, as is the test stand's large, circular deflector water-holding tank. The deflector water-holding tank is a surface pond facility. Miscellaneous camera and light stands sit at the periphery of the test stand.

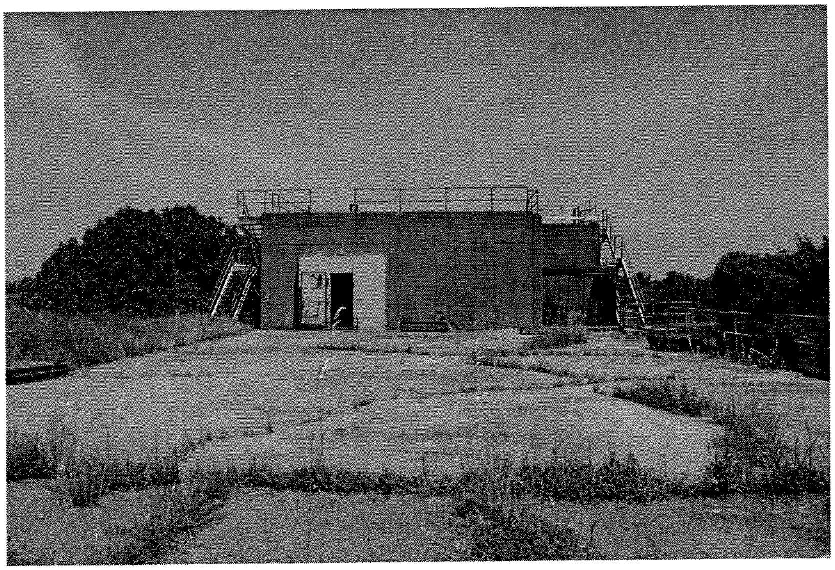

Plate 85: Test Stand No. 1, Alpha Test Complex, 1956-1957. Looking northeast. View of May 2005.

Plate 86: Test Stand No. 1, Alpha Test Complex, 1956-1957. Looking west. View of May 2005.

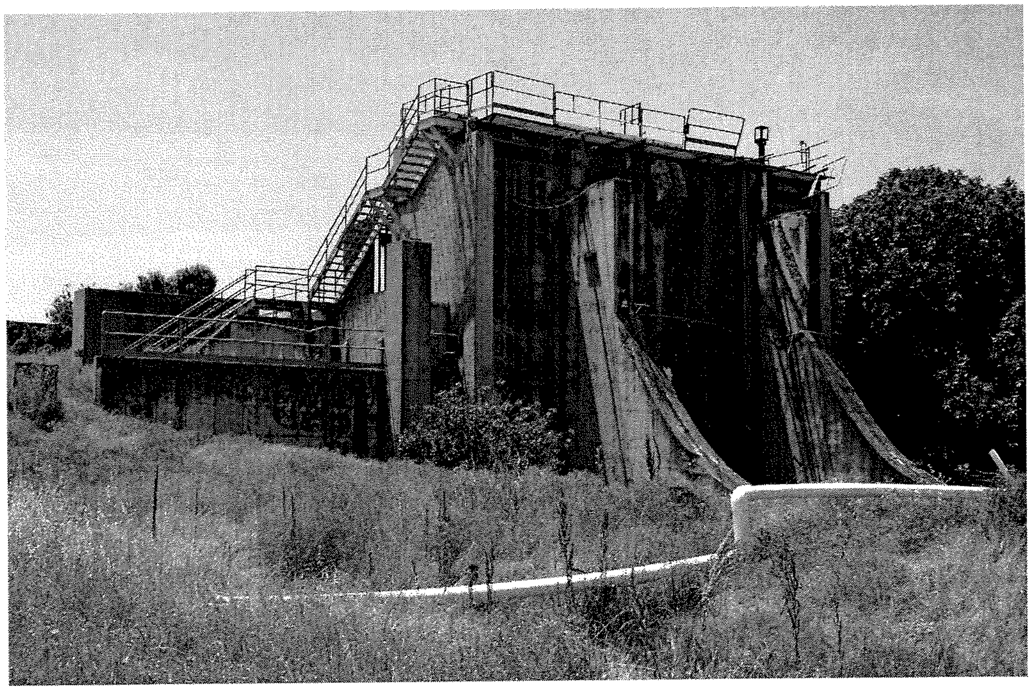

Plate 87: Test Stand No. 1, Alpha Test Complex, 1956-1957. Looking southwest. View of May 2005.

Plate 88: Test Stand No. 1, Alpha Test Complex, 1956-1957. Terminal room. Looking west/southwest. View of May 2005.

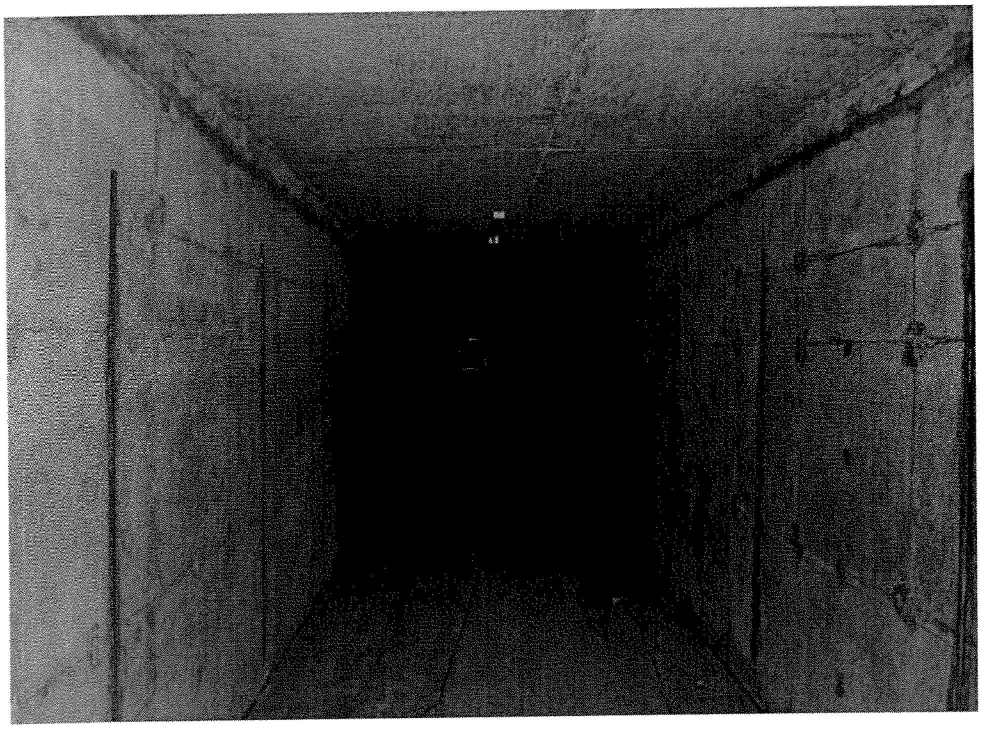

Plate 89: Test Stand No.1, Alpha Test Complex, 1956-1957. Instrumentation tunnel. Looking southwest. View of May 2005.

Plate 90: Vehicle stored inside base of Test Stand No.1, Alpha Test Complex. View of May 2005.

Plate 91: Vehicle stored inside base of Test Stand No.1, Alpha Test Complex. View of May 2005.

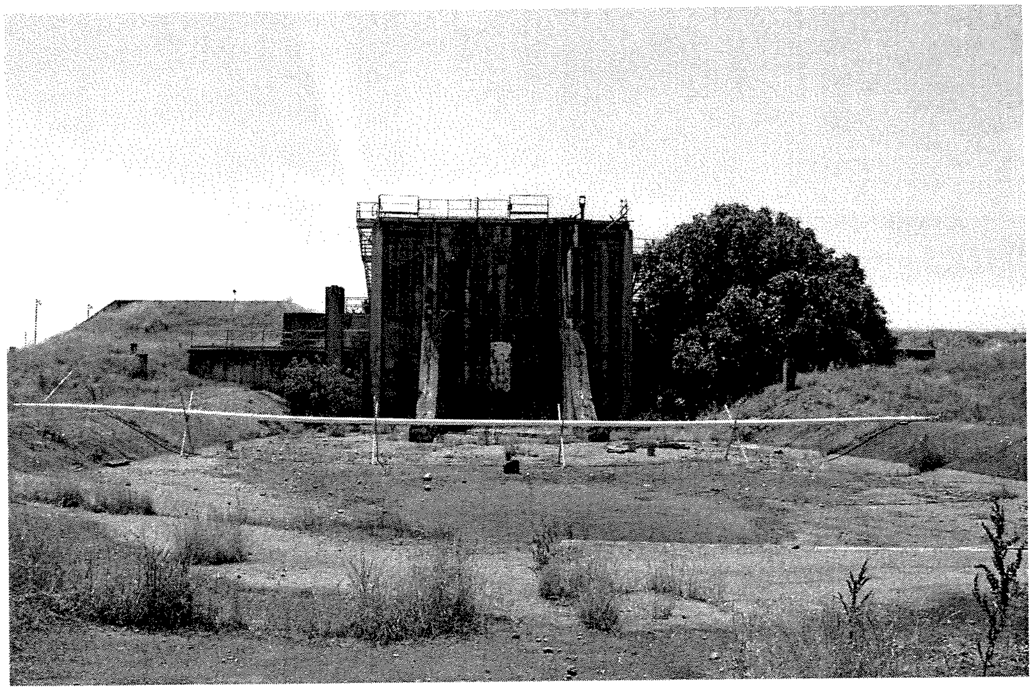

Plate 92: Test Stand No. 1, Alpha Test Complex, 1956-1957. Flame deflector catchment area. Looking south/southwest. View of May 2005.

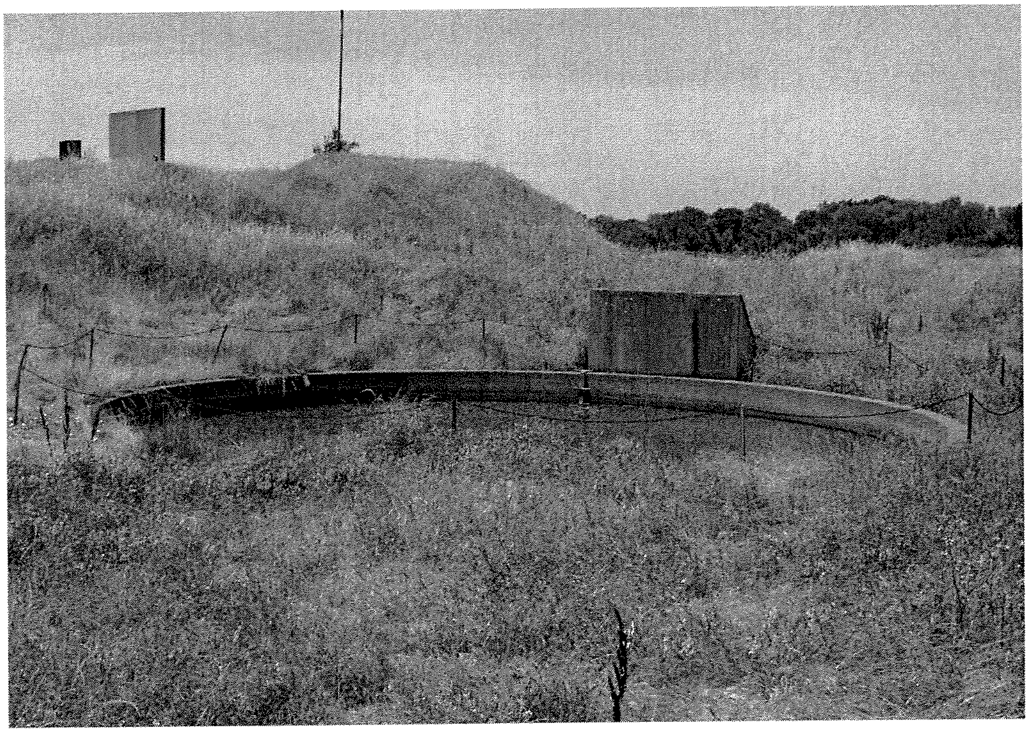

Plate 93: Test Stand No. 1, Alpha Test Complex, 1956-1957. Flame deflector water-containment tank. Looking southwest. View of May 2005.

LOX Tanks for Test Stand No. 1

Also known as Units 74 and 75, the two LOX tanks for Test Stand No. 1 sat within a protected area to the near southeast of the test stand. Today, a reinforced, ell-shaped barricade wall and surrounding earthen berm remain at the site. Placed at the location in 1956-1957, the LOX tanks are no longer present. (See Plates 57 and 68.)

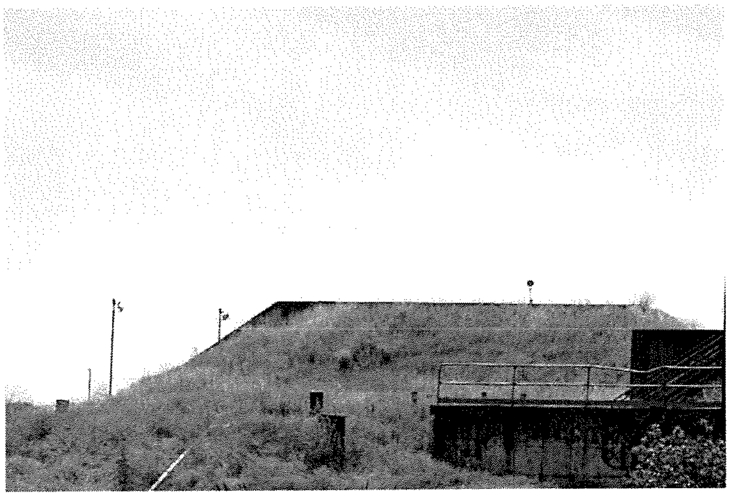

Plate 94: LOX Tank Area (Units 74 and 75), Test Stand No. 1, Alpha Test Complex, 1956-1957. Looking south/southwest. View of May 2005.

Test Cell

Also known as Unit 60, the test cell located to the near southeast of Test Stand No. 1 is a three-sided, flat-roofed, steel-frame structure placed on site in 1957. The inside face of the test cell is paneled, possibly with asbestos. Historic use of the test cell is undetermined.

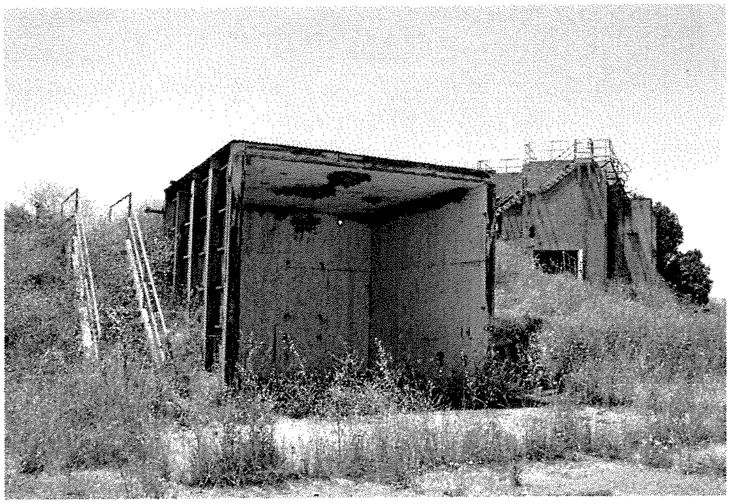

Plate 95: Test Cell (Unit 60), Test Stand No. 1, Alpha Test Complex, 1956-1957. Looking west. View of May 2005.

Beta Test Complex

The Beta Test Complex is a large, fenced compound laid out west of the Alpha Test Complex. The irregularly-shaped complex includes a central blockhouse and the remains of two static test stands. Originally configured with 30 numbered structures and several unnumbered support units and pads, the Beta Test Complex exists as 22 buildings, structures, and structural remnants in 2005 (Figures 7-8). The character-defining components within the complex are its blockhouse and test stands. Underground instrumentation tunnels connect the blockhouse to the terminal control rooms beneath both test stands. NASA planned three test stands for the Beta Test Complex, but constructed only two. Both Test Stand No. 1 and Test Stand No. 3 are single-position structures. NASA planned the unbuilt facility, Test Stand No. 2, to be located between Test Stands No. 1 and No. 3, in a triangular configuration. Ancillary buildings and structures varied from the larger secondary support facilities such as the facilities shop, test stand shops, calibration tower, pumphouse, power substation, and warehouse, to the critical, but smaller equipment units and test observation shelters. Equipment, sometimes with permanent raised foundations, included a liquid nitrogen tank, liquid hydrogen tanks, liquid oxygen (LOX) tanks, and a central water tank. Also on the site was a guard post at the entrance to the complex. Four observation shelters are separately sited north and south of the two test stands. Two fan rooms, constructed below ground north of two of the observation shelters, are unusual features of undetermined historic purpose. Also at the Beta Test Complex were hydrogen burn ponds and LOX dump pits, located north of each test stand.

The Beta Test Complex featured the final group of large-scale test stands erected for the Douglas Missile Test Facility at Rancho Cordova. Ralph M. Parsons designed the facilities within the Beta Test Complex in 1963. NASA had initiated activities at the Douglas test facility in late 1961, using the Alpha Test Complex for its Battleship Test Program for the Saturn S-IV. NASA leased the test site from Douglas. The Beta Test Complex expanded NASA's test capabilities for the Saturn S-IVB booster. The S-IVB was a second- and third-stage booster used in the Saturn IB and the Saturn V. Test Stand No. 1 in the Beta Test Complex accommodated battleship tests of the S-IVB, while Test Stand No. 3 in the complex was the location for acceptance tests and checkout verification of the booster (NASA 1966). During the 1965-1968 years, Douglas conducted acceptance testing of Saturn S-IVB boosters for NASA. The company shipped S-IVB boosters from its plant in Santa Monica for check-out, firing, and post-firing checks at the missile test facility in Rancho Cordova. After completion of the acceptance testing, Douglas shipped the Saturn S-IV boosters by air to NASA's facilities at Cape Kennedy in Florida for "mating with the Saturn S-I booster for exploratory 'Man on the Moon' feasibility studies" (NASA 1965). All static testing ended in 1969, although Douglas maintained the test stands in the complex in a state of readiness into late 1972. After deactivation of the Beta Test Complex, Douglas dismantled the superstructure of the test stands later in the decade (ENSR Consulting and Engineering 1993).

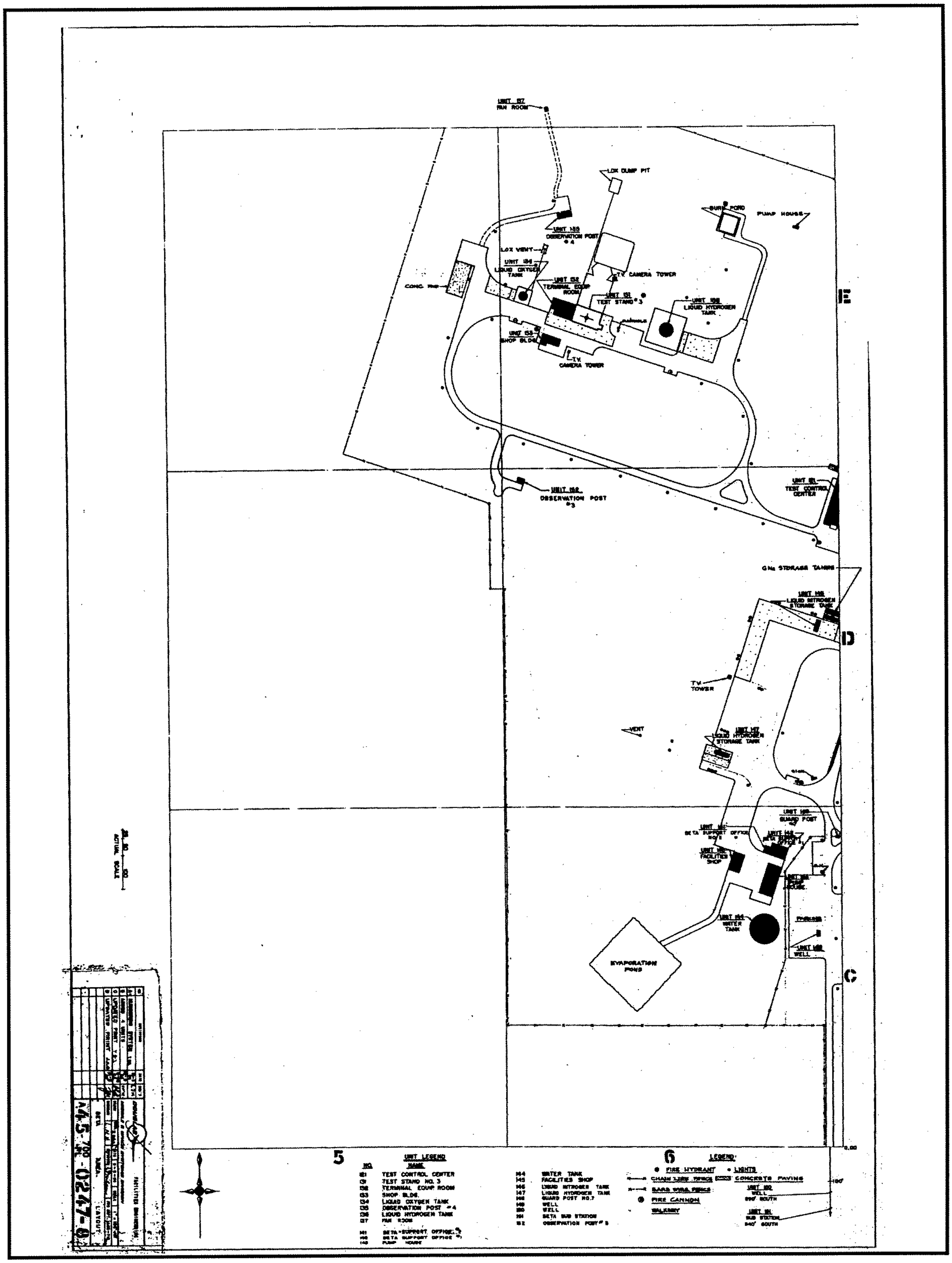

Figure 7: Douglas Facilities Engineering, Beta Test Complex (western half), Douglas Missile Test Facilities, 1964.

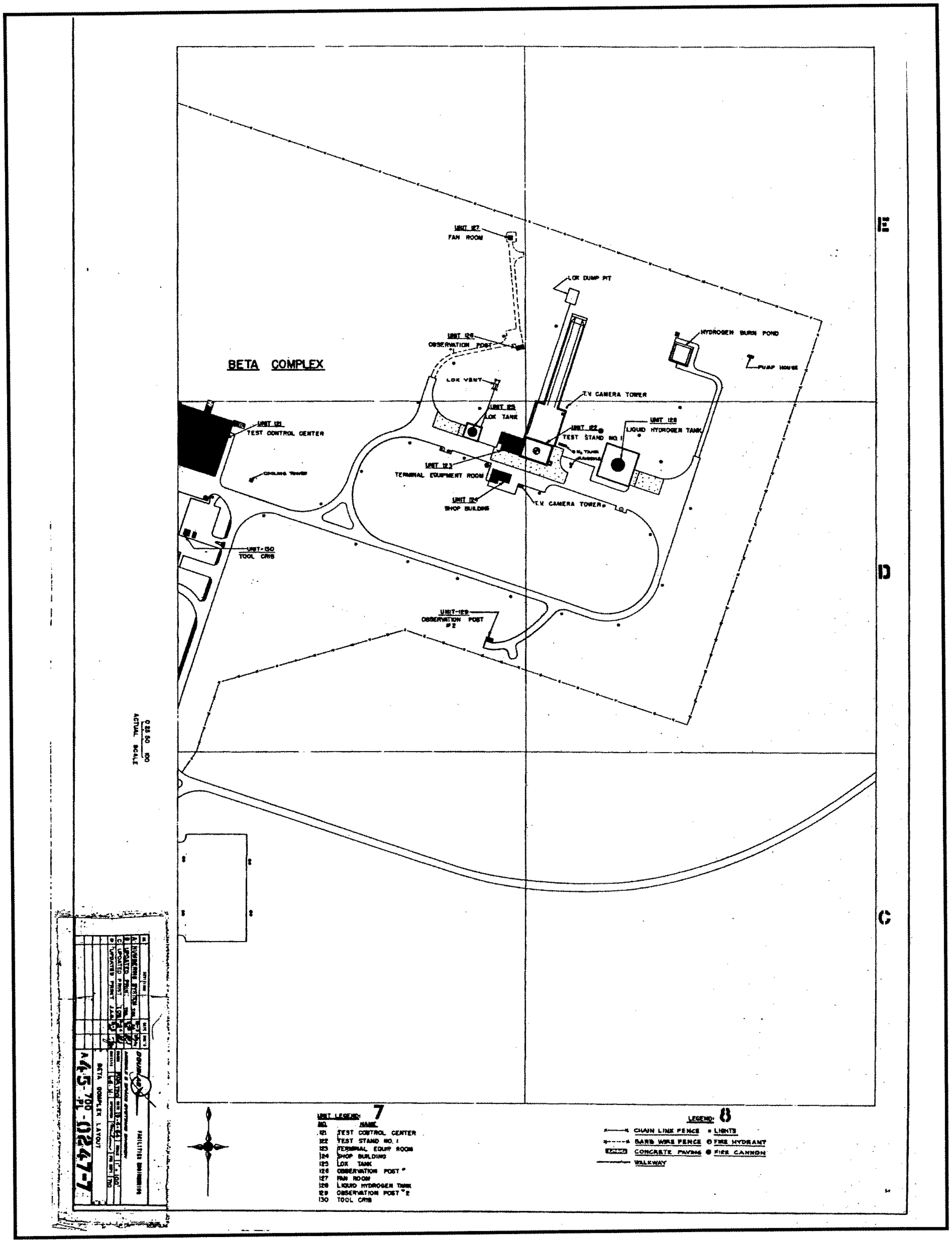

Figure 8: Douglas Facilities Engineering, Beta Test Complex (eastern half), Douglas Missile Test Facilities, 1964.

Ancillary structures interpreted as no longer standing within the Beta Test Complex include:

- a LOX tank (Unit 125) immediately west of Test Stand No. 1;
- an observation shelter (Unit 129) south of Test Stand No. 1;
- a tool crib (Unit 130) south of the test control center;
- a warehouse (Unit 138) west of Test Stand No. 3;
- a liquid nitrogen tank (Unit 146) south of the test control center;
- two wells (Units 149-150); and,
- a power substation (Unit 151) outside the security fencing, south of the complex.

The two wells (Units 149-150) and the substation (Unit 151) were placed outside the security fence of the Beta Test Complex, along the north-south road east of the southernmost area with the complex. These features were not field checked. Also not field checked were the unnumbered LOX dump pits and hydrogen burn ponds established for each test stand. A paired LOX dump pit and hydrogen burn pond existed north/northeast of Test Stand No. 3 and north/northwest of Test Stand No. 1.

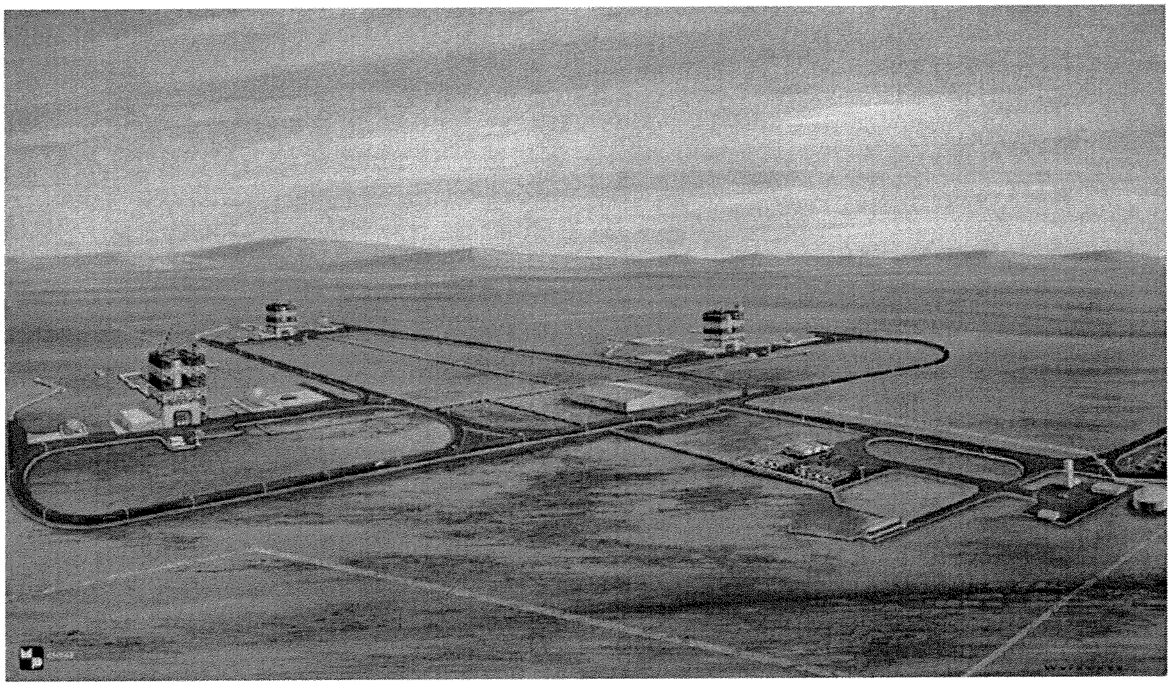

Plate 96: Beta Test Complex, as planned for three test stands, ca.1962-1963. Test control center (blockhouse), center. Test Stand No. 3, left. Test Stand No. 1, right. Facilities shop, calibration tower, pump house, and water tank, right foreground. Courtesy of NASA.

Observation Shelter No. 3

Also known as Unit 152, Observation Shelter No. 3 is one of two personnel stations erected for viewing captive firings at Test Stand No. 3 in the Beta Test Complex. Observation Shelter No. 3 is located south of the test stand at the end of a short access road. The shelter is a small, flat-roofed, reinforced concrete structure. The shelter features a bank of three viewing windows, each with thick, inset glass panes. A steel blast door on the rear façade provides entry to the shelter. The fenestration is typical of that found in blockhouses and observation posts at missile test facilities and launch sites. Constructed in 1963-1964, Observation Shelter No. 3 is unaltered today.

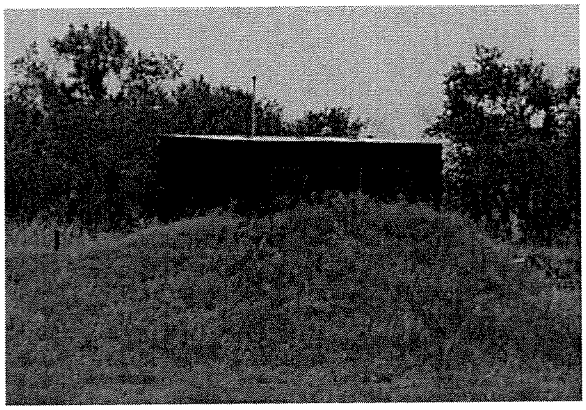

Plate 97: Observation Shelter No. 3 (Unit 152), Beta Test Complex, 1963-1964. Looking southwest. View of May 2005.

LOX Tank for Test Stand No. 3

Also known as Unit 134, the LOX tank for Test Stand No. 3 is located to the near west of the test stand. Constructed in 1963-1964, the tank is a large spherical chamber on raised footings. Today, the tank cap lies on the ground adjacent.

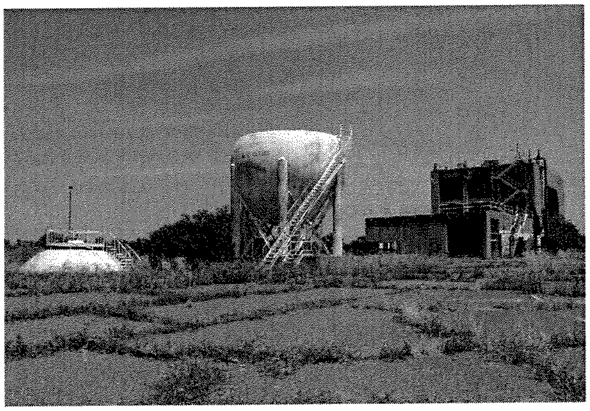

Plate 98: LOX Tank (Unit 134), Beta Test Complex, 1963-1964. Looking east/northeast. View of May 2005.

Fan Room for Test Stand No. 3

Also known as Unit 137, the fan room for Test Stand No. 3 is a small, underground structure accessed through a heavy steel, circular hatch cover. The hatch cover is imprinted with the words "42 TUBE TURN" and "WCB." The number "279," or "27" with a degree mark, is also included on the hatch. The historic origins of the hatch cover, likely a recycled item, are unknown. The historic usage of the fan room at the Beta Test Complex remains undetermined.

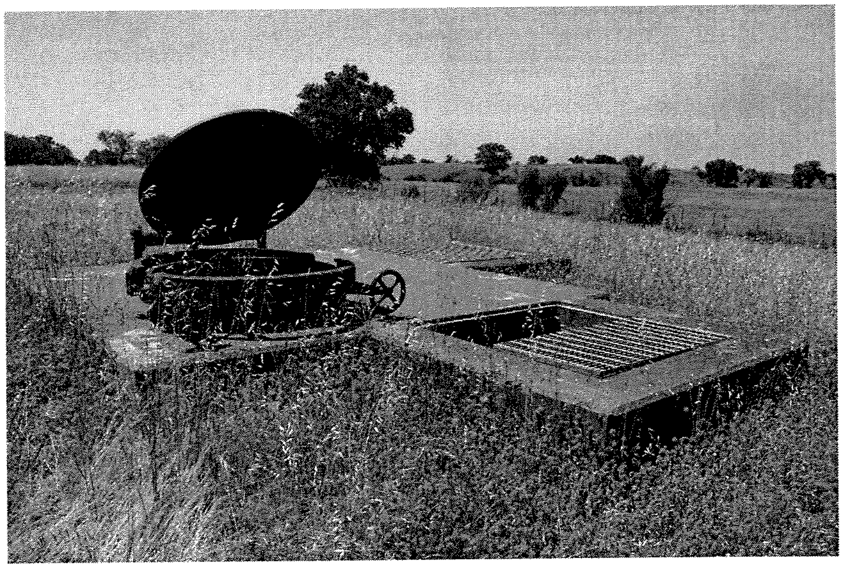

Plate 99: Fan Room for Test Stand No. 3 (Unit 137), Beta Test Complex, 1963-1964. Looking northwest. View of May 2005.

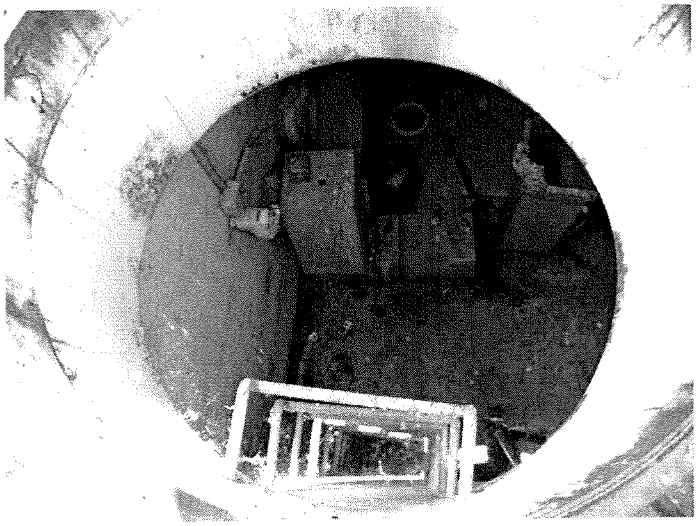

Plate 100: Fan Room for Test Stand No. 3 (Unit 137), Beta Test Complex, 1963-1964. Looking into the structure, with the access hatch up. View of May 2005.

Observation Shelter No. 4

Also known as Unit 135, Observation Shelter No. 3 is one of two personnel stations erected for viewing captive firings at Test Stand No. 3 in the Beta Test Complex. Observation Shelter No. 4 is located north of the test stand at the bend in the access road to the fan room for Test Stand No. 3. The shelter is a small, flat-roofed, reinforced concrete structure. Observation Shelter No. 4 features a bank of three viewing windows, each with thick, inset glass panes. A steel blast door on the rear façade provides entry to the shelter. The fenestration is typical of that found in blockhouses and observation posts at missile test facilities and launch sites. Constructed in 1963-1964, Observation Shelter No. 4 is unaltered today.

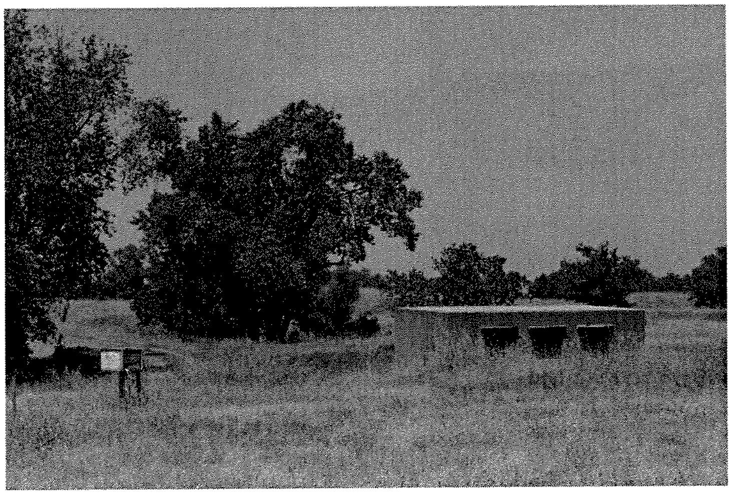

Plate 101: Observation Shelter No. 4 (Unit 135), Beta Test Complex, 1963-1964. Looking northeast. View of May 2005.

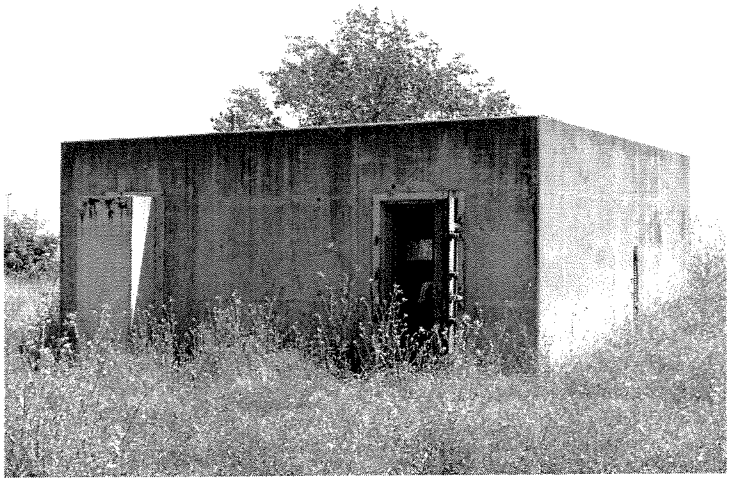

Plate 102: Observation Shelter No. 4 (Unit 135), Beta Test Complex, 1963-1964. Looking southeast. View of May 2005.

Terminal Equipment Room for Test Stand No. 3

Also known as Unit 132, the terminal equipment room for Test Stand No. 3 is a one-story, reinforced concrete structure that abuts the western face of the base of Test Stand No. 3. The instrumentation tunnel from Test Stand No. 3 to the Beta Test Complex test control center (blockhouse) exits from the lower level of the terminal equipment room. (Douglas numbered the terminal equipment room and the superstructure of the test stand as separate units in the Beta Test Complex, differing from the company's numbering the two units as a single structure in the Alpha Test Complex. In the Alpha Test Complex, the terminal equipment rooms function as the base of the test stands, rather than as adjunct units.)

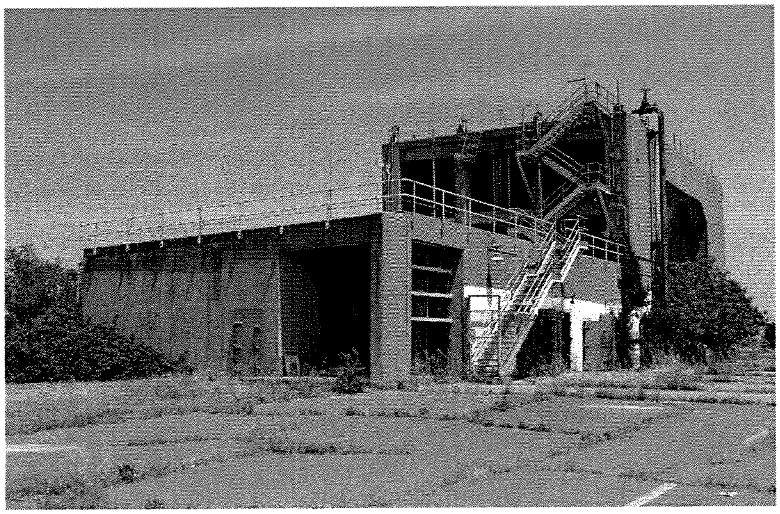

Plate 103: Terminal Equipment Room Test Stand No. 3 (Unit 132), Beta Test Complex, 1963-1964. Looking northeast. View of May 2005.

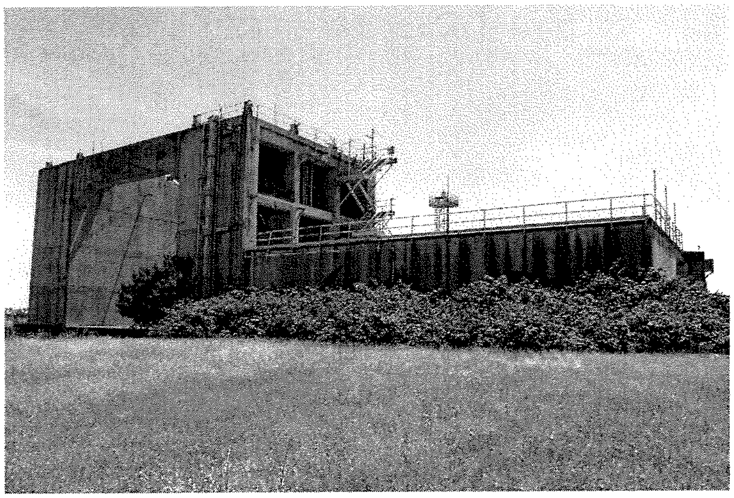

Plate 104: Terminal Equipment Room Test Stand No. 3 (Unit 132), Beta Test Complex, 1963-1964. Looking southeast. View of May 2005.

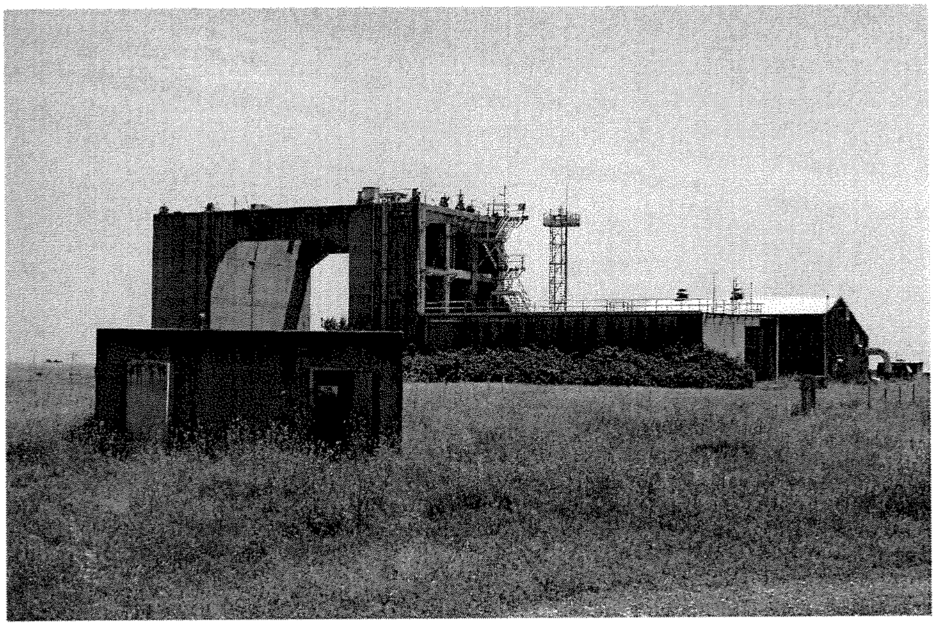

Plate 105: Terminal Equipment Room Test Stand No. 3 (Unit 132), Beta Test Complex, 1963-1964, middleground right. Base of Test Stand No. 3, middleground left. Observation Shelter No. 4, foreground left. Shop, background right. Looking southeast. View of May 2005.

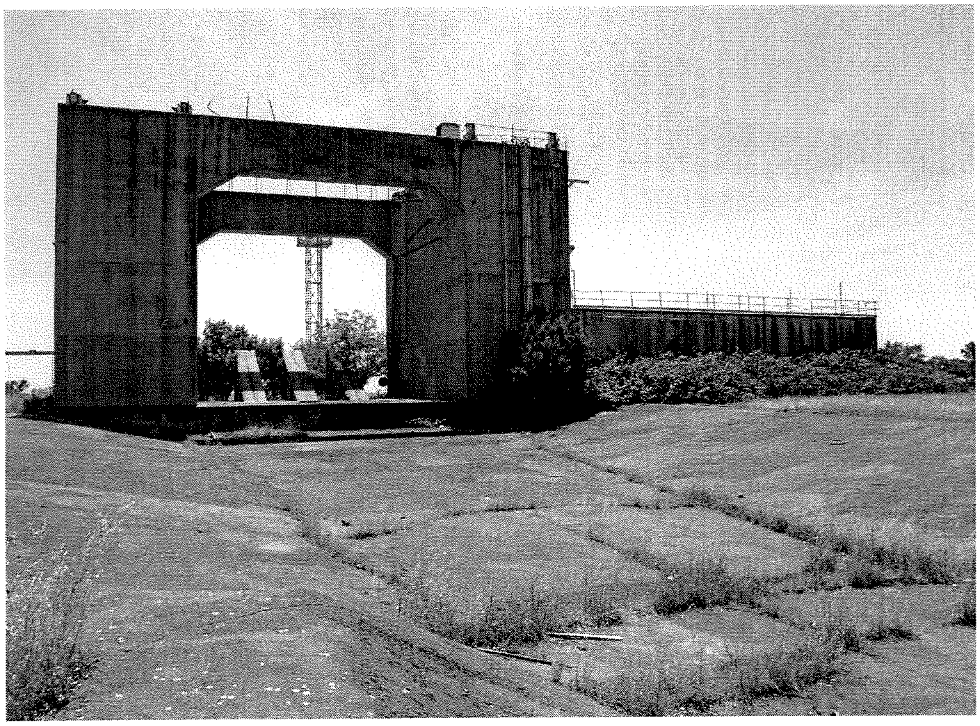

Plate 106: Terminal Equipment Room Test Stand No. 3 (Unit 132), Beta Test Complex, 1963-1964. Base of Test Stand No. 3, left, and flame deflector catchment basin, foreground. Looking southwest. View of May 2005.

Test Stand No. 3

Also known as Unit 131, Test Stand No. 3 featured a steel-beam tower atop a reinforced concrete base. Test Stand No. 3 included one captive-firing position and a north-facing flame deflector. The ground-level terminal room (Unit 132) for the facility abuts Test Stand No. 3 to the west. Test Stand No. 3 is 1,000 feet from the blockhouse for the Beta Test Complex. An underground instrumentation tunnel connects Test Stand No. 3, from its adjacent terminal control room, to the blockhouse, in a layout identical to the tunnelworks for Test Stand No. 1. The steel superstructure of Test Stand No. 3 accommodated a test item 60 feet long and 22 feet in diameter. NASA operated Test Stand No. 3 p to run acceptance and checkout tests for the Saturn S-IVB booster during 1965-1969. Test Stand No. 3 could withstand up to a 1,000,000-pound thrust during captive firings. A deluge system flooded the flame deflector (bucket) in a standard configuration for static tests. Test Stand No. 3 also included a 15-ton crane used to position test items in the captive-firing position (Douglas 1966).

Ralph M. Parsons designed Test Stand No. 3 during 1963 as a major component of its overall engineering for the Beta Test Complex. Today, only the reinforced concrete base of the test stand remains at the site. Douglas removed the steel superstructure of the tower and of the flame deflector in 1977. The reinforced concrete catchment basin at the base of the flame deflector is present, partially overgrown in weeds. Miscellaneous camera and light stands sit at the periphery of the test stand.

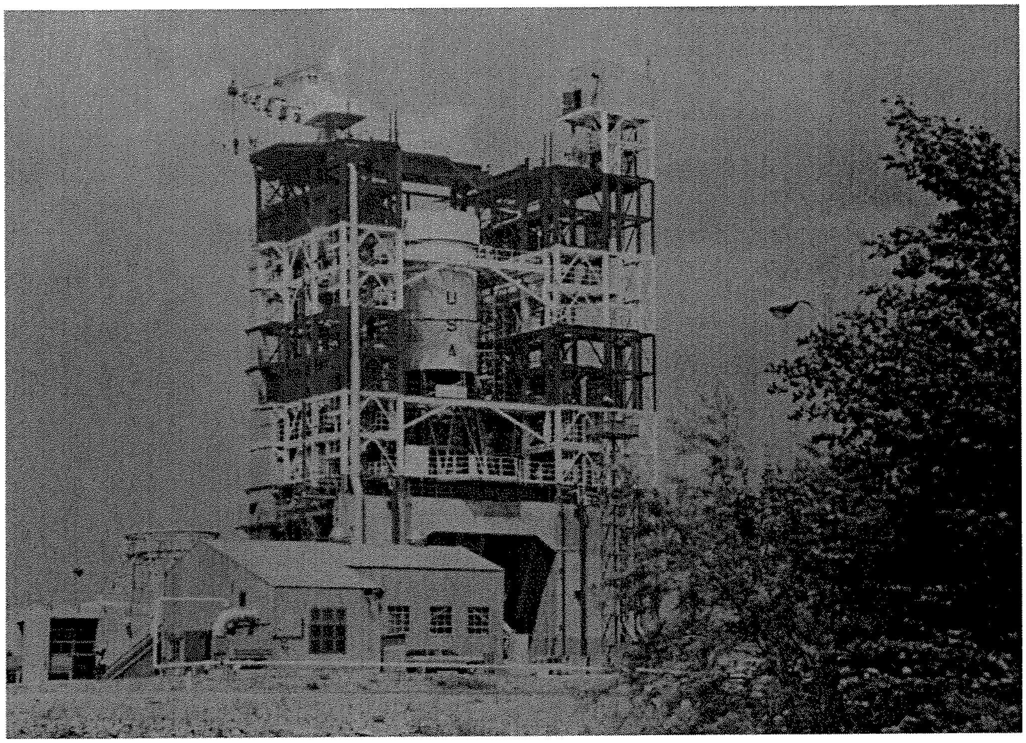

Plate 107: Test Stand No. 3 (Unit 131), Beta Test Complex, 1963-1964. With S-IVB booster undergoing checkout, ca.1966. Looking northeast. Courtesy of NASA.

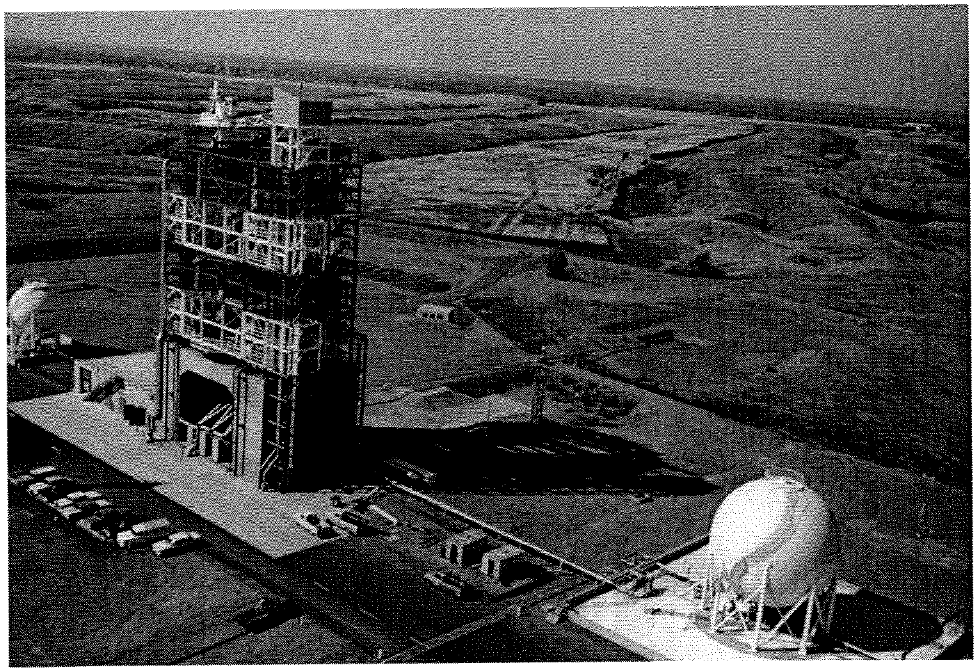

Plate 108: Test Stand No. 3 (Unit 131), Beta Test Complex, 1963-1964. Left to right: LOX tank, terminal room, test stand, north observation shelter, LOX dump pit, and liquid hydrogen tank. Looking northwest. Undated view. Courtesy of NASA.

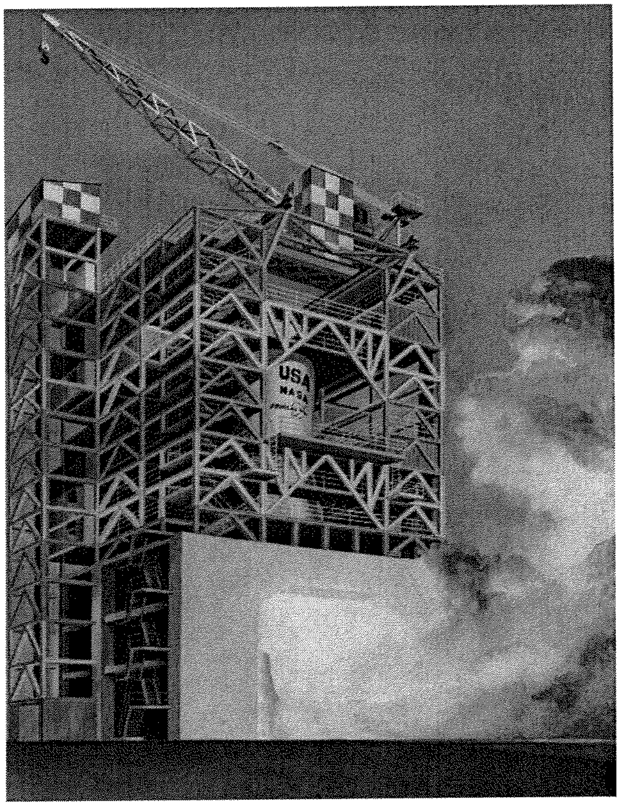

Plate 109: Beta Test Complex, drawing of planned test stand, ca.1962-1963. NASA.

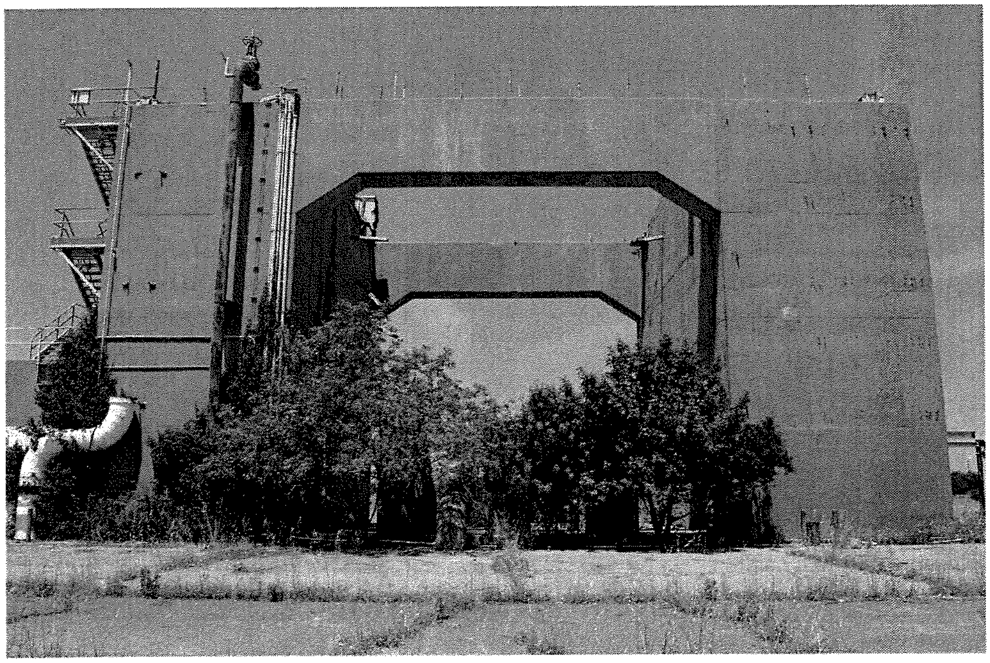

Plate 110: Test Stand No. 3 (Unit 131), Beta Test Complex, 1963-1964. Looking northeast. View of May 2005.

Plate 111: Flame deflector catchment basin at Test Stand No. 3 (Unit 131), Beta Test Complex, 1963-1964. TV camera stand, upper right. Looking northeast. View of May 2005.

Shop Building for Test Stand No. 3

Also known as Unit 133, the shop building for Test Stand No. 3 is a one-story, steel-frame structure erected in the Beta Test Complex in 1964. The shop building features steel I-beam construction with a light truss roof frame. Sheathed in corrugated siding, the shop building also includes a center-opening, track-mounted door on the east façade and a steel blast door on the west facade, with a simple entry on the north. Fenestration is 6/3 factory windows on the east façade and 3/6/3 factory windows on the north and south facades. The shop building has a combination gable roof, with a shed extension in the southwest corner. The interior of the structure is open, with rooms and an upper work space configured at its west end.

Plate 112: Shop for Test Stand No. 3 (Unit 133), Beta Test Complex, 1963-1964. TV camera stand, background left. Looking southeast. View of May 2005.

Plate 113: Shop for Test Stand No. 3 (Unit 133), Beta Test Complex, 1963-1964. Interior. Looking west. View of May 2005.

Liquid Hydrogen Tank for Test Stand No. 3

Also known as Unit 136, the liquid hydrogen tank for Test Stand No. 3 was a large, spherical structure on raised footings, as built. In 2005, only sections of the tank footings, the site's concrete perimeter wall, and access stairs remain.

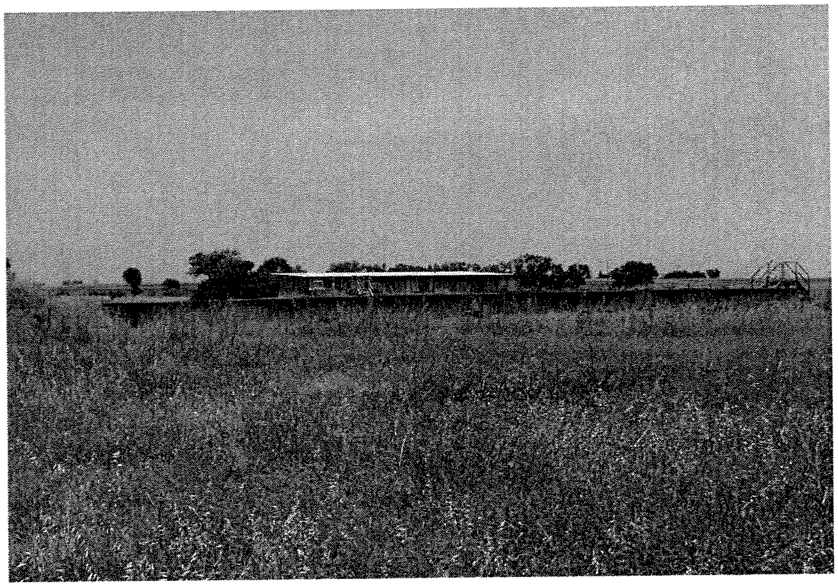

Plate 114: Liquid Hydrogen Tank at Test Stand No. 3 (Unit 136), foundation remnants, Beta Test Complex, 1963-1964. Test control center in background. Looking southeast. View of May 2005.

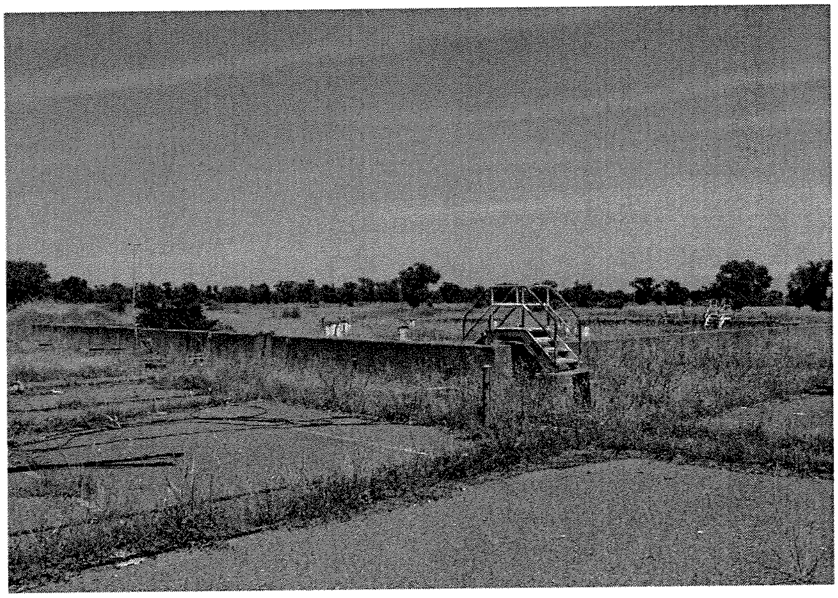

Plate 115: Liquid Hydrogen Tank at Test Stand No. 3 (Unit 136), foundation remnants, Beta Test Complex, 1963-1964. Looking northeast. View of May 2005.

Test Control Center

Also known as Unit 121, the test control center (blockhouse) for the Beta Test Complex is a one-story, windowless reinforced concrete structure. The test control center is flat-roofed, and features entrances on the building's east, west, and south facades. Center-opening, double sets of steel blast doors distinguish all entrances. Single inset view ports, additionally shielded by concrete overhangs on the building's exterior, sparsely articulate the east, west, and south facades. The interior of the test control center is configured with a large control room in the northern part of the building, overlooked by an observation room. The instrumentation tunnels from the terminal buildings at Test Stand No. 1 and Test Stand No. 3 enter the test control center through two extensions at the northeast and northwest corners of the blockhouse. Smaller work areas define the layout in the southern part of the building. The test control center sits between Test Stands No. 1 and No. 3 in the Beta Test Complex. As planned, a third captive-firing test stand (Test Stand No. 2) was to be constructed north of the test control center. Test Stand No. 2 was never built. Although derelict today, the test control center is unaltered.

Ralph M. Parsons designed the test control center during 1963 as a major component of its overall engineering for the Beta Test Complex.

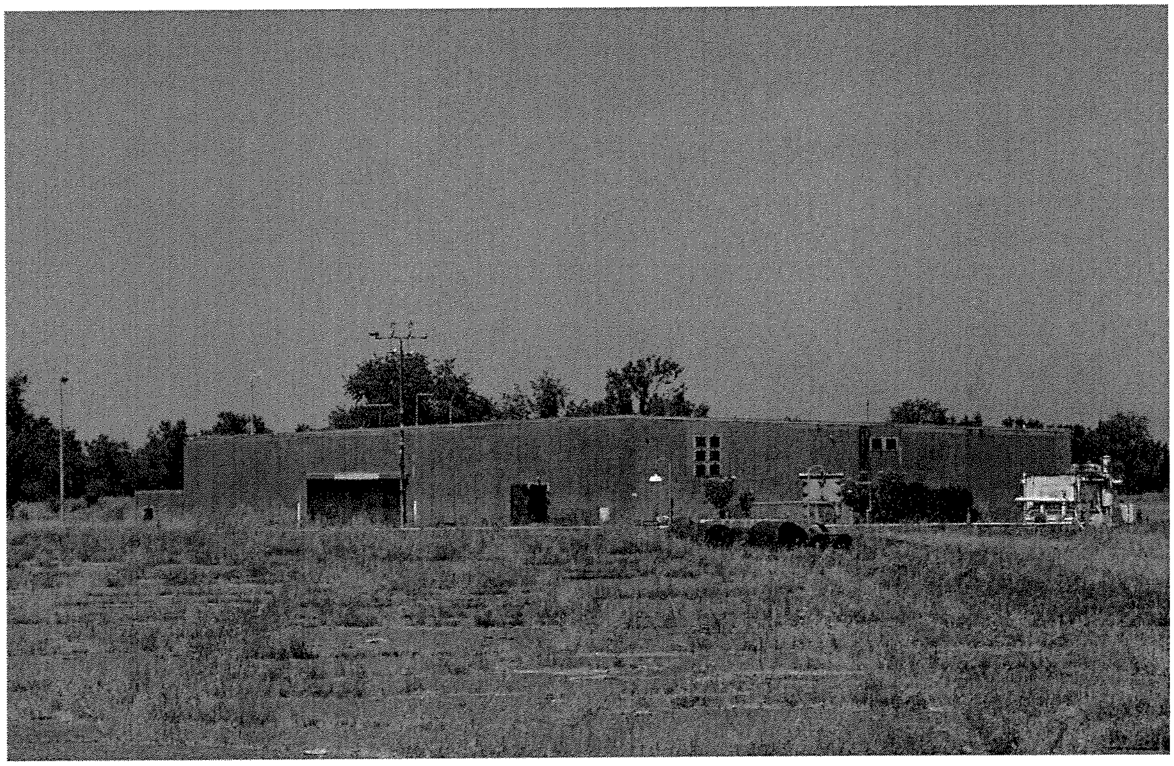

Plate 116: Test Control Center (Unit 121), Beta Test Complex, 1963-1964. Looking northeast. View of May 2005.

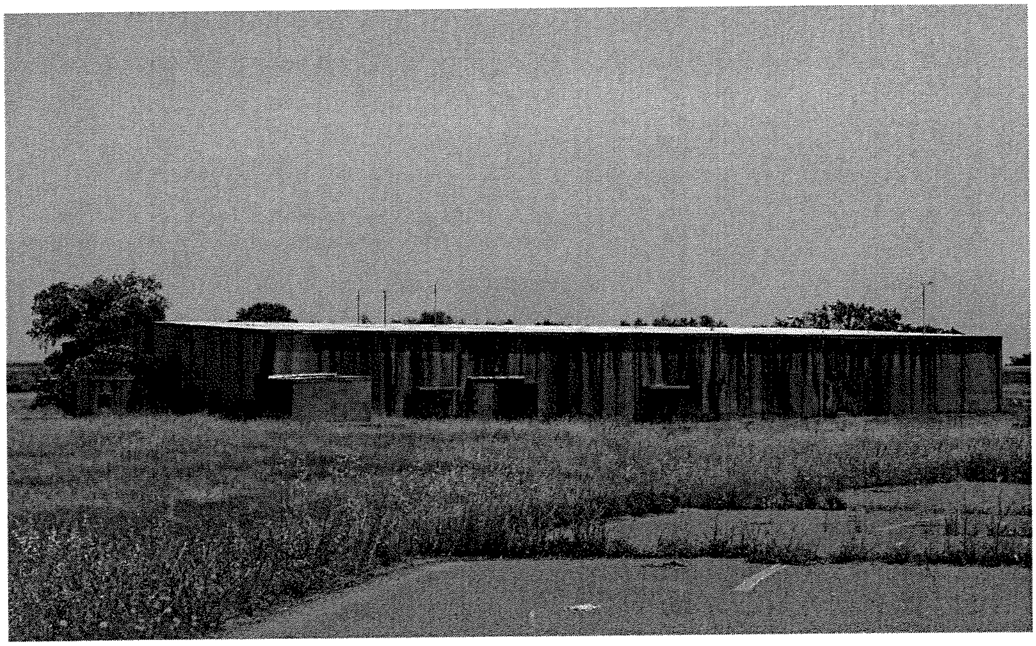

Plate 117: Test Control Center (Unit 121), Beta Test Complex, 1963-1964. Entrance to the instrumentation tunnel to Test Stand No. 3, projecting from northwest corner. Looking southeast. View of May 2005.

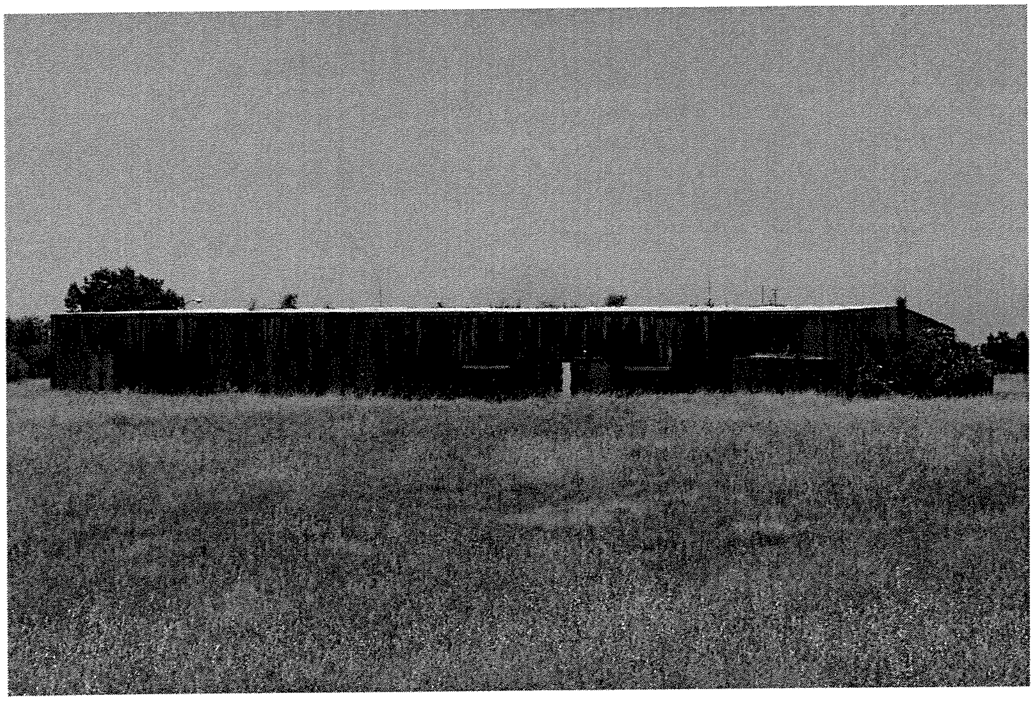

Plate 118: Test Control Center (Unit 121), Beta Test Complex, 1963-1964. Entrance to the instrumentation tunnel to Test Stand No. 1, projecting from northeast corner. Looking southwest. View of May 2005.

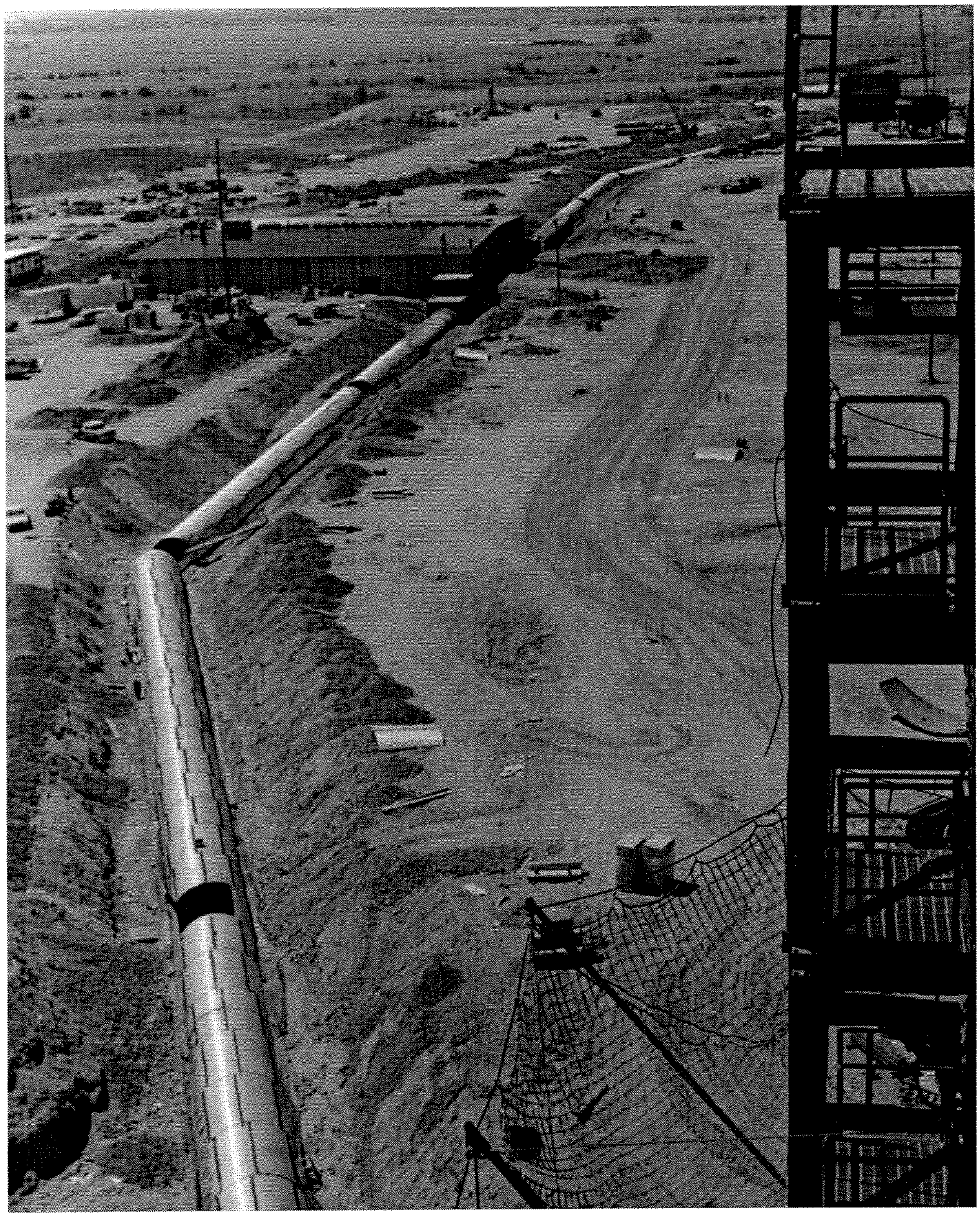

Plate 119: Test Control Center (Unit 121) and construction of the instrumentation tunnels to Test Stand No. 1 and Test Stand No. 3, Beta Test Complex, ca.1964. With Test Stand No. 1 in the foreground (right). Looking west. Courtesy of NASA.

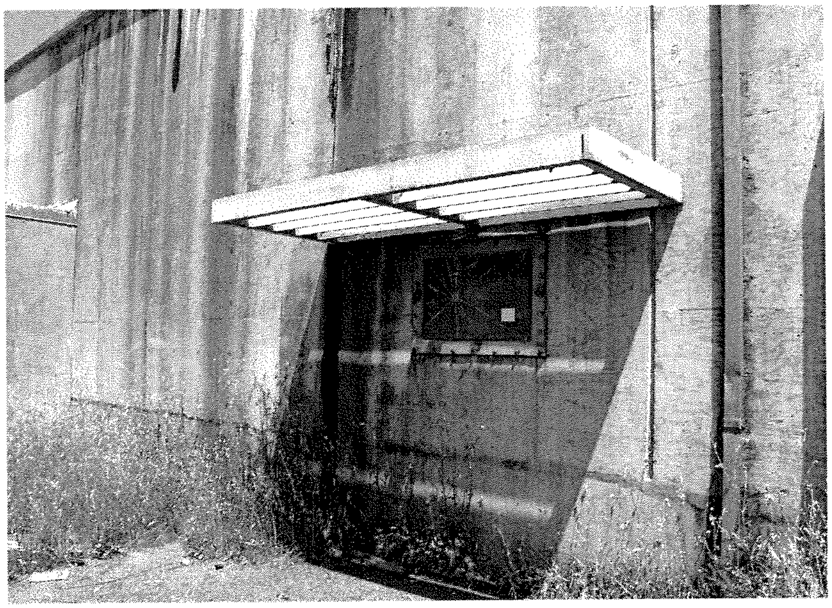

Plate 120: Test Control Center (Unit 121), Beta Test Complex, 1963-1964. Viewing port on west façade near northwest corner. Looking northeast. View of May 2005.

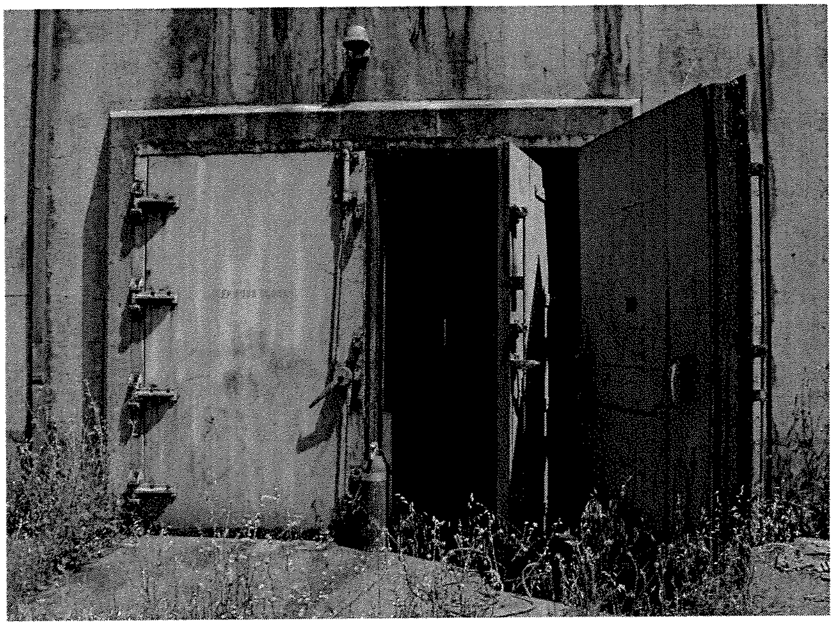

Plate 121: Test Control Center (Unit 121), Beta Test Complex, 1963-1964. Set of double blast doors on the west facade. Looking east. View of May 2005.

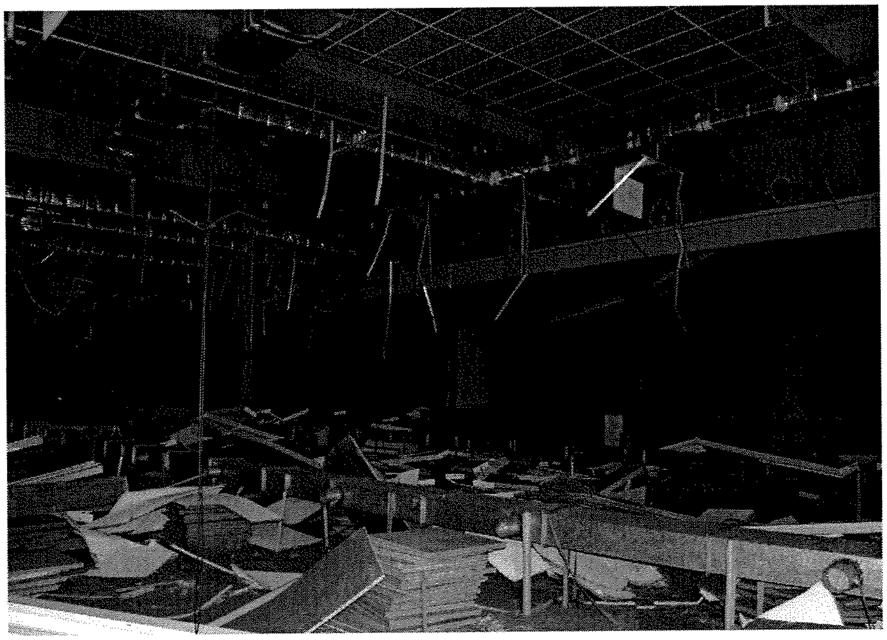

Plate 122: Test Control Center (Unit 121), Beta Test Complex, 1963-1964. Interior of main control room. Looking southeast. View of May 2005.

Plate 123: Test Control Center (Unit 121), Beta Test Complex, 1963-1964. Interior of main control room. Looking east/southeast. View of May 2005.

Liquid Hydrogen Tank

Also known as Unit 147, the liquid hydrogen tank northwest of the pump house was cylindrical and sat on concrete pedestal footings, as built. In 2005, only sections of the pedestal footings, vent pipes, the site's concrete perimeter wall, and access stairs remain.

Plate 124: Liquid Hydrogen Tank at Test Stand No. 3 (Unit 147), Beta Test Complex, 1963-1964. Looking northwest. View of May 2005.

Facilities Shop

Also known as Unit 145, the facilities shop for the Beta Test Complex is a one-story, prefabricated metal structure erected in 1964. The facilities shop is rigid-frame construction, sheathed in double-seam corrugated siding. The building features a center-opening, track-mounted door on the north facade and a gable roof. Factory windows, 3/6/3 and 6/3 in type, articulate the east and west facades of the building. The interior of the facilities shop is open. The shop is unaltered.

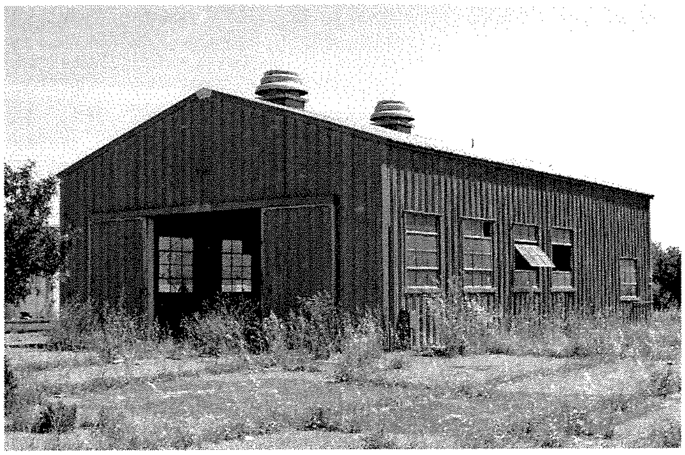

Plate 125: Facilities Shop (Unit 145), Beta Test Complex, 1963-1964. Looking southeast. View of May 2005.

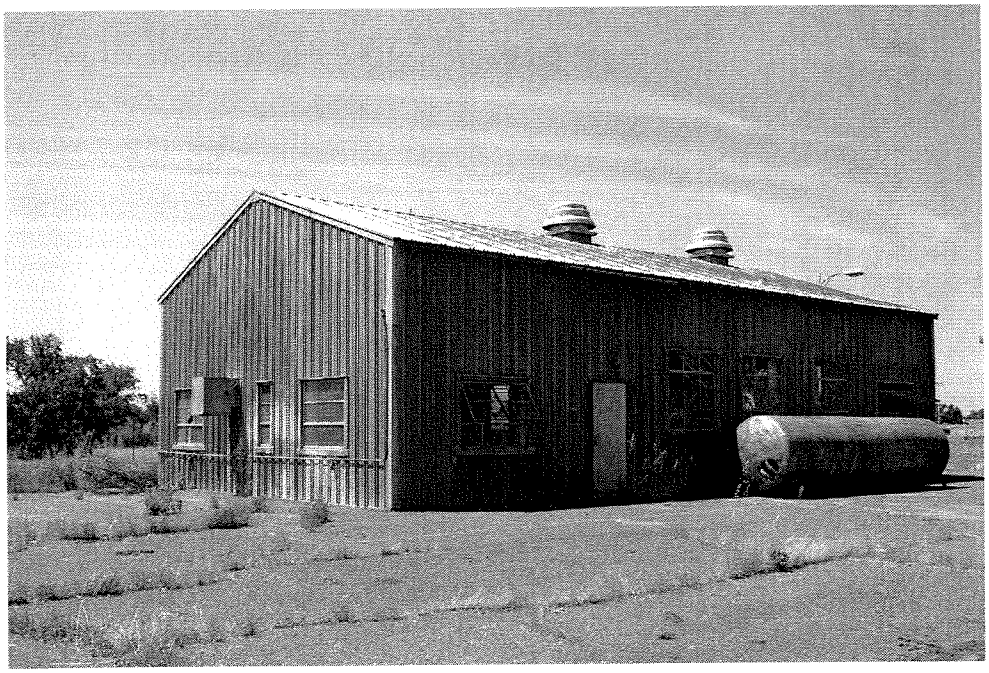

Plate 126: Facilities Shop (Unit 145), Beta Test Complex, 1963-1964. Looking northwest. View of May 2005.

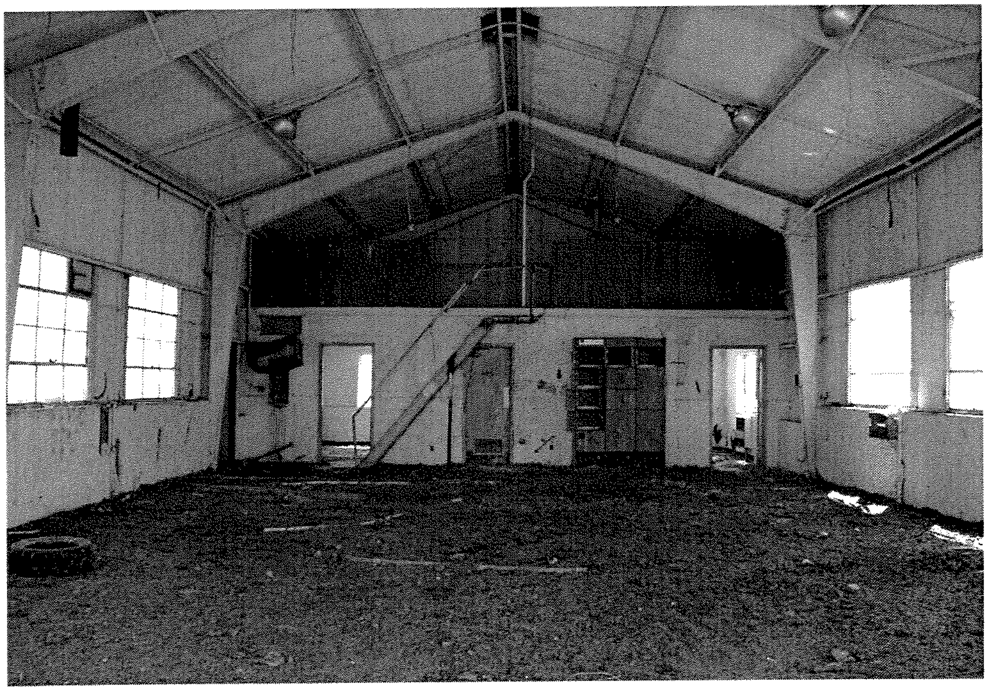

Plate 127: Facilities Shop (Unit 145), Beta Test Complex, 1963-1964. Looking southwest. View of May 2005.

Beta Support Offices No. 1 and No. 2

Also known as Units 142 and 141, Beta Support Offices No. 1 and No. 2 are abutting steel-frame structures sheathed in corrugated metal siding. Beta Support Office No. 1, the easternmost building of the pair, is a one-story structure featuring a flat roof. The interior of Beta Support Office No. 1 is open to the elements today, in use as a cattle shelter. Beta Support Office No. 2 first functioned as a calibration tower for the test complex. The lower two stories of Beta Support Office No. 2 are sheathed in siding, while the upper two stories are open steel I-beam framework. Beta Support Offices No. 1 and No. 2 are located immediately north of the Beta Test Complex pump facilities.

Ralph M. Parsons included Beta Support Offices No. 1 and No. 2 as components of its overall engineering design for the Beta Test Complex of 1963-1964.

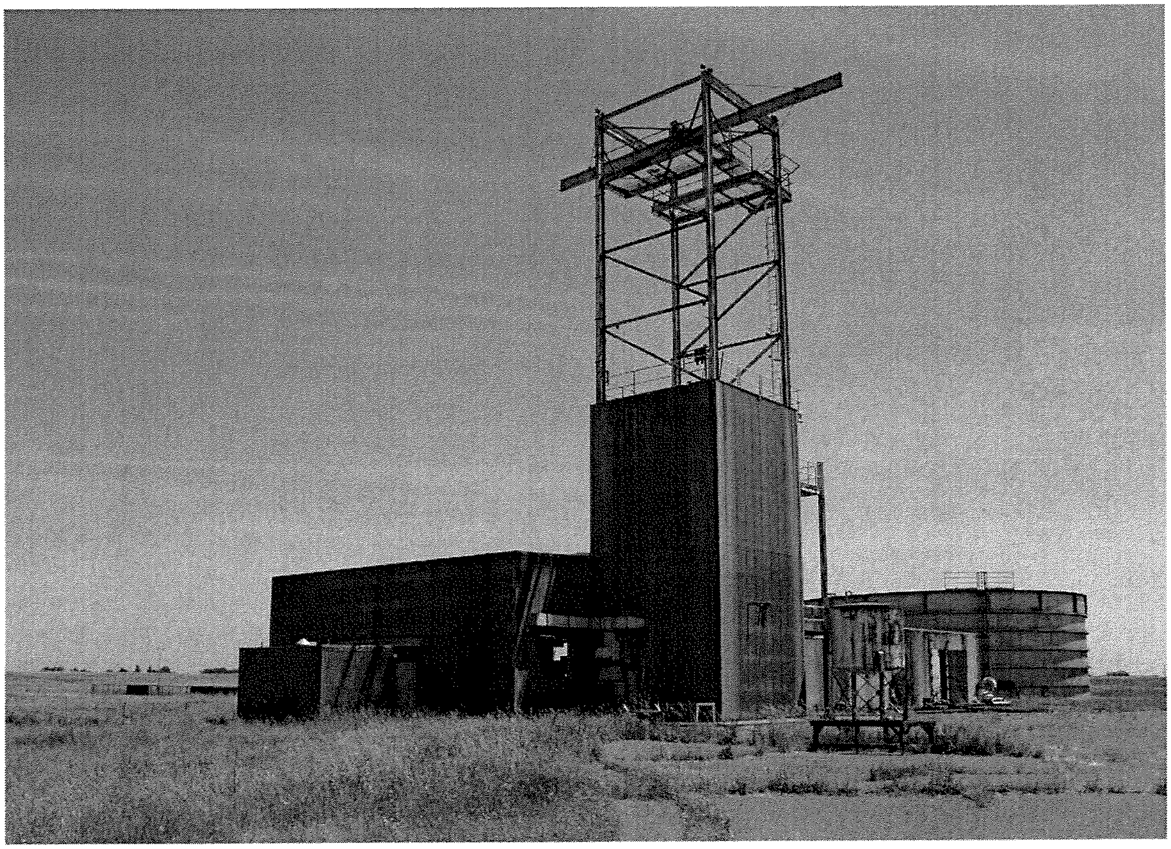

Plate 128: Beta Support Offices No. 1 (left) and No. 2 (right) (Units 142 and 141), Beta Test Complex, 1963-1964. Pump house and water tank, right. Looking southeast. View of May 2005.

Plate 129: Beta Support Office No. 1 (Unit 142), Beta Test Complex, 1963-1964. Interior. Looking northeast. View of May 2005.

Plate 130: Beta Support Office No. 2 (Unit 141), Beta Test Complex, 1963-1964. Interior. Looking northeast. View of May 2005.

Pump House

Also known as Unit 143, the pump house for the Beta Test Complex is a one-story, reinforced concrete structure erected in 1964. The building features fixed ventilation panels on its north and south facades, and is windowless. A single entrance articulates the west façade. The interior of the pump house is a single room, and is in derelict condition today.

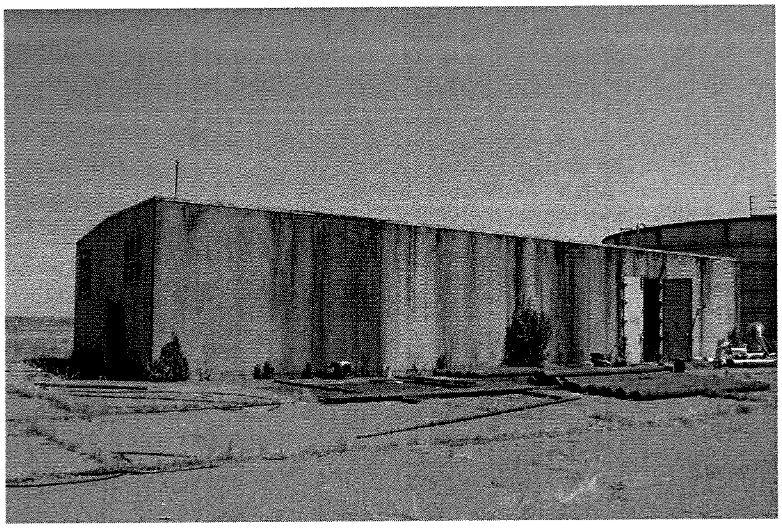

Plate 131: Pump House (Unit 143), Beta Test Complex, 1963-1964. Looking southeast. View of May 2005.

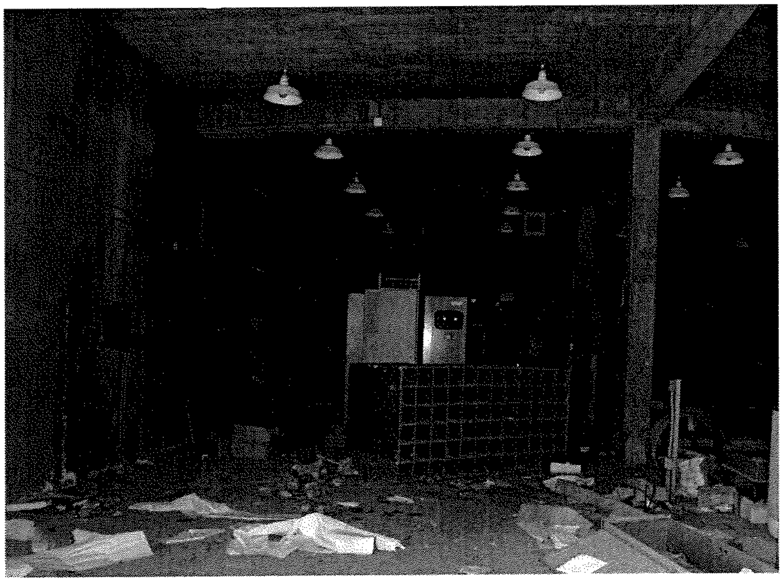

Plate 132: Pump House (Unit 143), Beta Test Complex, 1963-1964. Interior with debris. Looking north. View of May 2005.

Water Tank

Also known as Unit 144, the water storage tank for the Beta Test Complex is located at the southeastern corner of the pump house. The tank is a large steel structure fabricated in 1964. The water tank and pump house worked as a unit to provide the deluge system for the Beta Test Complex. Large amounts of water were required for captive missile and missile-engine firings on Test Stands No. 1 and No. 3.

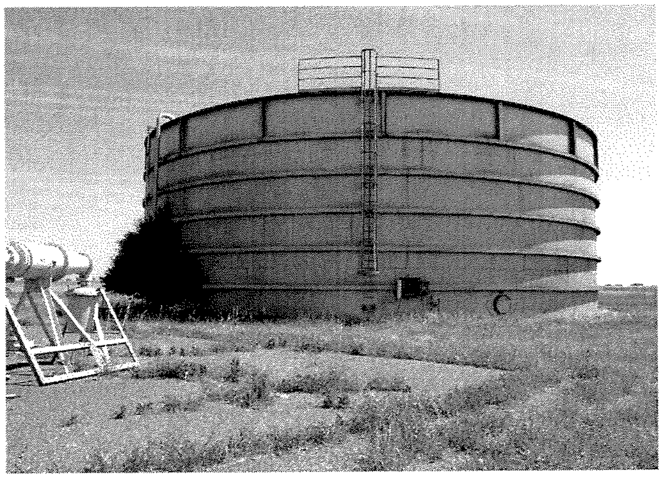

Plate 133: Water Tank (Unit 144), Beta Test Complex, 1963-1964. Looking southeast. View of May 2005.

Guard Post No. 7

Also known as Unit 148, Guard Post No. 7 is the surviving security gate on the Douglas Missile Test Facility. The post is a small one-story, wood-frame structure, banded on all facades with plate-glass windows. Erected in 1963-1964, Guard Post No. 7 is unaltered.

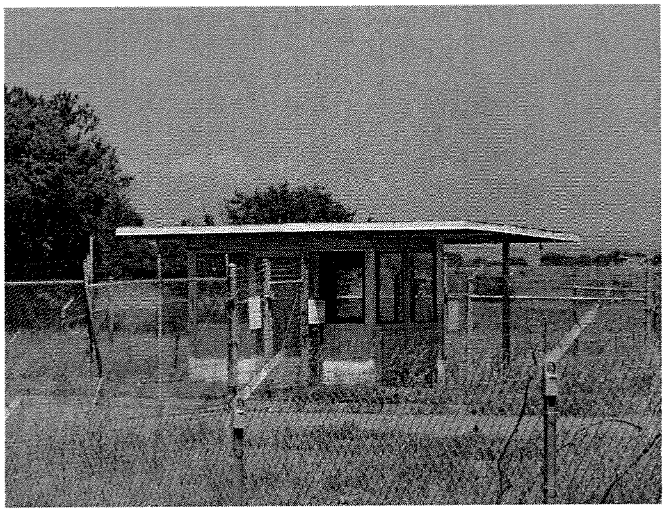

Plate 134: Guard Post No. 7 (Unit 148), Beta Test Complex, 1963-1964. Looking northeast. View of May 2005.

Fan Room for Test Stand No. 1

Also known as Unit 127, the fan room for Test Stand No. 1 is a small, underground structure accessed through a heavy steel, circular hatch cover. The hatch cover is imprinted with the words "42 TUBE TURN" and "WCB." The number "279," or "27" with a degree mark, is also included on the hatch. The historic origins of the hatch cover, likely a recycled item, are unknown. The historic usage of the fan room at the Beta Test Complex remains undetermined.

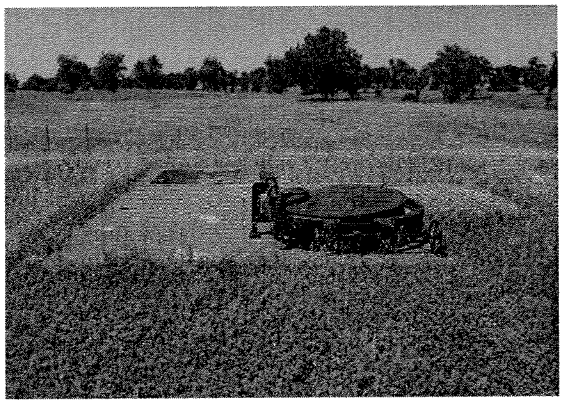

Plate 135: Fan Room for Test Stand No. 1 (Unit 127), Beta Test Complex, 1963-1964. Looking north. View of May 2005.

Observation Shelter No. 1

Also known as Unit 126, Observation Shelter No. 1 is the remaining viewing station at Test Stand No. 1 in the Beta Test Complex. Observation Shelter No. 1 is located north of the test stand, at the bend in the access road to the fan room. The shelter is a small, flat-roofed, reinforced concrete structure, and features a bank of three viewing windows, each with thick, inset glass panes. A steel blast door on the rear façade provides entry to the shelter. Constructed in 1963-1964, Observation Shelter No. 1 is unaltered today.

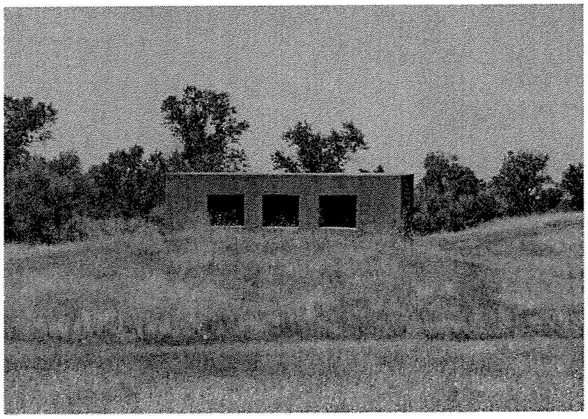

Plate 136: Observation Shelter No. 1 (Unit 126), Beta Test Complex, 1963-1964. Looking southwest. View of May 2005.

Terminal Equipment Room for Test Stand No. 1

Also known as Unit 123 and constructed in 1964, the terminal equipment room for Test Stand No. 1 is a one-story, reinforced concrete structure that abuts the western face of the base of Test Stand No. 1. The instrumentation tunnel from Test Stand No. 1 to the Beta Test Complex test control center (blockhouse) exits from the lower level of the terminal equipment room.

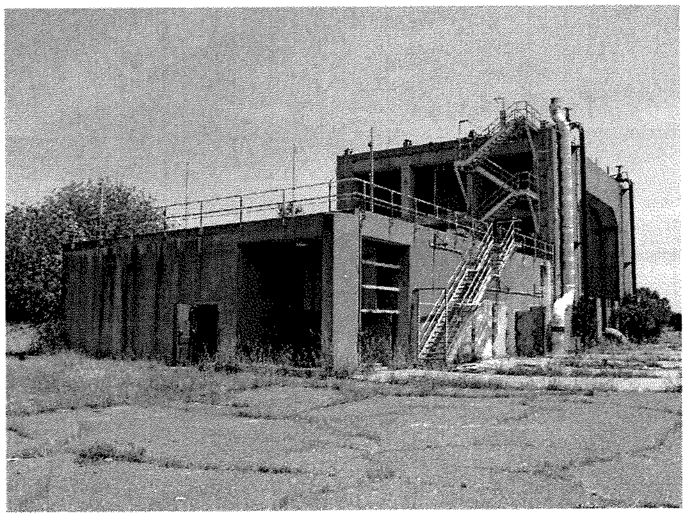

Plate 137: Terminal Equipment Room Test Stand No. 1 (Unit 123), Beta Test Complex, 1963-1964. Looking northeast. View of May 2005.

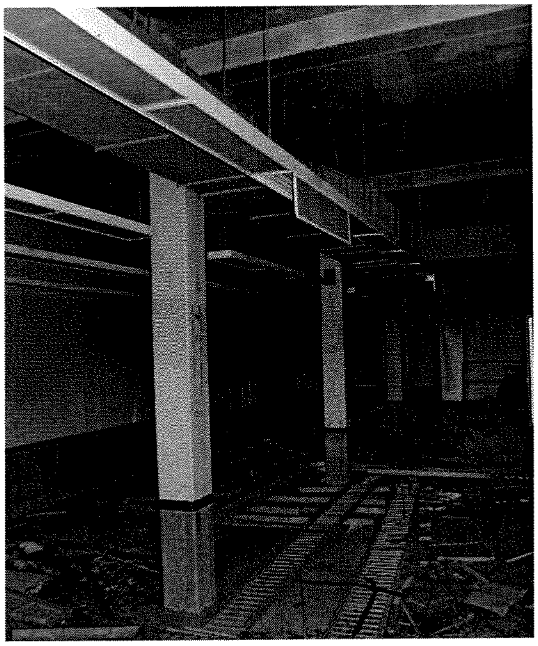

Plate 138: Terminal Equipment Room Test Stand No. 1 (Unit 123), Beta Test Complex, 1963-1964. Interior. Looking east. View of May 2005.

Test Stand No. 1

Also known as Unit 122, Test Stand No. 1 featured a steel-beam tower atop a reinforced concrete base. Test Stand No. 1 included one captive-firing position and a north-facing flame deflector. The ground-level terminal room (Unit 123) for the facility abuts Test Stand No. 1 to the west. Test Stand No. 1 is 1,000 feet from the blockhouse for the Beta Test Complex. An underground instrumentation tunnel connects Test Stand No. 1, from its adjacent terminal control room, to the blockhouse, in a layout identical to the tunnelworks for Test Stand No. 3. The steel superstructure of Test Stand No. 1 accommodated a test item 60 feet long and 22 feet in diameter. NASA operated Test Stand No. 1 p to run battleship tests for the Saturn S-IVB booster during 1965-1969. Test Stand No. 1 could withstand up to a 1,000,000-pound thrust during captive firings. A deluge system flooded the flame deflector (bucket) in a standard configuration for static tests. Test Stand No. 1 also included a 15-ton crane used to position test items in the captive-firing position (Douglas 1966).

Ralph M. Parsons designed Test Stand No. 1 during 1963 as a major component of its overall engineering for the Beta Test Complex. Today, only the reinforced concrete base of the test stand remains at the site. Douglas removed the steel superstructure of the tower and of the flame deflector in 1977. The reinforced concrete catchment basin at the base of the flame deflector is present, partially overgrown in weeds. Miscellaneous camera and light stands sit at the periphery of the test stand.

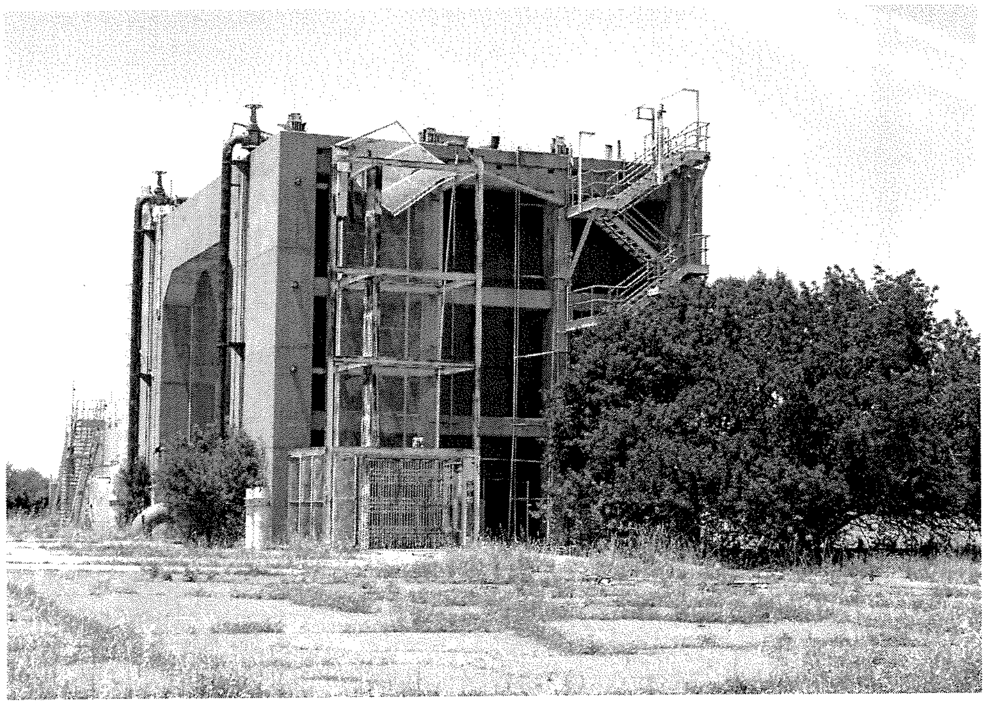

Plate 139: Test Stand No. 1 (Unit 122), Beta Test Complex, 1963-1964. Looking northwest. View of May 2005.

Plate 140: Test Stand No. 1 (Unit 122), Beta Test Complex, 1963-1964. Looking southeast. View of May 2005.

Plate 141: Test Stand No. 1 (Unit 122), flame deflector catchment basin, Beta Test Complex, 1963-1964. Looking northwest. View of May 2005.

Shop Building for Test Stand No. 1

Also known as Unit 124, the shop building for Test Stand No. 1 is a one-story, steel-frame structure erected in the Beta Test Complex in 1964. The shop building features steel I-beam construction with a light truss roof frame. Sheathed in corrugated siding, the shop building also includes a center-opening, track-mounted door on the east façade and a steel blast door on the west facade, with a simple entry on the north. Fenestration is 6/3 factory windows on the east façade and 3/6/3 factory windows on the north and south facades. The shop building has a combination gable roof, with a shed extension in the southwest corner. The interior of the structure is open, with rooms and an upper work space configured at its west end.

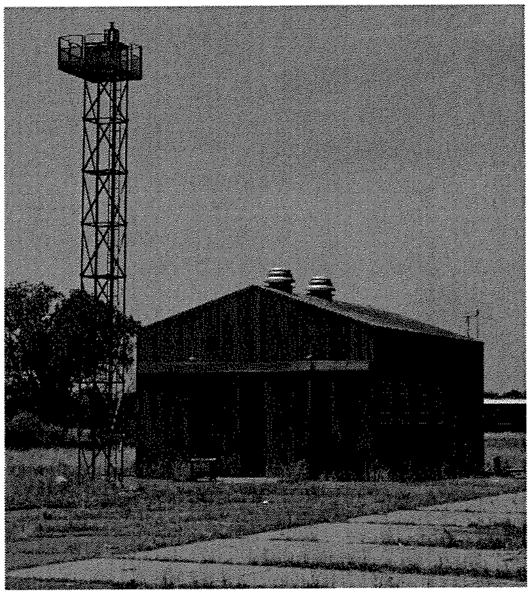

Plate 142: Shop for Test Stand No. 1 (Unit 124), Beta Test Complex, 1963-1964. TV camera stand, foreground left. Looking southwest. View of May 2005.

Plate 143: Shop for Test Stand No. 1 (Unit 124), Beta Test Complex, 1963-1964. Interior. Looking northwest. View of May 2005.

Liquid Hydrogen Tank for Test Stand No. 1

Also known as Unit 128, the liquid hydrogen tank for Test Stand No. 1 is a large, spherical structure on raised footings, constructed in 1964 to support Test Stand No. 1. Today, the tank cap lies on the ground adjacent.

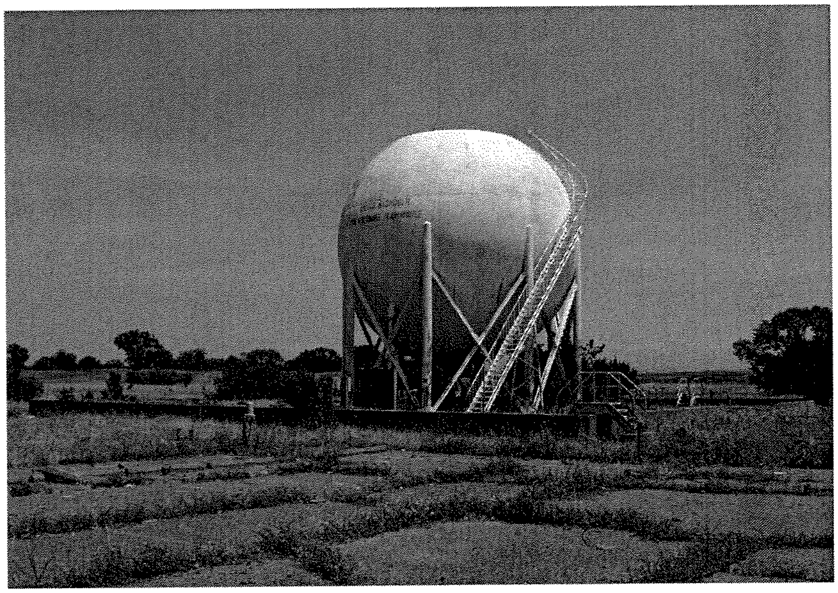

Plate 144: Liquid Hydrogen Tank at Test Stand No. 1 (Unit 128), Beta Test Complex, 1963-1964. Looking northeast. View of May 2005.

Plate 145: Liquid Hydrogen Tank at Test Stand No. 1 (Unit 128), cap, Beta Test Complex, 1963-1964. Looking southwest. View of May 2005.

Gamma Test Area

The Gamma Test Area is a small, fenced compound laid out between the Alpha Test Complex and the Administration Area in the southeast corner of the Douglas Missile Test Facility (Figure 9). The compound abuts the Kappa Test Area on its western edge. When established in 1964, the Gamma Test Area was laid out in a square configuration with dispersed buildings and structural elements. The first test sites in the neighboring Kappa Test Area predated the Gamma Test Area at the location, in place by ca.1957-1958. NASA set up the Gamma Test Area to develop and test the Saturn S-IVB attitude control motors and the handling of hypergolic propellants. While in planning, the site's name was the Attitude Control Area. Hypergolic rocket propellants are those that ignite spontaneously when mixed. The Gamma Test Area featured three test cells (in a single test structure), a test control center (blockhouse), and an instrumentation center (connected to the blockhouse by raised cable trays). Also part of the compound were propellant and gas storage facilities, transfer capabilities, a power substation, collection basins, and retention ponds. A maintenance and assembly building complemented the secured part of the compound, and sits to the near south/southeast of the Gamma Test Area. Historically, the maintenance and assembly building was a component of the test area, but today is no longer part of the former Douglas Missile Test Facility acreage.

NASA assigned property numbers to seven buildings and structures in the Gamma Test Area in 1964, with five additional unnumbered collection basins and retention ponds also within the fenced boundaries of the site. The character-defining components of the Gamma Test Area are the three-cell test structure, test control center, instrumentation center, and maintenance and assembly building.

Ancillary structures and site components no longer standing within the Gamma Test Area, or no longer readily visible/accessible for field inventory, include:

- a power substation (Unit 33) immediately northeast of the instrumentation center;
- a fuel storage shelter (Unit 35) in the northeast corner of the test area;
- an oxidizer shelter (Unit 36) in the northwest corner of the test area;
- a circular propellant collection basin (unnumbered) southeast of the oxidizer shelter;
- a circular propellant collection basin (unnumbered) southeast of the fuel storage shelter;
- a large, square retention pond (unnumbered) in the southeast quadrant of the test area;
- a small, rectangular collection basin for the test structure (unnumbered) in the southeastern corner of the test area; and,
- a large, square retention pond (unnumbered) in the southwestern corner of the test area.

The maintenance and assembly building (Unit 37), a metal, prefabricated structure, is outside the boundaries of the inventory, and is included in the descriptions and assessments below only photographically.

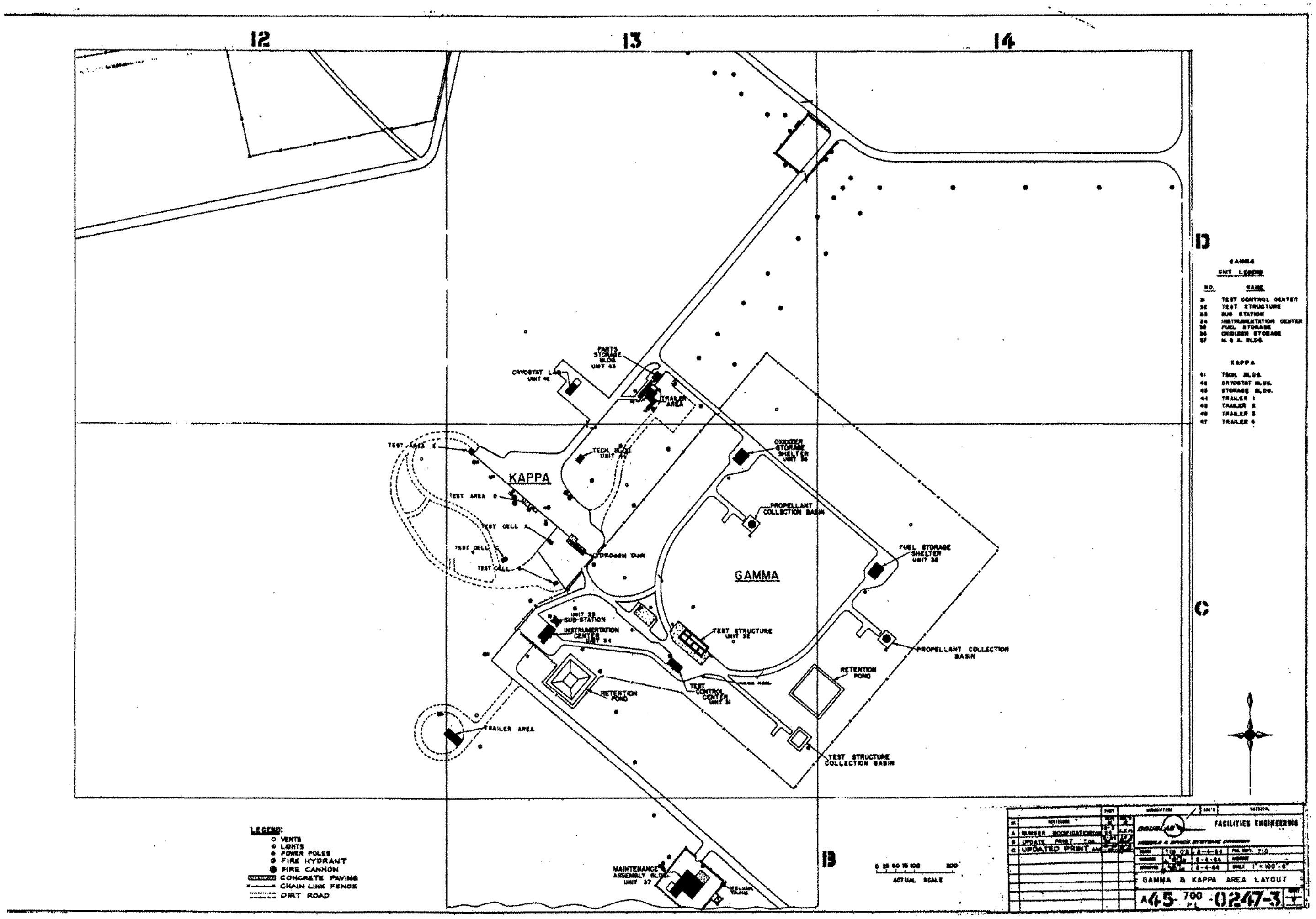

Figure 9: Douglas Facilities Engineering, Gamma/Kappa Test Areas, Douglas Missile Test Facilities, Rancho Cordova, California, 1964.

Instrumentation Center

Also known as Unit 34, the instrumentation center is a one-story, windowless reinforced concrete structure located in the southwestern corner of the Gamma Test Area. Constructed for NASA in 1964, the instrumentation center features a flat roof, steel blast doors on the east, west, and south facades, and an exterior-mounted, test-in-progress light system. A raised cable tray runs from the northeastern corner of the instrumentation center to the test control center (blockhouse). The instrumentation center is unaltered on its exterior. The interior of the center was inaccessible for inventory.

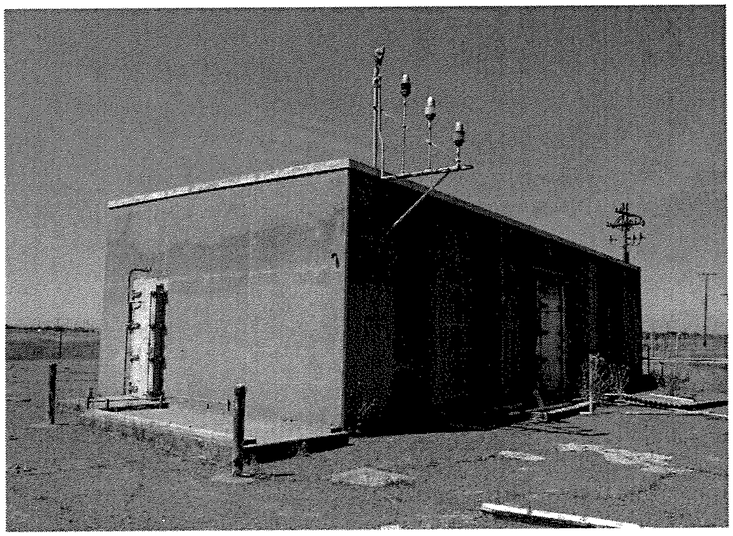

Plate 146: Instrumentation Center (Unit 34), Gamma Test Area, 1964. Looking north. View of May 2005.

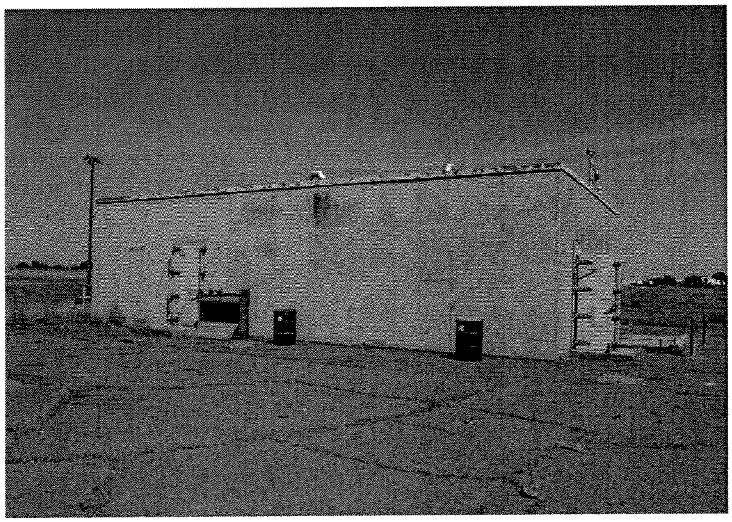

Plate 147: Instrumentation Center (Unit 34), Gamma Test Area, 1964. Looking east. View of May 2005.

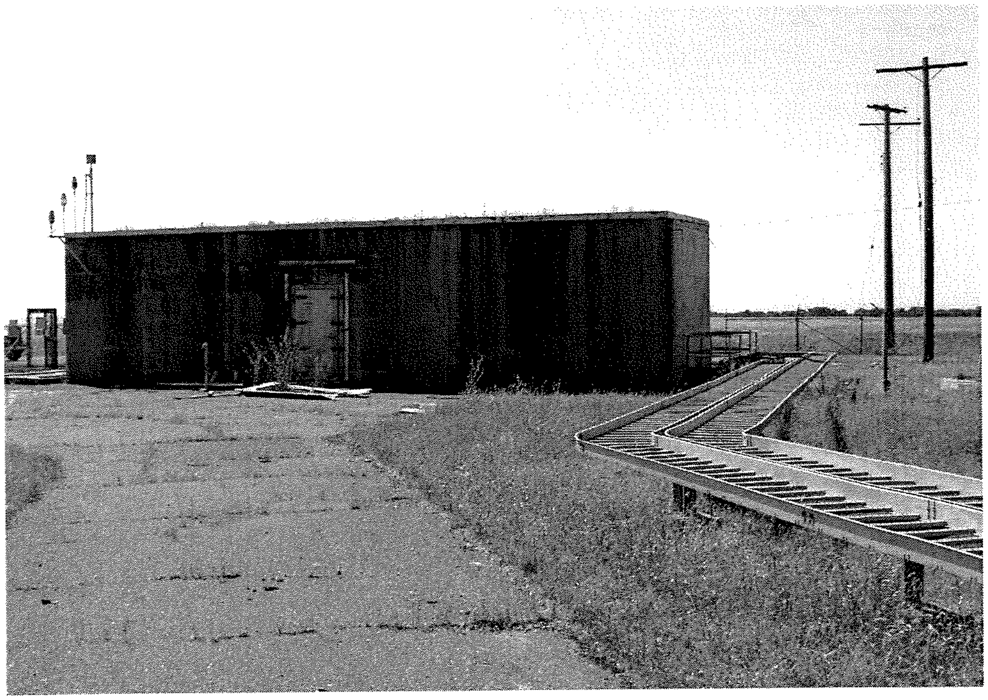

Plate 148: Instrumentation Center (Unit 34), Gamma Test Area, 1964. Looking west. View of May 2005.

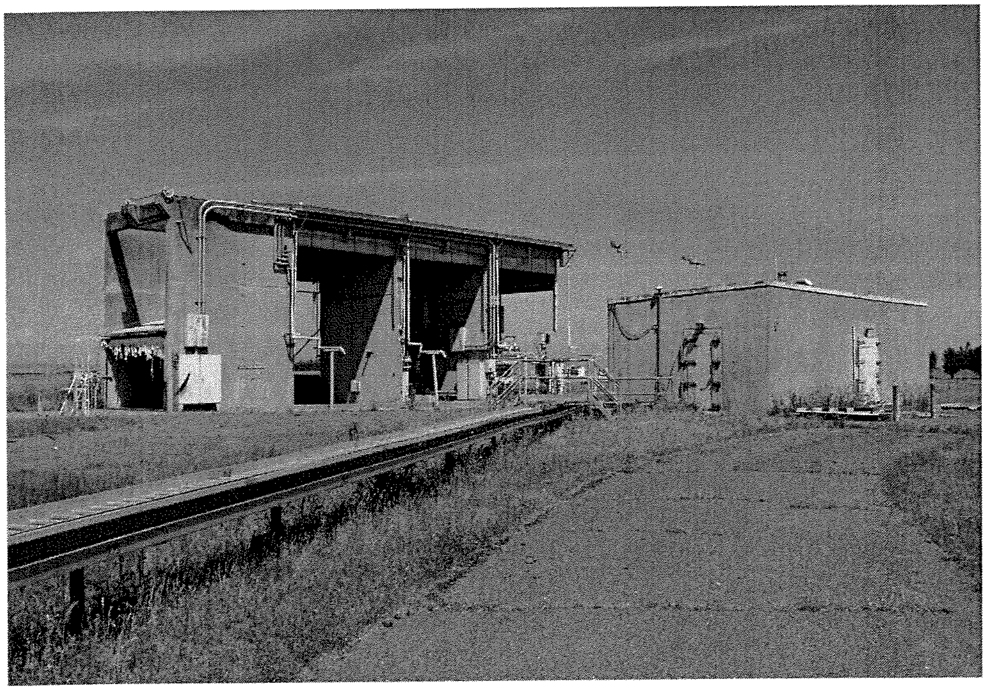

Plate 149: Cable tray from the Instrumentation Center (Unit 34) to the test control center, Gamma Test Area, 1964. Looking north. View of May 2005.

Test Control Center

Also known as Unit 31, the test control center (blockhouse) is a one-story, reinforced concrete structure located east of the instrumentation center, south/southwest of the test structure. Constructed for the Gamma Test Area in 1964, the test control center features a flat roof, steel blast doors on the southeast, southwest, and northwest facades, and three viewing ports on the northeast facade. The test control center faces the test structure. A raised cable tray runs from the northeastern corner of the instrumentation center to the northwest façade of the test control center. The instrumentation center is unaltered on its exterior. The interior of the center was inaccessible for inventory.

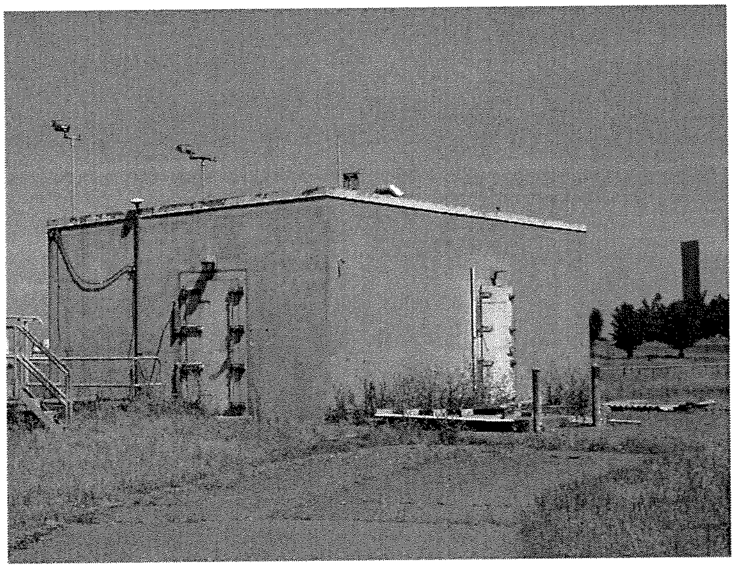

Plate 150: Test Control Center (Unit 31), Gamma Test Area, 1964. Looking east. View of May 2005.

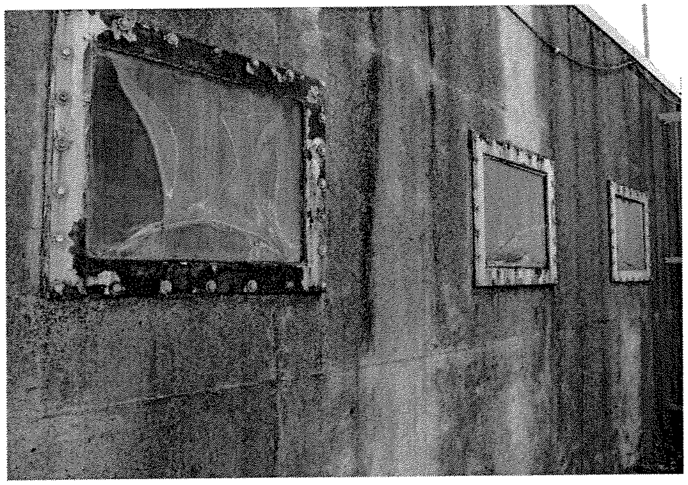

Plate 151: Test Control Center (Unit 31), Gamma Test Area, 1964. Viewing ports, eastern corner of northeast façade. Looking east. View of May 2005.

Test Structure

Also known as Unit 32, the test structure is three-bay, reinforced concrete and steel structure constructed in 1964 for the Gamma Test Area. The bays contained test cells, and are open on their northeast and southwest facades. The middle and east test cells included scaled-down captive test stands, inclusive of scaled flame deflectors (flame buckets). The eastern captive test stand remains intact in 2005, while the middle test stand exists only as a remnant structure. The west test cell is an open chamber, and is interpreted to never have been configured with a test stand. Heavy canvas curtains provided temporary walls for all open sides of the individual test cells: for the three bays on their northeast and southwest facades, as well as for the southeast and northwest facades of the overall test structure. A small, half-sized test cell also existed on the northwest end of the test structure, enclosable by a canvas curtain wall. Remnants of the canvas curtains are present today.

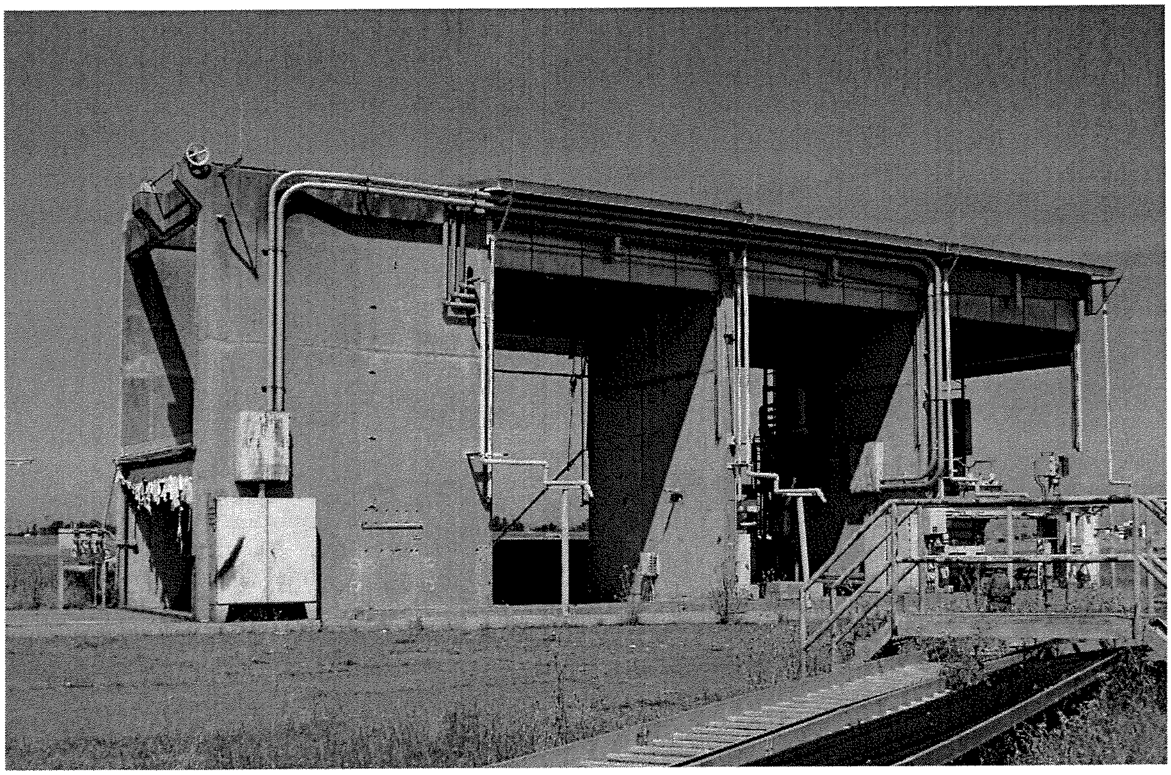

Plate 152: Test Structure (Unit 32), Gamma Test Area, 1964. Cable tray from the instrumentation center to the test control center, foreground right. Looking northeast. View of May 2005.

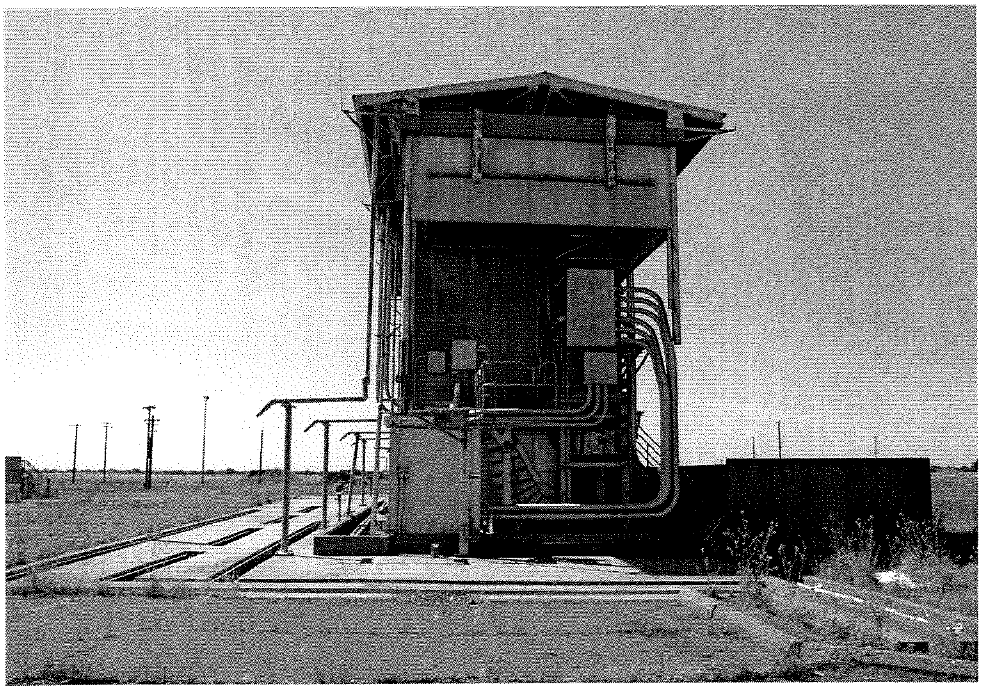

Plate 153: Test Structure (Unit 32), Gamma Test Area, 1964. With deluge channeling at the base of the structure, exiting at the lower right toward the collection basin for the test structure. Looking northwest. View of May 2005.

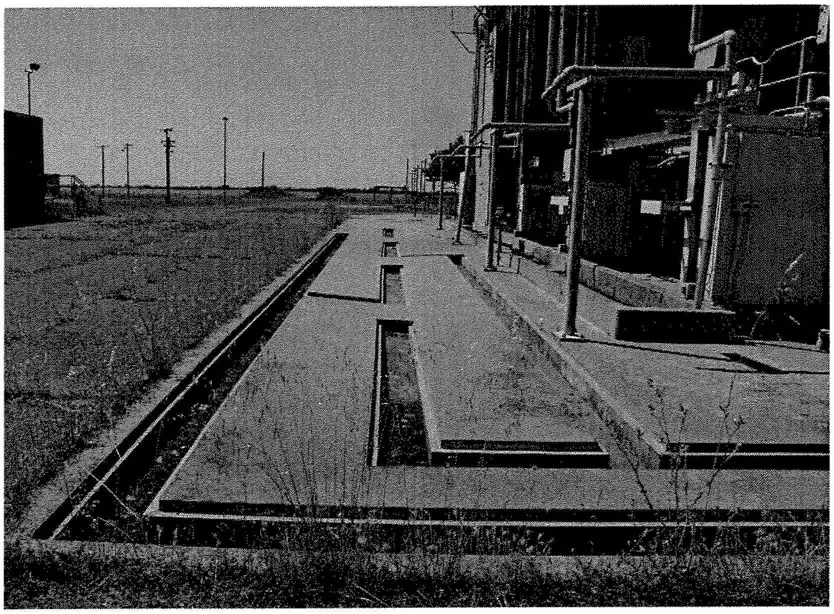

Plate 154: Test Structure (Unit 32), Gamma Test Area, 1964. Detail of the deluge channeling at the base of the structure. Test control center, background left. Looking northwest. View of May 2005.

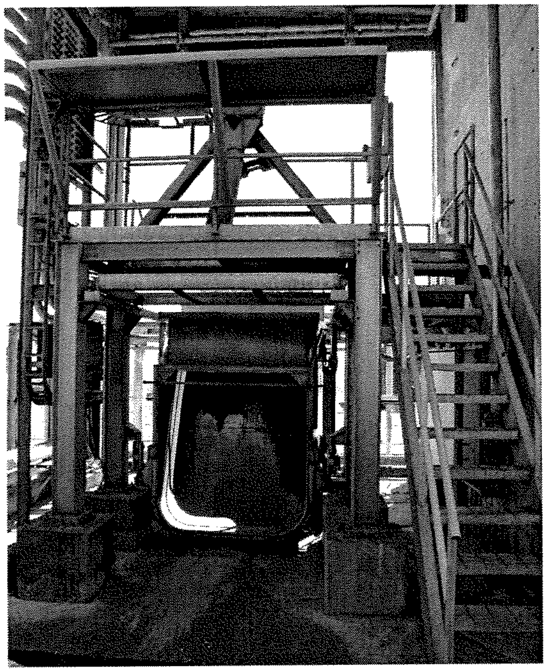

Plate 155: Test Structure (Unit 32), Gamma Test Area, 1964. East test cell, with scaled captive firing stand intact. Looking northwest. View of May 2005.

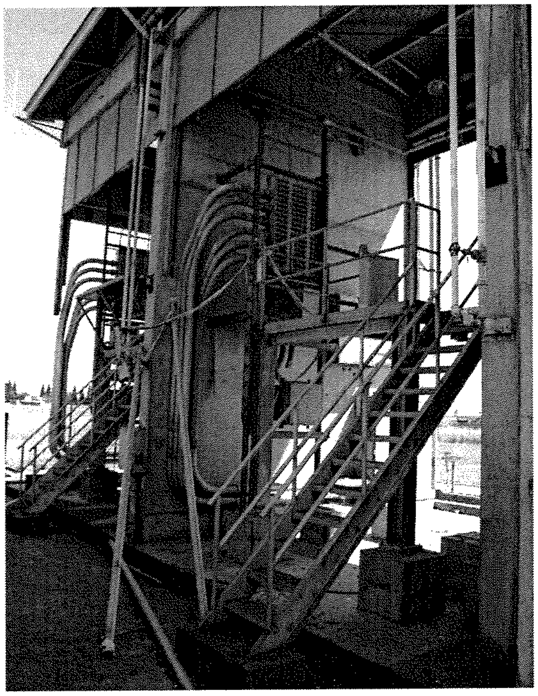

Plate 156: Test Structure (Unit 32), Gamma Test Area, 1964. Middle test cell, remnant. East test cell, background left. Looking northwest. View of May 2005.

Maintenance and Assembly Building

Also known as Unit 37, the maintenance and assembly building is outside the project area, sitting south/southwest of the secured portion of the Gamma Test Area. The Administration Area for the former Douglas Missile Test Facility sits to the southeast. The maintenance and assembly building was originally part of the Gamma Test Area.

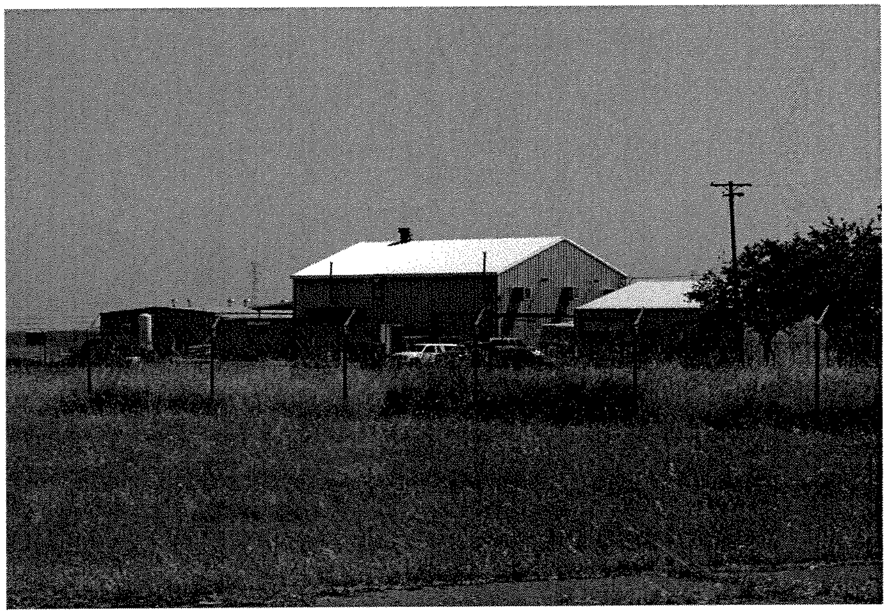

Plate 157: Maintenance and Assembly Building (Unit 37), Gamma Test Area, 1964. Augmented by other structures. Looking south. View of May 2005.

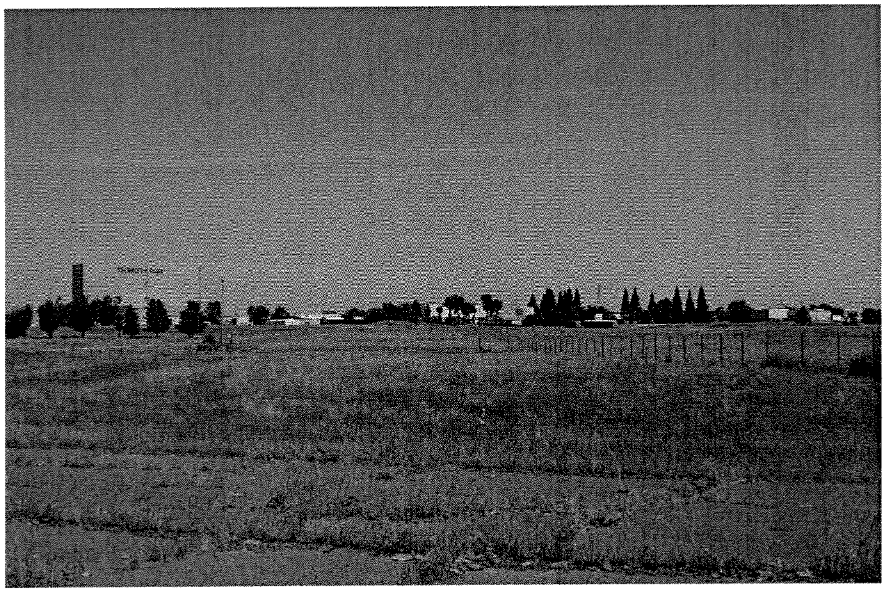

Plate 158: Administration Area, 1964. Southeast of the Gamma Test Area. Looking southeast. View of May 2005.

Kappa Test Area

The Kappa Test Area is a dispersed compound of individual test cells adjacent to the Gamma Test Area in the southeast corner of the Douglas Missile Test Facility (see Figure 9). The compound abuts the Gamma Test Area along its eastern edge. The Kappa Test Area originated in July 1959 as Initial Operational Capability (IOC) Site 2 for the developmental Thor (DM-18) IRBM. IOC Site 2 was a "propellant utilization pad." Douglas first used the location to conduct primary testing for "weights information and propellant density data" related to Thor (Douglas 1958-1962). During January through May 1960, Douglas continued to operate IOC 2 for the Thor In-Service Engineering Program. When IOC testing of Thor moved from the Douglas Missile Test Facility to Vandenberg Air Force Base in southern California at mid-year, IOC Site 2 became known as the Component Test Site. Douglas next used the Component Test Site to conduct early tests of NASA's Saturn DSV-IV (the developmental Saturn S-IV booster). The test programs of 1960 focused on subjecting the DSV-IV to a "liquid hydrogen environment" and on the "feasibility of transferring liquid hydrogen at high flow rates into a flight-type-vehicle tankage" (Douglas 1958-1962). Douglas ran 205 tests at the Component Test Site during the second half of the year, running an additional 548 tests at the Component Test Site in 1961.

The lineage of the Kappa Test Area transitioned again in 1962. Douglas renamed the location the Engineering Evaluation Site (EES). The EES was a very small test area aligned southeast to northwest. Personnel reached the EES from an access road that wyed southwards from the access road to the Alpha Test Complex. The EES included three components, southeast to northwest, that became the core of the sequentially developed Kappa Test Area: a hydrogen storage tank, Test Area D, and Test Area E (Ralph M. Parsons 1963). Douglas ran 337 tests in the EES to support the DSV-IV program during 1962. Personnel conducted 320 of these tests in Test Area E to develop the helium heater for the booster. The tests in Test Area E included 263 single injector firings at simulated altitudes, 28 helium heater integrated systems firings, 7 LOX-liquid hydrogen cold flow tests, and 4 cold helium system checkouts. By late 1962, Douglas had also augmented the complex of test cells with Test Cells A, B, and C. During 1962, personnel used Test Cell A for tests involving liquid hydrogen; Test Cell B, for testing insulations, bonding agents, and sealing resins; and, Test Area D for 24 tests to evaluate "tank insulation characteristics" during the transfer of liquid hydrogen into a scaled DSV-IV tank (Douglas 1958-1962).

In late 1964, the former IOC Site 2 and follow-on EES, expanded a third and final time into the Kappa Test Area. The Kappa Test Area included the five test cells/areas (A-E), the hydrogen tank, a test control center (in a trailer), instrumentation center (also in a trailer), a technical building, a parts storage building, two additional trailers, and a cryostat laboratory. NASA assigned property numbers to seven buildings and structures in the Kappa Test Area, with the five alpha-named test cells and hydrogen tank remaining unnumbered. The character-defining components of the Kappa Test Area are Test Cells A-C, Test Areas D-E, and the cryostat laboratory. The laboratory functioned as NASA's sixth test cell on site, with viewports to an outdoor test area. Also found within the

Kappa Test Area are multiple lights and power poles, two pair of water cannons bracketing Test Area D, and two large concrete pads with sections of rail trackage. From 1965 through 1969, NASA conducted cryogenic tests of “vehicle tank insulation, sealant and bonding compounds, and thermocouple probes, as well as test of scale tanks, helium heaters, and igniters” (NASA 1966). Control panels for the test cells existed in the trailer functioning as the test control center (blockhouse). NASA similarly installed instrumentation recording equipment in the trailer used as the test instrumentation center (NASA 1966).

Ancillary structures and site components no longer standing within the Kappa Test Area, or no longer readily visible/accessible for field inventory, include:

- the technical building (Unit 41) in the center of the test area;
- the parts storage building (Unit 43) at the north entrance to the test area;
- Trailer No. 1 (Unit 44) at the north entrance to the test area;
- Trailer No. 2 (Unit 45) at the north entrance to the test area;
- Trailer No. 3 (Unit 46) at the north entrance to the test area;
- Trailer No. 4 (Unit 47) at the north entrance to the test area;
- the hydrogen tank (unnumbered) at the eastern terminus of the core complex; and,
- Test Cell A (unnumbered) west of the hydrogen tank.

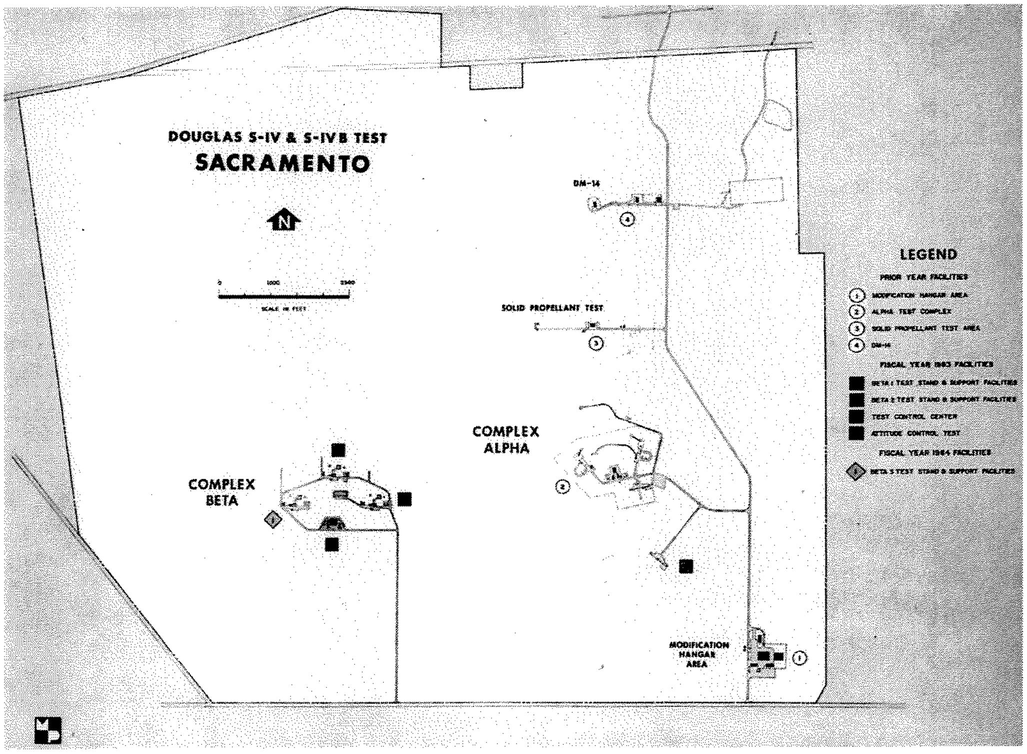

Plate 159: EES, 1963. Mapped immediately west of the planned Attitude Control Test Area (Gamma Test Area) in the southeastern corner the Douglas Missile Test Facility. Courtesy of NASA.

Test Cell B

Test Cell B is a three-sided, wood-frame structure added to location during its transition from the Component Test Site to the EES in 1962. Douglas used Test Cell B to conduct dome-plate experiments for insulations, bonding agents, and sealing resins. Douglas also ran thermal shock tests in the structure (Douglas 1958-1962). Test Cell B is deteriorated in place. The remains of an earthen berm exist behind the test cell. NASA was using Test Cell B in 1966 for experiments requiring liquid hydrogen and helium (Douglas 1966).

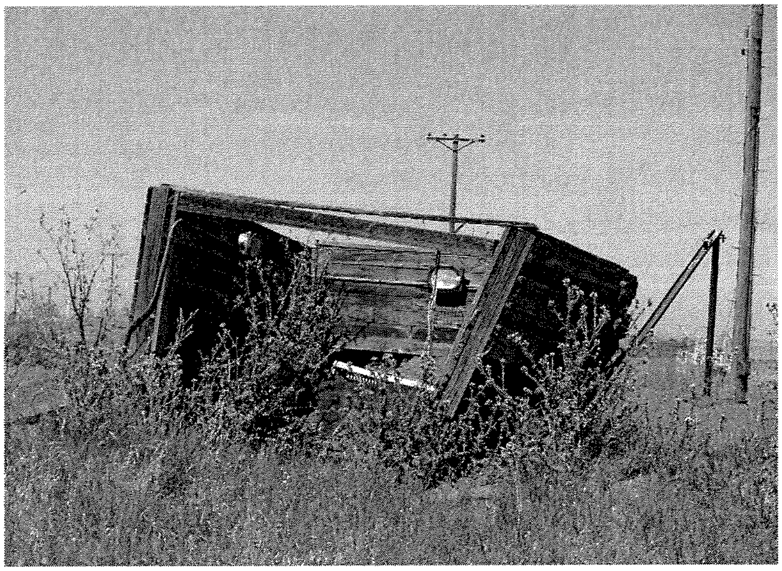

Plate 160: Test Cell B, Kappa Test Area, 1964. Looking north. View of May 2005.

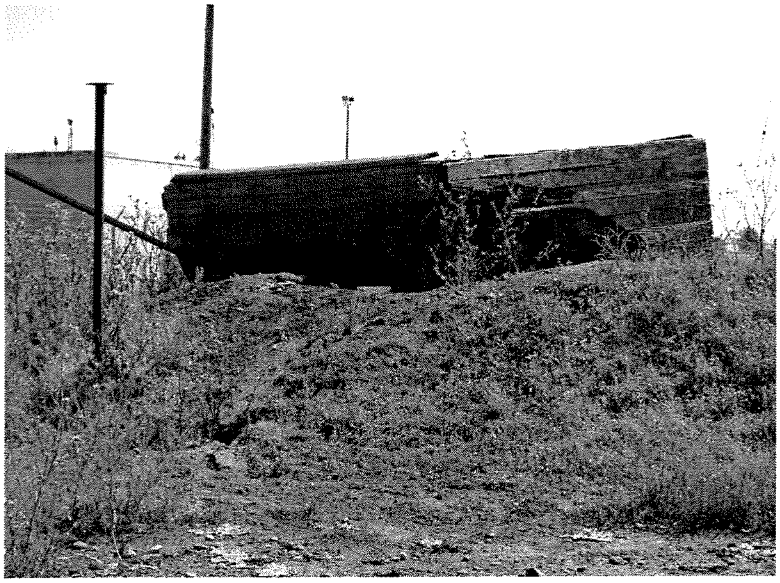

Plate 161: Test Cell B, Kappa Test Area, 1964. Looking north. View of May 2005.

Test Cell C

Test Cell C is the most elaborate test cell in the Kappa Test Area. The cell is a three-sided, blast-resistant steel structure added to location during its transition from the Component Test Site to the EES in 1962. An earthen berm surrounds the sides and rear of the cell. Early experiments in Test Cell C are undetermined. In 1966, Douglas used Test Cell C to "safely test liquid hydrogen components to failure in liquid hydrogen at pressures to 15,000 psi" (Douglas 1966). Test Cell C is unaltered and intact in 2005.

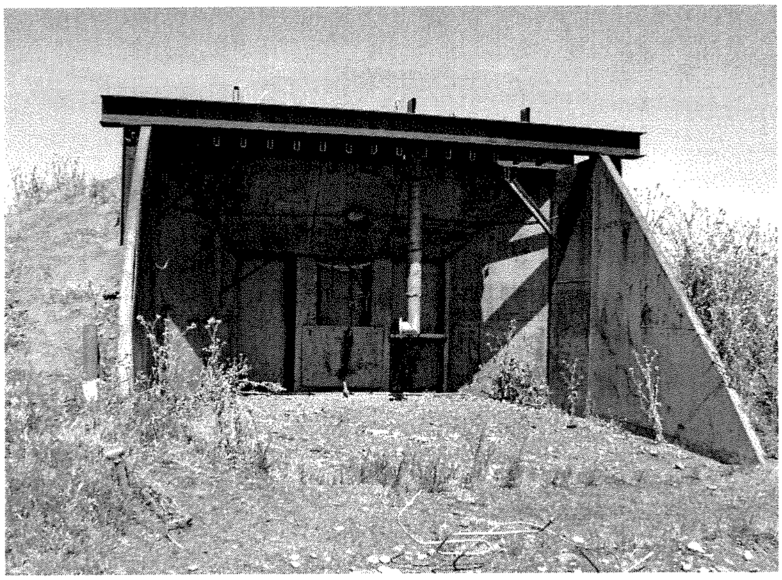

Plate 162: Test Cell C, Kappa Test Area, 1964. Looking northeast. View of May 2005.

Plate 163: Test Cell C, Kappa Test Area, 1964. Looking west. View of May 2005.

Test Area D

Test Area D is interpreted as part of the original IOC Site 2 that Douglas configured for Thor propellant tests in mid-1959. Only remnants of Test Area D exist in 2005. The major element at the location today is a piece of hydrogen test equipment carrying a dated metal stamped identification tag. Pairs of water cannons bracket Test Area D to the east and west. The cannons historically provided a deluge protection system for the area. In 1962, Douglas conducted 24 tests of the insulation for a scaled-down Saturn DSV-IV tank during the flow of liquid hydrogen (Douglas 1958-1962). The side was not in use in 1966 (Douglas 1966).

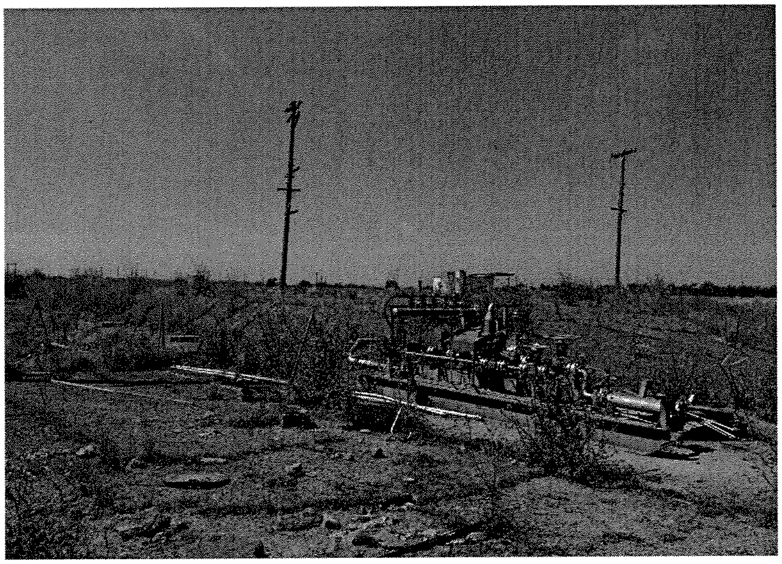

Plate 164: Test Area D, Kappa Test Area, 1964. Looking northeast. View of May 2005.

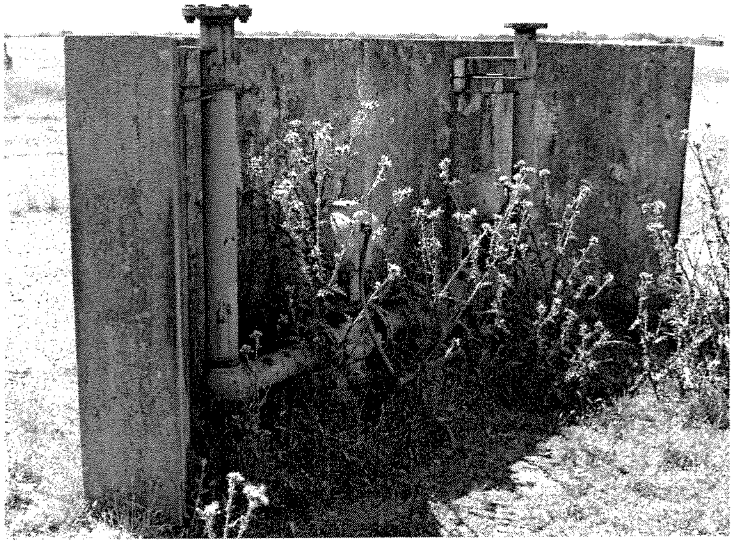

Plate 165: Test Area D, pair of water cannons, Kappa Test Area, 1964. Looking northwest. View of May 2005.

Test Area E

Test Area E is interpreted as part of the original IOC Site 2 that Douglas configured for Thor propellant tests in mid-1959. The location includes a reinforced concrete pad with an in-ground, concrete catchment channel. Steel plates covered the channel historically and remain partially extant. In 1962, Test Area E was the primary test site for the EES. Douglas conducted 320 tests in Test Area E focused on the development of the helium heater for the Saturn DSV-IV. Experiments included LOX and liquid hydrogen cold-flow tests, as well as cold helium checkout. In 1966, NASA used Test Area E for tests requiring liquid hydrogen (Douglas 1966) and had placed gaseous nitrogen tube trailers, a hydro-pneumatic trailer, a gaseous helium trailer, a liquid hydrogen run tank, an ullage (remnant fuel) storage tank, and two surge tanks at the site (NASA 1966).

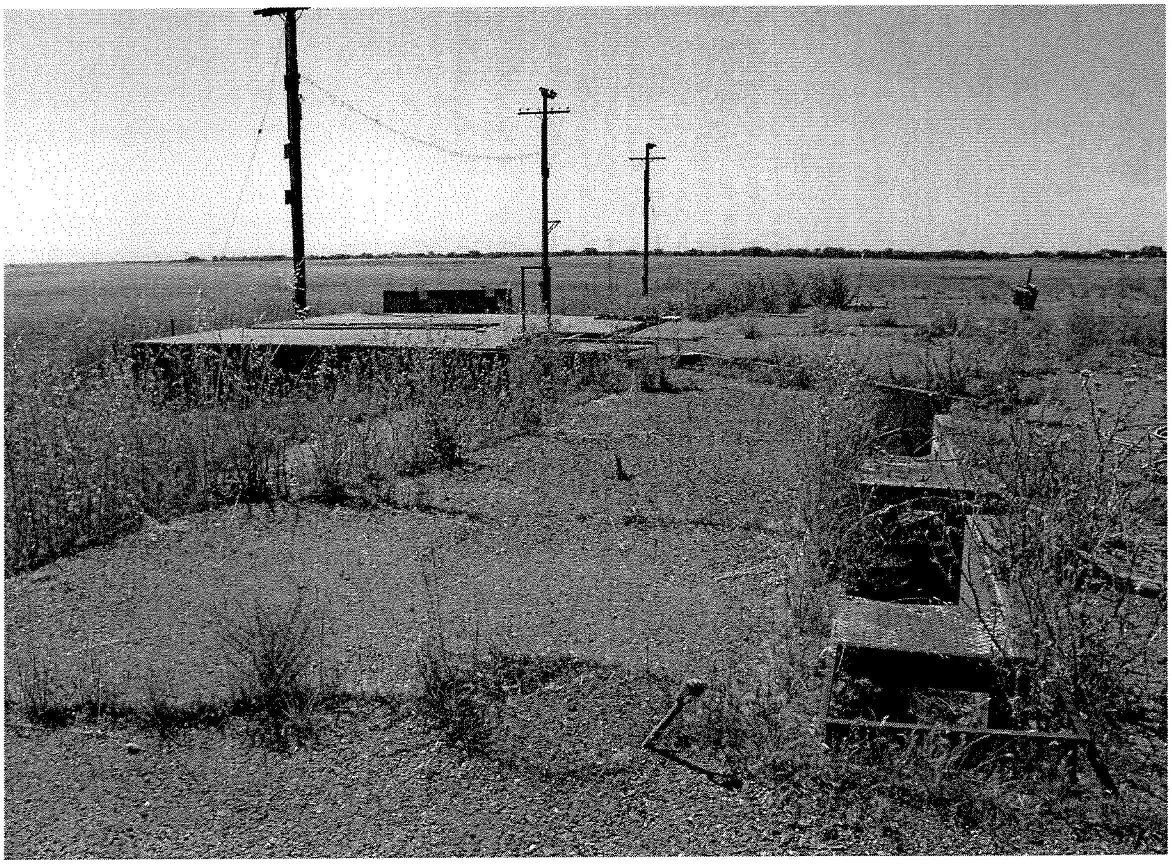

Plate 166: Test Area E, Kappa Test Area, 1964. Looking west. View of May 2005.

Cryostat Laboratory

Also known as Unit 42, the cryostat laboratory is a one-story, concrete block structure located in the northeastern section of the Kappa Test Area. The laboratory includes a covered, open test cell off its northeast façade. Two viewing ports and an equipment panel face the test cell. The cryostat laboratory features a flat roof and a single entrance on the southeast façade. A pair of long reinforced concrete pads, with imbedded steel rail trackage sit to the east of the laboratory, and are of undetermined historic purpose. In 1966, NASA used the cryostat laboratory to calibrate and verify temperature transducers. Personnel could calibrate instruments between temperatures of -423 degrees and 1,600 degrees Fahrenheit. A pressure tank holding cryogenic liquids provided the cold-temperature facility in the laboratory, while personnel achieved high temperatures in a hot oil bath (up to 500 degrees Fahrenheit) or a controlled-heat oven (above 500 degrees). The laboratory also accommodated the use of liquid hydrogen, liquid argon, and liquid nitrogen (Douglas 1966). The exterior of the cryostat laboratory is unaltered in 2005. The interior was inaccessible for inventory. The laboratory derives its name from the ultra-low temperature studies historically conducted on site.

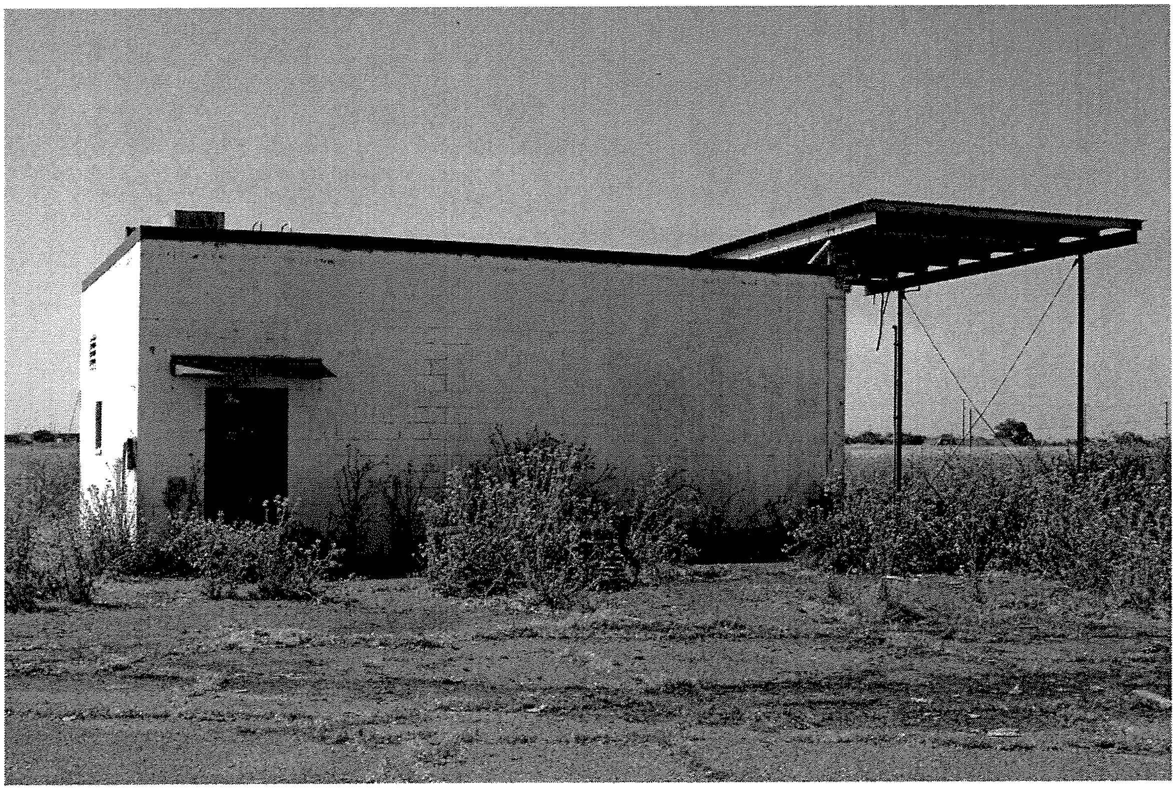

Plate 167: Cryostat Laboratory (Unit 42), Kappa Test Area, 1964. Covered open test cell, right. Looking west. View of May 2005.

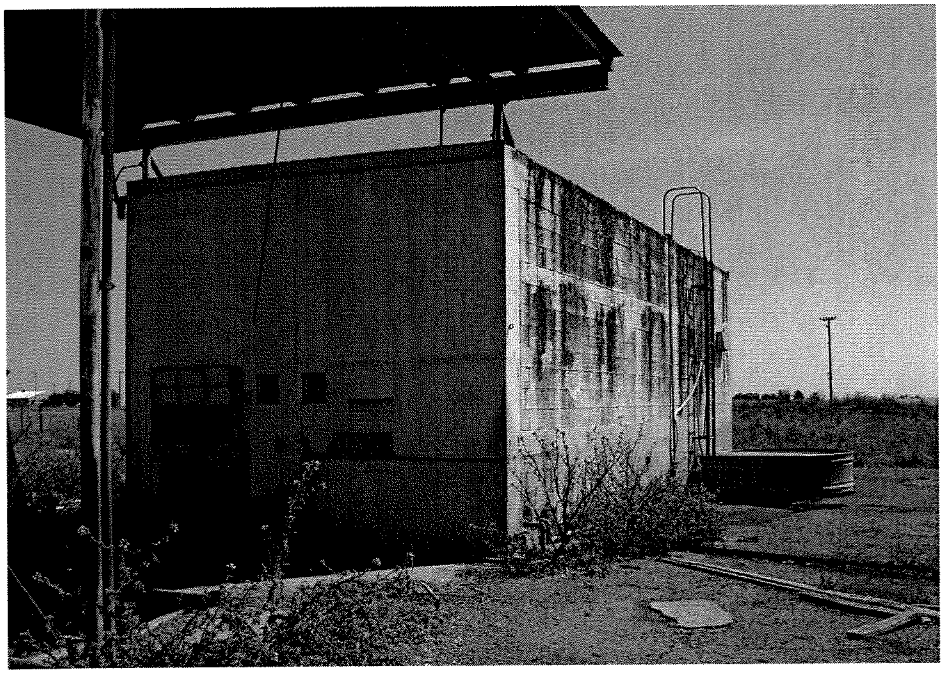

Plate 168: Cryostat Laboratory (Unit 42), Kappa Test Area, 1964. Covered open test cell, left. Viewing ports and equipment panel (with steel cover up), on the northeast façade facing the test cell Looking west. View of May 2005.

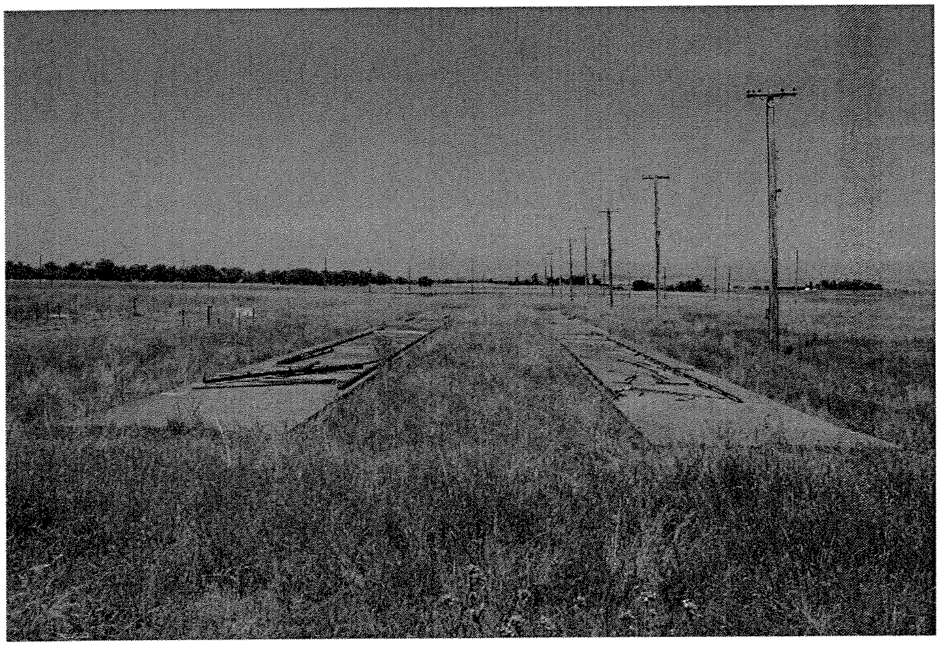

Plate 169: Test tracks on concrete pads west of the cryostat laboratory, Kappa Test Area, undetermined date of construction. Looking northeast. View of May 2005.

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APPENDIX H

NATIVE AMERICAN CONSULTATION

EDAW

EDAW INC

2022 J STREET

SACRAMENTO CALIFORNIA

95814

TEL 916 414 5800

FAX 916 414 5850

www.edaw.com

March 18, 2005

Ione Band of Miwok Indians
Glen Villa, Sr., Cultural Committee
712 Palm Drive
Ione, CA 95640

RE: Rio Del Oro Development Project, City of Rancho Cordova, Sacramento County, California

Dear Mr. Villa:

EDAW, Inc. (EDAW) has been retained to complete a cultural resource investigation for the above-referenced project. The proposed project area consists of approximately 4,000 acres situated east of Sunrise Boulevard, south of White Rock Road, and north of Douglas Boulevard. It is depicted on the Carmichael and Buffalo Creek 7.5 minute USGS quadrangles (see attached map).

We are pleased to bring this activity to your attention, and would appreciate any information you can provide regarding prehistoric, historic, or ethnographic land use of the area. We are also interested in any contemporary Native American values that may be present.

If you have any questions or comments about the proposed project, please contact me at my office at (916) 414-5800.

Sincerely,

Charlane Gross
Senior Archaeologist

enclosure

EDAW

EDAW INC

2022 J STREET

SACRAMENTO CALIFORNIA

95814

TEL 916 414 5800

FAX 916 414 5850

www.edaw.com

March 18, 2005

Wilton Rancheria
Mary Daniels-Tarango
7916 Farnell Way
Sacramento, CA 95823

RE: Rio Del Oro Development Project, City of Rancho Cordova, Sacramento County, California

Dear Ms. Daniels-Tarango:

EDAW, Inc. (EDAW) has been retained to complete a cultural resource investigation for the above-referenced project. The proposed project area consists of approximately 4,000 acres situated east of Sunrise Boulevard, south of White Rock Road, and north of Douglas Boulevard. It is depicted on the Carmichael and Buffalo Creek 7.5 minute USGS quadrangles (see attached map).

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Sincerely,

Charlane Gross
Senior Archaeologist

enclosure

EDAW

EDAW INC

2022 J STREET

SACRAMENTO CALIFORNIA

95814

TEL 916 414 5800

FAX 916 414 5850

www.edaw.com

March 18, 2005

El Dorado Miwok Tribe
Lysa Daniels
P.O. Box 513
Shingle Springs, CA 95682

RE: Rio Del Oro Development Project, City of Rancho Cordova, Sacramento County, California

Dear Ms. Daniels:

EDAW, Inc. (EDAW) has been retained to complete a cultural resource investigation for the above-referenced project. The proposed project area consists of approximately 4,000 acres situated east of Sunrise Boulevard, south of White Rock Road, and north of Douglas Boulevard. It is depicted on the Carmichael and Buffalo Creek 7.5 minute USGS quadrangles (see attached map).

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Sincerely,

Charlane Gross
Senior Archaeologist

enclosure

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SACRAMENTO CALIFORNIA

95814

TEL 916 414 5800

FAX 916 414 5850

www.edaw.com

March 18, 2005

El Dorado Miwok Tribe
Jeri Scambler, Chairperson
P.O. Box 1284
El Dorado, CA 95623

RE: Rio Del Oro Development Project, City of Rancho Cordova, Sacramento County, California

Dear Ms. Scambler:

EDAW, Inc. (EDAW) has been retained to complete a cultural resource investigation for the above-referenced project. The proposed project area consists of approximately 4,000 acres situated east of Sunrise Boulevard, south of White Rock Road, and north of Douglas Boulevard. It is depicted on the Carmichael and Buffalo Creek 7.5 minute USGS quadrangles (see attached map).

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Sincerely,

Charlane Gross
Senior Archaeologist

enclosure

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EDAW INC

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SACRAMENTO CALIFORNIA

95814

TEL 916 414 5800

FAX 916 414 5850

www.edaw.com

March 18, 2005

El Dorado Miwok Tribe
Ernest Faircloth, Cultural Preservation
P.O. Box 258
El Dorado, CA 95623

RE: Rio Del Oro Development Project, City of Rancho Cordova, Sacramento County, California

Dear Mr. Faircloth:

EDAW, Inc. (EDAW) has been retained to complete a cultural resource investigation for the above-referenced project. The proposed project area consists of approximately 4,000 acres situated east of Sunrise Boulevard, south of White Rock Road, and north of Douglas Boulevard. It is depicted on the Carmichael and Buffalo Creek 7.5 minute USGS quadrangles (see attached map).

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Sincerely,

Charlane Gross
Senior Archaeologist

enclosure

EDAW

EDAW INC

2022 J STREET

SACRAMENTO CALIFORNIA

95814

TEL 916 414 5800

FAX 916 414 5850

www.edaw.com

March 18, 2005

Rose Enos
15310 Bancroft Road
Auburn, CA 95603

RE: Rio Del Oro Development Project, City of Rancho Cordova, Sacramento County, California

Dear Ms. Enos:

EDAW, Inc. (EDAW) has been retained to complete a cultural resource investigation for the above-referenced project. The proposed project area consists of approximately 4,000 acres situated east of Sunrise Boulevard, south of White Rock Road, and north of Douglas Boulevard. It is depicted on the Carmichael and Buffalo Creek 7.5 minute USGS quadrangles (see attached map).

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Sincerely,

Charlane Gross
Senior Archaeologist

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EUROPE

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DESIGN, PLANNING AND ENVIRONMENTS WORLDWIDE

EDAW

EDAW INC

2022 J STREET

SACRAMENTO CALIFORNIA

95814

TEL 916 414 5800

FAX 916 414 5850

www.edaw.com

March 18, 2005

Randy Yonemura
4305-39th Avenue
Sacramento, CA 95824

RE: Rio Del Oro Development Project, City of Rancho Cordova, Sacramento County, California

Dear Mr. Yonemura:

EDAW, Inc. (EDAW) has been retained to complete a cultural resource investigation for the above-referenced project. The proposed project area consists of approximately 4,000 acres situated east of Sunrise Boulevard, south of White Rock Road, and north of Douglas Boulevard. It is depicted on the Carmichael and Buffalo Creek 7.5 minute USGS quadrangles (see attached map).

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Sincerely,

Charlane Gross
Senior Archaeologist

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EDAW INC

2022 J STREET

SACRAMENTO CALIFORNIA

95814

TEL 916 414 5800

FAX 916 414 5850

www.edaw.com

March 18, 2005

Billie Blue Elliston
604 Pringle Avenue, #42
Galt, CA 95632

RE: Rio Del Oro Development Project, City of Rancho Cordova, Sacramento County, California

Dear Mr. Elliston:

EDAW, Inc. (EDAW) has been retained to complete a cultural resource investigation for the above-referenced project. The proposed project area consists of approximately 4,000 acres situated east of Sunrise Boulevard, south of White Rock Road, and north of Douglas Boulevard. It is depicted on the Carmichael and Buffalo Creek 7.5 minute USGS quadrangles (see attached map).

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If you have any questions or comments about the proposed project, please contact me at my office at (916) 414-5800.

Sincerely,

Charlane Gross
Senior Archaeologist

enclosure

EDAW

EDAW INC

2022 J STREET

SACRAMENTO CALIFORNIA

95814

TEL 916 414 5800

FAX 916 414 5850

www.edaw.com

March 18, 2005

United Auburn Indian Community of the Auburn Rancheria
John Suehead
575 Menlo Drive, Suite 2
Rocklin, CA 95765

RE: Rio Del Oro Development Project, City of Rancho Cordova, Sacramento County, California

Dear Mr. Suehead:

EDAW, Inc. (EDAW) has been retained to complete a cultural resource investigation for the above-referenced project. The proposed project area consists of approximately 4,000 acres situated east of Sunrise Boulevard, south of White Rock Road, and north of Douglas Boulevard. It is depicted on the Carmichael and Buffalo Creek 7.5 minute USGS quadrangles (see attached map).

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Sincerely,

Charlane Gross
Senior Archaeologist

enclosure

UNITED STATES

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DESIGN, PLANNING AND ENVIRONMENTS WORLDWIDE

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95814

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FAX 916 414 5850

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March 18, 2005

United Auburn Indian Community of the Auburn Rancheria
Jessica Tavares, Chairperson
575 Menlo Drive, Suite 2
Rocklin, CA 95765

RE: Rio Del Oro Development Project, City of Rancho Cordova, Sacramento County, California

Dear Ms. Tavares:

EDAW, Inc. (EDAW) has been retained to complete a cultural resource investigation for the above-referenced project. The proposed project area consists of approximately 4,000 acres situated east of Sunrise Boulevard, south of White Rock Road, and north of Douglas Boulevard. It is depicted on the Carmichael and Buffalo Creek 7.5 minute USGS quadrangles (see attached map).

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95814

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FAX 916 414 5850

www.edaw.com

March 18, 2005

Sierra Native American Council
Dwight Dutschke, Chairperson
Box 12045
Ione, CA 95640

RE: Rio Del Oro Development Project, City of Rancho Cordova, Sacramento County, California

Dear Mr. Dutschke:

EDAW, Inc. (EDAW) has been retained to complete a cultural resource investigation for the above-referenced project. The proposed project area consists of approximately 4,000 acres situated east of Sunrise Boulevard, south of White Rock Road, and north of Douglas Boulevard. It is depicted on the Carmichael and Buffalo Creek 7.5 minute USGS quadrangles (see attached map).

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Charlane Gross
Senior Archaeologist

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2022 J STREET

SACRAMENTO CALIFORNIA

95814

TEL 916 414 5800

FAX 916 414 5850

www.edaw.com

March 18, 2005

Maidu Elders Organization
Martha Noel
P.O. Box 206
Dobbins, CA 95935

RE: Rio Del Oro Development Project, City of Rancho Cordova, Sacramento County, California

Dear Ms. Noel:

EDAW, Inc. (EDAW) has been retained to complete a cultural resource investigation for the above-referenced project. The proposed project area consists of approximately 4,000 acres situated east of Sunrise Boulevard, south of White Rock Road, and north of Douglas Boulevard. It is depicted on the Carmichael and Buffalo Creek 7.5 minute USGS quadrangles (see attached map).

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Charlane Gross
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2022 J STREET

SACRAMENTO CALIFORNIA

95814

TEL 916 414 5800

FAX 916 414 5850

www.edaw.com

March 18, 2005

Ione Band of Miwok Indians
Pamela Baumgartner, Tribal Administrator
P.O. Box 1190
Ione, CA 95640

RE: Rio Del Oro Development Project, City of Rancho Cordova, Sacramento County, California

Dear Ms. Baumgartner:

EDAW, Inc. (EDAW) has been retained to complete a cultural resource investigation for the above-referenced project. The proposed project area consists of approximately 4,000 acres situated east of Sunrise Boulevard, south of White Rock Road, and north of Douglas Boulevard. It is depicted on the Carmichael and Buffalo Creek 7.5 minute USGS quadrangles (see attached map).

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Sincerely,

Charlane Gross
Senior Archaeologist

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APPENDIX I

ADDITIONAL TRAFFIC ANALYSIS SCENARIOS

I. INTRODUCTION

This presents impacts of Phase I and buildout of the Rio del Oro Specific Plan on the adjacent transportation system for 2014 and Cumulative Conditions.

Please note that this information has been superseded with information in the EIR/EIS for the proposed project. However, this information is attached for informational purposes only.

Study Scenarios

Impacts of the proposed project to the surrounding transportation system were evaluated for the following study scenarios:

2014 Conditions:	A near-term planning horizon consisting of traffic volumes from expected development over the next ten years (provided by City Staff). The scenario incorporates roadway improvement projects associated with assumed development projects in the area and Tier I projects identified for completion in the *Metropolitan Transportation Plan* (MTP) by 2014.
2014 With Phase I:	2014 Conditions and completion of Phase I of the proposed specific plan area.
2014 With Specific Plan Buildout:	2014 Conditions and completion of the entire Rio del Oro Specific Plan.
Cumulative Conditions:	Cumulative planning horizon consisting of traffic volumes from expected development by year 2030 (provided by City Staff). The scenario incorporates roadway improvement projects associated with assumed development projects in the area and Tier I projects identified in the MTP. This scenario does *not* assume the extension of Hazel Avenue south to Grant Line Road.
Cumulative With Specific Plan Buildout:	Cumulative Conditions and traffic from buildout of the proposed Rio del Oro Specific Plan. This analysis assumes that Hazel Avenue will not be extended south to Grant Line Road.
Cumulative With Hazel Conditions:	Cumulative Conditions with the extension of Hazel Avenue south, through the GenCorp property, to Grant Line Road. This scenario is presented for informational purposes.
Cumulative With Specific Plan Buildout With Hazel Conditions:	Cumulative With Specific Plan Buildout and the extension of Hazel Avenue to Grant Line Road.

Study Area

Detailed traffic analyses were preformed for the following intersections, roadway segments, freeway facilities, and interchanges:

Intersections

1. State Route (SR) 16/Excelsior Road
2. SR 16/Eagles Nest Road
3. SR 16/Sunrise Boulevard
4. SR 16/Grant Line Road
5. Florin Road/Sunrise Boulevard
6. Grant Line Road/Sunrise Boulevard
7. Grant Line Road/Kiefer Boulevard
8. Douglas Road/Grant Line Road
9. Douglas Road/Sunrise Boulevard
10. Mather Field Road/Folsom Boulevard
11. Mather Field Road/US-50 Westbound Ramps
12. Mather Field Road/US-50 Eastbound Ramps
13. Mather Field Road/International Drive
14. Zinfandel Drive/International Drive
15. Zinfandel Drive/White Rock Road
16. Zinfandel Drive/US-50 Eastbound Ramps
17. Zinfandel Drive/US-50 Westbound Ramps
18. Sunrise Boulevard/White Rock Road
19. Sunrise Boulevard/Folsom Boulevard
20. Sunrise Boulevard/US-50 Eastbound Ramps
21. Sunrise Boulevard/US-50 Westbound Ramps
22. Sunrise Boulevard/Zinfandel Drive
23. Hazel Avenue/Folsom Boulevard
24. Hazel Avenue/US-50 Eastbound Ramps
25. Hazel Avenue/US-50 Westbound Ramps
26. White Rock Road/Grant Line Road
27. Sunrise Boulevard/Kiefer Boulevard – 2014 and Cumulative scenarios only
28. Eagles Nest/Kiefer Boulevard – 2014 and Cumulative scenarios only
29. Sunrise Boulevard/International Drive – 2014 and Cumulative scenarios only
30. Sunrise Reliever/White Rock Road – Cumulative scenario only
31. Sunrise Reliever/US-50 Eastbound Ramps – Cumulative scenario only
32. Sunrise Reliever/US-50 Westbound Ramps – Cumulative scenario only
33. Douglas Road/Jaeger Road – Cumulative scenario only
34. Douglas Road/Americanos Boulevard – Cumulative scenario only
35. Chrysanthy Boulevard/Sunrise Boulevard – Cumulative scenario only
36. Chrysanthy Boulevard/Jaeger Road – Cumulative scenario only
37. Chrysanthy Boulevard/Americanos Boulevard – Cumulative scenario only
38. Kiefer Boulevard/Jaeger Road – Cumulative scenario only
39. White Rock Road/Americanos Boulevard – Cumulative scenario only

Roadways

SR 16 – Excelsior Road to Eagles Nest Road

SR 16 – Sunrise Boulevard to Grant Line Road
Kiefer Boulevard – Grant Line Road to SR 16
Mather Boulevard – Femoyer Street to Douglas Road
Douglas Road – Mather Boulevard to Sunrise Boulevard
Douglas Road – Sunrise Boulevard to Grant Line Road
International Drive – South White Rock Road to Zinfandel Drive
International Drive – Zinfandel Drive to Kilgore Road
White Rock Road – Zinfandel Drive to Sunrise Boulevard
White Rock Road – Sunrise Boulevard to Grant Line Road
Folsom Boulevard – Zinfandel Drive to Sunrise Boulevard
Folsom Boulevard – Sunrise Boulevard to Hazel Avenue
Mather Field Road – Folsom Boulevard to US-50 Westbound Ramps
Mather Field Road – US-50 Eastbound Ramps to International Drive
Zinfandel Drive – Folsom Boulevard to US-50 Westbound Ramps
Zinfandel Drive – US-50 Eastbound Ramps to White Rock Road
Zinfandel Drive – White Rock Road to International Drive
Sunrise Boulevard – Gold Country Boulevard to Coloma Road
Sunrise Boulevard – Coloma Road to US-50 Westbound Ramps
Sunrise Boulevard – US-50 Eastbound Ramps to Folsom Boulevard
Sunrise Boulevard – Folsom Boulevard to White Rock Road
Sunrise Boulevard – White Rock Road to Douglas Road
Sunrise Boulevard – Douglas Road to SR 16
Sunrise Boulevard – SR 16 to Grant Line Road
Hazel Avenue – US-50 Westbound Ramps to Winding Way
Grant Line Road – White Rock Road to Douglas Road
Grant Line Road –Douglas Road to SR 16
Grant Line Road – SR 16 to Sunrise Boulevard
Douglas Road – Sunrise to Jaeger Road – 2014 and Cumulative scenarios only
Douglas Road – Americanos Boulevard to Grant Line Road – 2014 and Cumulative scenarios only
Sunrise Boulevard – Douglas to Kiefer Boulevard – 2014 and Cumulative scenarios only
Sunrise Boulevard – Kiefer Boulevard to SR16 – 2014 and Cumulative scenarios only
Douglas Road – Jaeger Road to Americanos Boulevard – Cumulative scenario only
Pyramid Boulevard – Sunrise Boulevard to Jaeger Road – Cumulative scenario only
Pyramid Boulevard – Jaeger Road to Americanos Boulevard – Cumulative scenario only
Kiefer Boulevard – Eagles Nest Road to Sunrise Boulevard – Cumulative scenario only
Kiefer Boulevard – Sunrise Boulevard to Jaeger Road – Cumulative scenario only
Eagles Nest Road – Mather Boulevard to Douglas Road – Cumulative scenario only
Eagles Nest Road – Douglas Road to Kiefer Boulevard – Cumulative scenario only
Eagles Nest Road – Kiefer Boulevard to SR 16 – Cumulative scenario only
Sunrise Boulevard – Douglas Road to Pyramid Boulevard – Cumulative scenario only
Sunrise Boulevard – Pyramid Boulevard to Kiefer Boulevard – Cumulative scenario only
Sunrise Boulevard – Kiefer Boulevard to SR 16 – Cumulative scenario only
Sunrise Reliever – US-50 to White Rock Road – Cumulative scenario only
Jaeger Road – White Rock Road to Douglas Road – Cumulative scenario only

Jaeger Road – Douglas Road to Pyramid Boulevard – Cumulative scenario only
Jaeger Road – Pyramid Boulevard to Kiefer Boulevard – Cumulative scenario only
Americanos Boulevard – White Rock Road to Douglas Road
Americanos Boulevard – Douglas Road to Pyramid Boulevard

Freeway Segments

29. US-50 – Mather Field Road to Zinfandel Boulevard
30. US-50 – Zinfandel Boulevard to Sunrise Boulevard
31. US-50 – Sunrise Boulevard to Hazel Avenue
32. US-50 – Hazel Avenue to Folsom Boulevard
33. US-50 – Sunrise Boulevard to Sunrise Reliever – 2014 and Cumulative Scenarios
34. US-50 – Sunrise Reliever to Hazel Avenue – 2014 and Cumulative Scenarios

Interchanges

1. Mather Field Road interchange at US-50
2. Zinfandel Drive interchange at US-50
3. Sunrise Boulevard interchange at US-50
4. Hazel Avenue interchange at US-50
5. Sunrise Reliever interchange at US-50 – 2014 and Cumulative Scenarios

Report Organization

The remainder of this report contains the following three sections:

Section II – 2014 Conditions
Section III – Cumulative (Year 2030) Conditions
Section IV – Impacts and Mitigation Measures

II. 2014 OPERATING CONDITIONS

The purpose of the 2014 analysis is to determine if implementation of the proposed project, in addition to background growth associated with approved/planned projects in the area over the next ten years, will adversely affect the planned transportation system through the . The following scenarios were analyzed for 2014 Conditions as outlined in Section II.

- 2014 No Project Conditions – Assumes no development on the Rio del Oro site.
- 2014 With Phase I – 2014 No Project Conditions with development from Phase I of the Rio del Oro Specific Plan.
- 2014 With Specific Plan Buildout – 2014 No project Conditions with development of the entire Rio del Oro Specific Plan.

Planned Transportation Improvements

2014 roadway improvements assumed in this analysis are consistent with Tier 1 improvements identified in the MTP for completion prior to 2014 as shown on Figure 3. As shown on Figure 3, the Sunrise Reliever interchange was assumed for 2014 Conditions. The interchange was assumed to be a Type L-7 interchange for westbound US-50, and a traditional diamond interchange for eastbound US-50. The following additional roadway segments and intersections were included in this analysis based on these improvements:

<u>Roadway Segments</u>

1. Douglas Road – Sunrise Boulevard to Jaeger Road
2. Douglas Road – Americanos Boulevard to Grant Line Road
3. Sunrise Boulevard – Douglas Road to Kiefer Boulevard
4. Sunrise Boulevard – Kiefer Boulevard to SR 16

<u>Intersections</u>

Sunrise Boulevard/Kiefer Boulevard
Sunrise Boulevard/International Drive
Eagles Nest Road/Douglas Road

Roadway System Operations

<u>Roadway Segments</u>

2014 Conditions daily traffic volumes were compared to the capacity criteria for roadway segments. Table 1 summarizes the roadway analysis for all 2014 scenarios.

As shown on Table 1, the following segments will operate at LOS F for at least one scenario:

Mather Boulevard – Femoyer Street to Douglas Road (Deficiency (D-1)
Zinfandel Drive – US-50 Eastbound Ramps to White Rock Road (D-2)
Sunrise Boulevard – Gold Country Boulevard to Coloma Road (D-3)
Sunrise Boulevard – Coloma Road to US-50 Westbound Ramps (D-4)
Sunrise Boulevard – US-50 Eastbound Ramps to Folsom Boulevard (D-5)
Sunrise Boulevard – SR-16 to Grant Line Road (D-6)
Hazel Avenue – Winding Way to US-50 Westbound Ramps (D-7)

US-50 – Mather Field Road to Zinfandel Drive (D-8)
Sunrise Boulevard – Douglas Road to Kiefer Boulevard (D-9)
Sunrise Boulevard – Kiefer Boulevard to SR-16 (D-10)

Intersections

2014 Volumes and identified roadway improvements were used to calculate AM and PM peak hour levels of service at the study intersections. The results of the LOS analysis are summarized in Table 2.

The results of the LOS analysis indicate that the following intersections will operate at an unacceptable level during the AM or PM peak hours for at least one scenario:

SR-16/Excelsior Road (D-11)
SR-16/Sunrise Boulevard (D-12)
SR-16/Grant Line Road (D-13)
Florin Road/Sunrise Boulevard (D-14)
Grant Line Road/Sunrise Boulevard (D-15)
Grant Line Road/Kiefer Road (D-16)
Grant Line Road/Douglas Road (D-17)
Douglas Road/Sunrise Boulevard (D-18)
Zinfandel Drive/White Rock Road (D-19)
Zinfandel Drive/US-50 Eastbound Ramps (D-20)
Sunrise Boulevard/White Rock Road (D-21)
Sunrise Boulevard/US-50 Westbound Ramps (D-22)
Sunrise Boulevard/Zinfandel Drive (D-23)
Hazel Avenue/Folsom Boulevard (D-24)
Hazel Avenue/US-50 Eastbound Ramps (D-25)
Hazel Avenue/US-50 Westbound Ramps (D-26)
Sunrise Boulevard/Kiefer Boulevard (D-27)
Sunrise Boulevard/International Drive (D-28)

Signal Warrant Analysis

Peak hour signal warrants were reviewed at the two unsignalized study intersections. The results show that both unsignalized study intersections will satisfy the peak hour volume warrant for traffic signal installation.

Freeway Ramp Merge/Diverge/Weave Analysis

The results of the merge/diverge/weave analysis are summarized in Table 3. The results indicate that the following merge/diverge/weave segments will operate at an unacceptable LOS F during the AM or PM peak hours for all scenarios:

Eastbound Mather Field Road Direct Off-Ramp (D-29)
Eastbound Zinfandel Drive Direct Off-Ramp (D-30)
Eastbound Sunrise Boulevard Loop/Direct On-Ramp (D-31)
Eastbound Sunrise Reliever Direct Off-Ramp (D-32)
Eastbound Sunrise Reliever Direct On-Ramp (D-33)
Westbound Hazel Avenue Direct Off-Ramp (D-34)
Westbound Hazel Avenue Loop On-Ramp (D-35)

TABLE 1
Roadway Segment Levels of Service – 2014 Conditions (2014)

Roadway Segment	Lanes	No Project			With Phase I			With SP Buildout		
		Vol	V/C	LOS	Vol	V/C	LOS	Vol	V/C	LOS
SR 16 – Excelsior Road to Eagles Nest Road	2	16,900	0.94	E	16,900	0.94	E	17,000	0.94	E
SR 16 – Sunrise Boulevard to Grant Line Road	4	16,900	0.47	A	17,800	0.49	A	17,700	0.49	A
Kiefer Boulevard – Grant Line Road to North of SR 16[1]	2	6,100	0.36	D	6,800	0.40	D	7,700	0.45	D
Mather Boulevard – Femoyer Street to Douglas Road	2	22,000	1.22	F	22,100	1.23	F	22,300	1.24	F
Douglas Road – Mather Boulevard to Sunrise Boulevard	6	25,800	0.48	A	28,600	0.53	A	31,200	0.58	A
International Drive – South White Rock Road to Zinfandel Drive	4	12,000	0.33	A	15,800	0.44	A	18,000	0.50	A
International Drive – Zinfandel Drive to Kilgore Road	4	10,100	0.28	A	18,800	0.52	A	23,300	0.65	B
White Rock Road – Zinfandel Drive to Sunrise Boulevard	6	17,900	0.33	A	27,800	0.51	A	32,700	0.61	B
White Rock Road – Sunrise Boulevard to Grant Line Road	4	8,400	0.23	A	11,800	0.33	A	18,200	0.51	A
Folsom Boulevard – Zinfandel Drive to Sunrise Boulevard	4	20,300	0.56	A	20,600	0.57	A	20,700	0.58	A
Folsom Boulevard – Sunrise Boulevard to Hazel Avenue	4	13,300	0.37	A	13,400	0.37	A	13,500	0.38	A
Mather Field Road – Folsom Boulevard to US-50 Westbound Ramps	4	26,400	0.73	C	27,000	0.75	C	27,500	0.76	C
Mather Field Road – US-50 Eastbound Ramps to International Drive	6	37,400	0.69	B	38,100	0.71	C	38,900	0.72	C
Zinfandel Drive – Folsom Boulevard to US-50 Westbound Ramps	4	22,700	0.63	B	23,500	0.65	B	23,700	0.66	B
Zinfandel Drive – US-50 Eastbound Ramps to White Rock Road	6	41,900	0.78	C	**55,700**	**1.03**	**F**	**62,400**	**1.16**	**F**
Zinfandel Drive – White Rock Road to International Drive	6	20,100	0.37	A	24,600	0.46	A	26,800	0.50	A
Sunrise Boulevard – Gold Country Boulevard to Coloma Road	6	75,800	1.40	F	**84,400**	**1.56**	**F**	**89,700**	**1.66**	**F**
Sunrise Boulevard – Coloma Road to US-50 Westbound Ramps	6	82,400	1.53	F	**92,100**	**1.71**	**F**	**97,900**	**1.81**	**F**
Sunrise Boulevard – US-50 Eastbound Ramps to Folsom Boulevard	6	52,100	0.96	E	**61,600**	**1.14**	**F**	**64,100**	**1.19**	**F**
Sunrise Boulevard – Folsom Boulevard to White Rock Road	6	37,200	0.69	B	47,700	0.88	D	50,600	0.94	E
Sunrise Boulevard – White Rock Road to Douglas Road	6	30,500	0.56	A	40,600	0.75	C	43,800	0.81	D
Sunrise Boulevard – SR 16 to Grant Line Road	2	23,900	1.33	F	**29,000**	**1.61**	**F**	**31,800**	**1.77**	**F**
Hazel Avenue – Winding Way to US-50 Westbound Ramps[2]	6	71,100	1.19	F	**75,700**	**1.26**	**F**	**79,800**	**1.33**	**F**
Grant Line Road – White Rock Road to Douglas Road	2	13,200	0.73	C	13,200	0.73	C	13,200	0.73	C
Grant Line Road –Douglas Road to SR 16	2	12,100	0.67	B	12,100	0.67	B	12,200	0.68	B
Grant Line Road – SR 16 to Sunrise Boulevard	2	10,600	0.59	A	10,600	0.59	A	10,900	0.61	B
US-50 – Mather Field Road to Zinfandel Drive	8	176,200	1.10	F	**188,500**	**1.18**	**F**	**197,900**	**1.24**	**F**
US-50 – Zinfandel Drive to Sunrise Boulevard	8	155,100	0.97	E	155,200	0.97	E	158,500	0.99	E
US-50 – Sunrise Boulevard to Hazel Avenue	8	134,100	0.84	D	134,500	0.84	D	142,000	0.89	D
US-50 – Hazel Avenue to Folsom Boulevard	8	119,400	0.75	C	127,400	0.80	D	131,800	0.82	D
Douglas Road – Sunrise Boulevard to Jaeger Road	4	19,700	0.55	A	24,900	0.69	B	27,700	0.77	C
Douglas Road – Americanos Boulevard to Grant Line Road	4	2,600	0.07	A	2,600	0.07	A	2,700	0.08	A
Sunrise Boulevard – Douglas Road to Kiefer Boulevard	4	39,800	1.11	F	**51,100**	**1.42**	**F**	**54,700**	**1.52**	**F**
Sunrise Boulevard – Kiefer Boulevard to SR 16	4	35,800	0.99	E	**43,500**	**1.21**	**F**	**46,900**	**1.30**	**F**

Notes:

Not expected to be a through roadway for 2014 Conditions.
Assumed to have high access control.
Shaded areas indicate deficiency. **Bold** indicates impact.

Source: *Fehr & Peers,* 2005.

TABLE 2
Intersection Levels of Service – 2014 Conditions (2014)

		No Project				With Phase I				With SP Buildout			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Intersection	**Control**	**V/C or Delay**	**LOS**	**V/C or Delay**	**LOS**	**V/C or Delay**	**LOS**	**V/C or Delay**	**LOS**	**V/C Or Delay**	**LOS**	**V/C or Delay**	**LOS**
1. SR 16/Excelsior Road	Signalized	1.66	F	1.24	F	1.70	F	1.30	F	1.73	F	1.26	F
2. SR 16/Eagles Nest Road	Signalized	0.59	A	0.46	A	0.58	A	0.45	A	0.58	A	0.47	A
3. SR 16/Sunrise Boulevard	Signalized	1.01	F	0.88	D	1.14	F	1.01	F	1.21	F	1.07	F
4. SR 16/Grant Line Road	Signalized	1.19	F	1.15	F	1.20	F	1.16	F	1.27	F	1.23	F
5. Florin Road/Sunrise Boulevard	Signalized	0.67	B	0.87	D	0.78	C	1.02	F	0.88	D	1.10	F
6. Grant Line Road/Sunrise Boulevard	Signalized	1.54	F	1.64	F	1.80	F	1.89	F	1.87	F	2.03	F
7. Grant Line Road/Kiefer Boulevard	All-Way Stop	90	F	110	F	130	F	143	F	175	F	> 180	F
8. Douglas Road/Grant Line Road	Side-Street Stop	50	F	36	E	79	F	56	F	77	F	35	E
9. Douglas Road/Sunrise Boulevard	Signalized	1.10	F	1.17	F	1.21	F	1.41	F	1.33	F	1.52	F
10. Mather Field Road/Folsom Boulevard	Signalized	0.76	C	0.97	E	0.76	C	0.98	E	0.74	C	0.95	E
11. Mather Field Road/US-50 Westbound Ramps	Signalized	0.54	A	0.61	B	0.54	A	0.62	B	0.56	A	0.62	B
12. Mather Field Road/US-50 Eastbound Ramps	Signalized	0.82	D	0.61	B	0.83	D	0.66	B	0.85	D	0.64	B
13. Mather Field Road/International Drive	Signalized	0.70	B	0.79	C	0.75	C	0.84	D	0.78	C	0.86	D
14. Zinfandel Drive/International Drive	Signalized	0.47	A	0.44	A	0.62	B	0.62	B	0.71	C	0.65	B
15. Zinfandel Drive/White Rock Road	Signalized	0.65	B	1.00	E	0.87	D	1.21	F	0.99	E	1.32	F
16. Zinfandel Drive/US-50 Eastbound Ramps	Signalized	0.89	D	1.09	F	1.03	F	1.34	F	1.16	F	1.47	F
17. Zinfandel Drive/US-50 Westbound Ramps	Signalized	0.47	A	0.53	A	0.54	A	0.54	A	0.50	A	0.55	A
18. Sunrise Boulevard/White Rock Road	Signalized	0.83	D	0.77	C	0.89	D	0.89	D	1.01	F	0.94	E
19. Sunrise Boulevard/Folsom Boulevard	Signalized	0.84	D	0.78	C	0.91	E	0.87	D	0.96	E	0.88	D

TABLE 2 Continued
Intersection Levels of Service – 2014 Conditions (2014)

Intersection	**Control**	**No Project**				**With Phase I**				**With SP Buildout**			
		AM Peak Hour		**PM Peak Hour**		**AM Peak Hour**		**PM Peak Hour**		**AM Peak Hour**		**PM Peak Hour**	
		V/C or Delay	**LOS**	**V/C or Delay**	**LOS**	**V/C or Delay**	**LOS**	**V/C or Delay**	**LOS**	**V/C or Delay**	**LOS**	**V/C or Delay**	**LOS**
20. Sunrise Boulevard/US-50 Eastbound Ramps	Signalized	0.55	A	0.62	B	0.63	B	0.68	B	0.65	B	0.69	B
21. Sunrise Boulevard/US-50 Westbound Ramps	Signalized	0.66	B	0.95	E	0.74	C	**1.04**	**F**	0.84	D	**1.09**	**F**
22. Sunrise Boulevard/Zinfandel Drive	Signalized	1.09	F	1.98	F	**1.18**	**F**	**2.08**	**F**	**1.23**	**F**	**2.10**	**F**
23. Hazel Avenue/Folsom Boulevard[4]	Signalized	1.85	F	1.64	F	1.82	F	1.64	F	1.83	F	1.61	F
24. Hazel Avenue/US-50 Eastbound Ramps	Signalized	0.86	D	1.24	F	0.91	E	**1.42**	**F**	**1.00**	**F**	**1.55**	**F**
25. Hazel Avenue/US-50 Westbound Ramps	Signalized	1.63	F	1.07	F	**1.71**	**F**	**1.16**	**F**	**1.77**	**F**	**1.21**	**F**
26. White Rock Road/Grant Line Road	Signalized	0.49	A	0.59	A	0.51	A	0.66	B	0.62	B	0.72	C
27. Sunrise Boulevard/Keifer Boulevard	Signalized	0.86	D	0.76	C	**1.06**	**F**	0.93	E	**1.12**	**F**	1.00	E
28. Eagles Nest Road/Keifer Road	Signalized	0.45	A	0.25	A	0.45	A	0.26	A	0.45	A	0.27	A
29. Sunrise Boulevard/International	Signalized	0.88	D	0.88	D	**1.17**	**F**	**1.50**	**F**	**1.54**	**F**	**1.65**	**F**

Notes: [1] V/C (volume-to-capacity) ratio is shown for signalized intersections. Delay is shown for unsignalized intersections.

[2] Delay for side-street stop unsignalized intersections reported for worst-case approach, for all-way stop intersections average intersection delay reported in seconds per vehicle.

[3] LOS = level of service

[4] The proposed project changes traffic distribution at this intersection such that traffic is added to non-critical movements (traffic is reduced at critical movements). Therefore, V/C of the critical movements decreases with the proposed project.

Shaded areas indicate deficiency. **Bold** indicates impact.

Source: *Fehr & Peers*, 2005.

Westbound Sunrise Reliever Direct Off-Ramp (D-36)
Westbound Sunrise Reliever Direct On-Ramp (D-37)
Westbound Zinfandel Drive Direct Off-Ramp (D-38)
Westbound Zinfandel Drive Direct On-Ramp (D-39)
Westbound Mather Field Road Direct Off-Ramp (D-40)
Westbound Mather Field Road Loop On-Ramp (D-41)
Westbound Mather Field Road Direct On-Ramp (D-42)

Freeway Segments

The results of the freeway segment peak hour analysis are summarized in Table 4. The results indicate that the following two segments will operate at an unacceptable level for 2014 No Project Conditions:

Eastbound US-50, Zinfandel Drive to Sunrise Boulevard
Westbound US-50, West of Mather Field Road

The addition of traffic associated with Phase I or Specific Plan Buildout of the proposed project is expected to degrade peak hour freeway segment operations to an unacceptable level for the following freeway segments:

Eastbound US-50, West of Mather Field Road (D-43)
Eastbound US-50, Mather Field Road to Zinfandel Drive (D-44)
Eastbound US-50, Zinfandel Drive to Sunrise Boulevard (D-45)
Eastbound US-50, Sunrise Boulevard to Sunrise Reliever (D-46)
Eastbound US-50, Sunrise Reliever to Hazel Avenue (D-47)
Eastbound US-50, East of Hazel Avenue (D-48)
Westbound US-50, East of Hazel Avenue (D-49)
Westbound US-50, Hazel Avenue to Sunrise Reliever (D-50)
Westbound US-50, Zinfandel Drive to Mather Field Road (D-51)
Westbound US-50, West of Mather Field Road (D-52)

TABLE 3
Merge/Diverge/Weave Level of Service – 2014 Conditions (2014)

Ramp	Merge, Diverge, or Weave	No Project				With Phase I				With SP Buildout			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Density[1]	LOS[2]	Density[1]	LOS[2]	Density[1]	LOS[2]	Density[1]	LOS[2]	Density[1]	LOS[2]	Density[1]	LOS[2]
EASTBOUND US-50													
Mather Field Road Direct Off-Ramp	Diverge	45	F	41	F	47	F	44	F	51	F	50	F
Mather Field Road Loop On-Ramp	Merge	23	C	24	C	24	C	26	C	26	C	28	C
Mather Field Road Direct On-Ramp	Merge	22	C	22	C	23	C	23	C	25	C	25	C
Zinfandel Drive Direct Off-Ramp	Diverge	24	C	19	B	29	D	24	C	36	F	31	D
Zinfandel Drive Loop On-Ramp	Merge	20	C	26	C	20	C	26	C	20	C	28	D
Zinfandel Drive Direct On-Ramp	Merge	20	B	25	C	20	B	26	C	20	B	27	C
Sunrise Boulevard Direct Off-Ramp	Diverge	22	C	31	D	22	C	31	D	23	C	33	D
Sunrise Boulevard Loop/Direct On-Ramp	Merge	34	D	37	F	34	D	37	F	35	D	42	F
Sunrise Reliever Direct Off-Ramp[3]	Diverge	27	C	40	F	27	C	41	F	29	D	45	F
Sunrise Reliever Direct On-Ramp[3]	Merge	31	D	36	E	39	F	40	F	44	F	47	F
Hazel Avenue Direct Off-Ramp	Diverge	22	C	23	C	24	C	26	C	27	C	32	D
Hazel Avenue Loop/Direct On-Ramp	Weave	N/A	D	N/A	E	N/A	D	N/A	E	N/A	D	N/A	E
AeroJet Direct Off-Ramp													
Westbound US-50													
Hazel Avenue Direct Off-Ramp	Diverge	44	F	42	F	47	F	45	F	58	F	47	F
Hazel Avenue Loop On-Ramp	Merge	37	E	34	D	38	E	36	E	42	F	38	E
Sunrise Reliever Direct Off-Ramp[3]	Diverge	40	F	32	D	44	F	35	E	49	F	41	F
Sunrise Reliever Loop On-Ramp[3]	Merge	41	F	27	C	42	F	27	C	49	F	29	D
Sunrise Boulevard Direct Off-Ramp	Diverge	23	C	14	B	24	C	14	B	29	D	16	B
Zinfandel Drive Direct Off-Ramp	Diverge	39	E	29	D	39	E	29	D	41	F	29	D
Zinfandel Drive Loop On-Ramp	Merge	29	D	28	C	30	D	29	D	31	D	31	D
Zinfandel Drive Direct On-Ramp	Merge	39	F	37	F	40	F	40	F	44	F	43	F
Mather Field Direct Off-Ramp	Diverge	44	F	37	E	46	F	39	E	51	F	42	F
Mather Field Loop On-Ramp	Merge	36	F	32	D	38	F	33	D	43	F	36	F
Mather Field Direct On-Ramp	Merge	46	F	43	F	49	F	45	F	55	F	49	F

Notes:

Density in passenger cars per mile per lane for merge/diverge analysis only.

LOS = Level of Service. LOS computed using HCS 2000 software for the merge/diverge analysis consistent with HCM 2000 methodologies. Weave analysis evaluated using the Leisch Method for Weaving Analysis.

Sunrise Reliever interchange assumed to have similar geometrics to nearby interchanges. One lane assumed on all ramps (a conservative assumption).

Shaded areas indicate deficiency where calculation indicates demand exceeds capacity.

N/A = Not Applicable.

Source: *Fehr & Peers*, 2005.

TABLE 4

Freeway Segment Level of Service – 2014 Conditions (2014)

Segment	Number of Lanes	No Project				With Phase I				With SP Buildout			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		V/C[1]	LOS[2]	V/C[1]	LOS[2]	V/C[1]	LOS[2]	V/C[1]	LOS[2]	V/C[1]	LOS[2]	V/C[1]	LOS[2]
EASTBOUND US-50													
West of Mather Field Road	4	0.90	E	0.88	D	0.95	E	1.15	F	0.98	E	1.42	F
Mather Field Road to Zinfandel Drive	4	0.77	D	0.88	D	0.82	D	1.17	F	0.84	D	1.48	F
Zinfandel Drive to Sunrise Boulevard	3	0.82	D	1.08	F	0.82	D	1.10	F	0.83	D	1.33	F
Sunrise Boulevard to Sunrise Reliever	3	0.55	B	0.92	E	0.55	C	0.99	E	0.57	C	1.57	F
Sunrise Reliever to Hazel Avenue	3	0.85	D	0.82	D	0.90	D	1.07	F	0.94	E	1.22	F
East of Hazel Avenue	3	0.77	C	0.92	E	0.80	D	1.08	F	0.83	D	1.15	F
Westbound US-50													
East of Hazel Avenue	2	0.97	E	0.80	D	1.02	F	0.89	D	1.05	F	0.93	E
Hazel Avenue to Sunrise Reliever	3	0.92	E	0.61	C	1.01	F	0.83	D	1.06	F	0.97	E
Sunrise Reliever to Sunrise Boulevard	3	0.86	D	0.64	C	0.87	D	0.65	C	0.97	E	0.74	D
Sunrise Boulevard to Zinfandel Drive	4	0.84	D	0.63	C	0.84	D	0.63	C	0.89	D	0.66	C
Zinfandel Drive to Mather Field Road	4	1.00	E	0.85	D	1.05	F	1.06	F	1.13	F	1.16	F
West of Mather Field Road	4	1.01	F	0.97	E	1.07	F	1.17	F	1.14	F	1.27	F

Notes:

V/C = Volume to Capacity ratio. Based on capacities from the Highway Capacity Manual.

LOS = Level of Service.

Excludes HOV lanes.

Shaded areas indicate deficiency where calculation indicates demand exceeds capacity.

Source: *Fehr & Peers*, 2005.

IV. CUMULATIVE OPERATING CONDITIONS

The purpose of the cumulative analysis is to determine if implementation of the proposed project, in addition to cumulative background growth, will adversely affect the planned transportation system through the year 2030. The following scenarios were analyzed for Cumulative Conditions :

Cumulative (Year 2030) Conditions
Cumulative (Year 2030) With Project (Specific Plan Buildout) Conditions
Cumulative (Year 2030) With Hazel Avenue Extension Conditions
Cumulative (Year 2030) With Project (Specific Plan Buildout) and Hazel Avenue Extension Conditions

Planned Transportation Improvements

Cumulative (Year 2030) roadway improvements are consistent with Tier 1 improvements identified in the MTP for 2025.

The timing of the Hazel Avenue extension between Folsom Boulevard and Grant Line Road is uncertain. Therefore, the analysis scenarios for "With Hazel Avenue Extension" are presented for informational purposes only.

The following roadway segments and intersections were included in the Cumulative Analysis:

Roadway Segments:

Douglas Road – Jaeger Road to Americanos Boulevard
Pyramid Boulevard – Sunrise Boulevard to Jaeger Road
Pyramid Boulevard – Jaeger Road to Americanos Boulevard
Kiefer Boulevard – Eagles Nest Road to Sunrise Boulevard
Kiefer Boulevard – Sunrise Boulevard to Jaeger Road
Eagles Nest Road – Mather Boulevard to Douglas Road
Eagles Nest Road – Douglas Road to Kiefer Boulevard
Eagles Nest Road – Kiefer Boulevard to SR 16
Sunrise Boulevard – Douglas Road to Pyramid Boulevard
Sunrise Boulevard – Pyramid Boulevard to Kiefer Boulevard
Sunrise Boulevard – Kiefer Boulevard to SR 16
Sunrise Reliever – US-50 to White Rock Road
Jaeger Road – White Rock Road to Douglas Road
Jaeger Road – Douglas Road to Pyramid Boulevard
Jaeger Road – Pyramid Boulevard to Kiefer Boulevard
Americanos Boulevard – White Rock Road to Douglas Road
Americanos Boulevard – Douglas Road to Pyramid Boulevard

Intersections:

Sunrise Reliever/White Rock Road
Sunrise Reliever/US-50 Eastbound Ramps
Sunrise Reliever/US-50 Westbound Ramps
Douglas Road/Jaeger Road

Douglas Road/Americanos Boulevard
Chrysanthy Boulevard/Sunrise Boulevard
Chrysanthy Boulevard/Jaeger Road
Chrysanthy Boulevard/Americanos Boulevard
Kiefer Boulevard/Jaeger Road
White Rock Road/Americanos Boulevard

Roadway System Operations

The following summarizes traffic operations for Cumulative (Year 2030) Conditions with and without the addition of the Rio del Oro Specific Plan.

Roadway Segments

Cumulative and Cumulative With Specific Plan daily traffic volumes were compared to the capacity criteria for roadway segments. Table 5 summarizes the roadway analysis for Cumulative Conditions without the Hazel Avenue Extension. Results for Cumulative Conditions With Hazel Avenue Extension are summarized in Table 6.

The results indicate that the following roadway segments will operate at an unacceptable LOS F for Cumulative Conditions:

- Mather Boulevard – Femoyer Street to Douglas Road (D-53)
- White Rock Road – Sunrise Boulevard to Grant Line Road – With Hazel Extension Only (D-54)
- Zinfandel Drive – US-50 Eastbound Ramps to White Rock Road (D-55)
- Sunrise Boulevard – Gold Country Road to Coloma Road (D-56)
- Sunrise Boulevard – Coloma Road to US-50 Westbound Ramps (D-57)

TABLE 5
Roadway Segment Levels of Service – Cumulative (2030) Conditions

Roadway Segment	**Lanes**	**No Project**			**With SP Buildout**		
		Vol	**V/C**	**LOS**	**Vol**	**V/C**	**LOS**
SR 16 – Excelsior Road to Eagles Nest Road	4	21,800	0.61	B	22,000	0.61	B
SR 16 – Sunrise Boulevard to Grant Line Road	4	22,600	0.63	B	23,300	0.65	B
Kiefer Boulevard – Grant Line Road to North of SR 16	2	9,300	0.61	E	10,700	0.63	E
Mather Boulevard – Femoyer Street to Douglas Road	2	22,900	1.27	F	23,100	1.29	F
Douglas Road – Mather Boulevard to Sunrise Boulevard	6	34,600	0.64	B	40,700	0.75	C
International Drive – South White Rock Road to Zinfandel Drive	4	15,300	0.43	A	23,900	0.66	B
International Drive – Zinfandel Drive to Kilgore Road	4	15,200	0.42	A	27,800	0.77	C
White Rock Road – Zinfandel Drive to Sunrise Boulevard	6	21,700	0.40	A	38,100	0.71	C
White Rock Road – Sunrise Boulevard to Grant Line Road	2	7,900	0.44	A	17,300	0.96	E
Folsom Boulevard – Zinfandel Drive to Sunrise Boulevard	4	23,900	0.66	B	24,600	0.68	B
Folsom Boulevard – Sunrise Boulevard to Hazel Avenue	4	15,500	0.43	A	15,700	0.43	A
Mather Field Road – Folsom Boulevard to US-50 Westbound Ramps	4	26,400	0.73	C	27,500	0.76	C
Mather Field Road – US-50 Eastbound Ramps to International Drive	6	45,500	0.84	D	49,200	0.91	E
Zinfandel Drive – Folsom Boulevard to US-50 Westbound Ramps	4	22,800	0.63	B	24,500	0.68	B
Zinfandel Drive – US-50 Eastbound Ramps to White Rock Road	6	57,300	1.06	F	**75,500**	**1.40**	**F**
Zinfandel Drive – White Rock Road to International Drive	6	33,600	0.62	B	35,800	0.66	B
Sunrise Boulevard – Gold Country Boulevard to Coloma Road	6	82,000	1.52	F	**92,000**	**1.70**	**F**
Sunrise Boulevard – Coloma Road to US-50 Westbound Ramps	6	94,200	1.74	F	**106,600**	**1.97**	**F**
Sunrise Boulevard – US-50 Eastbound Ramps to Folsom Boulevard	6	52,100	0.96	E	**62,800**	**1.16**	**F**
Sunrise Boulevard – Folsom Boulevard to White Rock Road	6	42,000	0.78	C	**55,000**	**1.02**	**F**
Sunrise Boulevard – White Rock Road to Douglas Road	6	42,300	0.78	C	**57,100**	**1.06**	**F**
Sunrise Boulevard – SR 16 to Grant Line Road	4	34,800	0.97	E	**41,800**	**1.16**	**F**
Hazel Avenue – Winding Way to US-50 Westbound Ramps	6	95,900	1.78	F	**103,200**	**1.91**	**F**
Grant Line Road – White Rock Road to Douglas Road	2	23,900	1.33	F	23,900	1.33	F
Grant Line Road –Douglas Road to SR 16	4	23,000	0.64	B	23,800	0.66	B
Grant Line Road – SR 16 to Sunrise Boulevard	2	15,900	0.88	D	16,100	0.89	D
US-50 – Mather Field Road to Zinfandel Drive	8	208,000	1.30	F	**224,800**	**1.40**	**F**
US-50 – Zinfandel Drive to Sunrise Boulevard	8	185,200	1.16	F	186,400	1.17	F
US-50 – Sunrise Boulevard to Sunrise Reliever	6	170,700	1.42	F	173,900	1.45	F
US-50 – Sunrise Reliever to Hazel Avenue	6	185,700	1.55	F	**205,100**	**1.71**	**F**
US-50 – Hazel Avenue to Folsom Boulevard	4	159,300	1.99	F	**170,800**	**2.13**	**F**
Douglas Road – Sunrise Boulevard to Jaeger Road	4	29,100	0.81	D	**39,900**	**1.11**	**F**
Douglas Road – Americanos Boulevard to Grant Line Road	4	18,100	0.50	A	22,300	0.62	B
35. Douglas Road – Jaeger Road to Americanos Boulevard	4	19,700	0.55	A	23,400	0.65	B
36. Chrysanthy Boulevard – Sunrise Boulevard to Jaeger Road	4	20,200	0.56	A	21,800	0.61	B
37. Chrysanthy Boulevard – Jaeger Road to Americanos Boulevard	4	28,500	0.79	C	32,800	0.91	E
38. Kiefer Boulevard – Eagles Nest Road to Sunrise Boulevard	2	21,500	1.19	F	21,900	1.22	F
39. Kiefer Boulevard – Sunrise Boulevard to Jaeger Road	2	18,500	1.03	F	**19,500**	**1.08**	**F**
40. Eagles Nest Road (Zinfandel Drive) – Mather Boulevard to Douglas Road	6	45,900	0.85	D	46,200	0.86	D
41. Eagles Nest Road – Douglas Road to Kiefer Boulevard	4	16,000	0.44	A	17,200	0.48	A
42. Eagles Nest Road – Kiefer Boulevard to SR 16	4	10,600	0.29	A	10,900	0.30	A
43. Sunrise Boulevard – Douglas Road to Chrysanthy Boulevard	6	68,700	1.27	F	**86,100**	**1.43**	**F**
44. Sunrise Boulevard – Chrysanthy Boulevard to Kiefer Boulevard	6	54,900	0.92	F	**69,600**	**1.16**	**F**
45. Sunrise Boulevard – Kiefer Boulevard to SR 16	4	53,900	1.35	F	**64,900**	**1.62**	**F**
46. Sunrise Reliever – US-50 to Easton Valley Parkway	6	59,800	1.11	F	**82,400**	**1.53**	**F**
47. Sunrise Reliever – Easton Valley Parkway to White Rock Road	6	46,200	0.86	D	**75,300**	**1.39**	**F**
47. Jaeger Road – White Rock Road to Douglas Road	4	12,500	0.35	A	28,700	0.80	C
48. Jaeger Road – Douglas Road to Pyramid Boulevard	4	27,800	0.77	C	**43,300**	**1.20**	**F**
49. Jaeger Road – Pyramid Boulevard to Kiefer Boulevard	4	12,800	0.36	A	16,000	0.45	A
50. Americanos Boulevard – White Rock Road to Douglas Road	4	9,100	0.25	A	16,400	0.46	A
51. Americanos Boulevard – Douglas Road to Pyramid Boulevard	4	22,700	0.63	B	29,200	0.81	D

Notes:
Shaded areas indicate deficiency. **Bold** indicates impact.
Source: *Fehr & Peers*, 2005.

TABLE 6
Roadway Segment Levels of Service – Cumulative (2030) Conditions With Hazel Avenue Extension

Roadway Segment	**Lanes**	**No Project**			**With SP Buildout**		
		Vol	**V/C**	**LOS**	**Vol**	**V/C**	**LOS**
1. SR 16 – Excelsior Road to Eagles Nest Road	4	22,100	0.61	B	22,300	0.62	B
2. SR 16 – Sunrise Boulevard to Grant Line Road	4	22,500	0.63	B	23,200	0.65	B
3. Kiefer Boulevard – Grant Line Road to North of SR 16	2	9,600	0.56	D	11,000	0.65	E
4. Mather Boulevard – Femoyer Street to Douglas Road	2	22,500	1.25	F	22,700	1.26	F
5. Douglas Road – Mather Boulevard to Sunrise Boulevard	6	34,400	0.64	B	40,300	0.75	C
6. International Drive – South White Rock Road to Zinfandel Drive	4	14,800	0.41	A	22,900	0.64	B
7. International Drive – Zinfandel Drive to Kilgore Road	4	15,000	0.42	A	27,200	0.76	C
8. White Rock Road – Zinfandel Drive to Sunrise Boulevard	6	22,200	0.41	A	39,000	0.72	C
9. White Rock Road – Sunrise Boulevard to Grant Line Road	2	8,900	0.49	A	**18,800**	**1.04**	**F**
10. Folsom Boulevard – Zinfandel Drive to Sunrise Boulevard	4	23,700	0.66	B	24,400	0.68	B
11. Folsom Boulevard – Sunrise Boulevard to Hazel Avenue	4	15,000	0.42	A	15,100	0.42	A
12. Mather Field Road – Folsom Boulevard to US-50 Westbound Ramps	4	26,400	0.73	C	27,500	0.76	C
13. Mather Field Road – US-50 Eastbound Ramps to International Drive	6	44,700	0.83	D	47,700	0.88	D
14. Zinfandel Drive – Folsom Boulevard to US-50 Westbound Ramps	4	22,800	0.63	B	24,500	0.68	B
15. Zinfandel Drive – US-50 Eastbound Ramps to White Rock Road	6	57,900	1.07	F	**76,500**	**1.42**	**F**
16. Zinfandel Drive – White Rock Road to International Drive	6	33,800	0.63	B	35,900	0.67	B
17. Sunrise Boulevard – Gold Country Boulevard to Coloma Road	6	81,700	1.51	F	**91,700**	**1.70**	**F**
18. Sunrise Boulevard – Coloma Road to US-50 Westbound Ramps	6	93,700	1.74	F	**106,100**	**1.96**	**F**
19. Sunrise Boulevard – US-50 Eastbound Ramps to Folsom Boulevard	6	52,100	0.96	E	**63,000**	**1.17**	**F**
20. Sunrise Boulevard – Folsom Boulevard to White Rock Road	6	40,800	0.76	C	**54,100**	**1.00**	**F**
21. Sunrise Boulevard – White Rock Road to Douglas Road	6	42,000	0.78	C	**56,800**	**1.05**	**F**
22. Sunrise Boulevard – SR 16 to Grant Line Road	4	34,900	0.97	E	**41,700**	**1.16**	**F**
23. Hazel Avenue – Winding Way to US-50 Westbound Ramps	6	96,500	1.79	F	**104,000**	**1.93**	**F**
24. Grant Line Road – White Rock Road to Douglas Road	2	26,200	1.46	F	26,200	1.46	F
25. Grant Line Road –Douglas Road to SR 16	4	22,700	0.63	B	23,400	0.65	B
26. Grant Line Road – SR 16 to Sunrise Boulevard	2	15,400	0.86	D	15,700	0.87	D
27. US-50 – Mather Field Road to Zinfandel Drive	8	208,600	1.30	F	**225,900**	**1.41**	**F**
28. US-50 – Zinfandel Drive to Sunrise Boulevard	8	184,600	1.15	F	186,000	1.16	F
29. US-50 – Sunrise Boulevard to Sunrise Reliever	6	170,500	1.42	F	173,600	1.45	F
30. US-50 – Sunrise Reliever to Hazel Avenue	6	183,400	1.53	F	**201,500**	**1.68**	**F**
31. US-50 – Hazel Avenue to Folsom Boulevard	4	160,400	2.01	F	**171,600**	**2.14**	**F**
32. Douglas Road – Sunrise Boulevard to Jaeger Road	4	29,600	0.82	D	**40,100**	**1.12**	**F**
33. Douglas Road – Americanos Boulevard to Grant Line Road	4	17,800	0.49	A	21,900	0.61	B
35. Douglas Road – Jaeger Road to Americanos Boulevard	4	18,800	0.52	A	22,500	0.62	B
36. Chrysanthy Boulevard – Sunrise Boulevard to Jaeger Road	4	18,800	0.52	A	20,500	0.57	A
37. Chrysanthy Boulevard – Jaeger Road to Americanos Boulevard	4	28,400	0.79	C	32,600	0.91	E
38. Kiefer Boulevard – Eagles Nest Road to Sunrise Boulevard	2	21,400	1.19	F	21,800	1.21	F
39. Kiefer Boulevard – Sunrise Boulevard to Jaeger Road	2	18,600	1.03	F	**19,500**	**1.08**	**F**
40. Eagles Nest Road (Zinfandel Drive) – Mather Boulevard to Douglas Road	6	45,100	0.84	D	45,300	0.84	D
41. Eagles Nest Road – Douglas Road to Kiefer Boulevard	4	15,900	0.44	A	17,300	0.48	A
42. Eagles Nest Road – Kiefer Boulevard to SR 16	4	10,700	0.30	A	11,000	0.31	A
43. Sunrise Boulevard – Douglas Road to Chrysanthy Boulevard	6	67,600	1.13	F	**84,700**	**1.41**	**F**
44. Sunrise Boulevard – Chrysanthy Boulevard to Kiefer Boulevard	6	55,200	0.92	F	**69,500**	**1.16**	**F**
45. Sunrise Boulevard – Kiefer Boulevard to SR 16	4	54,000	1.35	F	**64,700**	**1.62**	**F**
46. Sunrise Reliever – US-50 to Easton Valley Parkway	6	59,100	1.09	F	**80,300**	**1.49**	**F**
47. Sunrise Reliever – Easton Valley Parkway to White Rock Road	6	45,000	0.83	D	**72,800**	**1.35**	**F**
47. Jaeger Road – White Rock Road to Douglas Road	4	12,300	0.34	A	28,300	0.79	C
48. Jaeger Road – Douglas Road to Pyramid Boulevard	4	28,900	0.80	D	**44,300**	**1.23**	**F**
49. Jaeger Road – Pyramid Boulevard to Kiefer Boulevard	4	12,700	0.35	A	15,900	0.44	A
50. Americanos Boulevard – White Rock Road to Douglas Road	4	8,300	0.23	A	15,800	0.44	A
51. Americanos Boulevard – Douglas Road to Pyramid Boulevard	4	21,900	0.61	B	28,300	0.79	C

Notes:
Shaded areas indicate deficiency. **Bold** indicates impact.
Source: *Fehr & Peers,* 2005.

- Sunrise Boulevard – US-50 Eastbound Ramps to Folsom Boulevard (D-58)
- Sunrise Boulevard – Folsom Boulevard to White Rock Road (D-59)
- Sunrise Boulevard – White Rock Road to Douglas Road (D-60)
- Sunrise Boulevard – SR-16 to Grant Line Road (D-61)

- Hazel Avenue – Winding Way to US-50 Ramps (D-62)
- Grant Line Road – White Rock Road to Douglas Road (D-63)
- US-50 – Mather Field Road to Zinfandel Drive (D-64)
- US-50 – Zinfandel Drive to Sunrise Boulevard (D-65)
- US-50 – Sunrise Boulevard to Sunrise Reliever (D-66)
- US-50 – Sunrise Reliever to Hazel Avenue (D-67)
- US-50 – Hazel Avenue to Folsom Boulevard (D-68)
- Douglas Road – Sunrise Boulevard to Jaeger Road (D-69)
- Kiefer Boulevard – Eagles Nest Road to Sunrise Boulevard (D-70)
- Kiefer Boulevard – Sunrise Boulevard to Jaeger Road (D-71)
- Sunrise Boulevard – Douglas Road to Chrysanthy Boulevard (D-72)
- Sunrise Boulevard – Chrysanthy Boulevard to Kiefer Boulevard (D-73)
- Sunrise Boulevard – Kiefer Boulevard to SR-16 (D-74)
- Sunrise Reliever – US-50 to Easton Valley Parkway (D-75)
- Sunrise Reliever – Easton Valley Parkway to White Rock Road (D-76)
- Jaeger Road – Douglas Road to Chrysanthy Boulevard (D-77)

Study Intersections

The Cumulative (2030) traffic volumes were used to calculate peak hour levels of service at the study intersections with and without trips from the Rio del Oro Specific Plan. Table 7 summarizes the LOS at each study intersection. Table 8 presents the results of the LOS analysis at the study intersections for Cumulative Conditions with the Hazel Avenue Extension.

The results of analysis without the Hazel Avenue extension indicate that the following roadway segments will operate at an unacceptable LOS F during the AM or PM peak hour for Cumulative No Project or Cumulative With Project Conditions:

- SR 16/Sunrise Boulevard (D-78)
- Florin Road/Sunrise Boulevard (D-79)
- Grant Line Road/Kiefer Boulevard (D-80)
- Douglas Road/Grant Line Road (D-81)
- Douglas Road/Sunrise Boulevard (D-82)
- Mather Field Road/International Drive (D-83)
- Zinfandel Drive/International Drive (D-84)
- Zinfandel Drive/White Rock Road (D-85)
- Zinfandel Drive/US-50 Eastbound Ramps (D-86)
- Sunrise Boulevard/White Rock Road (D-87)
- Sunrise Boulevard/Folsom Boulevard (D-88)
- Sunrise Boulevard/US-50 Westbound Ramps (D-89)
- Sunrise Boulevard/Zinfandel Drive (D-90)
- Hazel Avenue/Folsom Boulevard (D-91)
- Hazel Avenue/US-50 Eastbound Ramps (D-92)
- Hazel Avenue/US-50 Westbound Ramps (D-93)
- White Rock Road/Grant Line Road (D-94)
- Sunrise Boulevard/Keifer Boulevard (D-95)
- Eagles Nest Road/Keifer Road (D-96)
- Sunrise Boulevard/International (D-97)
- Sunrise Reliever/White Rock Road (D-98)
- Sunrise Reliever/US-50 Eastbound Ramps (D-99)
- Douglas Road/Jaeger Road (D-100)
- Douglas Road/Americanos Boulevard (D-101)
- Chrysanthy Boulevard/Sunrise Boulevard (D-102)

TABLE 7
Intersection Levels of Service – Cumulative (2030) Conditions

Intersection	Control	No Project				With SP Buildout			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		V/C or Delay^{1,2}	LOS^{3}	V/C or Delay^{1,2}	LOS^{3}	V/C or Delay^{1,2}	LOS^{3}	V/C or Delay^{1,2}	LOS^{3}
1. SR 16/Excelsior Road	Signalized	0.87	D	0.69	B	0.91	E	0.71	C
2. SR 16/Eagles Nest Road	Signalized	0.80	C	0.74	C	0.79	C	0.75	C
3. SR 16/Sunrise Boulevard	Signalized	1.03	F	1.01	F	**1.14**	**F**	**1.21**	**F**
4. SR 16/Grant Line Road	Signalized	0.72	C	0.59	A	0.73	C	0.61	B
5. Florin Road/Sunrise Boulevard	Signalized	0.94	E	0.88	D	**1.09**	**F**	**1.06**	**F**
6. Grant Line Road/Sunrise Boulevard	Signalized	0.80	D	0.55	A	0.92	E	0.61	B
7. Grant Line Road/Kiefer Boulevard	All-Way Stop	> 180	F	> 180	F	**> 180**	**F**	**> 180**	**F**
8. Douglas Road/Grant Line Road	Side-Street Stop	> 180	F	102	F	**> 180**	**F**	**> 180**	**F**
9. Douglas Road/Sunrise Boulevard	Signalized	1.27	F	1.72	F	1.30	F	**2.08**	**F**
10. Mather Field Road/Folsom Boulevard	Signalized	0.81	D	0.94	E	0.83	D	0.95	E
11. Mather Field Road/US-50 Westbound Ramps	Signalized	0.64	B	0.61	B	0.63	B	0.63	B
12. Mather Field Road/US-50 Eastbound Ramps	Signalized	0.89	E	0.80	D	0.95	E	0.84	D
13. Mather Field Road/International Drive	Signalized	0.71	C	1.03	F	0.81	D	**1.10**	**F**
14. Zinfandel Drive/International Drive[4]	Signalized	0.79	C	1.00	F	0.86	D	0.83	D
15. Zinfandel Drive/White Rock Road	Signalized	0.97	E	1.11	F	**1.21**	**F**	**1.40**	**F**
16. Zinfandel Drive/US-50 Eastbound Ramps	Signalized	1.08	F	1.13	F	**1.30**	**F**	**1.50**	**F**
17. Zinfandel Drive/US-50 Westbound Ramps	Signalized	0.63	B	0.58	A	0.64	B	0.59	B
18. Sunrise Boulevard/White Rock Road	Signalized	0.90	D	0.74	D	**1.34**	**F**	1.08	F
19. Sunrise Boulevard/Folsom Boulevard	Signalized	1.44	F	1.36	F	**1.54**	**F**	**1.66**	**F**
20. Sunrise Boulevard/US-50 Eastbound Ramps	Signalized	0.55	A	0.62	B	0.65	B	0.69	B
21. Sunrise Boulevard/US-50 Westbound Ramps	Signalized	0.76	D	1.12	F	0.89	D	**1.24**	**F**
22. Sunrise Boulevard/Zinfandel Drive	Signalized	1.16	F	2.05	F	**1.27**	**F**	**2.19**	**F**
23. Hazel Avenue/Folsom Boulevard[4]	Signalized	1.51	F	2.00	F	1.54	F	2.01	F
24. Hazel Avenue/US-50 Eastbound Ramps	Signalized	1.28	F	1.55	F	**1.43**	**F**	**1.70**	**F**
25. Hazel Avenue/US-50 Westbound Ramps	Signalized	1.96	F	1.40	F	**2.07**	**F**	**1.51**	**F**
26. White Rock Road/Grant Line Road	Signalized	0.82	D	0.92	E	**1.03**	**F**	0.94	E
27. Sunrise Boulevard/Keifer Boulevard	Signalized	1.11	F	0.98	E	**1.36**	**F**	**1.17**	**F**
28. Eagles Nest Road/Keifer Road	Signalized	1.13	F	1.11	F	**1.18**	**F**	1.08	F
29. Sunrise Boulevard/International	Signalized	1.02	F	1.15	F	**1.30**	**F**	**1.53**	**F**
30. Sunrise Reliever/White Rock Road	Signalized	1.19	F	0.96	E	**2.28**	**F**	**2.34**	**F**
31. Sunrise Reliever/US-50 Eastbound Ramps	Signalized	0.95	E	1.20	F	**1.23**	**F**	**1.64**	**F**
32. Sunrise Reliever/US-50 Westbound Ramps	Uncontrolled	-	-	-	-	-	-	-	-
33. Douglas Road/Jaeger Road	Signalized	0.82	D	1.00	E	**1.36**	**F**	**1.30**	**F**
34. Douglas Road/Americanos Boulevard	Signalized	1.00	E	0.89	D	**1.52**	**F**	**1.31**	**F**
35. Chrysanthy Boulevard/Sunrise Boulevard	Signalized	1.42	F	0.87	D	**1.70**	**F**	**1.12**	**F**
36. Chrysanthy Boulevard/Jaeger Road	Signalized	0.89	D	0.56	A	**1.14**	**F**	0.76	C
37. Chrysanthy Boulevard/Americanos Boulevard	Signalized	0.63	B	0.68	B	0.74	C	0.74	C
38. Kiefer Boulevard/Jaeger Road	Signalized	0.73	C	0.66	B	0.79	C	0.68	B
39. White Rock Road/Americanos Boulevard	Signalized	0.66	B	0.77	C	**1.38**	**F**	**1.76**	**F**

Notes:
[1] V/C (volume-to-capacity) ratio is shown for signalized intersections. Delay is shown for unsignalized intersections.
[2] Delay for side-street stop unsignalized intersections reported for worst-case approach, for all-way stop intersections average intersection delay reported in seconds per vehicle.
[3] LOS = level of service
[4] The proposed project changes traffic distribution at this intersection such that traffic is added to non-critical movements (traffic is reduced at critical movements). Therefore, V/C of the critical movements decreases with the proposed project.
Shaded areas indicate deficiency. **Bold** indicates impact.

Source: *Fehr & Peers*, 2005.

TABLE 8
Intersection Levels of Service – Cumulative (2030) Conditions With Hazel Avenue Extension

		No Project				**With SP Buildout**			
		AM Peak Hour		**PM Peak Hour**		**AM Peak Hour**		**PM Peak Hour**	
Intersection	**Control**	**V/C or Delay[1,2]**	**LOS[3]**	**V/C or Delay[1,2]**	**LOS[3]**	**V/C or Delay[1,2]**	**LOS[3]**	**V/C or Delay[1,2]**	**LOS[3]**
1. SR 16/Excelsior Road	Signalized	0.90	D	0.72	C	0.92	E	0.73	C
2. SR 16/Eagles Nest Road	Signalized	0.78	C	0.73	C	0.85	D	0.73	C
3. SR 16/Sunrise Boulevard	Signalized	1.03	F	1.02	F	**1.18**	**F**	**1.22**	**F**
4. SR 16/Grant Line Road	Signalized	0.72	C	0.59	A	0.74	C	0.61	B
5. Florin Road/Sunrise Boulevard	Signalized	0.92	E	0.89	D	**1.08**	**F**	**1.02**	**F**
6. Grant Line Road/Sunrise Boulevard	Signalized	0.77	C	0.56	A	0.90	E	0.62	B
7. Grant Line Road/Kiefer Boulevard	All-Way Stop	> 180	F	174	F	**> 180**	**F**	**>180**	**F**
8. Douglas Road/Grant Line Road	Side-Street Stop	> 180	F	> 180	F	**> 180**	**F**	**> 180**	**F**
9. Douglas Road/Sunrise Boulevard	Signalized	1.25	F	1.73	F	**1.43**	**F**	**2.19**	**F**
10. Mather Field Road/Folsom Boulevard[4]	Signalized	0.81	D	0.95	E	0.80	D	0.93	E
11. Mather Field Road/US-50 Westbound Ramps	Signalized	0.64	B	0.61	B	0.66	C	0.63	B
12. Mather Field Road/US-50 Eastbound Ramps	Signalized	0.89	D	0.72	C	0.96	E	0.85	D
13. Mather Field Road/International Drive	Signalized	0.71	C	1.02	F	0.77	C	**1.12**	**F**
14. Zinfandel Drive/International Drive[4]	Signalized	0.85	D	1.05	F	0.93	E	0.99	E
15. Zinfandel Drive/White Rock Road	Signalized	1.03	F	1.06	F	**1.27**	**F**	**1.33**	**F**
16. Zinfandel Drive/US-50 Eastbound Ramps	Signalized	1.07	F	1.20	F	**1.30**	**F**	**1.46**	**F**
17. Zinfandel Drive/US-50 Westbound Ramps	Signalized	0.60	B	0.57	A	0.61	B	0.57	A
18. Sunrise Boulevard/White Rock Road	Signalized	0.89	D	0.76	C	**1.32**	**F**	0.99	E
19. Sunrise Boulevard/Folsom Boulevard	Signalized	1.46	F	1.40	F	**1.54**	**F**	**1.85**	**F**
20. Sunrise Boulevard/US-50 Eastbound Ramps	Signalized	0.55	A	0.62	B	0.64	B	0.69	B
21. Sunrise Boulevard/US-50 Westbound Ramps	Signalized	0.77	D	1.11	F	0.88	E	**1.24**	**F**
22. Sunrise Boulevard/Zinfandel Drive	Signalized	1.15	F	2.05	F	**1.26**	**F**	**2.17**	**F**
23. Hazel Avenue/Folsom Boulevard[4]	Signalized	1.64	F	2.02	F	1.67	F	2.04	F
24. Hazel Avenue/US-50 Eastbound Ramps	Signalized	1.29	F	1.57	F	**1.41**	**F**	**1.67**	**F**
25. Hazel Avenue/US-50 Westbound Ramps	Signalized	1.94	F	1.47	F	**2.05**	**F**	**1.55**	**F**
26. White Rock Road/Grant Line Road	Signalized	1.07	F	1.00	E	**1.35**	**F**	**1.19**	**F**
27. Sunrise Boulevard/Keifer Boulevard	Signalized	1.15	F	0.97	E	**1.36**	**F**	**1.24**	**F**
28. Eagles Nest Road/Keifer Road[4]	Signalized	1.16	F	1.10	F	1.19	F	1.09	F
29. Sunrise Boulevard/International	Signalized	1.07	F	1.07	F	**1.56**	**F**	**1.63**	**F**
30. Sunrise Reliever/White Rock Road	Signalized	1.16	F	1.00	E	**2.25**	**F**	**2.35**	**F**
31. Sunrise Reliever/US-50 Eastbound Ramps	Signalized	0.96	E	1.16	F	**1.21**	**F**	**1.64**	**F**
32. Sunrise Reliever/US-50 Westbound Ramps	Uncontrolled	-	-	-	-	-	-	-	-
33. Douglas Road/Jaeger Road	Signalized	0.77	C	1.05	F	**1.24**	**F**	**1.29**	**F**
34. Douglas Road/Americanos Boulevard	Signalized	1.02	F	0.94	E	**1.50**	**F**	**1.29**	**F**
35. Chrysanthy Boulevard/Sunrise Boulevard	Signalized	1.37	F	0.86	D	**1.73**	**F**	**1.12**	**F**
36. Chrysanthy Boulevard/Jaeger Road	Signalized	0.87	D	0.60	A	**1.09**	**F**	0.75	C
37. Chrysanthy Boulevard/Americanos Boulevard	Signalized	0.66	B	0.68	B	0.75	C	0.74	C
38. Kiefer Boulevard/Jaeger Road	Signalized	0.69	B	0.67	B	0.75	C	0.68	B
39. White Rock Road/Americanos Boulevard	Signalized	0.68	B	0.82	D	**1.32**	**F**	**1.74**	**F**

Notes:
[1] V/C (volume-to-capacity) ratio is shown for signalized intersections. Delay is shown for unsignalized intersections.
[2] Delay for side-street stop unsignalized intersections reported for worst-case approach, for all-way stop intersections average intersection delay reported in seconds per vehicle.
[3] LOS = level of service
[4] The proposed project changes traffic distribution at this intersection such that traffic is added to non-critical movements (traffic is reduced at critical movements). Therefore, V/C of the critical movements decreases with the proposed project.
Shaded areas indicate deficiency. **Bold** indicates impact.

Source: *Fehr & Peers*, 2005.

- Chrysanthy Boulevard/Jaeger Road (D-103)
- White Rock Road/Americanos Boulevard (D-104)

Signal Warrants

The peak hour volume warrant for traffic signal installation was reviewed for Cumulative Conditions at the two unsignalized study intersections. The results indicate that both intersections will satisfy the warrant for Cumulative Conditions, with or without the Hazel Avenue Extension.

Freeway Ramp Merge/Diverge/Weave Analysis

The results of the merge/diverge/weave analysis are summarized in Table 9 for Cumulative Conditions without the Hazel Avenue Extension. Table 10 presents the results of the analysis for Cumulative Conditions with the Hazel Avenue Extension.

The results indicate that the following merging/diverging/weaving segments operate at an unacceptable level during for Cumulative Conditions:

Eastbound Mather Field Road Direct Off-Ramp (D-105)
Eastbound Zinfandel Drive Direct Off-Ramp (D-106)
Eastbound Sunrise Boulevard Loop/Direct On-Ramp (D-107)
Eastbound Sunrise Reliever Direct Off-Ramp (D-108)
Eastbound Sunrise Reliever Direct On-Ramp (D-109)
Eastbound Hazel Avenue Direct Off-Ramp (D-110)
Eastbound Hazel Avenue/AeroJet Auxiliary Lane (D-111)
Westbound Hazel Avenue Direct Off-Ramp (D-112)
Westbound Hazel Avenue Loop On-Ramp (D-113)
Westbound Sunrise Reliever Direct Off-Ramp (D-114)
Westbound Sunrise Reliever Loop On-Ramp (D-115)
Westbound Zinfandel Drive Direct Off-Ramp (D-116)
Westbound Zinfandel Drive Direct On-Ramp (D-117)
Westbound Mather Field Road Direct Off-Ramp (D-118)
Westbound Mather Field Road Loop On-Ramp (D-119)
Westbound Mather Field Road Direct On-Ramp (D-120)

Freeway Segment Analysis

The results of the freeway segment peak hour analysis for Cumulative Conditions (Without Hazel Avenue Extension) are summarized in Table 11. Table 12 presents the results of the freeway segment analysis for Cumulative With Hazel Avenue Extension Conditions. The results indicate that the following segments will operate at an unacceptable level during the AM or PM peak hours:

- Eastbound US-50, west of Mather Field Road (D-121)
- Eastbound US-50, Zinfandel Drive to Sunrise Boulevard (D-122)
- Eastbound US-50, Sunrise Reliever to Hazel Avenue (D-123)
- Eastbound US-50, east of Hazel Avenue (D-124)
- Westbound US-50, east of Hazel Avenue (D-125)
- Westbound US-50, Hazel Avenue to Sunrise Reliever (D-126)
- Westbound US-50, Zinfandel Drive to Mather Field Road (D-127)
- Westbound US-50, west of Mather Field Road (D-128)

TABLE 9
Merge/Diverge/Weave Level of Service – Cumulative Conditions (No Hazel Avenue Extension)

		No Project				With Specific Plan Buildout			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Ramp	**Merge, Diverge, or Weave**	**Density[1]**	**LOS[2]**	**Density[1]**	**LOS[2]**	**Density[1]**	**LOS[2]**	**Density[1]**	**LOS[2]**
EASTBOUND US-50									
Mather Field Road Direct Off-Ramp	Diverge	55	F	48	F	58	F	53	F
Mather Field Road Loop On-Ramp	Merge	27	C	24	C	28	D	26	C
Mather Field Road Direct On-Ramp	Merge	26	C	22	C	27	C	24	C
Zinfandel Drive Direct Off-Ramp	Diverge	30	D	20	B	35	F	22	C
Zinfandel Drive Loop On-Ramp	Merge	25	C	26	C	25	C	27	C
Zinfandel Drive Direct On-Ramp	Merge	24	C	25	C	24	C	26	C
Sunrise Boulevard Direct Off-Ramp	Diverge	31	D	33	D	31	D	34	D
Sunrise Boulevard Loop/Direct On-Ramp	Merge	46	F	37	F	46	F	39	F
Sunrise Reliever Direct Off-Ramp[3]	Diverge	37	E	41	F	37	E	43	F
Sunrise Reliever Direct On-Ramp[3]	Merge	40	F	42	F	55	F	48	F
Hazel Avenue Direct Off-Ramp	Diverge	38	F	27	C	43	F	32	D
Hazel Avenue Loop/Direct On-Ramp	Weave	N/A	F	N/A	E	N/A	F	N/A	F
AeroJet Direct Off-Ramp									
Westbound US-50									
Hazel Avenue Direct Off-Ramp	Diverge	45	F	67	F	49	F	71	F
Hazel Avenue Loop On-Ramp	Merge	39	F	53	F	43	F	57	F
Sunrise Reliever Direct Off-Ramp[3]	Diverge	42	F	44	F	47	F	50	F
Sunrise Reliever Loop On-Ramp[3]	Merge	42	F	39	F	47	F	39	F
Sunrise Boulevard Direct Off-Ramp	Diverge	26	C	27	C	29	D	27	C
Zinfandel Drive Direct Off-Ramp	Diverge	41	F	38	E	42	F	38	E
Zinfandel Drive Loop On-Ramp	Merge	30	D	31	D	31	D	31	D
Zinfandel Drive Direct On-Ramp	Merge	38	F	45	F	41	F	48	F
Mather Field Direct Off-Ramp	Diverge	44	F	44	F	48	F	47	F
Mather Field Loop On-Ramp	Merge	37	F	37	F	40	F	39	F
Mather Field Direct On-Ramp	Merge	47	F	53	F	52	F	56	F

Notes:

[1] Density in passenger cars per mile per lane for merge/diverge analysis only.

[2] LOS = Level of Service. LOS computed using HCS 2000 software for the merge/diverge analysis consistent with HCM 2000 methodologies. Weave analysis evaluated using the Leisch Method for Weaving Analysis.

[3] Sunrise Reliever interchange assumed to have similar geometrics to nearby interchanges. One lane assumed on all ramps (a conservative assumption).

Shaded areas indicate deficiency where calculation indicates demand exceeds capacity.

N/A = Not Applicable.

Source: *Fehr & Peers*, 2005.

TABLE 10
Merge/Diverge/Weave Level of Service – Cumulative Conditions With Hazel Avenue Extension

		No Project				With Specific Plan Buildout			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Ramp	**Merge, Diverge, or Weave**	**Density[1]**	**LOS[2]**	**Density[1]**	**LOS[2]**	**Density[1]**	**LOS[2]**	**Density[1]**	**LOS[2]**
EASTBOUND US-50									
Mather Field Road Direct Off-Ramp	Diverge	55	F	45	F	58	F	50	F
Mather Field Road Loop On-Ramp	Merge	27	C	25	C	28	D	27	C
Mather Field Road Direct On-Ramp	Merge	26	C	23	C	37	C	24	C
Zinfandel Drive Direct Off-Ramp	Diverge	30	D	22	C	36	F	28	D
Zinfandel Drive Loop On-Ramp	Merge	25	C	26	C	25	C	27	C
Zinfandel Drive Direct On-Ramp	Merge	24	C	25	C	24	C	26	C
Sunrise Boulevard Direct Off-Ramp	Diverge	31	D	33	E	31	D	35	D
Sunrise Boulevard Loop/Direct On-Ramp	Merge	46	F	37	F	47	F	40	F
Sunrise Reliever Direct Off-Ramp[3]	Diverge	38	E	41	F	38	E	44	F
Sunrise Reliever Direct On-Ramp[3]	Merge	47	F	42	F	53	F	48	F
Hazel Avenue Direct Off-Ramp	Diverge	36	F	26	C	41	F	31	D
Hazel Avenue Loop/Direct On-Ramp	Weave	N/A	F	N/A	E	N/A	F	N/A	F
AeroJet Direct Off-Ramp									
Westbound US-50									
Hazel Avenue Direct Off-Ramp	Diverge	45	F	67	F	49	F	71	F
Hazel Avenue Loop On-Ramp	Merge	39	F	52	F	43	F	56	F
Sunrise Reliever Direct Off-Ramp[3]	Diverge	42	F	43	F	47	F	48	F
Sunrise Reliever Loop On-Ramp[3]	Merge	42	F	39	F	46	F	40	F
Sunrise Boulevard Direct Off-Ramp	Diverge	24	C	27	C	27	C	27	C
Zinfandel Drive Direct Off-Ramp	Diverge	40	E	41	F	42	F	41	F
Zinfandel Drive Loop On-Ramp	Merge	30	D	31	D	31	D	32	D
Zinfandel Drive Direct On-Ramp	Merge	38	F	45	F	41	F	48	F
Mather Field Direct Off-Ramp	Diverge	44	F	44	F	48	F	47	F
Mather Field Loop On-Ramp	Merge	37	F	37	F	40	F	39	F
Mather Field Direct On-Ramp	Merge	48	F	52	F	52	F	56	F

Notes:
[1] Density in passenger cars per mile per lane for merge/diverge analysis only.
[2] LOS = Level of Service. LOS computed using HCS 2000 software for the merge/diverge analysis consistent with HCM 2000 methodologies. Weave analysis evaluated using the Leisch Method for Weaving Analysis.
[3] Sunrise Reliever interchange assumed to have similar geometrics to nearby interchanges. One lane assumed on all ramps (a conservative assumption).
Shaded areas indicate deficiency where demand exceeds capacity.
N/A = Not Applicable.
Source: *Fehr & Peers*, 2005.

TABLE 11
Freeway Segment Level of Service – Cumulative Conditions (No Hazel Avenue Extension)

Segment	**Number of Lanes**	**No Project**				**With Specific Plan Buildout**			
		AM Peak Hour		**PM Peak Hour**		**AM Peak Hour**		**PM Peak Hour**	
		V/C[1]	**LOS[2]**	**V/C[1]**	**LOS[2]**	**V/C[1]**	**LOS[2]**	**V/C[1]**	**LOS[2]**
EASTBOUND US-50									
West of Mather Field Road	4	1.06	F	0.91	E	1.13	F	1.01	F
Mather Field Road to Zinfandel Drive	4	0.92	E	0.85	D	0.98	E	0.93	E
Zinfandel Drive to Sunrise Boulevard	3	1.03	F	1.06	F	1.03	F	1.09	F
Sunrise Boulevard to Sunrise Reliever	3	0.80	D	0.89	D	0.81	D	0.95	E
Sunrise Reliever to Hazel Avenue	3	1.19	F	0.85	D	1.31	F	0.96	E
East of Hazel Avenue	3	1.00	E	0.92	E	1.07	F	0.98	E
Westbound US-50									
East of Hazel Avenue	2	0.93	E	1.43	F	1.02	F	1.53	F
Hazel Avenue to Sunrise Reliever	3	0.92	E	0.93	E	1.04	F	1.06	F
Sunrise Reliever to Sunrise Boulevard	3	0.82	D	0.91	E	0.90	E	0.92	E
Sunrise Boulevard to Zinfandel Drive	4	0.80	D	0.82	D	0.84	D	0.82	D
Zinfandel Drive to Mather Field Road	4	0.96	E	1.00	E	1.05	F	1.06	F
West of Mather Field Road	4	0.94	E	1.11	F	1.04	F	1.18	F

Notes:
[1] V/C = Volume to Capacity ratio. Based on capacities from the Highway Capacity Manual.
[2] LOS = Level of Service.
[3] Excludes HOV lanes.
Shaded areas indicate deficiency where calculation indicates demand exceeds capacity.
Source: *Fehr & Peers*, 2005.

TABLE 12
Freeway Segment Level of Service – Cumulative Conditions With Hazel Avenue Extension

Segment	**Number of Lanes**	**No Project**				**With Specific Plan Buildout**			
		AM Peak Hour		**PM Peak Hour**		**AM Peak Hour**		**PM Peak Hour**	
		V/C[1]	**LOS**[2]	**V/C**[1]	**LOS**[2]	**V/C**[1]	**LOS**[2]	**V/C**[1]	**LOS**[2]
EASTBOUND US-50									
West of Mather Field Road	4	1.06	F	0.90	E	1.13	F	1.00	F
Mather Field Road to Zinfandel Drive	4	0.91	E	0.87	D	0.98	E	0.96	E
Zinfandel Drive to Sunrise Boulevard	3	1.01	F	1.06	F	1.02	F	1.11	F
Sunrise Boulevard to Sunrise Reliever	3	0.80	D	0.89	D	0.81	D	0.96	E
Sunrise Reliever to Hazel Avenue	3	1.16	F	0.85	D	1.27	F	0.96	E
East of Hazel Avenue	3	1.12	F	0.91	E	1.19	F	0.97	E
Westbound US-50									
East of Hazel Avenue	2	0.94	E	1.43	F	1.02	F	1.52	F
Hazel Avenue to Sunrise Reliever	3	0.73	C	0.91	E	0.85	D	1.02	F
Sunrise Reliever to Sunrise Boulevard	3	0.82	D	0.91	E	0.88	D	0.92	E
Sunrise Boulevard to Zinfandel Drive	4	0.80	D	0.81	D	0.83	D	0.81	D
Zinfandel Drive to Mather Field Road	4	0.96	E	0.99	E	1.05	F	1.06	F
West of Mather Field Road	4	1.01	F	1.10	F	1.11	F	1.18	F

Notes:
[1] V/C = Volume to Capacity ratio. Based on capacities from the Highway Capacity Manual.
[2] LOS = Level of Service.
[3] Excludes HOV lanes.
Shaded areas indicate deficiency where calculation indicates demand exceeds capacity.
Source: *Fehr & Peers*, 2005.

VI. IMPACTS AND MITIGATION MEASURES

This section of the report identifies impacts and mitigation measures associated with Phase I of the proposed project and buildout of the proposed Specific Plan for 2014 and Cumulative (2030) Conditions. First, the project impacts are described based on policies and analyses identified in previous chapters. Then, the significance of identified deficiencies is discussed. Finally, measures to mitigate specific impacts are identified.

2014 Conditions

Significant impacts, identified deficiencies, and proposed mitigation measures for 2014 Conditions are described below.

<u>Roadway Segments</u>

Impact (I) 1: Phase I and buildout of the Specific Plan will increase daily volume-to-capacity (V/C) ratios on area roadway segments for 2014 Conditions. This is considered a ***significant impact.***

Deficiency (D) -1: *Mather Boulevard, Femoyer Street to Douglas Road.* The segment operates at LOS F for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Buildout Conditions. However, traffic associated with Phase I and Specific Plan Buildout is not expected to increase the V/C on the segment by 0.05 or more. Therefore, Phase I and buildout of the Specific Plan are expected to result in a less-than-significant impact. Since the impact is less-than-significant, no mitigation is required.

For this segment to operate at an acceptable level, four lanes would be needed on the roadway segment. This is consistent with improvements identified in the Sunrise Douglas II Specific Plan analysis and the City's General Plan.

D-2: *Zinfandel Drive, US 50 Eastbound Ramps to White Rock Road.* The segment operates at LOS C for 2014 No Project Conditions. The addition of traffic from Phase I and buildout of the proposed Specific Plan will degrade operations to and unacceptable LOS F. This is considered a significant impact based on the significance criteria.

Mitigation (M) -2: For this segment to operate at an acceptable level, it would need to be widened from six to eight lanes. Implementation of this mitigation measure would reduce the impact to a ***less-than-significant level.*** However, the widening is not consistent with the City's General Plan. The General Plan analysis indicates that, with improved connectivity within the City of Rancho Cordova, the roadway may only need six lanes to serve expected demands.

D-3: *Sunrise Boulevard, Gold Country Boulevard to Coloma Road.* The segment operates at an unacceptable LOS F for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Buildout Conditions. Traffic associated with Phase I and buildout of the Specific Plan will increase the V/C ratio by more than 0.05. This is considered a significant impact based on the significance criteria.

M-3: Consistent with recommendations in the Sacramento County Mobility Study, this segment could be widened to eight lanes. The additional lanes would have capacity to serve the number of trips added by Phase I and buildout of the Specific Plan and would reduce the impact to a ***less-than-significant level.*** This improvement is consistent with the City's General Plan.

Although the project impact would be reduced to a less-than-significant level, the roadway segment would still operate at an unacceptable LOS F. Therefore, additional measures are needed to reduce the total number of trips on this roadway segment and improve operations. These measures consist of support of alternative travel modes, bus-rapid-transit (BRT) on or parallel to Sunrise Boulevard, and shuttle or bus service supporting BRT route. Additionally, unique treatments could be applied to this segment consisting of signal coordination or other capacity-improving intersection treatments.

D-4: *Sunrise Boulevard, Coloma Road to US-50 Westbound Ramps.* The segment will operate at an unacceptable LOS F for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will increase V/C ratios by 0.05 or more. This is considered a significant impact based on the significance criteria.

M-4: Consistent with recommendations in the Sacramento County Mobility Study, this segment could be widened to eight lanes. Additionally, pedestrian facilities could be added to improve walkability through the segment which could reduce traffic volumes on the segment. The additional lanes would have capacity to serve the number of trips added by Phase I and buildout of the Specific Plan and would reduce the impact to a ***less-than-significant level.*** This improvement is consistent with the City's General Plan.

Although the project impact would be reduced to a less-than-significant level, the roadway segment would still operate at an unacceptable LOS F. Therefore, additional measures are needed to reduce the total number of trips on this roadway segment and improve operations. These measures consist of support of alternative travel modes, bus-rapid-transit (BRT) on or parallel to Sunrise Boulevard, and shuttle or bus service supporting BRT route. Additionally, unique treatments could be applied to this segment consisting of signal coordination or other capacity-improving intersection treatments.

D-5: *Sunrise Boulevard, US-50 Eastbound Ramps to Folsom Boulevard.* The segment will operate at an acceptable LOS E for 2014 No Project Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will degrade operations to an unacceptable LOS F. This is considered a significant impact based on the significance criteria.

M-5: The addition of travel lanes on this segment is considered infeasible due to limited right-of-way. Therefore, the addition of project traffic is expected to result in a ***significant-and-unavoidable impact*** to this roadway segment.

The number of trips added to this roadway segment could be reduced with the implementation of bus-rapid-transit (BRT) on or parallel to Sunrise Boulevard, shuttle or bus service supporting the BRT route, and shuttle or bus service supporting the LRT station. Additionally, unique treatments could be applied to this segment consisting of signal coordination or other capacity-improving intersection treatments. These improvements are consistent with the City's General Plan, which identifies eight lanes or special roadway treatments on the segment.

D-6: *Sunrise Boulevard, SR-16 to Grant Line Road.* The segment will operate at an unacceptable LOS F for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will increase V/C ratios by 0.05 or more. This is considered a significant impact based on the significance criteria.

M-6: Consistent with recommendations in the Sunrise Douglas II Specific Plan analysis, this roadway segment could be widened from two to four lanes (the City's General Plan identifies an ultimate cross section of six lanes on this segment. This improvement would provide acceptable roadway operations for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions. The improvement would reduce the impact to a ***less-than-significant level.***

D-7: *Hazel Avenue, Winding Way to US-50 Westbound Ramps.* The segment will operate at an unacceptable LOS F for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions. Traffic from Phase I and buildout of the Specific Plan will increase the V/C ratio by 0.05 or more. This is considered a significant impact based on the significance criteria.

M-7: To mitigate impacts, the segment would need to be widened as an eight lane, high access control roadway and is consistent with the City's General Plan. However, this improvement may not be feasible due to right-of-way constraints. Additionally, since the facility is not controlled by the City of Rancho Cordova, the lead agency for this EIR, improvements to the segment cannot be guaranteed. Therefore, the addition traffic from Phase I and buildout of the Specific Plan is expected to result in a ***significant-and-unavoidable impact.***

The number of trips added to this roadway segment could be reduced with the implementation of alternative transportation modes, like BRT on Sunrise Boulevard and connectivity to BRT and LRT. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project.

D-8: *US-50, Mather Field Road to Zinfandel Drive.* The segment will operate at an unacceptable LOS F for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions. Traffic from Phase I and buildout of the Specific Plan will increase the V/C ratio by 0.05 or more. This is considered a significant impact based on the significance criteria.

M-8: To offset impacts associated with the proposed project on this roadway segment, additional lanes would need to be added to US-50 on this segment. The increased capacity (approximately 40,000 ADT) would be more than sufficient to accommodate the additional 12,300 trips added by Phase I and the 21,700 trips added by buildout of the Specific Plan. However, the only identified improvement for this segment is in the MTP and consists of adding HOV lanes to the segment. Any additional capacity enhancing improvements may not be feasible due to right-of-way constraints. Additionally, since the facility is not controlled by the City of Rancho Cordova, the lead agency for this EIR, improvements to the segment cannot be guaranteed. Based on all of these factors, the addition traffic from Phase I and buildout of the Specific Plan is expected to result in a ***significant-and-unavoidable impact.***

To reduce the number of trips added to this freeway segment, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento, by providing effective connectivity to the LRT station (from a shuttle or bus). This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project.

D-9: *Sunrise Boulevard, Douglas Road to Kiefer Boulevard.* The segment will operate at an unacceptable LOS F for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions. Traffic from Phase I and buildout of the Specific Plan will increase the V/C ratio by 0.05 or more. This is considered a significant impact based on the significance criteria.

M-9: Consistent with recommendations in the Sunrise Douglas II Specific Plan analysis and the City's General Plan, this roadway segment could be widened from four to six lanes. This improvement would provide acceptable roadway operations for 2014 No Project and 2014 With Phase I Conditions and reduce the impact of Phase I to a ***less-than-significant level.***

However, to provide acceptable operations for 2014 With Specific Plan Conditions, the segment would also need to be high access controlled. With these improvements, the Specific Plan impact would be reduced to a ***less-than-significant level.***

D-10: *Sunrise Boulevard, Kiefer Boulevard to SR-16.* This segment will operate at an acceptable LOS E for 2014 No Project Conditions. The addition of traffic from Phase I or buildout of the Specific Plan will degrade operations of the segment to an unacceptable LOS F and, based on the significance criteria, is considered a significant impact.

M-10: Consistent with recommendations in the Sunrise Douglas II Specific Plan analysis and the City's General Plan, this roadway segment could be widened from four to six lanes. This improvement would provide acceptable roadway operations for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions and reduce the impact to a ***less-than-significant level.***

Intersections

I-2: Phase I and buildout of the Specific Plan will add traffic to area intersections for 2014 Conditions. This is considered a ***significant impact.***

D-11: *SR-16/Excelsior Road.* The intersection will operate at an unacceptable LOS F during the AM and PM peak hours for 2014, 2014 With Phase I, and 2014 With Specific Plan Conditions. The addition of traffic from Phase I during PM peak hour is expected to increase the V/C ratio by more than 0.05. Traffic from the proposed Specific Plan will increase the V/C ratio by more than 0.05 during the AM peak hour. Therefore, the addition of traffic from Phase I and buildout of the Specific Plan is expected to result in a significant impact based on the significance criteria.

M-11: To mitigate impacts at the intersection, the following lane configuration is needed:

- One left-turn lane and one shared through/right-turn lane on the northbound approach
- One left-turn lane, one through lane, and one right-turn lane on the southbound approach. Provide a southbound right-turn arrow concurrent with the eastbound left-turn movement (otherwise known as an overlap right-turn phase). This would require prohibiting eastbound U-turns at the intersection.
- One left-turn lane, one through lane, and one shared through/right-turn lane on the eastbound and westbound approaches (SR-16 is identified as a four-lane facility in the City's General Plan).

With the above improvements, the intersection would operate at an acceptable LOS E or better during the AM and PM peak hours for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions, reducing the impact to a less-than-significant level. However, the City of Rancho Cordova does not control the intersection (SR-16 is currently a Caltrans controlled facility). Since Rancho Cordova, as the lead agency, cannot guarantee that these improvements can be incorporated, the impact is considered ***significant-and-unavoidable.***

D-12: *SR-16/Sunrise Boulevard.* The intersection will operate at an unacceptable LOS F during the AM peak hour for 2014 No Project Conditions. The addition of traffic from Phase I and buildout of the Specific Plan is expected to degrade operations during the PM peak hour from an acceptable level to an unacceptable LOS F. Traffic from Phase I and buildout of the Specific Plan is expected to increase the V/C ratio at the intersection during the AM peak hour by more than 0.05. This is considered a significant impact based on the significance criteria.

M-12: To mitigate impacts at the intersection, the following lane configuration is needed:

- One left-turn lane, two through lanes, and one shared through/right-turn lane on the northbound approach.
- One left-turn lane, three through lanes, and one right-turn lane with overlap right-turn phase on the southbound approach. This would require prohibiting eastbound U-turns at the intersection.
- One left-turn lane, two through lanes, and one right-turn lane on the eastbound approach.
- One left-turn lane, two through lanes, and one right-turn lane with overlap right-turn phase on the westbound approach. This would require prohibiting southbound U-turns at the intersection.

With the above improvements, the intersection would operate at an acceptable LOS E or better during the AM and PM peak hours for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions, reducing the impact to a less-than-significant level. However, the City of Rancho Cordova does not control the intersection (SR-16 is currently a Caltrans controlled facility). Since Rancho Cordova, as the lead agency, cannot guarantee that these improvements can be incorporated, the impact is considered ***significant-and-unavoidable.***

The referenced improvements are consistent with the City's General Plan, as six lanes are identified for Sunrise Boulevard, and four lanes are identified for SR-16.

D-13: *SR-16/Grant Line Road.* The intersection will operate at LOS F during the AM and PM peak hour for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions.

The addition of traffic associated with Phase I is expected to increase the V/C ratio by less than 0.05. Therefore, based on the significance criteria, traffic from Phase I is expected to result in a less-than-significant impact to the intersection.

However, the addition of traffic from buildout of the Specific Plan will increase the V/C ratio by 0.05 or more during the AM and PM peak hours. Therefore, traffic from the Specific Plan is expected to result in a significant impact based on the significance criteria.

M-13: To mitigate the Specific Plan impact at the intersection, the following modifications are required on the northbound and southbound approaches:

- Reconfigure both approaches to consist of one left-turn lane, one through lane, and one right-turn lane.
- Provide protected left-turn phasing.

With the above improvements, the intersection would operate at an acceptable LOS D or better during the AM and PM peak hours for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions, reducing the impact to a less-than-significant level. However, the City of Rancho Cordova does not control the intersection (SR-16 is currently a Caltrans controlled facility). Since Rancho Cordova, as the lead agency, cannot guarantee that these improvements can be incorporated, the impact is considered ***significant-and-unavoidable.*** The City's General Plan identifies additional lanes and unique treatments at the intersection over that identified in this study. This is to accommodate additional traffic that could be at the intersection if Grant Line Road and/or SR-16 are upgraded as expressways, as identified in the General Plan (and not included in this analysis).

D-14: *Florin Road/Sunrise Boulevard.* The intersection is expected to operate at an acceptable level during the AM and PM peak hours for 2014 No Project Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will degrade operations to an unacceptable LOS F during the PM peak hour, resulting in a significant impact based on the significance criteria.

M-14: To mitigate impacts at the intersection, the southbound approach would need to be reconfigured to consist of two through lanes and a dedicated right-turn lane. With this improvement, the intersection would operate at an acceptable level during the AM and PM peak hours for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions, reducing the impact to a less-than-significant level. However, this intersection is outside the City limits, and is controlled by the County of Sacramento. Since the City cannot guarantee implementation of the mitigation measure, the impact is considered ***significant and unavoidable.***

The City's General Plan identifies Sunrise Boulevard as a six-lane facility on this roadway segment, which would be more than adequate to accommodate the identified improvement.

D-15: *Grant Line Road/Sunrise Boulevard.* The intersection will operate at an unacceptable LOS F for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions. The addition of traffic from Phase I or buildout of the Specific Plan will increase the V/C ratio at the intersection by 0.05 or more during the AM and PM peak hours. This is considered a significant impact based on the significance criteria.

M-15: Due to substantial southbound right-turns and eastbound left-turns, the following improvements are needed:

- Provide a dedicated southbound right-turn lane with receiving lane on Grant Line Road, creating an uncontrolled (free) right-turn movement.
- Add a second eastbound left-turn lane.

These improvements would allow the intersection to operate at an acceptable level for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions, reducing the Phase I and Specific Plan buildout impact to a ***less-than-significant level.***

The City's General Plan identifies both roadways as six-lane facilities, which is more than sufficient to accommodate the identified improvements.

D-16: *Grant Line Road/Kiefer Road.* The all-way stop-controlled intersection will operate at an unacceptable LOS F during the AM and PM peak hours for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will increase delays at the intersection by more than five seconds. This is considered a significant impact based on the significance criteria.

M-16: To mitigate impacts at the intersection, a traffic signal could be installed at the intersection with protected left-turn phasing on all approaches. With this improvement, the intersection would operate at an acceptable LOS E or better for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions, reducing the impact to a ***less-than-significant level.***

The City's General Plan identifies Grant Line Road as an expressway, which would have limited access and grade-separation at major intersections. As such, the proposed signal has adequate spacing from other intersections to accommodate the expressway.

D-17: *Grant Line Road/Douglas Road.* The intersection operates at an unacceptable LOS F for the following scenarios:

- 2014 No Project Conditions, AM peak hour only.
- 2014 With Phase I Conditions, AM and PM peak hours. Traffic from Phase I is expected to increase intersection delay by more than five seconds.
- 2014 With Specific Plan Conditions, AM peak hour only. Traffic from buildout of the Specific Plan is expected to increase AM peak hour delay by more than five seconds.

Traffic from Phase I and buildout of the Specific Plan is expected to result in a significant impact based on the significance criteria.

M-17: To mitigate impacts at the intersection the following improvements are needed:

- Install traffic signal with protected northbound left-turn phase.
- Modify northbound approach to consist of one left-turn lane and one through lane
- Modify southbound approach to consist of one right-turn lane and one through lane

With these improvements, the intersection would operate at an acceptable level for all 2014 analysis scenarios and would reduce the project impact to a ***less-than-significant level.***

The City's General Plan identifies Grant Line Road as an expressway, which would have limited access and grade-separation at major intersections. As such, the proposed signal has adequate spacing from other intersections to accommodate the expressway.

D-18: *Douglas Road/Sunrise Boulevard.* The intersection operates at an unacceptable level for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions during the AM and PM peak hours. The addition of traffic from Phase I and buildout of the Specific Plan is expected to increase the V/C ratio at the intersection by 0.05 or more. This is considered a significant impact based on the significance criteria.

M-18: To mitigate impacts at the intersection, the following lane configuration is needed:

- Two left-turn lanes, three through lanes, and one right-turn lane on the northbound approach
- Two left-turn lanes, three through lanes, and one shared through/right-turn lane on the southbound approach.
- Two left-turn lanes, three through lanes, and two right-turn lanes on the eastbound approach.

- Two left-turn lanes, three through lanes, and one right-turn lane with overlap right-turn phase on the westbound approach. This would require prohibiting southbound U-turns at the intersection.

The intersection would operate at an acceptable LOS E or better during the AM and PM peak hours for 2014 No Project, 2014 With Phase I, and 2014 With Specific Plan Conditions, reducing the impact to a ***less-than-significant level.***

The City's General Plan identifies Douglas Road as a four-lane facility east of Sunrise Boulevard, and a six-lane facility west of Douglas Road. Sunrise Boulevard is identified as a six lane facility. Although the mitigation would require widening the westbound approach to accommodate the additional through lane (compared to the General Plan), the mitigation measure is consistent with that identified in the General Plan.

D-19: *Zinfandel Drive/White Rock Road.* The intersection operates at an acceptable LOS E during the AM and PM peak hours for 2014 No Project Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will degrade operations during the PM peak hour to an unacceptable LOS F. This is considered a significant impact based on the significance criteria.

M-19: To mitigate impacts associated with Phase I of the proposed project, the intersection could be modified to consist of the following lane configuration:

- Two left-turn lanes, three through lanes, and one right-turn lane on the northbound approach.
- Three left-turn lanes, two through lanes, and one shared through/right-turn lane on the southbound approach.
- Three left-turn lanes, two through lanes, and one shared through/right-turn lane on the eastbound approach.
- Two left-turn lanes, two through lanes, and two right-turn lanes with overlap right-turn signal phase on the westbound approach. This would require prohibiting southbound U-turns at the intersection

The addition of traffic from buildout of the Specific Plan would require the following lane configuration:

- Two left-turn lanes, three through lanes, and one shared through/right-turn lane on the northbound approach. This would require four receiving lanes north of the intersection.
- Three left-turn lanes, two through lanes, and one shared through/right-turn lane on the southbound approach.
- Three left-turn lanes, two through lanes, and one shared through/right-turn lane on the eastbound approach.
- Two left-turn lanes, two through lanes, and two right-turn lanes with overlap right-turn signal phase on the westbound approach. This would require prohibiting southbound U-turns at the intersection

With the mitigation measures described above, the project impact would be reduced to a ***less-than-significant level.*** The identified measures are consistent with the City's General Plan.

D-20: *Zinfandel Drive/US-50 Eastbound Ramps.* The intersection operates at an unacceptable LOS F during the PM peak hour only for 2014 No Project Conditions. The addition of traffic from Phase I and buildout of the Specific Plan is expected to degrade operations during the AM peak hour from an acceptable level to an unacceptable LOS F. Additionally, the V/C ratio during the PM peak hour is expected to increase by 0.05 or more. This is considered a significant impact based on the significance criteria.

M-20: To mitigate impacts associated with Phase I of the proposed project, the intersection could be modified to consist of the following lane configuration:

- Four through lanes and one right-turn lane on the northbound approach.
- Two through lanes and a free (uncontrolled) right-turn lane on the southbound approach.
- One left-turn lane, one share through/left-turn lane, one through lane, and three right-turn lanes on the eastbound approach.
- Three right-turn lanes on the westbound approach.

With these improvements, the intersection would operate at an acceptable level during the AM peak hour, but would continue to operate at an unacceptable LOS F during the PM peak hour. However, the improvements would decrease the V/C ratio at the intersection to a level that is less than that for the No Project Condition and would decrease the impact to less-than-significant level. The identified improvements are consistent with the City's General Plan.

To mitigate Specific Plan buildout impacts, the following configuration would be needed:

- Four through lanes and one shared through/right-turn lane on the northbound approach.
- Two through lanes and a free (uncontrolled) right-turn lane on the southbound approach.
- One left-turn lane, one share through/left-turn lane, one through lane, and three right-turn lanes on the eastbound approach.
- Three right-turn lanes on the westbound approach.

With these improvements, the intersection would operate at an acceptable level during the AM peak hour, but would continue to operate at an unacceptable LOS F during the PM peak hour. However, the improvements would decrease the V/C ratio at the intersection to a level that is less than that for the No Project Condition and would decrease the impact to less-than-significant level. The identified improvements are consistent with the City's General Plan.

This ramp-terminal intersection is controlled by Caltrans. Since Rancho Cordova, as the lead agency, cannot guarantee implementation of the measures described above, the impact is considered ***significant-and-unavoidable.***

To reduce the number of trips added to this intersection, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento, by providing effective connectivity to the LRT station (from a shuttle or bus). This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project. Additionally, improvements of parallel routes, like completion of Kiefer Road or added capacity to White Rock Road or Old Placerville Road, would have the capacity of relieving the projected demand at the interchange.

D-21: *Sunrise Boulevard/White Rock Road.* The intersection is expected to operate at an acceptable level for 2014 No Project Conditions. The addition of traffic from buildout of the Specific Plan is expected to degrade operations during the AM peak hour to an unacceptable LOS F. This is considered a significant impact based on the significance criteria.

M-21: To mitigate impacts at the study intersection, a third southbound left-turn lane would be needed. With this improvement, the intersection would operate at an acceptable LOS E during the AM peak hour and reduce the impact to a ***less-than-significant level.*** The identified improvement is consistent with the City's General Plan.

D-22: *Sunrise Boulevard/US-50 Westbound Ramps.* The intersection will operate at an acceptable level of service for 2014 No Project Conditions. The addition of traffic from Phase I and Specific Plan Buildout will degrade operations to an unacceptable level during the PM peak hour. This is considered a significant impact based on the significance criteria.

M-22: To mitigate impacts at this intersection, a third westbound right-turn lane could be added. With this improvement, the intersection would operate at an acceptable level during the AM and PM peak hours for all 2014 analysis scenarios and would reduce the project impact to a less-than-significant level.

This ramp-terminal intersection is controlled by Caltrans. Since Rancho Cordova, as the lead agency, cannot guarantee implementation of the measure described above, the impact is considered ***significant-and-unavoidable.***

To reduce the number of trips added to this intersection, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento and BRT on or parallel to Sunrise Boulevard. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on Sunrise Boulevard.

D-23: *Sunrise Boulevard/Zinfandel Drive.* The intersection will operate at an unacceptable LOS F for 2014 No Project Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will increase the V/C ratio at the intersection by 0.05 or more. This is considered a significant impact based on the significance criteria.

M-23: Consistent with improvements identified in the Sacramento County Mobility Study and the City's General Plan, one through lane in the northbound and southbound directions could be added at the intersection. Although the intersection would still operate at an unacceptable LOS F during the PM peak hour, the improvement provides sufficient capacity to offset the addition of Phase I and buildout of the Specific Plan traffic to the intersection and would reduce the impact to a ***less-than-significant level.***

D-24: *Hazel Avenue/Folsom Boulevard.* The intersection will operate at an unacceptable LOS F during the AM and PM peak hours for all 2014 analysis scenarios. The addition of project traffic to the intersection will not increase the V/C ratio by 0.05 or more. Therefore, the addition of traffic from Phase I or buildout of the Specific Plan is expected to result in a less-than-significant impact to the study intersection. Since the impact is less-than-significant, no mitigation is required.

Significant improvements would be needed to improve operations to an acceptable level. These improvements will likely include grade-separation of the intersection and would likely require reconstruction of the Hazel Avenue/US-50 interchange. The City's General Plan also identifies grade-separation at this intersection.

D-25: *Hazel Avenue/US-50 Eastbound Ramps.* The intersection will operate at an unacceptable LOS F during the PM peak hour for 2014 No Project Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will increase the V/C ratio at the intersection by 0.05 or more during the PM peak hour. The addition of traffic from buildout of the Specific Plan will degrade intersection operations during the AM peak hour from and acceptable level to an unacceptable LOS F. This is considered a significant impact based on the significance criteria.

M-25: To mitigate impacts at the intersection, additional capacity is needed on the freeway over-crossing to serve substantial demand for the northbound through movement and the eastbound left-turn movement. Since the interchange is not controlled by the City of Rancho Cordova, the lead agency for this project, implementation of interchange improvements cannot be guaranteed. Therefore, the addition of traffic from Phase I and buildout of the Specific Plan will result in a ***significant-and-unavoidable impact.***

To reduce the number of trips added to this intersection, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento and BRT crossings of the American River. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project at the study intersection.

D-26: *Hazel Avenue/US-50 Westbound Ramps.* The intersection operates at an unacceptable LOS F during the AM and PM peak hours for all 2014 Conditions analysis scenarios. The addition of traffic from Phase I and buildout of the Specific Plan is expected to increase the V/C ratio by 0.05 or more during the AM and PM peak hours. This is considered a significant impact based on the significance criteria.

M-26: To mitigate project impacts, a second northbound left-turn lane is needed. Additionally, a fourth through lane is needed on the northbound and southbound approaches. Since this intersection is not controlled by the City of Rancho Cordova, the lead agency for this project, implementation of interchange improvements cannot be guaranteed. Therefore, the addition of traffic from Phase I and buildout of the Specific Plan will result in a ***significant-and-unavoidable impact.***

To reduce the number of trips added to this intersection, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento and BRT crossings of the American River. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project at the study intersection.

D-27: *Sunrise Boulevard/Kiefer Boulevard.* The intersection operates at an acceptable level during the AM and PM peak hours for 2014 No Project Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will degrade operations during the AM peak hour to an unacceptable LOS F. This is considered a significant impact based on the significance criteria.

M-27: To mitigate impacts, the intersection could consist of the following configuration:

- One left-turn lane, two through lanes, and one shared through/right-turn lane on the northbound and southbound approaches.
- One left-turn lane, one through lane, one right-turn lane on the eastbound and westbound approaches.

With this configuration, the intersection would operate at an acceptable LOS E or better during the AM and PM peak hours for all 2014 Conditions analysis scenarios, reducing the impact to a ***less-than-significant level.*** The identified configuration is consistent with the City's General Plan.

D-28: *Sunrise Boulevard/International Drive.* The intersection will operate at an acceptable level during the AM and PM peak hours for 2014 No Project Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will degrade operations to an unacceptable LOS F during the AM and PM peak hours. This is considered a significant impact based on the significance criteria.

M-28: To mitigate project impacts, the intersection could consist of the following geometrics:

- Two left-turn lanes, three through lanes, and one right-turn lane on the northbound approach.
- One left-turn lane, three through lanes, and one right-turn lane on the southbound approach.

- One left-turn lane, one through lane, and two right-turn lanes with overlap right-turn signal phase on the eastbound approach. This would require prohibiting northbound U-turns.
- One left-turn lane, one through lane, and one right-turn lane on the westbound approach.

With these improvements, the intersection would operate at an acceptable level during the AM and PM peak hours for all 2014 Conditions analysis scenarios. This would reduce the impact to a ***less-than-significant level.*** The City's General Plan identifies Sunrise Boulevard as having eight-lanes or special treatments near International Drive. Additionally, the General Plan identifies this intersection as a potential location for at-grade intersection improvements.

Freeway Ramp Merge/Diverge/Weave

I-3: Phase I and buildout of the Specific Plan will add traffic to area freeway ramps for 2014 Conditions. This is considered a ***significant impact.***

D-29: *Eastbound Mather Field Road Direct Off-Ramp* – Ramp operates and an unacceptable LOS F during the AM and PM peak hours for all 2014 analysis scenarios. Phase I and buildout of the specific plan are expected to add more than ten trips to the freeway ramp. This is considered a significant impact based on the significance criteria.

M-29: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-30: *Eastbound Zinfandel Drive Direct Off-Ramp* – Ramp operates and an acceptable level during the AM and PM peak hours for 2014 No Project Conditions. Buildout of the Specific Plan is expected to degrade ramp operations to an unacceptable LOS F during the AM peak hour. This is considered a significant impact based on the significance criteria.

M-30: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the

City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-31: *Eastbound Sunrise Boulevard Loop/Direct On-Ramp* – Ramp operates and an unacceptable LOS F during the PM peak hour for all 2014 Conditions analysis scenarios. Phase I and buildout of the Specific Plan are expected to add approximately ten trips to the ramp. Therefore, the impact is considered significant based on the significance criteria.

M-31: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard, White Rock Road, or Easton Valley Parkway could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-32: *Eastbound Sunrise Reliever Direct Off-Ramp* - Ramp operates and an unacceptable level during the PM peak hour for all 2014 Conditions analysis scenarios. Phase I and buildout of the Specific Plan are expected to add more than ten trips to this freeway ramp. This is considered a significant impact based on the significance criteria.

M-32: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Options to provide acceptable operations of the interchange will be considered in the project study report (PSR) that is currently underway for the Sunrise Reliever interchange.

D-33: *Eastbound Sunrise Reliever Direct On-Ramp* – Ramp operates and an acceptable level during the AM and PM peak hours for 2014 No Project Conditions. Phase I and buildout of the Specific Plan are expected to degrade ramp operations to an unacceptable level during the AM and PM peak hours. This is considered a significant impact based on the significance criteria.

M-33: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Options to provide acceptable operations of the interchange will be considered in the project study report (PSR) that is currently underway for the Sunrise Reliever interchange.

D-34: *Westbound Hazel Avenue Direct Off-Ramp* - Ramp operates and an unacceptable level during the AM and PM peak hours for all 2014 Conditions analysis scenarios. Phase I and buildout of the Specific Plan are not expected to add traffic to this ramp. Therefore, Phase I and buildout of the Specific Plan are expected to result in a less-than-significant impact to the study freeway ramp.

D-35: *Westbound Hazel Avenue Loop On-Ramp* – The segment operates at an acceptable level during the AM and PM peak hours for 2014 No Project Conditions. The addition of traffic from buildout of the Specific Plan will degrade ramp operations to an unacceptable LOS F during the AM peak hour. Based on the significance criteria, this is considered a significant impact.

M-35: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard, White Rock Road, or Easton Valley Parkway could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-36: *Westbound Sunrise Reliever Direct Off-Ramp* - Ramp operates and an unacceptable level during the AM peak hour for all 2014 Conditions analysis scenarios. Buildout of the Specific Plan is expected to degrade operations to an unacceptable level during the PM peak hour. During the AM peak hour, Phase I and buildout of the Specific Plan are expected to add more than ten trips to this freeway ramp. This is considered a significant impact based on the significance criteria.

M-36: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Options to provide acceptable operations of the interchange will be considered in the project study report (PSR) that is currently underway for the Sunrise Reliever interchange.

D-37: *Westbound Sunrise Reliever Loop On-Ramp* - Ramp operates and an unacceptable level during the AM peak hour for all 2014 Conditions analysis scenarios. Phase I and buildout of the Specific Plan are expected to add more than ten trips to this freeway ramp. This is considered a significant impact based on the significance criteria.

M-37: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Options to provide acceptable operations of the interchange will be considered in the project study report (PSR) that is currently underway for the Sunrise Reliever interchange.

D-38: *Westbound Zinfandel Drive Direct Off-Ramp* - Ramp operates and an acceptable level during the AM and PM peak hours for 2014 No Project Conditions. Buildout of the Specific Plan is expected to degrade ramp operations to an unacceptable level during the AM peak hour. This is considered a significant impact based on the significance criteria.

M-38: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-39: *Westbound Zinfandel Drive Direct On-Ramp* – Ramp operates and an unacceptable LOS F during the AM and PM peak hours for all 2014 Conditions analysis scenarios. Phase I and Buildout of the Specific Plan will add more than ten peak hour trips to the ramp during the AM peak hour only. This is considered a significant impact based on the significance criteria.

M-39: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-40: *Westbound Mather Field Road Direct Off-Ramp* - Ramp operates and an unacceptable level during the AM peak hour for all 2014 Conditions analysis scenarios. Phase I and buildout of the Specific Plan will add ten or more trips during the AM peak hour. Additionally, buildout of the Specific Plan is expected to degrade ramp operations to an unacceptable level during the PM peak hour. This is considered a significant impact based on the significance criteria.

M-40: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-41: *Westbound Mather Field Road Loop On-Ramp* - Ramp operates and an unacceptable level during the AM peak hour for all 2014 Conditions analysis scenarios. Phase I and buildout of the Specific Plan will add ten or more trips during the AM peak hour. Additionally, buildout of the Specific Plan is expected to degrade ramp operations to an unacceptable level during the PM peak hour. This is considered a significant impact based on the significance criteria.

M-41: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-42: *Westbound Mather Field Road Direct On-Ramp* - Ramp operates and an unacceptable LOS F during the AM and PM peak hours for all 2014 analysis scenarios. Phase I and buildout of the Specific Plan will add more than ten trips to the freeway ramp during the AM peak hour only. This is considered a significant impact based on the significance criteria.

M-42: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

Freeway Segments

I-4: Phase I and buildout of the Specific Plan will add traffic to area freeway segments during the peak hours for 2014 Conditions. This is considered a ***significant impact.***

D-43: *Eastbound US-50, West of Mather Field Road* – The segment operates at an acceptable level for 2014 Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will degrade operations during the PM peak hour to an unacceptable LOS F. This is considered a significant impact based on the significance criteria.

M-43: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-44: *Eastbound US-50, Mather Field Road to Zinfandel Drive* – The segment operates at an acceptable level for 2014 Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will degrade operations during the PM peak hour to an unacceptable LOS F. This is considered a significant impact based on the significance criteria.

M-44: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-45: *Eastbound US-50, Zinfandel Drive to Sunrise Boulevard* – The segment operates at an unacceptable LOS F during the PM peak hour only for all 2014 Conditions analysis scenarios. The addition of traffic from Phase I and buildout of the Specific Plan will add more than ten trips to this freeway segment. This is considered a significant impact based on the significance criteria.

M-45: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-46: *Eastbound US-50, Sunrise Boulevard to Sunrise Reliever* – The segment operates at an acceptable for 2014 No Project Conditions. The addition of traffic from buildout of the Specific Plan will degrade operations to an unacceptable level during the PM peak hour. This is considered a significant impact based on the significance criteria.

M-46: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-47: *Eastbound US-50, Sunrise Reliever to Hazel Avenue* – The segment operates at an acceptable level for 2014 No Project Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will degrade operations to an unacceptable level during the PM peak hour. This is considered a significant impact based on the significance criteria.

M-47: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-48: *Eastbound US-50, East of Hazel Avenue* – The segment operates at an acceptable level for 2014 No Project Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will degrade operations to an unacceptable level during the PM peak hour. This is considered a significant impact based on the significance criteria.

M-48: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho

Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-49 *Westbound US-50, East of Hazel Avenue* – The segment operates at an acceptable level for 2014 No Project Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will degrade operations to an unacceptable LOS F during the AM peak hour. This is considered a significant impact based on the significance criteria.

M-49: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-50: *Westbound US-50, Hazel Avenue to Sunrise Reliever* – The segment operates at an acceptable level for 2014 No Project Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will degrade operations to an unacceptable LOS F during the AM peak hour. This is considered a significant impact based on the significance criteria.

M-50: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-51: *Westbound US-50, Zinfandel Drive to Mather Field Road* – The segment operates at an acceptable level for 2014 No Project Conditions. The addition of traffic from Phase I and buildout of the Specific Plan will degrade operations to an unacceptable LOS F during the AM and PM peak hours. This is considered a significant impact based on the significance criteria.

M-51: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-52: *Westbound US-50, West of Mather Field Road* – The segment operates at an unacceptable LOS F for 2014 No Project Conditions during the AM peak hour only. Phase I and buildout of the Specific Plan will add more than ten trips to this segment during the AM peak hour. Traffic from Phase I and buildout of the Specific Plan will also degrade operations during the PM peak hour to an unacceptable level. This is considered a significant impact based on the significance criteria.

M-52: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

Cumulative (2030) Conditions

Significant impacts, identified deficiencies, and proposed mitigation measures for Cumulative Conditions are described below.

Roadway Segments

I-5: Buildout of the Specific Plan will increase daily volume-to-capacity (V/C) ratios on area roadway segments for Cumulative (2030) Conditions. This is considered a ***significant impact.***

D-53: *Mather Boulevard, Femoyer Street to Douglas Road.* The segment operates at LOS F for Cumulative No Project and Cumulative With Specific Plan Buildout Conditions, with and without the Hazel Avenue Extension. However, traffic associated with the Specific Plan is not expected to increase the V/C on the segment by 0.05 or more with or without the Hazel Avenue Extension. Therefore, buildout of the Specific Plan is expected to result in a less-than-significant impact. Since the impact is less-than-significant, no mitigation is required.

For this segment to operate at an acceptable level, four lanes would be needed on the roadway segment. This is consistent with improvements identified in the Sunrise Douglas II Specific Plan analysis and the City's General Plan.

D-54: *White Rock Road, Sunrise Boulevard to Grant Line Road.* The segment operates at an acceptable level for Cumulative (2030) No Project Conditions. However, for Cumulative With Project With Hazel Avenue Conditions, the segment degrades to an unacceptable LOS F. Based on the significance criteria, this constitutes a significant impact.

M-54: For this segment to operate at an acceptable level, it would need to be widened from two to four lanes. Implementation of this mitigation measure would reduce the impact to a ***less-than-significant level.***

The City's General Plan identifies this roadway as a potential six-lane expressway, which would require additional right-of-way than that identified for mitigation in this analysis.

D-55: *Zinfandel Drive, US-50 Eastbound Ramps to White Rock Road.* The segment operates at an acceptable level for Cumulative (2030) No Project Conditions. The addition of traffic from buildout of the Specific Plan will increase the V/C ratio by more than 0.05 with and without the Hazel Avenue Extension. Based on the significance criteria, this constitutes a significant impact.

M-55: For this segment to operate at an acceptable level, it would need to be widened from six to eight lanes. Implementation of this mitigation measure would reduce the impact to a ***less-than-significant level.***

The City's General Plan identifies this facility as a six-lane facility. The General Plan analysis assumes additional capacity on east-west facilities paralleling US-50, including completion of Kiefer Boulevard and improvements to Old Placerville Road. If implemented, these roadway improvements will shift demand from the study segment.

D-56: *Sunrise Boulevard, Gold Country Boulevard to Coloma Road.* The segment operates at an unacceptable LOS F for Cumulative (2030) No Project Conditions. Traffic associated with buildout of the Specific Plan will increase the V/C ratio by more than 0.05 with and without the Hazel Avenue Extension. This is considered a significant impact based on the significance criteria.

M-56: Consistent with recommendations in the Sacramento County Mobility Study and the City's General Plan, this segment could be widened to eight lanes. The additional lanes would have capacity to serve the number of trips added by buildout of the Specific Plan and would reduce the impact to a ***less-than-significant level.***

Although the project impact would be reduced to a less-than-significant level, the roadway segment would still operate at an unacceptable LOS F. Therefore, additional measures are needed to reduce the total number of trips on this roadway segment and improve operations. These measures consist of supporting alternative travel modes like BRT on or parallel to Sunrise Boulevard and shuttle or bus service from the project site to BRT stops. Additionally, unique treatments could be applied to this segment consisting of signal coordination or other capacity-improving intersection treatments.

D-57: *Sunrise Boulevard, Coloma Road to US-50 Westbound Ramps.* The segment will operate at an unacceptable LOS F for Cumulative (2030) No Project Conditions. The addition of traffic from buildout of the Specific Plan, with and without the Hazel Avenue Extension, will increase V/C ratios by 0.05 or more. This is considered a significant impact based on the significance criteria.

M-57: Consistent with recommendations in the Sacramento County Mobility Study and the City's General Plan, this segment could be widened to eight lanes. Additionally, pedestrian facilities could be added to improve walkability through the segment which would have the potential reduce traffic volumes on the segment. The additional lanes would have capacity to serve the number of trips added by buildout of the Specific Plan and would reduce the impact to a ***less-than-significant level.***

Although the project impact would be reduced to a less-than-significant level, the roadway segment would still operate at an unacceptable LOS F. Therefore, additional measures are needed to reduce the total number of trips on this roadway segment and improve operations. These measures consist of support of alternative travel modes like BRT on or parallel to Sunrise Boulevard and shuttle or bus service from the project site to BRT stops. Additionally, unique treatments could be applied to this segment consisting of signal coordination or other capacity-improving intersection treatments.

D-58: *Sunrise Boulevard, US-50 Eastbound Ramps to Folsom Boulevard.* The segment will operate at an acceptable LOS E for Cumulative (2030) No Project Conditions. The addition of traffic from buildout of the Specific Plan will degrade operations to an unacceptable LOS F, with and without the Hazel Avenue Extension. This is considered a significant impact based on the significance criteria.

M-58: The addition of travel lanes on this segment is considered infeasible due to limited right-of-way. Therefore, the addition of project traffic is expected to result in a ***significant-and-unavoidable impact*** to this roadway segment.

To reduce the number of trips added to this roadway segment, the proposed project should support BRT on or parallel to Sunrise Boulevard by providing shuttle or bus service to BRT stops, and shuttle or bus service providing access to the LRT station. Additionally, unique treatments could be applied to this segment consisting of signal coordination or other capacity-improving intersection treatments.

D-59: *Sunrise Boulevard, Folsom Boulevard to White Rock Road.* The segment operates at an acceptable level for Cumulative (2030) No Project Conditions. With the addition of traffic generated by buildout of the Specific Plan, the segment will degrade to an unacceptable LOS F, with or without the Hazel Avenue Extension. This is considered a significant impact based on the significance criteria.

M-59: The roadway segment could be widened to eight lanes, consistent with City's General Plan. Alternatively, control access could be modified on this segment through driveway consolidation such that the segment would be considered to have high access control. Either of these would reduce the impact to a ***less-than-significant level.***

D-60: *Sunrise Boulevard, White Rock Road to Douglas Road.* The segment operates at an acceptable level for Cumulative (2030) No Project Conditions. With the addition of traffic generated by buildout of the Specific Plan, the segment will degrade to an unacceptable LOS F, with or without the Hazel Avenue Extension. This is considered a significant impact based on the significance criteria.

M-60: The roadway segment could be widened to eight lanes. Alternatively, control access could be modified on this segment to be considered to have high access control. Either of these would reduce the impact to a ***less-than-significant level.***

The City's General Plan identifies six- to eight-lanes along this roadway segment. Therefore, the identified mitigation is consistent with the General Plan.

D-61: *Sunrise Boulevard, SR-16 to Grant Line Road.* The segment will operate at an acceptable level for Cumulative (2030) No Project Conditions. The addition of traffic from buildout of the Specific Plan will degrade operations to an unacceptable LOS F with or without the Hazel Avenue Extension. This is considered a significant impact based on the significance criteria.

M-61: The roadway segment could be widened from four to six lanes and reduce the impact to a ***less-than-significant level.*** This measure is consistent with the City's General Plan.

D-61: *Hazel Avenue, Winding Way to US-50 Westbound Ramps.* The segment will operate at an unacceptable LOS F for Cumulative (2030) No Project Conditions. Traffic from buildout of the Specific Plan will increase the V/C ratio by 0.05 or more. This is considered a significant impact based on the significance criteria.

M-61: To mitigate impacts, the segment would need to be widened as an eight lane, high access control roadway. However, this improvement may not be feasible due to right-of-way constraints. Additionally, since the facility is not controlled by the City of Rancho Cordova, the lead agency for this EIR, improvements to the segment cannot be guaranteed. Therefore, the addition traffic from buildout of the Specific Plan will result in a ***significant-and-unavoidable impact.***

To reduce the number of trips added to this roadway segment, the proposed project should support alternative transportation modes, like BRT on Sunrise Boulevard and connectivity from the project site to BRT and LRT. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project.

D-62: *Grant Line Road, White Rock Road to Douglas Road.* The segment operates at an unacceptable LOS F for Cumulative (2030) No Project Conditions and Cumulative With Specific Plan Conditions, with or without the Hazel Avenue Extension. However, the project will not increase the V/C ratio on this segment by 0.05, with or without the Hazel Avenue Extension. Therefore, the Specific Plan is considered to result in a less-than-significant impact to the roadway segment.

For the segment to operate at an acceptable level, it would need to be widened to a six lane facility, or be maintained as a four-lane facility with high access control. Either of these improvements would provide acceptable operations. The City's General Plan identifies Grant Line Road as a six-lane expressway, which is consistent with the identified mitigation measure.

D-63: *US-50, Mather Field Road to Zinfandel Drive.* The segment will operate at an unacceptable LOS F for Cumulative (2030) No Project Conditions. Traffic from buildout of the Specific Plan will increase the V/C ratio by 0.05 or more. This is considered a significant impact based on the significance criteria.

M-63: To offset impacts associated with the proposed project on this roadway segment, additional lanes would need to be added to US-50 on this segment. The increased capacity (approximately 40,000 ADT) would be more than sufficient to accommodate the additional 17,350 (with Hazel Avenue Extension) to 16,770 (without Hazel Avenue Extension) trips added by buildout of the Specific Plan. However, the only identified improvement for this segment is in the MTP and consists of adding HOV lanes to the segment. Any additional capacity enhancing improvements may not be feasible due to right-of-way constraints. Additionally, since the facility is not controlled by the City of Rancho Cordova, the lead agency for this EIR, improvements to the segment cannot be guaranteed. Based on all of these factors, the addition traffic from buildout of the Specific Plan is expected to result in a ***significant-and-unavoidable impact.***

To reduce the number of trips added to this freeway segment, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento, by providing effective connectivity to the LRT station (from a shuttle or bus). Additionally, improvements to parallel facilities, like Kiefer Boulevard or Old Placerville Road, would have the capacity to reduce demand on US-50. These measures have the potential to decrease the amount of traffic generated by the proposed project and could reduce traffic demands on US-50.

D-64: *US-50, Zinfandel Drive to Sunrise Boulevard.* The segment will operate at an unacceptable LOS F for Cumulative (2030) No Project Conditions. Traffic from buildout of the Specific Plan will not increase the V/C ratio by 0.05 or more, with or without the Hazel Avenue Extension. Therefore, buildout of the Specific Plan will result in a less-than-significant impact based on the significance criteria.

To improve operations on this roadway segment, additional lanes would need to be added to US-50 on this segment. However, the only identified improvement for this segment is in the MTP and consists of adding HOV lanes to the segment. Any additional capacity enhancing improvements may not be feasible due to right-of-way constraints.

To reduce the number of trips added to this freeway segment, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento, by providing effective connectivity to the LRT station (from a shuttle or bus). Additionally, improvements to parallel facilities, like Kiefer Boulevard, Old Placerville Road, International Drive, or White Rock Road would have the capacity to reduce demand on US-50. These measures have the potential to reduce traffic demands on US-50.

D-65: *US-50, Sunrise Boulevard to Sunrise Reliever.* The segment will operate at an unacceptable LOS F for Cumulative (2030) No Project Conditions. Traffic from buildout of the Specific Plan will not increase the V/C ratio by 0.05 or more, with or without the Hazel Avenue Extension. Therefore, buildout of the Specific Plan will result in a less-than-significant impact based on the significance criteria.

To improve operations on this roadway segment, additional lanes would need to be added to US-50 on this segment. However, the only identified improvement for this segment is in the MTP and consists of adding HOV lanes to the segment. Any additional capacity enhancing improvements may not be feasible due to right-of-way constraints.

To reduce the number of trips added to this freeway segment, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento, by providing effective connectivity to the LRT station (from a shuttle or bus). Additionally, improvements to parallel facilities like White Rock Road would have the capacity to reduce demand on US-50. These measures have the potential to reduce traffic demands on US-50.

D-66: *US-50, Sunrise Reliever to Hazel Avenue.* The segment will operate at an unacceptable LOS F for Cumulative (2030) No Project Conditions. Traffic from buildout of the Specific Plan will increase the V/C ratio by 0.05 or more. This is considered a significant impact based on the significance criteria.

M-66: To offset impacts associated with the proposed project on this roadway segment, additional lanes would need to be added to US-50 on this segment. The increased capacity (approximately 40,000 ADT) would be more than sufficient to accommodate the additional 19,420 (without Hazel Avenue Extension) to 18,050 (with Hazel Avenue Extension) trips added by buildout of the Specific Plan.

However, there are no identified improvements for this segment and any additional capacity enhancing improvements may not be feasible due to right-of-way constraints. Additionally, since the facility is not controlled by the City of Rancho Cordova, the lead agency for this EIR, improvements to the segment cannot be guaranteed. Based on all of these factors, the addition traffic from buildout of the Specific Plan is expected to result in a ***significant-and-unavoidable impact.***

To reduce the number of trips added to this freeway segment, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento, by providing effective connectivity to the LRT station (from a shuttle or bus). Additionally, improvements to parallel facilities, like Easton Valley Parkway or White Rock Road, would have the capacity to reduce demand on US-50. These measures have the potential to reduce traffic demands on US-50.

D-67: *US-50, Hazel Avenue to Folsom Boulevard.* The segment will operate at an unacceptable LOS F for Cumulative (2030) No Project Conditions. Traffic from buildout of the Specific Plan will increase the V/C ratio by 0.05 or more. This is considered a significant impact based on the significance criteria.

M-67: To offset impacts associated with the proposed project on this roadway segment, additional lanes would need to be added to US-50 on this segment. The increased capacity (approximately 40,000 ADT) would be more than sufficient to accommodate the additional 11,450 (without Hazel Avenue Extension) to 11,190 (with Hazel Avenue Extension) trips added by buildout of the Specific Plan.

However, there are no identified improvements for this segment and any additional capacity enhancing improvements may not be feasible due to right-of-way constraints. Additionally, since the facility is not controlled by the City of Rancho Cordova, the lead agency for this EIR, improvements to the segment cannot be guaranteed. Based on all of these factors, the addition traffic from buildout of the Specific Plan is expected to result in a ***significant-and-unavoidable impact.***

To reduce the number of trips added to this freeway segment, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento, by providing effective connectivity to the LRT station (from a shuttle or bus). Additionally, improvements to parallel facilities, like Easton Valley Parkway or White Rock Road, would have the capacity to reduce demand on US-50. These measures have the potential to reduce traffic demands on US-50.

D-68: *Douglas Road, Sunrise Boulevard to Jaeger Road.* This segment operates at an acceptable level for Cumulative (2030) No Project Conditions, with or without the Hazel Avenue Extension. The addition of traffic from buildout of the Specific Plan will degrade operations to an unacceptable LOS F with or without the Hazel Avenue Extension. This constitutes a significant impact based on the significance criteria.

M-68: To mitigate impacts for the analysis scenario without the Hazel Avenue Extension, the facility could be designated for high access control. However, with the Hazel Avenue Extension, the roadway would need to be six lanes. These measures would reduce the impact to a ***less-than-significant level.***

Additional east-west connectivity (like the extension of International Drive to Grant Line Road) was assumed in the General Plan analysis that was not assumed in this analysis. Due to the improved connectivity, the roadway segment would require only four lanes, not the six lanes identified in this analysis.

D-69: *Kiefer Boulevard, Eagles Nest Road to Sunrise Boulevard.* The segment operates at LOS F for all Cumulative (2030) Conditions analysis scenarios, with our without the Hazel Avenue Extension. However, the addition of traffic from the Specific Plan will not increase the V/C ratio by 0.05 or more. Therefore, the project impact to the roadway segment is considered to be less-than-significant, based on the significance criteria.

For the segment to operate at an acceptable level, the roadway would need to be widened to four lanes. This is consistent with the City's General Plan.

D-70: *Kiefer Boulevard, Sunrise Boulevard to Jaeger Road.* The segment operates at LOS F for all Cumulative (2030) Conditions analysis scenarios, with our without the Hazel Avenue Extension. The addition of traffic from the Specific Plan will increase the V/C ratio by 0.05 or more with or without the Hazel Avenue Extension. This constitutes a significant impact based on the significance criteria.

M-70: For the segment to operate at an acceptable level, the roadway would need to be widened to four lanes. With this improvement, the roadway would operate at an acceptable level and the impact would be reduced to a ***less-than-significant level.*** The identified improvement is consistent with the City's General Plan.

D-71: *Sunrise Boulevard, Douglas Road to Chrysanthy Boulevard.* The segment operates at an unacceptable LOS F for all Cumulative (2030) Conditions analysis scenarios, with or without the Hazel Avenue Extension. The addition of traffic from the Specific Plan will increase the V/C ratio by 0.05 or more. This constitutes a significant impact based on the significance criteria.

M-71: To mitigate project impacts on the roadway segment, the segment could be widened to eight lanes. The additional capacity (approximately 20,000 ADT) would offset the 19,370 (without the Hazel Avenue Extension) and 17,130 (with the Hazel Avenue Extension) trips added to the segment by buildout of the Specific Plan. This would reduce the project impact to a ***less-than-significant level.***

Although the impact would be mitigated, the roadway segment would continue to operate at an unacceptable level. For the segment to operate acceptably, additional parallel facilities are needed. These parallel facilities could include the extension of Jaeger Road south to Grant Line Road, the extension of Chrysanthy Boulevard west to Kiefer Boulevard, and upgrading Grant Line Road to an expressway. With the improved connectivity, the segment could operate at an acceptable level with a six lane cross section. The additional north-south connectivity is consistent with the City's General Plan, which identifies Sunrise Boulevard as a six-lane facility in this area.

D-72: *Sunrise Boulevard, Chrysanthy Boulevard to Kiefer Boulevard.* The segment operates at an acceptable level for Cumulative No Project Conditions with and without the Hazel Avenue Extension. However, the addition of traffic from the Specific Plan will degrade operations to an unacceptable level. This constitutes a significant impact based on the significance criteria.

M-72: To mitigate project impacts on the roadway segment, the segment could be widened to eight lanes. The additional capacity (approximately 20,000 ADT) would offset the 14,700 (without the Hazel Avenue Extension) and 14,330 (with the Hazel Avenue Extension) trips added to the segment by buildout of the Specific Plan. This would reduce the project impact to a ***less-than-significant level.***

Alternatively, additional parallel facilities could be provided. These parallel facilities could include the extension of Jaeger Road south to Grant Line Road, the extension of Chrysanthy Boulevard west to Kiefer Boulevard, and upgrading Grant Line Road to an expressway. With the improved connectivity, the segment could operate at an acceptable level with a six lane cross section. The additional north-south connectivity is consistent with the City's General Plan, which identifies Sunrise Boulevard as a six-lane facility in this area.

D-73: *Sunrise Boulevard, Kiefer Boulevard to SR-16.* The segment operates at an unacceptable LOS F for all Cumulative (2030) Conditions analysis scenarios. The addition of traffic from the Specific Plan will increase the V/C ratio by 0.05 or more. Based on the significance criteria, this constitutes a significant impact.

M-73: To mitigate project impacts on the roadway segment, the segment could be widened to six lanes. The additional capacity (approximately 20,000 ADT) would offset the 10,970 (without the Hazel Avenue Extension) and 10,710 (with the Hazel Avenue Extension) trips added to the segment by buildout of the Specific Plan. This would reduce the project impact to a ***less-than-significant level.***

Although the impact would be mitigated, the roadway segment would continue to operate at an unacceptable level. For the segment to operate acceptably, additional parallel facilities are needed. These parallel facilities could include the extension of Jaeger Road south to Grant Line Road, the extension of Chrysanthy Boulevard west to Kiefer Boulevard, and upgrading Grant Line Road to an expressway. With the improved connectivity, the segment could operate at an acceptable level with a six lane cross section. The additional north-south connectivity is consistent with the City's General Plan, which identifies Sunrise Boulevard as a six-lane facility in this area.

D-74: *Sunrise Reliever, US-50 to Easton Valley Parkway.* The segment operates at an unacceptable LOS F for all Cumulative (2030) Conditions analysis scenarios. The addition of traffic from the Specific Plan will increase the V/C ratio by 0.05 or more. Based on the significance criteria, this constitutes a significant impact.

M-74: The segment could be widened to eight lanes and the facility could be designated and controlled as an expressway (with grade-separated intersections) to provide additional capacity. Although the facility could be upgraded, it would still operate at an unacceptable level, and the impact would be ***significant-and-unavoidable.***

Alternatively, parallel facilities could be provided to improve north-south connectivity in the area. These facilities could include a north-south connector from Folsom Boulevard to White Rock Road between the Sunrise Reliever and Hazel Avenue. Additionally, the Hazel Avenue Extension could be aligned north-south (instead of northwest-southeast). This would improve access to the project site and other developments south of Rio del Oro, and shift demand from Sunrise Boulevard and Sunrise Reliever. The additional north-south connectivity is consistent with the City's General Plan, which identifies Sunrise Reliever as a six-lane expressway in this area.

To reduce the number of trips added to this roadway segment, the proposed project should support alternative transportation modes, like BRT on Sunrise Boulevard and connectivity from the project site to BRT and LRT. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project to this roadway segment.

D-75: *Sunrise Reliever, Easton Valley Parkway to White Rock Road.* The segment operates at an acceptable level for Cumulative (2030) No Project Conditions with and without the Hazel Avenue Extension. The addition of traffic from the Specific Plan will degrade operations to an unacceptable LOS F with and without the Hazel Avenue Extension. This constitutes a significant impact based on the significance Criteria.

M-75: To mitigate project impacts, the roadway could be widened to eight lanes with high access control. With this configuration, the facility would operate at an acceptable level and reduce the impact to a ***less-than-significant level.***

Alternatively, this facility could be designed as an expressway, with grade-separated intersections, to increase roadway capacity. Additionally, parallel capacity facilities, like those described in M-74, would have the capacity to reduce traffic on this roadway segment. The additional north-south connectivity is consistent with the City's General Plan, which identifies Sunrise Reliever as a six-lane expressway in this area.

D-76: *Jaeger Road, Douglas Road to Chrysanthy Boulevard.* The segment operates at an acceptable level for Cumulative (2030) No Project Conditions, with and without the Hazel Avenue Extension. The addition of traffic from the Specific Plan will degrade operations to an unacceptable level with and without the Hazel Avenue Extension. Based on the significance criteria, this constitutes a significant impact.

M-76: To mitigate the project impact, widen the segment to six lanes. This would provide acceptable operations and reduce the impact to a ***less-than-significant level.***

Due to improved north-south and east-west connectivity proposed as part of the City's General Plan (including the extension of Chrysanthy Boulevard to the west), the General Plan identifies this roadway segment as a four-lane facility. The General Plan indicates that, if the additional connectivity is provided, that the proposed mitigation may not be needed.

Intersections

I-6: Buildout of the Specific Plan will add traffic to area intersections for Cumulative Conditions. This is considered a ***significant impact.***

D-77: *SR-16/Sunrise Boulevard.* The intersection operates at an unacceptable LOS F for all Cumulative (2030) Conditions analysis scenarios, with and without the Hazel Avenue Extension. Buildout of the Specific Plan will increase the V/C ratio by 0.05 or more during the AM and PM peak hours, with and without the Hazel Avenue Extension. This constitutes a significant impact based on the significance criteria.

M-77: To mitigate impacts at the intersection, the following lane configuration is needed:

- Two left-turn lanes, three through lanes, and one right-turn lane on the northbound approach.
- Two left-turn lanes, three through lanes, and one right-turn lane with overlap right-turn phase on the southbound approach. This would require prohibiting eastbound U-turns at the intersection.
- Two left-turn lanes, two through lanes, and one right-turn lane on the eastbound approach.
- Two left-turn lanes, two through lanes, and one right-turn lane with overlap right-turn phase on the eastbound approach. This would require prohibiting southbound U-turns at the intersection.

With this lane configuration, the intersection would operate at an acceptable level during the PM peak hour, with or without the Hazel Avenue Extension. Although, the intersection would still operate at an unacceptable LOS F during the AM peak hour with or without the Hazel Avenue Extension, it would operate at a better level than the Cumulative No Project Condition. This would reduce the impact to a less-than-significant level. However, since the City of Rancho Cordova, the lead agency for the EIR, does not control the intersection (it is a Caltrans controlled facility), the City cannot guarantee implementation of the improvements. Therefore, the impact is considered ***significant and unavoidable.***

For the intersection to operate at an acceptable level during the AM peak hour, the improvements listed above would be needed, and the southbound right-turn would need to be a free (uncontrolled) turning movement. This would require widening SR-16 west of the intersection to provide a receiving lane for the free right-turn movement. The identified improvements are consistent with the City's

General Plan, which identifies Sunrise Boulevard as a six-lane roadway and SR-16 is identified as a six-lane expressway. Additionally, the City's General Plan has identified future at-grade intersection improvements at this location.

D-78: *Florin Road/Sunrise Boulevard.* The intersection operates at an acceptable level for Cumulative (2030) No Project Conditions, with or without the Hazel Avenue Extension. The addition of traffic from buildout of the Specific Plan will degrade operations to an unacceptable LOS F during the AM and PM peak hours, with or without the Hazel Avenue Extension. Based on the significance criteria, this constitutes a significant impact.

M-78: To mitigate project impacts at the intersection, the following intersection lane configuration is needed:

- One left-turn lane and three through lanes on the northbound approach.
- Three through lanes and one right-turn lane with overlap right-turn phase on the southbound approach. This will require prohibiting eastbound U-turns at the intersection.
- Two left-turn lanes and one right-turn lane on the eastbound approach.

With these improvements, the intersection would operate at an acceptable level for Cumulative With Project Conditions, with and without the Hazel Avenue Extension. The improvements would reduce the impact to a less-than-significant level. Additionally, these improvements are consistent with the City's General Plan.

However, this intersection is outside the City limits, and is controlled by the County of Sacramento. Since the City cannot guarantee implementation of the mitigation measure, the impact is considered ***significant and unavoidable.***

D-79: *Grant Line Road/Kiefer Boulevard.* The unsignalized intersection will operate at an unacceptable LOS F during the AM and PM peak hours for all Cumulative (2030) Conditions analysis scenarios, with and without the Hazel Avenue Extension. The addition of project-generated traffic will add more than five seconds of delay to the intersection. Based on the significance criteria, this constitutes a significant impact.

M-79: To mitigate impacts, a traffic signal, with protected left-turn phases, would need to be installed at the intersection. With this improvement, the intersection would operate at an acceptable level for all Cumulative Conditions analysis scenarios, with and without the Hazel Avenue Extension, reducing the project impact to a ***less-than-significant level.*** The intersection improvement is consistent with the City's General Plan, which identifies Grant Line Road as a six-lane expressway.

D-80: *Grant Line Road/Douglas Road.* The intersection operates at an unacceptable LOS F during the AM and PM peak hours for all Cumulative (2030) analysis scenarios, with and without the Hazel Avenue Extension. The addition of project-generated traffic will increase delays at the intersection by more than five sections. This constitutes a significant impact based on the significance criteria.

M-80: To mitigate impacts at the intersection, a traffic signal would need to be installed with protected northbound left-turn phasing. With this improvement, the intersection would operate at an acceptable level, with and without the Hazel Avenue Extension. This would reduce the project impact to a ***less-than-significant level.*** The intersection improvement is consistent with the City's General Plan, which identifies Grant Line Road as a six-lane expressway.

D-81: *Douglas Road/Sunrise Boulevard.* The intersection will operate at an unacceptable LOS F during the AM and PM peak hours for all Cumulative (2030) Conditions analysis scenarios, with or with or without the Hazel Avenue Extension. The addition of project-generated traffic will increase the V/C ratio at the intersection by 0.05 or more during both peak hours, with and without the Hazel Avenue Extension. Based on the Significance criteria, this constitutes a significant impact.

M-81: The intersection has substantial traffic volumes that would require significant turn lanes at the intersection. The intersection will continue to operate at an unacceptable LOS F for all Cumulative Conditions analysis scenarios, with and without the Hazel Avenue Extension, with two left-turn lanes, three through lanes, and one right-turn lane with overlap right-turn phase on all approaches (U-turns would be prohibited). Therefore, the impact is considered ***significant-and-unavoidable.***

Intersection operations would improve if additional east-west connections were provided. The completion of Kiefer Boulevard and the extension of Chrysanthy Boulevard southwest to Kiefer Boulevard and Jackson Highway would have the capacity to alleviate traffic from the study intersection and could mitigate the impact to a less-than-significant level.

The City's General Plan has identified the intersection as a location where alternative intersection treatments, such as triple left-turn lanes or a continuous flow intersection, would be needed. The identified impact is consistent with the City's General Plan.

D-82: *Mather Field Road/International Drive.* The intersection operates at LOS F during the PM peak hour only for all Cumulative (2030) Conditions analysis scenarios, with and without the Hazel Avenue Extension. The addition of project-generated traffic during the PM peak hour will increase the V/C ratio by 0.05 or more with and without the Hazel Avenue Extension. Based on the Significance Criteria, this is considered a significant impact.

M-82: To mitigate impacts at the study intersection, a third northbound left-turn lane would be needed. With this improvement, the intersection would operate at an acceptable level, reducing the impact to a ***less-than-significant level.***

The City's General Plan has identified alternate roadway alignments in this area, which may alleviate the demand for this left-turn movement. However, Mather Field Road is identified as a six-lane roadway, which would be sufficient to accommodate the identified improvement.

D-83: *Zinfandel Drive/International Drive.* The intersection operates at an unacceptable LOS F during the PM peak hour for Cumulative No Project Conditions, with and without the Hazel Avenue Extension. The redistribution of traffic due to new roadways associated with the proposed project will decrease the V/C ratio at the study intersection with and without the Hazel Avenue Extension. Based on the significance criteria, the project will result in a ***less-than-significant impact*** at the study intersection.

D-84: *Zinfandel Drive/White Rock Road.* The intersection is expected to operate at an unacceptable level for the following conditions:

- Cumulative No Project Conditions without the Hazel Avenue Extension – PM peak hour only.
- Cumulative With Project Conditions without the Hazel Avenue Extension – AM and PM peak hours. Project will increase the V/C ratio during the PM peak hour by 0.05 or more.
- Cumulative No Project Conditions with the Hazel Avenue Extension — AM and PM peak hours.
- Cumulative With Project Conditions with the Hazel Avenue Extension – AM and PM peak hours. The addition of project-generated traffic will increase the V/C ratio by 0.05 or more.

Based on the significance criteria, this constitutes a significant impact.

M-84: To mitigate project impact at the study intersection, the following improvements are needed:

Two left-turn lanes, three through lanes, and one right-turn lane on the northbound approach.
Three left-turn lanes, two through lanes, and one shared through/right-turn lane on the southbound approach.
Three left-turn lanes, two through lanes, and one shared through/right-turn lane on the eastbound approach.
Two left-turn lanes, two through lanes, and one free (uncontrolled) right-turn lane. This will require a receiving lane north of the intersection.

With these improvements, the intersection would operate at an acceptable level of all Cumulative Conditions scenarios except the Cumulative With Project Conditions without Hazel Avenue Extension during the PM peak hour only. However, with the improvements, the intersection would operate at a better level then the No Project Conditions. Therefore, the impact would be mitigated to a ***less-than-significant level.***

For the intersection to operate at an acceptable level, a fourth through lane would be needed on the northbound approach.

The City's General Plan identifies this intersection as a location that would need special treatments, such as a continuous flow intersection, triple left-turn lanes, and/or a fourth through lane at the intersection. Therefore, the identified improvements are consistent with the City's General Plan.

D-85: *Zinfandel Drive/US-50 Eastbound Ramps.* The intersection will operate at an unacceptable LOS F during the AM and PM peak hours for all Cumulative (2030) analysis scenarios, with and without the Hazel Avenue Extension. The addition of traffic from the proposed project will increase the V/C ratio by 0.05 or more during the AM and PM peak hours with and without the Hazel Avenue Extension. This constitutes a significant impact based on the significance criteria.

M-85: To mitigate impacts at the intersection, the following configuration would be needed:

- Four through lanes and one shared through/right-turn lane on the northbound approach.
- Two through lanes and a free (uncontrolled) right-turn lane on the southbound approach.
- One left-turn lane, one share through/left-turn lane, one through lane, and three right-turn lanes on the eastbound approach.
- Three right-turn lanes on the westbound approach.

With these improvements, the intersection would continue to operate at unacceptable LOS F during the AM and PM peak hours for the Cumulative With Project Conditions without the Hazel Avenue Extension and during the PM peak hour for Cumulative With Project Conditions with the Hazel Avenue Extension. However, the intersection would operate at a better level with these improvements compared to the No Project scenario, reducing the impact to a less-than significant level.

This ramp-terminal intersection is controlled by Caltrans. Since Rancho Cordova, as the lead agency, cannot guarantee implementation of the measures described above, the impact is considered ***significant-and-unavoidable.***

To reduce the number of trips added to this intersection, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento, by providing effective connectivity to the LRT station (from a shuttle or bus). This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project. Additionally, improvements of parallel routes, like completion of Kiefer Road or added capacity to White Rock Road or Old Placerville Road, would have the capacity of relieving the projected demand at the interchange.

D-86: *Sunrise Boulevard/White Rock Road.* The intersection will operate at an acceptable level for Cumulative (2030) No Project Conditions, with or without the Hazel Avenue Extension. The addition of traffic from the proposed project will degrade operations during the AM and PM peak hours to an unacceptable LOS F. Based on the significance criteria this is considered a significant impact.

D-87: To mitigate impacts at the intersection, the following lane configurations are needed:

- Two left-turn lanes, four through lanes, and one right-turn lane on the northbound approach.
- Three left-turn lanes, three through lanes, and one right-turn lane with overlap right-turn phase on the southbound approach. This would require prohibiting eastbound U-turns.
- Two left-turn lanes, two through lanes, and one right-turn lane on the eastbound approach.
- Two left-turn lanes, three through lanes, and one right-turn lane with overlap right-turn phase. This would require prohibiting southbound U-turns at the intersection.

With these improvements, the intersection would operate at an acceptable level with or without the Hazel Avenue Extension, reducing the project impact to a ***less-than-significant level.***

The identified improvements are consistent with the City's General Plan, which identifies Sunrise Boulevard as an eight-lane facility or roadway with special treatments. Additionally, the General Plan identifies this intersection as a location for at-grade intersection improvements.

D-88: *Sunrise Boulevard/Folsom Boulevard.* The intersection will operate at an unacceptable LOS F during the AM and PM peak hours for Cumulative (2030) No Project Conditions, with or without the Hazel Avenue Extension. The addition of traffic from the proposed project will increase the V/C ratio at the intersection by more than 0.05 during the AM and PM peak hours, with or without the Hazel Avenue Extension. This constitutes a significant impact based on the significance criteria.

M-88: To mitigate impacts at the intersection for Cumulative Conditions with or without the Hazel Avenue Extension, the following lane configurations would be needed:

- Two left-turn lanes, four through lanes, and one right-turn lane with overlap right-turn phase on the northbound approach. This would require prohibiting westbound U-turns at the intersection.
- Three left-turn lanes, four through lanes, and one right-turn lane with overlap right-turn phase on the southbound approach. This would require prohibiting eastbound U-turns at the intersection.
- Two left-turn lanes, two through lanes, and one free (uncontrolled) right-turn lane at the intersection. The free right-turn movement would require a receiving lane south of the intersection.
- Three left-turn lanes, one through lane, one shared through/right-turn lane, and one right-turn lane with overlap right-turn phase. This would require prohibiting southbound U-turns at the intersection.

With these improvements, the intersection would continue to operate at unacceptable LOS F during the AM and PM peak hours for the Cumulative With Project Conditions, with or without the Hazel Avenue Extension. However, the intersection would operate at a better level with these improvements compared to the No Project scenario, reducing the impact to a less-than significant level.

Implementation of the above referenced measures maybe infeasible due to geometric constraints at the intersection caused by the grade separated LRT tracks. Due to this geometric constraint, the impact is considered to be ***significant-and-unavoidable.*** This is consistent with the City's General Plan, which identifies this intersection for at-grade enhancements.

To reduce the number of trips added to this intersection, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento, by providing effective connectivity to the LRT station (from a shuttle or bus). This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project. Additionally, improvements of parallel routes, like completion of Kiefer Road, would have the capacity of relieving the projected demand at the intersection.

D-89: *Sunrise Boulevard/US-50 Westbound Ramps.* The intersection will operate at an unacceptable level during the PM peak hour only for Cumulative No Project and Cumulative With Project Conditions, with or without the Hazel Avenue Extension. Buildout of the proposed project will increase the V/C ratio during the PM peak hour by 0.05 or more, with or without the Hazel Avenue Extension. Based on the significance criteria, this constitutes a significant impact.

M-89: To mitigate impacts at this intersection, a third westbound right-turn lane and a fourth northbound through lane would be needed. With these improvements, the intersection would operate at an acceptable level during the AM and PM peak hours for Cumulative With Project Conditions, with or without the Hazel Avenue Extension.

This ramp-terminal intersection is controlled by Caltrans. Since Rancho Cordova, as the lead agency, cannot guarantee implementation of the measure described above, the impact is considered ***significant-and-unavoidable.***

To reduce the number of trips added to this intersection, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento and BRT on or parallel to Sunrise Boulevard. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on Sunrise Boulevard.

D-90: *Sunrise Boulevard/Zinfandel Drive.* The intersection will operate at an unacceptable LOS F during the AM and PM peak hours for all Cumulative Conditions analysis scenarios, with or without the Hazel Avenue Extension. The addition of project-generated traffic will increase the V/C ratio at the intersection by 0.05 or more during the AM and PM peak hours, with or without the Hazel Avenue Extension. Based on the significance criteria, this constitutes a significant impact.

M-90: Consistent with improvements identified in the Sacramento County Mobility Study, one through lane in the northbound and southbound directions could be added at the intersection. Although the intersection would still operate at an unacceptable

LOS F during the AM and PM peak hours, the improvement provides sufficient capacity to offset the addition of project-generated traffic to the intersection during the AM and PM peak hours, with or without the Hazel Avenue Extension, and would reduce the impact to a ***less-than-significant level.***

The City's General Plan identifies this intersection as a location for potential grade separation. Grade separation will provide additional capacity at the intersection, and will improve operations.

D-91: *Hazel Avenue/Folsom Boulevard.* The intersection will operate at an unacceptable LOS F during the AM and PM peak hours for all Cumulative (2030) Conditions analysis scenarios, with or without the Hazel Avenue Extension. The addition of project-generated traffic will not increase the V/C ratio by 0.05 or more. Therefore, based on the significance criteria, the proposed project will have a less-than-significant impact to the study intersection and no mitigation is required.

Significant improvements would be needed to improve operations to an acceptable level. These improvements will likely include grade-separation of the intersection and would likely require reconstruction of the Hazel Avenue/US-50 interchange. This is consistent with the City's General Plan.

D-92: *Hazel Avenue/US-50 Eastbound Ramps.* The intersection will operate at an unacceptable LOS F during the AM and PM peak hours for all Cumulative Conditions analysis scenarios, with or without the Hazel Avenue Extension. The addition of project-generated traffic will increase the V/C ratio by 0.05 or more during the AM and PM peak hours with or without the Hazel Avenue Extension. Based on the significance criteria, this constitutes a significant impact.

M-92: To mitigate impacts at the intersection, additional capacity is needed on the freeway over-crossing to serve substantial demand for the northbound through movement and the eastbound left-turn movement. Since the interchange is not controlled by the City of Rancho Cordova, the lead agency for this project, implementation of interchange improvements cannot be guaranteed. Therefore, the addition of traffic from proposed project will result in a ***significant-and-unavoidable impact.***

To reduce the number of trips added to this intersection, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento and BRT crossings of the American River. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project at the study intersection.

D-93: *Hazel Avenue/US-50 Westbound Ramps.* The intersection will operate at an unacceptable LOS F during the AM and PM peak hours for all Cumulative Conditions analysis scenarios, with or without the Hazel Avenue Extension. The addition of project-generated traffic will increase the V/C ratio by 0.05 or more during the AM and PM peak hours with or without the Hazel Avenue Extension. Based on the significance criteria, this constitutes a significant impact.

M-93: To mitigate project impacts, a second northbound left-turn lane is needed. Additionally, a fourth through lane is needed on the northbound and southbound approaches. With these improvements, the intersection would continue to operate at an unacceptable LOS F during the AM and PM peak hours, with or without the Hazel Avenue Extension. However, the V/C ratio would be lower compared to the Cumulative No Project Condition without the improvements, offsetting the project impact to the intersection.

Since this intersection is not controlled by the City of Rancho Cordova, the lead agency for this project, implementation of interchange improvements cannot be guaranteed. Therefore, the addition of traffic from buildout of the Specific Plan will result in a ***significant-and-unavoidable impact.***

To reduce the number of trips added to this intersection, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento and BRT crossings of the American River. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project at the study intersection.

D-94: *White Rock Road/Grant Line Road.* The intersection will operate at an unacceptable LOS F for the following scenarios:

- Cumulative With Project Conditions without the Hazel Avenue Extension – AM peak hour only
- Cumulative No Project Conditions with the Hazel Avenue Extension – AM peak hour only
- Cumulative With Project Conditions with the Hazel Avenue Extension – AM and PM peak hours. V/C ratio during the AM peak hour increases by 0.05 or more.

Based on the significance criteria, the addition of project-generated traffic will result in a significant impact to the study intersection.

M-94: To mitigate project impacts for Cumulative Conditions without the Hazel Avenue Extension, following lane configurations would be required:

- One left-turn lane and two through lanes on the northbound approach.
- Two through lanes and one right-turn lane with overlap right-turn phase on the southbound approach. This would require prohibiting eastbound U-turns at the intersection.
- Two left-turn lanes and one right-turn lane on the eastbound approach.

With these improvements, the intersection would operate at an acceptable level during the AM and PM peak hours for Cumulative With Project Conditions without the Hazel Avenue Extension, reducing the impact to a less-than-significant level.

To mitigate project impacts for Cumulative Conditions with the Hazel Avenue Extension, following lane configurations would be required:

- One left-turn lane, two through lanes, and one right-turn lane with overlap right-turn phase on the northbound approach. This would require prohibiting westbound U-turns at the intersection.
- One left-turn lane, two through lanes, and one right-turn lane on the southbound approach.
- Two left-turn lanes, two through lanes, and one right-turn lane on the eastbound approach.
- Two left-turn lanes, two through lanes, and one right-turn lane on the westbound approach.

With these improvements, the intersection would operate at an acceptable level during the AM and PM peak hours for Cumulative With Project Conditions with the Hazel Avenue Extension, reducing the impact to a less-than-significant level. The identified improvements are consistent with the City's General Plan, which identifies both roadways as six-lane expressways.

However, the intersection is not within the City of Rancho Cordova, the lead agency for this EIR (the intersection is controlled by the County of Sacramento). Since the City cannot guarantee implementation of the proposed improvements, the impact is considered ***significant-and-unavoidable.***

D-95: *Sunrise Boulevard/Kiefer Boulevard.* The intersection will operate at an unacceptable LOS F during the AM peak hour only for Cumulative No Project Conditions, with or without the Hazel Avenue Extension. The addition of traffic from the proposed project will degrade operations from an acceptable level to an unacceptable level during the PM peak hour with or without the Hazel Avenue Extension. The addition of project-generated traffic will increase the V/C ratio by 0.05 or more at the intersection during the AM peak hour, with or without the Hazel Avenue Extension. Based on the significance criteria, this constitutes a significant impact with or without the Hazel Avenue Extension.

M-95: To mitigate project impacts, the intersection would need the following lane configuration:

- One left-turn lane, four through lanes, and one right-turn lane on the northbound and southbound approaches.
- Two left-turn lanes, two through lanes, and one right-turn lane on the eastbound approach.
- One left-turn lane, two through lanes, and one right-turn lane with overlap right-turn phase on the westbound approach. This would require prohibiting southbound U-turns at the intersection.

With these improvements, the intersection would operate at an acceptable level during the AM and PM peak hours for Cumulative With Project Conditions, with or without the Hazel Avenue Extension, reducing the impact to a ***less-than-significant level.***

The City's General Plan identifies Sunrise Boulevard as a six-lane facility at this location. The additional north-south connectivity identified in the General Plan, like the extension of Chrysanthy Boulevard to SR-16 and the extension of Jaeger

Road to Grant Line Road, may decrease demand at the intersection and require fewer through lanes than identified in the mitigation measure.

D-96: *Eagles Nest/Kiefer Road.* The intersection will operate at an unacceptable level for all Cumulative Conditions analysis scenarios, with or without the Hazel Avenue Extension. However, the proposed project will increase the V/C ratio by 0.05 or more during the AM peak hour only without the Hazel Avenue Extension. Based on the significance criteria, this constitutes a significant impact.

M-96: To mitigate project impacts, the intersection should consist of one left-turn lane, two through lanes, and one right-turn lane on all approaches. With this configuration, the intersection would operate at an acceptable level for all Cumulative Conditions analysis scenarios, with or without the Hazel Avenue Extension and would reduce the impact to a less-than-significant level. The identified improvement is consistent with the City's General Plan.

However, the intersection is not within the City of Rancho Cordova, the lead agency for this EIR (the intersection is controlled by the County of Sacramento). Since the City cannot guarantee implementation of the proposed improvements, the impact is considered ***significant-and-unavoidable.***

D-97: *Sunrise Boulevard/International Drive.* The intersection will operate at an unacceptable level during the AM and PM peak hours for all Cumulative (2030) Conditions analysis scenarios, with or without the Hazel Avenue Extension. The addition of traffic from the proposed project will increase the V/C ratio at the intersection by 0.05 or more during the AM and PM peak hours, with or without the Hazel Avenue Extension. Based on the significance criteria, this constitutes a significant impact.

M-97: To mitigate impacts, the intersection could consist of the following geometrics:

- Two left-turn lanes, four through lanes, and one right-turn lane on the northbound approach.
- One left-turn lane, four through lanes, and one right-turn lane on the southbound approach.
- Two left-turn lanes, one through lane, and two right-turn lanes with overlap right-turn phase on the eastbound approach. This would require prohibiting northbound U-turns at the intersection.
- Two left-turn lanes, two through lanes, and one right-turn lane on the westbound approach.

With these improvements, the intersection would operate at an acceptable level during the AM and PM peak hours for all Cumulative Conditions analysis scenarios, with or without the Hazel Avenue Extension. This would reduce the project impact to a *less-than-significant level.* The identified improvements are consistent with the City's General Plan.

D-98: *Sunrise Reliever/White Rock Road.* The intersection operates at an unacceptable level for the following conditions:

- Cumulative No Project Conditions, with or without the Hazel Avenue Extension – AM peak hour only
- Cumulative With Project Conditions, with or without the Hazel Avenue Extension – AM and PM peak hours. Traffic from the proposed project will increase the V/C during the AM peak hour by 0.05 or more.

Based on the significance criteria, the addition of project-generated traffic constitutes a significant impact to the intersection.

M-98: Improvements to this intersection would include the following lane configurations:

- Three left-turn lanes, three through lanes, and one right-turn lane on the northbound approach.
- Two left-turn lanes, three through lanes, and two right-turn lanes with overlap right-turn phase on the southbound approach. This would require prohibiting eastbound U-turns.
- Two left-turn lanes, three through lanes, and two right-turn lanes with overlap right-turn phase on the eastbound approach. This would require prohibiting northbound U-turns.
- Two left-turn lanes, three through lanes, and one right-turn lane with overlap right-turn phase on the westbound approach. This would require prohibiting southbound U-turns.

However, with these improvements, the intersection would continue to operate at an unacceptable LOS F, and the impact would remain ***significant-and-unavoidable.***

Unique intersection control at this location, with higher capacities, could improve operations of the intersection. These treatments could include a continuous flow intersection or grade separation. This is consistent with the City's General Plan, which identifies this location for potential at-grade enhancements.

D-99: *Sunrise Reliever/US-50 Eastbound Ramps.* Intersection operates at an unacceptable level during the PM peak hour for Cumulative No Project Conditions, with or without the Hazel Avenue Extension. The addition of project-generated traffic will degrade operations to an unacceptable level during the AM peak hour, and will increase the V/C ratio during the PM peak hour by 0.05 or more, with or without the Hazel Avenue Extension. Based on the significance criteria, this constitutes a significant impact.

M-99: To mitigate project impacts, an third southbound through lane and a third eastbound right-turn lane could be added to the intersection. With this improvement, the intersection would operate at an acceptable level during the AM peak hour, with or without the Hazel Avenue Extension. Although the intersection would continue to operate at an unacceptable level during the PM peak hour with or without the Hazel Avenue Extension, the V/C ratio would be lower than the No Project Conditions, mitigating the impact to a less-than-significant level.

However, the intersection is not within the City of Rancho Cordova, the lead agency for this EIR (the intersection will be controlled by Caltrans). Since the City cannot guarantee implementation of the proposed improvements, the impact is considered ***significant-and-unavoidable.***

A project study report (PSR) is currently underway for the Sunrise Reliever interchange which will include a detailed simulation analysis of the interchange.

The interchange should be configured such that acceptable operations are provided.

D-100: *Douglas Road/Jaeger Road.* The intersection operates at an acceptable level for Cumulative No Project Conditions without the Hazel Avenue Extension. The addition of project-generated traffic will degrade operations to an unacceptable level. Based on the significance criteria, this constitutes a significant impact.

The intersection will operate at an unacceptable level during the PM peak hour only for Cumulative No Project Conditions with the Hazel Avenue Extension. The addition of project-generated traffic will degrade operations during the AM peak hour to an unacceptable level. During the PM peak hour, the V/C ratio will increase by 0.05 or more. Based on the significance criteria, this constitutes a significant impact.

M-100: To mitigate project impacts for Cumulative Conditions, with or without the Hazel Avenue Extension, the intersection would require the following lane configuration:

- Two left-turn lanes, three through lanes, and one right-turn lane on the northbound approach.
- Two left-turn lanes, three through lanes, and one right-turn lane on the southbound approach.
- Two left-turn lanes, three through lanes, and one right-turn lane with overlap right-turn phase on the eastbound approach. This would require prohibiting northbound U-turns.
- Two left-turn lanes, three through lanes, and two right-turn lanes with overlap right-turn phase on the westbound approach. This would require prohibiting southbound u-turns at the intersection.

With these improvements, the intersection would operate at an acceptable level, reducing the project impact to a ***less-than-significant level***, with or without the Hazel Avenue Extension. The identified improvements are consistent with the City's General Plan, which identifies both roadways as four-lane facilities.

D-101: *Douglas Road/Americanos Boulevard.* The intersection operates at an acceptable level during the AM and PM peak hours for Cumulative No Project Conditions without the Hazel Avenue Extension. The addition of traffic from the proposed project will degrade operations to an unacceptable level. Based on the significance criteria, this is considered a significant impact.

The intersection will operate at an unacceptable level for Cumulative No Project Conditions during the AM peak hour only with the Hazel Avenue Extension. The addition of project-generated traffic will increase the V/C ratio during the AM peak hour by 0.05 or more. Project-generated traffic will also degrade operations from an acceptable level to an unacceptable level during the PM peak hour. This constitutes a significant impact based on the significance criteria.

M-101: To mitigate impacts, the intersection could be improved to consist of the following lane configuration:

- Two left-turn lanes, three through lanes, and one right-turn lane on the northbound approach.
- Three left-turn lanes, three through lanes, and one right-turn lane on the southbound approach.

- Two left-turn lanes, two through lanes, and two right-turn lanes with overlap right-turn phase on the eastbound approach. This would require prohibiting northbound U-turns at the intersection.
- Two left-turn lanes, two through lanes, and two right-turn lanes with overlap right-turn phase on the westbound approach. This would require prohibiting southbound U-turns at the intersection.

With these improvements, the intersection would operate at an acceptable level during the AM and PM peak hours with or without the Hazel Avenue Extension. This would reduce the impact to a ***less-than-significant level.*** The City's General Plan identifies both roadways as four-lane facilities. Although the intersection approaches on Douglas Road are consistent with the City's General Plan, the lane configurations on Americanos Boulevard are not. The intersection may need additional capacity at the intersection, or improved connectivity identified in the General Plan may reduce demand at the intersection.

D-102: *Chrysanthy Boulevard/Sunrise Boulevard.* The intersection will operate at an unacceptable level during the AM peak hour only, with or without the Hazel Avenue Extension. The addition of project-generated traffic will degrade operations during the PM peak hour from an acceptable level to an unacceptable level, with or without the Hazel Avenue Extension. Project traffic will also increase the V/C ratio by 0.05 or more during the AM peak hour. This constitutes a significant impact based on the significance criteria.

M-102: To mitigate project impacts, the following lane configuration is needed at the intersection:

- Three through lanes and a right-turn lane on the northbound approach.
- Four through lanes and two left-turn lanes on the southbound approach.
- Two left-turn lanes and two right-turn lanes with overlap right-turn phase on the westbound approach. This would require prohibiting southbound U-turns at the intersection.

With these improvements, the intersection would operate at an acceptable level, reducing the impact to a ***less-than-significant level.*** The City's General Plan identifies Sunrise Boulevard as a six-lane facility at the intersection and is not consistent with the City's General Plan. The additional capacity may not be required with additional connectivity identified in the General Plan, like the extension of Chrysanthy Boulevard to SR-16, or the extension of Jaeger Road to Grant Line Road.

D-103: *Chrysanthy Boulevard/Jaeger Road.* The intersection will operate at an acceptable level during the AM and PM peak hours for Cumulative (2030) No Project Conditions, with or without the Hazel Avenue Extension. The addition of project-generated traffic will degrade operations during the AM peak hour to an unacceptable LOS F. Based on the significance criteria, this constitutes a significant impact.

M-103: For the intersection to operate at an acceptable level, and to mitigate project impacts, a second westbound right-turn lane with overlap right-turn phase is needed. This would require prohibiting northbound U-turns at the intersection. This is consistent with the City's General Plan, which identifies both roadways as four-lane facilities.

With this improvement, the intersection would operate at an acceptable level during the AM and PM peak hours for all Cumulative Conditions analysis scenarios, with and without the Hazel Avenue Extension. This would reduce the impact to a ***less-than-significant level.***

D-104: *White Rock Road/Americanos Boulevard.* The intersection will operate at an acceptable level for Cumulative (2030) No Project Conditions, with and without the Hazel Avenue Extension. The addition of project-generated traffic will degrade operations to an unacceptable level during the AM and PM peak hours. Based on the significance criteria this constitutes a significant impact.

M-104: For the intersection to operate at an acceptable level, the following intersection geometrics are needed:

- ➢ Two left-turn lanes, three through lanes, and one right-turn lane on the northbound and southbound approaches.
- ➢ One left-turn lane, two through lanes, and two right-turn lanes with overlap right-turn phase on the eastbound approach. This would require prohibiting northbound U-turns.
- ➢ One left-turn lane, two through lanes, and one right-turn lane on the westbound approach.

With these improvements, the intersection would operate at an acceptable level for all Cumulative Conditions analysis scenarios, with or without the Hazel Avenue Extension. This would reduce the impact to a ***less-than-significant level.*** These improvements are consistent with the City's General Plan.

Freeway Ramp Merge/Diverge/Weave Analysis

I-7 Buildout of the Specific Plan will add traffic to area freeway ramps for Cumulative Conditions. This is considered a ***significant impact.***

D-105: *Eastbound Mather Field Road Direct Off-Ramp* – Ramp operates and an unacceptable LOS F during the AM and PM peak hours for all Cumulative (2030) Conditions analysis scenarios, with and without the Hazel Avenue Extension. Buildout of the Specific Plan will add more than ten trips to the freeway ramp. This is considered a significant impact based on the significance criteria.

M-105: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-106: *Zinfandel Drive Direct Off-Ramp* – Ramp operates at an acceptable level for Cumulative (2030) No project Conditions with or without the Hazel Avenue Extension. The addition of project-generated traffic will reduce operations to an unacceptable level. This is considered a significant impact based on the significance criteria.

M-106: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard, Old Placerville Road, or White Rock Road, could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-107: *Eastbound Sunrise Boulevard Loop/Direct On-Ramp* – Ramp operates and an unacceptable LOS F during the AM and PM peak hours for all Cumulative (2030) Conditions analysis scenarios, with and without the Hazel Avenue Extension. buildout of the Specific Plan is expected to add approximately ten trips to the ramp during the AM and PM peak hours with or without the Hazel Avenue Extension. This is considered a significant impact based on the significance criteria.

M-107: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard, White Rock Road, or Easton Valley Parkway could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-108: *Eastbound Sunrise Reliever Direct Off-Ramp* - Ramp operates and an unacceptable level during the PM peak hour for all Cumulative (2030) Conditions analysis scenarios. Buildout of the Specific Plan is expected to add more than ten trips to this freeway ramp. This is considered a significant impact based on the significance criteria.

M-108: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Options to provide acceptable operations of the interchange will be considered in the project study report (PSR) that is currently underway for the Sunrise Reliever interchange.

D-109: *Eastbound Sunrise Reliever Direct On-Ramp* – Ramp operates and an unacceptable level for all Cumulative (2030) Conditions analysis scenarios, with or without the Hazel Avenue Extension. Buildout of the Specific Plan is expected to add more than ten trips to the ramp during the AM and PM peak hours. This is considered a significant impact based on the significance criteria.

M-109: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Options to provide acceptable operations of the interchange will be considered in the project study report (PSR) that is currently underway for the Sunrise Reliever interchange.

D-110: *Eastbound Hazel Avenue Direct Off-Ramp* - Ramp operates and an unacceptable level during the AM peak hour only for all Cumulative (2030) Conditions analysis scenarios, with or without the Hazel Avenue Extension. Buildout of the Specific Plan will add more than ten trips to this ramp. This constitutes a significant impact based on the significance criteria.

M-110: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered significant-and-unavoidable.

Capacity improvements to parallel facilities, such as Easton Valley Parkway, or White Rock Road could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-111: *Eastbound Hazel Avenue Loop/Direct On-Ramp to AeroJet Direct Off-Ramp Weave Segment* – Weaving section operates at an unacceptable level during the AM peak hour only for Cumulative (2030) No Project Conditions, with or without the Hazel Avenue Extension. The addition of project-generated traffic to the mainline and the auxiliary lane will degrade operations during the PM peak hour from an acceptable level to an unacceptable level. The proposed project will add ten or more trips to the auxiliary lane during the AM and PM peak hours. Based on the significance criteria, this constitutes a significant impact.

M-111: Poor operations to the weaving section occur due to increased traffic in the auxiliary lane and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or additional auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered significant-and-unavoidable.

Capacity improvements to parallel facilities, such as Easton Valley Parkway, or White Rock Road could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-112: *Westbound Hazel Avenue Direct Off-Ramp* - Ramp operates and an unacceptable level during the AM and PM peak hours for all Cumulative (2030) Conditions analysis scenarios, with or without the Hazel Avenue Extension. Buildout of the Specific Plan will add approximately ten trips to this ramp during the AM and PM peak hours for the with Hazel Avenue Extension analysis scenario only. Therefore, buildout of the Specific Plan will result in a significant impact to the study freeway ramp.

M-112: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Easton Valley Parkway, or White Rock Road could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-113: *Westbound Hazel Avenue Loop On-Ramp* – The ramp operates at an unacceptable level during the AM and PM peak hours for all Cumulative (2030) Conditions analysis scenarios, with or without the Hazel Avenue Extension. Project-generated traffic will add more than ten trips to the ramp during the AM and PM peak hours. Based on the significance criteria, this is considered a significant impact.

M-113: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard, White Rock Road, or Easton Valley Parkway could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-114: *Westbound Sunrise Reliever Direct Off-Ramp* - Ramp operates and an unacceptable level during the AM and PM peak hours for all Cumulative (2030) Conditions analysis scenarios, with or without the Hazel Avenue Extension. Buildout of the Specific Plan will add more than ten trips to the freeway ramp during the AM and PM peak hours. This is considered a significant impact based on the significance criteria.

M-114: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Options to provide acceptable operations of the interchange will be considered in the project study report (PSR) that is currently underway for the Sunrise Reliever interchange.

D-115: *Westbound Sunrise Reliever Loop On-Ramp* - Ramp operates and an unacceptable level during the AM and PM peak hours for all Cumulative (2030) Conditions analysis scenarios, with and without the Hazel Avenue Extension. Buildout of the Specific Plan will add more than ten trips to the freeway ramp during the AM and PM peak hours, with and without the Hazel Avenue Extension. This is considered a significant impact based on the significance criteria.

M-115: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Options to provide acceptable operations of the interchange will be considered in the project study report (PSR) that is currently underway for the Sunrise Reliever interchange.

D-116: *Westbound Zinfandel Drive Direct Off-Ramp* - Ramp operates and an unacceptable level for the following analysis scenarios:

- Cumulative No Project Conditions without the Hazel Avenue Extension – AM peak hour only.
- Cumulative With Project Conditions without the Hazel Avenue Extension – AM peak hour only. Buildout of the Specific Plan will add approximately ten trips to the ramp during the AM peak hour.
- Cumulative No Project Conditions with the Hazel Avenue Extension — PM peak hour only.
- Cumulative With Project Conditions with the Hazel Avenue Extension – AM and PM peak hours. Buildout of the Specific Plan will add approximately ten trips to the ramp during the PM peak hour.

Based on the significance criteria, this constitutes a significant impact.

M-116: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-117: *Westbound Zinfandel Drive Direct On-Ramp* – Ramp operates and an unacceptable LOS F during the AM and PM peak hours for all Cumulative (2030) Conditions analysis scenarios, with and without the Hazel Avenue Extension. Buildout of the Specific Plan will add more than ten peak hour trips to the ramp during the AM and PM peak hours. This is considered a significant impact based on the significance criteria.

M-117: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and

Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-118: *Westbound Mather Field Road Direct Off-Ramp* - Ramp operates and an unacceptable LOS F during the AM and PM peak hours for all Cumulative (2030) Conditions analysis scenarios, with and without the Hazel Avenue Extension. Buildout of the Specific Plan will add ten or more trips during the AM and PM peak hour with or without the Hazel Avenue Extension. This is considered a significant impact based on the significance criteria.

M-118: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-119: *Westbound Mather Field Road Loop On-Ramp* - Ramp operates and an unacceptable LOS F during the AM and PM peak hours for all Cumulative (2030) Conditions analysis scenarios, with and without the Hazel Avenue Extension. Buildout of the Specific Plan will add ten or more trips to the ramp during the AM and PM peak hours, with or without the Hazel Avenue Extension. This is considered a significant impact based on the significance criteria.

M-119: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-120: *Westbound Mather Field Road Direct On-Ramp* - Ramp operates and an unacceptable LOS F during the AM and PM peak hours for all Cumulative (2030) analysis scenarios, with or without the Hazel Avenue Extension. Buildout of the Specific Plan will add more than ten trips to the freeway ramp during the AM peak hour only. This is considered a significant impact based on the significance criteria.

M-120: Poor operations to the freeway ramp occur due to increased traffic on the ramp and congestion on the freeway mainline segment. Mainline improvements (such as lane additions or creation of auxiliary lanes) or ramp improvements (such as lane additions) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline and freeway ramp. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

Freeway Segments

I-8: Buildout of the Specific Plan will add traffic to area freeway segments during the peak hours for Cumulative Conditions. This is considered a ***significant impact.***

D-121: *Eastbound US-50, West of Mather Field Road* – The segment operates at an unacceptable LOS F during the AM peak hour only for Cumulative (2030) Conditions, with or without the Hazel Avenue Extension. The addition of traffic from buildout of the Specific Plan will degrade operations during the PM peak hour to an unacceptable LOS F. Additionally, the proposed project will add more than ten trips to this segment during the AM peak hour. This is considered a significant impact based on the significance criteria.

M-121: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-122: *Eastbound US-50, Zinfandel Drive to Sunrise Boulevard* – The segment operates at an unacceptable LOS F during the AM and PM peak hours only for all Cumulative (2030) Conditions analysis scenarios, with or without the Hazel Avenue Extension. The addition of traffic from buildout of the Specific Plan will add more than ten trips to this freeway segment. This is considered a significant impact based on the significance criteria.

M-122: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-123: *Eastbound US-50, Sunrise Reliever to Hazel Avenue* – The segment operates at an unacceptable LOS F during the AM peak hour only for Cumulative (2030) No Project Conditions, with or without the Hazel Avenue Extension. Buildout of the Specific Plan will add more than ten trips to the segment. This is considered a significant impact based on the significance criteria.

M-123: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-124: *Eastbound US-50, East of Hazel Avenue* – The segment operates at an unacceptable level for the following Cumulative (2030) Conditions:

- Cumulative (2030) With Project Conditions without Hazel Avenue Extension – AM peak hour only.
- Cumulative No Project Conditions with Hazel Avenue Extension – AM Peak hour only.
- Cumulative With Project Conditions with Hazel Avenue Extension – AM peak hour only. Project adds more than ten trips to the segment.

This is considered a significant impact based on the significance criteria.

M-124: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline.

Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-125: *Westbound US-50, East of Hazel Avenue* – The segment operates at an acceptable level during the AM peak hour for Cumulative (2030) No Project Conditions with or without the Hazel Avenue Extension. The addition of traffic from buildout of the Specific Plan will degrade operations to an unacceptable LOS F during the AM peak hour with or without the Hazel Avenue Extension. The segment will operate at LOS F during the PM peak hour for Cumulative No Project and Cumulative With Project Conditions, with or with out the Hazel Avenue Extension. There are more than ten project-generated trips on the segment during both peak hours, with or without the Hazel Avenue Extension. This is considered a significant impact based on the significance criteria.

M-125: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-126: *Westbound US-50, Hazel Avenue to Sunrise Reliever* – The segment operates at an acceptable level for Cumulative (2030) No Project Conditions with or without eh Hazel Avenue Extension. The addition of traffic from buildout of the Specific Plan will degrade operations to an unacceptable LOS F during the AM peak hour without the Hazel Avenue Extension. With the Hazel Avenue Extension, operations will degrade to an unacceptable LOS F. This is considered a significant impact based on the significance criteria.

M-126: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-127: *Westbound US-50, Zinfandel Drive to Mather Field Road* – The segment operates at an acceptable level for Cumulative (2030) No Project Conditions, with or without the Hazel Avenue Extension. The addition of traffic from buildout of the Specific Plan will degrade operations to an unacceptable LOS F during the AM and PM peak hours, with or without the Hazel Avenue Extension. This is considered a significant impact based on the significance criteria.

M-127: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

D-128: *Westbound US-50, West of Mather Field Road* – The segment operates at an unacceptable LOS F for the following Cumulative (2030) Conditions analysis scenarios:

- Cumulative No Project Conditions without the Hazel Avenue Extension – PM peak hour only.
- Cumulative With Project Conditions without the Hazel Avenue Extension – AM and PM peak hours. Project adds more than ten trips during the PM peak hour.
- Cumulative No Project Conditions with the Hazel Avenue Extension – AM and PM peak hours.
- Cumulative With Project Conditions with the Hazel Avenue Extension – AM and PM peak hours. Project adds more than ten trips during the AM and PM peak hours.

This is considered a significant impact based on the significance criteria.

M-128: Mainline improvements (such as lane additions or creation of auxiliary lanes) would improve operations. However, since the lead agency (the City of Rancho Cordova) cannot guarantee improvements, the impact is considered ***significant-and-unavoidable.***

Capacity improvements to parallel facilities, such as Kiefer Boulevard or Old Placerville Road, could reduce traffic demands on the freeway mainline. Additionally, the proposed project should contribute to and support alternative transportation modes, like LRT from Rancho Cordova to Folsom and Sacramento. This will improve the effectiveness of alternative transportation modes and has the potential to decrease the amount of traffic generated by the proposed project on US-50.

APPENDIX J

PROJECTED TRAFFIC VOLUME CHANGES WITH INTERNATIONAL DRIVE REALIGNMENT

FEHR & PEERS
TRANSPORTATION CONSULTANTS

June 19, 2006

Mr. Pat Angell
PMC
10461 Old Placerville Road, Suite 110
Sacramento, CA 95827

Re: City of Rancho Cordova General Plan – International Alignment 1042-1976

Dear Mr. Angell:

The City of Rancho Cordova is actively participating in the U.S. 50 Corridor TAC whose purpose is identifying and providing for parallel capacity to U.S. 50. Through the City's involvement with the TAC, it has been suggested that International Drive be reoriented within Rio del Oro northward to White Rock Road. The intention of this realignment would be to split traffic loads between International Drive and White Rock Road more evenly.

Fehr & Peers has conducted travel demand forecasting runs to identify potential shifts in traffic volumes with this proposed realignment. The attached model output shows the change in volumes compared to the originally identified alignment.

We hope this information is helpful. Please feel free to contact us with any questions.

Sincerely,

FEHR & PEERS

Jason D. Pack
Senior Transportation Engineer

Jeffrey Clark, P.E.
Senior Associate

Differences in Daily Volumes (Two-way Total) of Post 2080 Models With / Without New International Alignment

3/17/2006

N:\Projects\1042\1976_Rancho_Cordova_GP\Modeling\Modeling\Model Runs\with_122205_LU\Post_2080_122205LU\With New International Alignment\Comparison\COMPARE_DAILY.NET

APPENDIX K

AIR QUALITY ASSUMPTIONS AND MODELING DATA

Rio del Oro Phase 1 Short-Term Construction Air Quality Modeling Assumptions:

- Assume that only approximately half of the area to be developed under phase 1 needs to be graded.
- Nearly all necessary grading would occur at near the beginning of construction of phase 1, rather than over time as different land uses would be developed.
- Due to internal restrictions within URBEMIS on construction duration to 5 years (60 months) it is assumed that 50% implementation of phase 1 would occur within the first 4 years (48 months), and the remaining 50% would occur within the last 4 years of the construction schedule (2006-2014). Results from the first period are presented since emission factors will be highest, and this will represent a worse case.
- Assume 8 hours per work day, 22 construction days per month.
- Low VOC emission architectural coatings will be used during building construction; emission factor 0.0013 lb/s.f. surface area.
- Equipment types and quantities were determined by SMAQMD guidance 2004 revised Table 3.1.

Rio del Oro Phase 1 Long-Term Operational Air Quality Modeling Assumptions:

- URBEMIS was adjusted to reflect the exact VMT and number of trips generated by phase 1 as obtained from traffic report are used instead of model defaults (Fehr & Peers 2005).
- URBEMIS model runs were conducted for the *net change* in acreages of the land use types for the HD and IM alternatives relative to the PP.

APPENDIX K-1

NET CHANGE IN LAND USE TYPE FOR THE HIGH DENSITY AND IMPACT MINIMIZATION ALTERNATIVES, PHASE 1: RELATIVE TO THE PROPOSED PROJECT ALTERNATIVE

Unmititgated Operational Emissions

	Proposed Project (PP)			High Density (HD) [net change from PP]						Impact Minimization (IM) [net change from PP]					
Land Use	**ROG**	**NOx**	**PM10**	**ROG**		**NOx**		**PM10**		**ROG**		**NOx**		**PM10**	
Single Family Housing	164.58	188.69	376.1	0	164.58	0	188.69	0	376.1	-44.25	120.33	-44.56	144.13	-88.82	287.28
Apt Low Rise	37.39	36.75	73.26	0.14	37.53	0.13	36.88	0.26	73.52	-1.41	35.98	-1.32	35.43	-2.64	70.62
Apt Mid Rise	14.34	10.97	21.86	0.31	14.65	0.28	11.25	0.55	22.41	59.28	73.62	53.09	64.06	105.81	127.67
Elementary School	7.87	5.79	11.66	0	7.87	0	5.79	0	11.66	0	7.87	0	5.79	0	11.66
High School	67.3	49.73	100.38	0	67.3	0	49.73	0	100.38	0	67.3	0	49.73	0	100.38
City Park	41.51	53.2	107.54	0	41.51	0	53.2	0	107.54	0.22	41.73	0.11	53.31	0.23	107.77
Regional Shopping Cntr	65.63	48.65	98.43	-7.2	58.43	-8.93	39.72	-18.06	80.37	-171.24	-105.61	-212.22	-163.57	-429.34	-330.91
Strip Mall	18.99	14.08	28.48	0	18.99	0	14.08	0	28.48	0	18.99	0	14.08	0	28.48
Office Park	36.57	26.61	53.14	-1.15	35.42	-1.2	25.41	-2.4	50.74	0	36.57	0	26.61	0	53.14
Industrial Park	98.26	121.83	243.74	-18.3	79.96	-17.4	104.43	-34.82	208.92	-18.3	79.96	17.4	139.23	-34.82	208.92
Total (lb/day)	**552.44**	**556.30**	**1114.59**		**526.24**		**529.18**		**1060.12**		**376.74**		**368.8**		**665.01**

APPENDIX K-2

PROPOSED PROJECT ALTERNATIVE, PHASE 1: ISC MODELING EMISSION FACTORS FOR PM_{10}

Proposed Project Alternative, Phase 1: Construction Emissions
(See Assumptions)

*This spreadsheet is derived from SMAQMD BEEST PM Modeling Guidance - Appendix C

Bold cells = formulae or constant (do not

Target year = 2006

Developing Emission Factors

1. GRADING / SOIL VOLUME

Volume soil removed = [(A x B x C)/27] + (A x 2 x C x D)

A = Length of area (ft) 4,895.00

B = Width of area (ft) 4,895.00

C = Depth of grading (ft) (use 2.0 unless data available) 0.50

D = Fall-in factor (use 0.0 unless data available) 0.00

TABLE 1

Cubic yards of soil removed	**443,722.69**

2. GRADING / SOIL DENSITY

Tons soil removed = (A x B)/2000

A = Amount of soil removed (cubic yds) (Table 1) **443,722.69**

B = Soild density (lbs/cubic yd) (use 2528.0 unless data available) 2,528.00

TABLE 2

Tons of soil removed	**560,865.47**

3. EMISSION RATE

Emission factor x Operational time

TABLE 3

1. Emission Factor (lbs/hr)	0.75	(default)
2. Operational Time (hrs/day)	8.00	
3. Emission Rate (lbs/day)	**6.02**	

4. STOCKPILE LOADING EMISSONS

Emission Factor = k(0.0032) x (U/5)^1.3 x (M/2)^-1.4

k = Particle size multiplier (use 0.35) 0.35

U = Mean wind speed (mph) (use 5.1 unless data available) 5.10

M = Material moisture content (%) (use 7.9 unless available) 7.90

TABLE 4

1. Emission Factor (lbs/ton)	**0.00017**
2. Tons Transferred (from Table 2)	**560,865.47**
3. Emission Rate (lbs/day)	**94.19**

5. STOCKPILE WIND EROSION EMISSIONS

Emission Rate = 1.6 x U x 0.5 x A

U = mean wind speed (m/s) (use 2.3 unless data available) 2.30

A = acres 137.50 URBEMIS

TABLE 5

1. Emission Rate (lbs/hr)	**253.00**
2. Emission Rate (lbs/day)	**6,072.00**

6. MOBILE SOURCE EMISSIONS

TABLE 6

1. Type of Equipment	Crawler tractors	
2. Equipment Used (#)	13.75	URBEMIS

3. Operational Time (hrs/day)	8.00	
4. Emission Factor (lbs/hp-hr)	0.43	SMAQMD
5. Emission Rate (lbs/day)	**5.91**	

1. Type of Equipment	Graders	
2. Equipment Used (#)	13.75	URBEMIS
3. Operational Time (hrs/day)	8.00	
4. Emission Factor (lbs/hp-hr)	0.28	SMAQMD
5. Emission Rate (lbs/day)	**3.85**	

1. Type of Equipment	Off-highway trucks	
2. Equipment Used (#)	13.75	URBEMIS
3. Operational Time (hrs/day)	8.00	
4. Emission Factor (lbs/hp-hr)	0.58	SMAQMD
5. Emission Rate (lbs/day)	**7.98**	

TABLE 7

Mobile Equipment Emission Rate Totals (lbs/day)	**17.74**

7. TOTALS

TABLE 8

1. Table 3, Row 3	**6.02**	
2. Table 4, Row 3	**94.19**	
3. Table 5, Row 2	**6,072.00**	
4. Total	**6,172.22**	Fugitive Emissions (lbs/day)
5. Table 7	**17.74**	Mobile Emissions (lbs/day)

8. CONVERTING TO GRAMS PER SECOND

Emission Factor (grams/sec) = (A / 24 / 60 / 60) x 453.592 grams/lb
A = Emission factor (lbs/day)

TABLE 9

Fugitive Dust Emissions	**32.40**
Mobile PM Emissions	**0.09**

9. DISTRIBUTE POINT SOURCES OVER SITE

If project =< 10 acres, divide by 49
if project > 10 acres, divide by 64

TABLE 10

		Mitigated PM Emission
Fugitive Dust Emissions	**0.5063**	**0.1266**
Mobile PM Emissions	**0.0015**	**0.0008**

Proposed Project Alternative, Phase 1: Construction Emissions (Second Half of Construction) (See Assumptions)

```
/2006 10:46 AM


            URBEMIS 2002 For Windows   8.7.0

e Name:                        C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio PP construction.urb
ject Name:                     Rio Del Oro PP
ject Location:                 Lower Sacramento Valley Air Basin
Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                    SUMMARY REPORT
                 (Pounds/Day - Summer)

STRUCTION EMISSION ESTIMATES
                                                                        PM10       PM10       PM10
* 2006 ***                          ROG        NOx         CO        SO2      TOTAL    EXHAUST       DUST
TALS (lbs/day,unmitigated)        99.92     728.56     804.87       1.59   5,281.82      28.89   5,252.93
TALS (lbs/day, mitigated)         95.24     604.65     804.87       1.59   1,330.50      16.94   1,313.56

                                                                        PM10       PM10       PM10
* 2007 ***                          ROG        NOx         CO        SO2      TOTAL    EXHAUST       DUST
TALS (lbs/day,unmitigated)        89.64     505.46     801.98       0.05      24.55      22.11       2.44
TALS (lbs/day, mitigated)         86.43     407.46     801.98       0.05      14.73      12.29       2.44

                                                                        PM10       PM10       PM10
* 2008 ***                          ROG        NOx         CO        SO2      TOTAL    EXHAUST       DUST
TALS (lbs/day,unmitigated)        87.61     480.64     797.11       0.04      22.62      20.18       2.44
TALS (lbs/day, mitigated)         84.40     387.40     797.11       0.04      13.67      11.23       2.44

                                                                        PM10       PM10       PM10
* 2009 ***                          ROG        NOx         CO        SO2      TOTAL    EXHAUST       DUST
TALS (lbs/day,unmitigated)        85.49     455.06     791.43       0.04      21.34      18.90       2.44
TALS (lbs/day, mitigated)         82.28     366.70     791.43       0.04      12.96      10.52       2.44

                                                                        PM10       PM10       PM10
* 2010 ***                          ROG        NOx         CO        SO2      TOTAL    EXHAUST       DUST
TALS (lbs/day,unmitigated)       434.34     496.93   1,120.46       0.09      23.63      18.74       4.89
TALS (lbs/day, mitigated)        431.13     413.31   1,120.46       0.09      16.12      11.23       4.89


A SOURCE EMISSION ESTIMATES
                                    ROG        NOx         CO        SO2       PM10
TALS (lbs/day,unmitigated)        92.74      60.96      72.44       0.15       0.19


RATIONAL (VEHICLE) EMISSION ESTIMATES
                                    ROG        NOx         CO        SO2       PM10

TALS (lbs/day,unmitigated)       704.93     792.17   8,241.21      10.44   1,595.97

 OF AREA AND OPERATIONAL EMISSION ESTIMATES
                                    ROG        NOx         CO        SO2       PM10
TALS (lbs/day,unmitigated)       797.67     853.13   8,313.66      10.59   1,596.17
```

```
e. 2
31/2006 10:46 AM


              URBEMIS 2002 For Windows   8.7.0

e Name:                      C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio PP construction.urb
ject Name:                   Rio Del Oro PP
ject Location:               Lower Sacramento Valley Air Basin
Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       DETAIL REPORT
                   (Pounds/Day - Summer)

nstruction Start Month and Year: June, 2006
nstruction Duration: 48
tal Land Use Area to be Developed: 550 acres
ximum Acreage Disturbed Per Day: 137.5 acres
ngle Family Units: 725 Multi-Family Units: 772
tail/Office/Institutional/Industrial Square Footage: 9006500

NSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                    PM10      PM10      PM10
  Source                        ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
** 2006***
ase 1 - Demolition Emissions
gitive Dust                       -         -         -         -      0.00         -      0.00
f-Road Diesel                  0.00      0.00      0.00         -      0.00      0.00      0.00
-Road Diesel                   0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                     0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day                0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 2 - Site Grading Emissions
gitive Dust                       -         -         -         -  5,252.50         -  5,252.50
f-Road Diesel                 93.67    619.57    768.71         -     26.55     26.55      0.00
-Road Diesel                   5.42    108.14     20.00      1.58      2.72      2.32      0.40
rker Trips                     0.83      0.85     15.64      0.01      0.05      0.02      0.03
Maximum lbs/day               99.92    728.56    804.35      1.59  5,281.82     28.89  5,252.93

ase 3 - Building Construction
dg Const Off-Road Diesel      64.22    513.75    457.24         -     23.76     23.76      0.00
dg Const Worker Trips         27.35     16.44    347.63      0.05      2.72      0.28      2.44
ch Coatings Off-Gas            0.00         -         -         -         -         -         -
ch Coatings Worker Trips       0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Off-Gas                  0.00         -         -         -         -         -         -
phalt Off-Road Diesel          0.00      0.00      0.00         -      0.00      0.00      0.00
phalt On-Road Diesel           0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Worker Trips             0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               91.57    530.19    804.87      0.05     26.48     24.04      2.44

Max lbs/day all phases        99.92    728.56    804.87      1.59  5,281.82     28.89  5,252.93


** 2007***
ase 1 - Demolition Emissions
gitive Dust                       -         -         -         -      0.00         -      0.00
f-Road Diesel                  0.00      0.00      0.00         -      0.00      0.00      0.00
-Road Diesel                   0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                     0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day                0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 2 - Site Grading Emissions
gitive Dust                       -         -         -         -      0.00         -      0.00
f-Road Diesel                  0.00      0.00      0.00         -      0.00      0.00      0.00
-Road Diesel                   0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                     0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day                0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 3 - Building Construction
dg Const Off-Road Diesel      64.22    489.99    475.22         -     21.83     21.83      0.00
dg Const Worker Trips         25.43     15.47    326.76      0.05      2.72      0.28      2.44
ch Coatings Off-Gas            0.00         -         -         -         -         -         -
ch Coatings Worker Trips       0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Off-Gas                  0.00         -         -         -         -         -         -
phalt Off-Road Diesel          0.00      0.00      0.00         -      0.00      0.00      0.00
phalt On-Road Diesel           0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Worker Trips             0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               89.64    505.46    801.98      0.05     24.55     22.11      2.44

Max lbs/day all phases        89.64    505.46    801.98      0.05     24.55     22.11      2.44


** 2008***
```

```
ase 1 - Demolition Emissions
gitive Dust                      -         -         -         -      0.00         -      0.00
f-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 2 - Site Grading Emissions
gitive Dust                      -         -         -         -      0.00         -      0.00
f-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 3 - Building Construction
dg Const Off-Road Diesel     64.22    466.23    492.56         -     19.91     19.91      0.00
dg Const Worker Trips        23.39     14.41    304.55      0.04      2.72      0.28      2.44
ch Coatings Off-Gas           0.00         -         -         -         -         -         -
ch Coatings Worker Trips      0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Off-Gas                 0.00         -         -         -         -         -         -
phalt Off-Road Diesel         0.00      0.00      0.00         -      0.00      0.00      0.00
phalt On-Road Diesel          0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Worker Trips            0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day              87.61    480.64    797.11      0.04     22.62     20.18      2.44

Max lbs/day all phases       87.61    480.64    797.11      0.04     22.62     20.18      2.44


** 2009***
ase 1 - Demolition Emissions
gitive Dust                      -         -         -         -      0.00         -      0.00
f-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 2 - Site Grading Emissions
gitive Dust                      -         -         -         -      0.00         -      0.00
f-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 3 - Building Construction
dg Const Off-Road Diesel     64.22    441.83    510.54         -     18.62     18.62      0.00
dg Const Worker Trips        21.27     13.23    280.89      0.04      2.72      0.28      2.44
ch Coatings Off-Gas           0.00         -         -         -         -         -         -
ch Coatings Worker Trips      0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Off-Gas                 0.00         -         -         -         -         -         -
phalt Off-Road Diesel         0.00      0.00      0.00         -      0.00      0.00      0.00
phalt On-Road Diesel          0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Worker Trips            0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day              85.49    455.06    791.43      0.04     21.34     18.90      2.44

Max lbs/day all phases       85.49    455.06    791.43      0.04     21.34     18.90      2.44


** 2010***
ase 1 - Demolition Emissions
gitive Dust                      -         -         -         -      0.00         -      0.00
f-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 2 - Site Grading Emissions
gitive Dust                      -         -         -         -      0.00         -      0.00
f-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 3 - Building Construction
dg Const Off-Road Diesel     64.22    418.07    527.88         -     16.70     16.70      0.00
dg Const Worker Trips        19.31     12.10    258.51      0.04      2.72      0.28      2.44
ch Coatings Off-Gas         320.30         -         -         -         -         -         -
ch Coatings Worker Trips     19.31     12.10    258.51      0.04      2.72      0.28      2.44
phalt Off-Gas                 2.21         -         -         -         -         -         -
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phalt Off-Road Diesel          8.72     50.58     74.13          -       1.40       1.40       0.00
phalt On-Road Diesel           0.22      4.05      0.81       0.01       0.10       0.09       0.01
phalt Worker Trips             0.05      0.03      0.62       0.00       0.01       0.00       0.01
Maximum lbs/day              434.34    496.93  1,120.46       0.09      23.63      18.74       4.89

Max lbs/day all phases       434.34    496.93  1,120.46       0.09      23.63      18.74       4.89



ase 1 - Demolition Assumptions:  Phase Turned OFF

ase 2 - Site Grading Assumptions
art Month/Year for Phase 2: Jun '06
ase 2 Duration: 5.3 months
-Road Truck Travel (VMT): 3806
f-Road Equipment
No.     Type                                  Horsepower    Load Factor     Hours/Day
  14    Crawler Tractors                         143           0.575           8.0
  14    Graders                                  174           0.575           8.0
  14    Off Highway Trucks                       417           0.490           8.0

ase 3 - Building Construction Assumptions
art Month/Year for Phase 3: Nov '06
ase 3 Duration: 42.7 months
Start Month/Year for SubPhase Building: Nov '06
SubPhase Building Duration: 42.7 months
Off-Road Equipment
No.     Type                                  Horsepower    Load Factor     Hours/Day
  41    Other Equipment                          190           0.620           6.0
Start Month/Year for SubPhase Architectural Coatings: Jan '10
SubPhase Architectural Coatings Duration: 4.3 months
Start Month/Year for SubPhase Asphalt: Mar '10
SubPhase Asphalt Duration: 2.1 months
Acres to be Paved: 39
Off-Road Equipment
No.     Type                                  Horsepower    Load Factor     Hours/Day
   4    Pavers                                   132           0.590           8.0
   4    Rollers                                  114           0.430           8.0
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anges made to the default values for Land Use Trip Percentages


anges made to the default values for Construction

te Grading Fugitive Dust Emission Rate changed from 10 to 38.2
chitectural Coatings: # ROG/ft2 (residential) changed from 0.0185 to 0.0013
chitectural Coatings: # ROG/ft2 (non-res) changed from 0.0185 to 0.0013
ase 2 mitigation measure Soil Disturbance:
   has been changed from off to on.
ase 2 mitigation measure Off-Road Diesel Exhaust:
   has been changed from off to on.
ase 3 mitigation measure Off-Road Diesel Exhaust:
   has been changed from off to on.

anges made to the default values for Area

e landscape year changed from 2005 to 2015.
e residential Arch. Coatings ROG emission factor changed from 0.0185 to 0.0013.
e nonresidential Arch. Coatings ROG emission factor changed from 0.0185 to 0.0013.

anges made to the default values for Operations

e operational emission year changed from 2005 to 2015.
e home based work selection item changed from  8 to 7.
e home based work urban trip length changed from 9.7 to 6.3.
e home based work rural trip length changed from 16.8 to 6.3.
e home based shopping selection item changed from  8 to 7.
e home based shopping urban trip length changed from 3.8 to 6.3.
e home based shopping rural trip length changed from 7.1 to 6.3.
e home based other selection item changed from  8 to 7.
e home based other urban trip length changed from 4.6 to 6.3.
e home based other rural trip length changed from 7.9 to 6.3.
e commercial based commute selection item changed from  8 to 7.
e commercial based commute urban trip length changed from 7.8 to 6.3.
e commercial based commute rural trip length changed from 14.7 to 6.3.
e commercial based non-work selection item changed from  8 to 7.
e commercial based non-work urban trip length changed from 4.5 to 6.3.
e commercial based non-work rural trip length changed from 6.6 to 6.3.
e commercial based customer selection item changed from  8 to 7.
e commercial based customer urban trip length changed from 4.5 to 6.3.
e commercial based customer rural trip length changed from 6.6 to 6.3.
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             URBEMIS 2002 For Windows   8.7.0

le Name:                      C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio PP construction part II.urb
oject Name:                   Rio Del Oro PP
oject Location:               Lower Sacramento Valley Air Basin
-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                     SUMMARY REPORT
                  (Pounds/Day - Summer)

NSTRUCTION EMISSION ESTIMATES
                                                                         PM10       PM10      PM10
** 2010 ***                       ROG       NOx        CO       SO2     TOTAL    EXHAUST      DUST
OTALS (lbs/day,unmitigated)    110.16    465.36  1,442.57      0.54     20.79      18.35      2.44
OTALS (lbs/day, mitigated)     106.95    381.75  1,442.57      0.54     13.28      10.84      2.44

                                                                         PM10       PM10      PM10
** 2011 ***                       ROG       NOx        CO       SO2     TOTAL    EXHAUST      DUST
OTALS (lbs/day,unmitigated)    110.16    465.36  1,442.57      0.54     20.79      18.35      2.44
OTALS (lbs/day, mitigated)     106.95    381.75  1,442.57      0.54     13.28      10.84      2.44

                                                                         PM10       PM10      PM10
** 2012 ***                       ROG       NOx        CO       SO2     TOTAL    EXHAUST      DUST
OTALS (lbs/day,unmitigated)    110.16    465.36  1,442.57      0.54     20.79      18.35      2.44
OTALS (lbs/day, mitigated)     106.95    381.75  1,442.57      0.54     13.28      10.84      2.44

                                                                         PM10       PM10      PM10
** 2013 ***                       ROG       NOx        CO       SO2     TOTAL    EXHAUST      DUST
OTALS (lbs/day,unmitigated)    110.16    465.36  1,442.57      0.54     20.79      18.35      2.44
OTALS (lbs/day, mitigated)     106.95    381.75  1,442.57      0.54     13.28      10.84      2.44

                                                                         PM10       PM10      PM10
** 2014 ***                       ROG       NOx        CO       SO2     TOTAL    EXHAUST      DUST
OTALS (lbs/day,unmitigated)    427.30    531.61  1,776.54      0.59     24.99      20.10      4.89
OTALS (lbs/day, mitigated)     424.09    448.00  1,776.54      0.59     17.48      12.59      4.89


EA SOURCE EMISSION ESTIMATES
                                  ROG       NOx        CO       SO2      PM10
OTALS (lbs/day,unmitigated)     92.74     60.96     72.44      0.15      0.19


ERATIONAL (VEHICLE) EMISSION ESTIMATES
                                  ROG       NOx        CO       SO2      PM10

OTALS (lbs/day,unmitigated)    704.93    792.17  8,241.21     10.44  1,595.97

M OF AREA AND OPERATIONAL EMISSION ESTIMATES
                                  ROG       NOx        CO       SO2      PM10
OTALS (lbs/day,unmitigated)    797.67    853.13  8,313.66     10.59  1,596.17
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            URBEMIS 2002 For Windows   8.7.0

le Name:                      C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio PP construction part II.urb
oject Name:                   Rio Del Oro PP
oject Location:               Lower Sacramento Valley Air Basin
-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                     DETAIL REPORT
                 (Pounds/Day - Summer)

nstruction Start Month and Year: June, 2010
nstruction Duration: 48
tal Land Use Area to be Developed: 550 acres
ximum Acreage Disturbed Per Day: 137.5 acres
ngle Family Units: 725 Multi-Family Units: 772
tail/Office/Institutional/Industrial Square Footage: 9006500

NSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                 PM10      PM10        PM10
  Source                        ROG       NOx        CO       SO2     TOTAL   EXHAUST        DUST
** 2010***
ase 1 - Demolition Emissions
gitive Dust                       -         -         -         -      0.00         -        0.00
f-Road Diesel                  0.00      0.00      0.00         -      0.00      0.00        0.00
-Road Diesel                   0.00      0.00      0.00      0.00      0.00      0.00        0.00
rker Trips                     0.00      0.00      0.00      0.00      0.00      0.00        0.00
Maximum lbs/day                0.00      0.00      0.00      0.00      0.00      0.00        0.00

ase 2 - Site Grading Emissions
gitive Dust                       -         -         -         -      0.00         -        0.00
f-Road Diesel                  0.00      0.00      0.00         -      0.00      0.00        0.00
-Road Diesel                   0.00      0.00      0.00      0.00      0.00      0.00        0.00
rker Trips                     0.00      0.00      0.00      0.00      0.00      0.00        0.00
Maximum lbs/day                0.00      0.00      0.00      0.00      0.00      0.00        0.00

ase 3 - Building Construction
dg Const Off-Road Diesel      64.22    418.07    527.88         -     16.70     16.70        0.00
dg Const Worker Trips         45.94     47.30    914.69      0.54      4.09      1.65        2.44
ch Coatings Off-Gas            0.00         -         -         -         -         -           -
ch Coatings Worker Trips       0.00      0.00      0.00      0.00      0.00      0.00        0.00
phalt Off-Gas                  0.00         -         -         -         -         -           -
phalt Off-Road Diesel          0.00      0.00      0.00         -      0.00      0.00        0.00
phalt On-Road Diesel           0.00      0.00      0.00      0.00      0.00      0.00        0.00
phalt Worker Trips             0.00      0.00      0.00      0.00      0.00      0.00        0.00
Maximum lbs/day              110.16    465.36  1,442.57      0.54     20.79     18.35        2.44

Max lbs/day all phases       110.16    465.36  1,442.57      0.54     20.79     18.35        2.44


** 2011***
ase 1 - Demolition Emissions
gitive Dust                       -         -         -         -      0.00         -        0.00
f-Road Diesel                  0.00      0.00      0.00         -      0.00      0.00        0.00
-Road Diesel                   0.00      0.00      0.00      0.00      0.00      0.00        0.00
rker Trips                     0.00      0.00      0.00      0.00      0.00      0.00        0.00
Maximum lbs/day                0.00      0.00      0.00      0.00      0.00      0.00        0.00

ase 2 - Site Grading Emissions
gitive Dust                       -         -         -         -      0.00         -        0.00
f-Road Diesel                  0.00      0.00      0.00         -      0.00      0.00        0.00
-Road Diesel                   0.00      0.00      0.00      0.00      0.00      0.00        0.00
rker Trips                     0.00      0.00      0.00      0.00      0.00      0.00        0.00
Maximum lbs/day                0.00      0.00      0.00      0.00      0.00      0.00        0.00

ase 3 - Building Construction
dg Const Off-Road Diesel      64.22    418.07    527.88         -     16.70     16.70        0.00
dg Const Worker Trips         45.94     47.30    914.69      0.54      4.09      1.65        2.44
ch Coatings Off-Gas            0.00         -         -         -         -         -           -
ch Coatings Worker Trips       0.00      0.00      0.00      0.00      0.00      0.00        0.00
phalt Off-Gas                  0.00         -         -         -         -         -           -
phalt Off-Road Diesel          0.00      0.00      0.00         -      0.00      0.00        0.00
phalt On-Road Diesel           0.00      0.00      0.00      0.00      0.00      0.00        0.00
phalt Worker Trips             0.00      0.00      0.00      0.00      0.00      0.00        0.00
Maximum lbs/day              110.16    465.36  1,442.57      0.54     20.79     18.35        2.44

Max lbs/day all phases       110.16    465.36  1,442.57      0.54     20.79     18.35        2.44


** 2012***
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```
ase 1 - Demolition Emissions
gitive Dust                      -         -         -         -      0.00         -      0.00
f-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 2 - Site Grading Emissions
gitive Dust                      -         -         -         -      0.00         -      0.00
f-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 3 - Building Construction
dg Const Off-Road Diesel     64.22    418.07    527.88         -     16.70     16.70      0.00
dg Const Worker Trips        45.94     47.30    914.69      0.54      4.09      1.65      2.44
ch Coatings Off-Gas           0.00         -         -         -         -         -         -
ch Coatings Worker Trips      0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Off-Gas                 0.00         -         -         -         -         -         -
phalt Off-Road Diesel         0.00      0.00      0.00         -      0.00      0.00      0.00
phalt On-Road Diesel          0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Worker Trips            0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day             110.16    465.36  1,442.57      0.54     20.79     18.35      2.44

Max lbs/day all phases      110.16    465.36  1,442.57      0.54     20.79     18.35      2.44


** 2013***
ase 1 - Demolition Emissions
gitive Dust                      -         -         -         -      0.00         -      0.00
f-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 2 - Site Grading Emissions
gitive Dust                      -         -         -         -      0.00         -      0.00
f-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 3 - Building Construction
dg Const Off-Road Diesel     64.22    418.07    527.88         -     16.70     16.70      0.00
dg Const Worker Trips        45.94     47.30    914.69      0.54      4.09      1.65      2.44
ch Coatings Off-Gas           0.00         -         -         -         -         -         -
ch Coatings Worker Trips      0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Off-Gas                 0.00         -         -         -         -         -         -
phalt Off-Road Diesel         0.00      0.00      0.00         -      0.00      0.00      0.00
phalt On-Road Diesel          0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Worker Trips            0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day             110.16    465.36  1,442.57      0.54     20.79     18.35      2.44

Max lbs/day all phases      110.16    465.36  1,442.57      0.54     20.79     18.35      2.44


** 2014***
ase 1 - Demolition Emissions
gitive Dust                      -         -         -         -      0.00         -      0.00
f-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 2 - Site Grading Emissions
gitive Dust                      -         -         -         -      0.00         -      0.00
f-Road Diesel                 0.00      0.00      0.00         -      0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 3 - Building Construction
dg Const Off-Road Diesel     64.22    418.07    527.88         -     16.70     16.70      0.00
dg Const Worker Trips        45.94     47.30    914.69      0.54      4.09      1.65      2.44
ch Coatings Off-Gas         286.94         -         -         -         -         -         -
ch Coatings Worker Trips     19.31     12.10    258.51      0.04      2.72      0.28      2.44
phalt Off-Gas                 1.94         -         -         -         -         -         -
```

```
phalt Off-Road Diesel         8.72     50.58     74.13         -       1.40       1.40        0.00
phalt On-Road Diesel          0.19      3.54      0.71      0.01       0.09       0.08        0.01
phalt Worker Trips            0.05      0.03      0.62      0.00       0.01       0.00        0.01
Maximum lbs/day             427.30    531.61  1,776.54      0.59      24.99      20.10        4.89

Max lbs/day all phases      427.30    531.61  1,776.54      0.59      24.99      20.10        4.89


ase 2 - Site Grading Assumptions:  Phase Turned OFF


ase 3 - Building Construction Assumptions
art Month/Year for Phase 3: Jun '10
ase 3 Duration: 48 months
Start Month/Year for SubPhase Building: Jun '10
SubPhase Building Duration: 48 months
Off-Road Equipment
No.     Type                                Horsepower    Load Factor     Hours/Day
 41     Other Equipment                        190           0.620           6.0
Start Month/Year for SubPhase Architectural Coatings: Jan '14
SubPhase Architectural Coatings Duration: 4.8 months
Start Month/Year for SubPhase Asphalt: Mar '14
SubPhase Asphalt Duration: 2.4 months
Acres to be Paved: 39
Off-Road Equipment
No.     Type                                Horsepower    Load Factor     Hours/Day
  4     Pavers                                 132           0.590           8.0
  4     Rollers                                114           0.430           8.0
```

```
anges made to the default values for Land Use Trip Percentages


anges made to the default values for Construction

chitectural Coatings: # ROG/ft2 (residential) changed from 0.0185 to 0.0013
chitectural Coatings: # ROG/ft2 (non-res) changed from 0.0185 to 0.0013
ase 3 mitigation measure Off-Road Diesel Exhaust:
   has been changed from off to on.

anges made to the default values for Area

e landscape year changed from 2005 to 2015.
e residential Arch. Coatings ROG emission factor changed from 0.0185 to 0.0013.
e nonresidential Arch. Coatings ROG emission factor changed from 0.0185 to 0.0013.

anges made to the default values for Operations

e operational emission year changed from 2005 to 2015.
e home based work selection item changed from  8 to 7.
e home based work urban trip length changed from 9.7 to 6.3.
e home based work rural trip length changed from 16.8 to 6.3.
e home based shopping selection item changed from  8 to 7.
e home based shopping urban trip length changed from 3.8 to 6.3.
e home based shopping rural trip length changed from 7.1 to 6.3.
e home based other selection item changed from  8 to 7.
e home based other urban trip length changed from 4.6 to 6.3.
e home based other rural trip length changed from 7.9 to 6.3.
e commercial based commute selection item changed from  8 to 7.
e commercial based commute urban trip length changed from 7.8 to 6.3.
e commercial based commute rural trip length changed from 14.7 to 6.3.
e commercial based non-work selection item changed from  8 to 7.
e commercial based non-work urban trip length changed from 4.5 to 6.3.
e commercial based non-work rural trip length changed from 6.6 to 6.3.
e commercial based customer selection item changed from  8 to 7.
e commercial based customer urban trip length changed from 4.5 to 6.3.
e commercial based customer rural trip length changed from 6.6 to 6.3.
```

Proposed Project Alternative, Phase 1: Area-Source Emissions

```
2/08/2005 1:05 PM


             URBEMIS 2002 For Windows   8.7.0

ile Name:                     C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio PP.urb
roject Name:                  Rio Del Oro PP
roject Location:              Lower Sacramento Valley Air Basin
n-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       DETAIL REPORT
                   (Pounds/Day - Summer)

REA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)
   Source                        ROG       NOx        CO        SO2       PM10
Natural Gas                     8.87    120.22     88.62          0       0.22
Hearth - No summer emissions
Landscaping                     6.32      0.81     49.90       0.29       0.16
Consumer Prdcts               146.48         -         -          -          -
Architectural Coatings         18.92         -         -          -          -
TOTALS(lbs/day,unmitigated)   180.58    121.03    138.53       0.29       0.38
```

Proposed Project Alternative, Phase 1: Operational Emissions

```
              UNMITIGATED OPERATIONAL EMISSIONS

                                 ROG        NOx        CO        SO2      PM10
.ngle family housing           164.58     188.69  2,058.64      2.49    376.10
)artments low rise              37.39      36.75    400.99      0.49     73.26
)artments mid rise              14.34      10.97    119.66      0.14     21.86
.ementary school                 7.87       5.79     60.53      0.08     11.66
.gh school                      67.30      49.73    512.79      0.66    100.38
.ty park                        41.51      53.20    544.91      0.70    107.54
:gnl shop. center               65.63      48.65    496.28      0.64     98.43
:rip mall                       18.99      14.08    143.59      0.19     28.48
:fice park                      36.57      26.61    288.31      0.35     53.14
ıdustrial park                  98.26     121.83  1,309.27      1.61    243.74

)TAL EMISSIONS (lbs/day)       552.43     556.31  5,934.96      7.34  1,114.58

)es not include correction for passby trips.
)es not include double counting adjustment for internal trips.

)ERATIONAL (Vehicle) EMISSION ESTIMATES

ıalysis Year: 2015  Temperature (F): 85   Season: Summer

IFAC Version: EMFAC2002 (9/2002)

ımmary of Land Uses:

                                                                     No.     Total
ıit Type                  Acreage    Trip Rate                      Units    Trips

.ngle family housing       483.33    27.11 trips/dwelling unit  1,450.0039,309.50
)artments low rise          56.50     8.47 trips/dwelling unit    904.00 7,656.88
)artments mid rise          16.84     3.57 trips/dwelling unit    640.00 2,284.80
.ementary school                      3.11 trips/1000 sq. ft.     392.00 1,219.12
.gh school                            3.11 trips/1000 sq. ft.   3,376.0010,499.36
.ty park                            135.54 trips/acres             83.0011,249.82
:gnl shop. center                     3.11 trips/1000 sq. ft.   3,311.0010,297.21
:rip mall                             3.11 trips/1000 sq. ft.     958.00 2,979.38
:fice park                            3.11 trips/1000 sq. ft.   1,786.00 5,554.46
ıdustrial park                      135.54 trips/acres            188.0025,481.52

                                                 Sum of Total Trips    116,532.05
                                           Total Vehicle Miles Traveled  734,151.92

:hicle Assumptions:

.eet Mix:

:hicle Type              Percent Type    Non-Catalyst     Catalyst         Diesel
.ght Auto                    54.40          0.40            99.40            0.20
.ght Truck < 3,750   lbs     15.30          0.70            98.00            1.30
.ght Truck  3,751- 5,750     16.40          0.60            98.80            0.60
:d Truck    5,751- 8,500      7.30          0.00            98.60            1.40
.te-Heavy   8,501-10,000      1.10          0.00            81.80           18.20
.te-Heavy  10,001-14,000      0.30          0.00            66.70           33.30
:d-Heavy   14,001-33,000      1.00          0.00            20.00           80.00
:avy-Heavy 33,001-60,000      0.80          0.00             0.00          100.00
.ne Haul > 60,000    lbs      0.00          0.00             0.00          100.00
:ban Bus                      0.20          0.00            50.00           50.00
)torcycle                     1.60         50.00            50.00            0.00
:hool Bus                     0.10          0.00             0.00          100.00
)tor Home                     1.50          0.00            93.30            6.70

:avel Conditions
                                Residential                   Commercial
                          Home-     Home-     Home-
                          Work      Shop      Other   Commute  Non-Work Customer
:ban Trip Length (miles)   6.3       6.3       6.3      6.3       6.3      6.3
ıral Trip Length (miles)   6.3       6.3       6.3      6.3       6.3      6.3
:ip Speeds (mph)          35.0      35.0      35.0     35.0      35.0     35.0
 of Trips - Residential   27.3      21.2      51.5

 of Trips - Commercial (by land use)
.ementary school                                       20.0      10.0     70.0
.gh school                                             10.0       5.0     85.0
.ty park                                                5.0       2.5     92.5
:gnl shop. center                                       2.0       1.0     97.0
```

rip mall	2.0	1.0	97.0
fice park	48.0	24.0	28.0
dustrial park	41.5	20.8	37.8

```
2/08/2005 1:05 PM


anges made to the default values for Land Use Trip Percentages

e Trip Rate and/or Acreage values for Single family housing
ave changed from the defaults 9.57/483.33 to 27.11/483.33
e Trip Rate and/or Acreage values for Apartments low rise
ave changed from the defaults 6.9/56.5 to 8.47/56.5
e Trip Rate and/or Acreage values for Apartments mid rise
ave changed from the defaults 5.76/16.84 to 3.57/16.84

anges made to the default values for Construction

te Grading Fugitive Dust Emission Rate changed from 10 to 38.2
chitectural Coatings: # ROG/ft2 (residential) changed from 0.0185 to 0.0013
chitectural Coatings: # ROG/ft2 (non-res) changed from 0.0185 to 0.0013
ase 2 mitigation measure Soil Disturbance:
    has been changed from off to on.
ase 2 mitigation measure Off-Road Diesel Exhaust:
    has been changed from off to on.
ase 3 mitigation measure Off-Road Diesel Exhaust:
    has been changed from off to on.

anges made to the default values for Area

e landscape year changed from 2005 to 2015.
e residential Arch. Coatings ROG emission factor changed from 0.0185 to 0.0013.
e nonresidential Arch. Coatings ROG emission factor changed from 0.0185 to 0.0013.

anges made to the default values for Operations

e operational emission year changed from 2005 to 2015.
e home based work selection item changed from  8 to 7.
e home based work urban trip length changed from 9.7 to 6.3.
e home based work rural trip length changed from 16.8 to 6.3.
e home based shopping selection item changed from  8 to 7.
e home based shopping urban trip length changed from 3.8 to 6.3.
e home based shopping rural trip length changed from 7.1 to 6.3.
e home based other selection item changed from  8 to 7.
e home based other urban trip length changed from 4.6 to 6.3.
e home based other rural trip length changed from 7.9 to 6.3.
e commercial based commute selection item changed from  8 to 7.
e commercial based commute urban trip length changed from 7.8 to 6.3.
he commercial based commute rural trip length changed from 14.7 to 6.3.
ne commercial based non-work selection item changed from  8 to 7.
he commercial based non-work urban trip length changed from 4.5 to 6.3.
he commercial based non-work rural trip length changed from 6.6 to 6.3.
he commercial based customer selection item changed from  8 to 7.
he commercial based customer urban trip length changed from 4.5 to 6.3.
he commercial based customer rural trip length changed from 6.6 to 6.3.
```

APPENDIX K-3

HIGH DENSITY ALTERNATIVE, PHASE 1: ISC MODELING EMISSION FACTORS FOR PM_{10}

*This spreadsheet is derived from SMAQMD BEEST PM Modeling Guidance - Appendix C

Bold cells = formulae or constant (do not

Developing Emission Factors

Target year = 2006

1. GRADING / SOIL VOLUME

Volume soil removed = [(A x B x C)/27] + (A x 2 x C x D)

A = Length of area (ft)	4,895.00
B = Width of area (ft)	4,895.00
C = Depth of grading (ft) (use 2.0 unless data available)	0.50
D = Fall-in factor (use 0.0 unless data available)	0.00

TABLE 1

Cubic yards of soil removed	**443,722.69**

2. GRADING / SOIL DENSITY

Tons soil removed = (A x B)/2000

A = Amount of soil removed (cubic yds) (Table 1)	**443,722.69**
B = Soild density (lbs/cubic yd) (use 2528.0 unless data available)	2,528.00

TABLE 2

Tons of soil removed	**560,865.47**

3. EMISSION RATE

Emission factor x Operational time

TABLE 3

1. Emission Factor (lbs/hr)	0.75	(default)
2. Operational Time (hrs/day)	8.00	
3. Emission Rate (lbs/day)	**6.02**	

4. STOCKPILE LOADING EMISSONS

Emission Factor = k(0.0032) x (U/5)^1.3 x (M/2)^-1.4

k = Particle size multiplier (use 0.35)	0.35
U = Mean wind speed (mph) (use 5.1 unless data available)	5.10
M = Material moisture content (%) (use 7.9 unless available)	7.90

TABLE 4

1. Emission Factor (lbs/ton)	**0.00017**
2. Tons Transferred (from Table 2)	**560,865.47**
3. Emission Rate (lbs/day)	**94.19**

5. STOCKPILE WIND EROSION EMISSIONS

Emission Rate = 1.6 x U x 0.5 x A

U = mean wind speed (m/s) (use 2.3 unless data available)	2.30	
A = acres	137.50	URBEMIS

TABLE 5

1. Emission Rate (lbs/hr)	**253.00**
2. Emission Rate (lbs/day)	**6,072.00**

6. MOBILE SOURCE EMISSIONS

TABLE 6

1. Type of Equipment	Crawler tractors	
2. Equipment Used (#)	13.75	URBEMIS

3. Operational Time (hrs/day)	8.00	
4. Emission Factor (lbs/hp-hr)	0.43	SMAQMD
5. Emission Rate (lbs/day)	**5.91**	

1. Type of Equipment	Graders	
2. Equipment Used (#)	13.75	URBEMIS
3. Operational Time (hrs/day)	8.00	
4. Emission Factor (lbs/hp-hr)	0.28	SMAQMD
5. Emission Rate (lbs/day)	**3.85**	

1. Type of Equipment	Off-highway truck	
2. Equipment Used (#)	13.75	URBEMIS
3. Operational Time (hrs/day)	8.00	
4. Emission Factor (lbs/hp-hr)	0.58	SMAQMD
5. Emission Rate (lbs/day)	**7.98**	

TABLE 7

Mobile Equipment Emission Rate Totals (lbs/day)	**17.74**

7. TOTALS

TABLE 8

1. Table 3, Row 3	**6.02**	
2. Table 4, Row 3	**94.19**	
3. Table 5, Row 2	**6,072.00**	
4. Total	**6,172.22**	Fugitive Emissions (lbs/day)
5. Table 7	**17.74**	Mobile Emissions (lbs/day)

8. CONVERTING TO GRAMS PER SECOND

Emission Factor (grams/sec) = (A / 24 / 60 / 60) x 453.592 grams/lb
A = Emission factor (lbs/day)

TABLE 9

Fugitive Dust Emissions	**32.40**
Mobile PM Emissions	**0.09**

9. DISTRIBUTE POINT SOURCES OVER SITE

If project =< 10 acres, divide by 49
if project > 10 acres, divide by 64

TABLE 10

		Mitigated PM Emission
Fugitive Dust Emissions	**0.5063**	**0.1266**
Mobile PM Emissions	**0.0015**	**0.0008**

High Density Alternative, Phase 1: Construction Emissions
(See Assumptions)

```
ge: 1
/31/2006 10:47 AM


             URBEMIS 2002 For Windows   8.7.0

le Name:                      C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio HD construction.urb
oject Name:                   Rio Del Oro HD
oject Location:               Lower Sacramento Valley Air Basin
-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                     SUMMARY REPORT
                  (Pounds/Day - Summer)

NSTRUCTION EMISSION ESTIMATES
                                                                         PM10      PM10      PM10
** 2006 ***                       ROG       NOx        CO       SO2     TOTAL    EXHAUST     DUST
OTALS (lbs/day,unmitigated)     99.92    728.56    804.35      1.59 5,281.82     28.89  5,252.93
OTALS (lbs/day, mitigated)      95.24    604.65    804.35      1.59 1,330.50     16.94  1,313.56

                                                                         PM10      PM10      PM10
** 2007 ***                       ROG       NOx        CO       SO2     TOTAL    EXHAUST     DUST
OTALS (lbs/day,unmitigated)     88.98    505.06    793.47      0.04    24.47     22.10      2.37
OTALS (lbs/day, mitigated)      85.77    407.06    793.47      0.04    14.65     12.28      2.37

                                                                         PM10      PM10      PM10
** 2008 ***                       ROG       NOx        CO       SO2     TOTAL    EXHAUST     DUST
OTALS (lbs/day,unmitigated)     87.00    480.27    789.18      0.04    22.55     20.18      2.37
OTALS (lbs/day, mitigated)      83.79    387.02    789.18      0.04    13.59     11.22      2.37

                                                                         PM10      PM10      PM10
** 2009 ***                       ROG       NOx        CO       SO2     TOTAL    EXHAUST     DUST
OTALS (lbs/day,unmitigated)     84.94    454.72    784.11      0.04    21.26     18.89      2.37
OTALS (lbs/day, mitigated)      81.73    366.35    784.11      0.04    12.88     10.51      2.37

                                                                         PM10      PM10      PM10
** 2010 ***                       ROG       NOx        CO       SO2     TOTAL    EXHAUST     DUST
OTALS (lbs/day,unmitigated)    425.77    493.50  1,103.09      0.09    23.40     18.65      4.75
OTALS (lbs/day, mitigated)     422.15    400.29  1,103.09      0.09    15.28     10.53      4.75


EA SOURCE EMISSION ESTIMATES
                                  ROG       NOx        CO       SO2      PM10
OTALS (lbs/day,unmitigated)     94.15     60.93     72.32      0.15      0.19


ERATIONAL (VEHICLE) EMISSION ESTIMATES
                                  ROG       NOx        CO       SO2      PM10

OTALS (lbs/day,unmitigated)    692.76    779.47  8,107.24     10.27 1,570.46

M OF AREA AND OPERATIONAL EMISSION ESTIMATES
                                  ROG       NOx        CO       SO2      PM10
OTALS (lbs/day,unmitigated)    786.92    840.40  8,179.55     10.42 1,570.66
```

```
              URBEMIS 2002 For Windows   8.7.0

le Name:                       C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio HD construction.urb
oject Name:                    Rio Del Oro HD
oject Location:                Lower Sacramento Valley Air Basin
-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       DETAIL REPORT
                   (Pounds/Day - Summer)

nstruction Start Month and Year: June, 2006
nstruction Duration: 48
tal Land Use Area to be Developed: 550 acres
ximum Acreage Disturbed Per Day: 137.5 acres
ngle Family Units: 725 Multi-Family Units: 806
tail/Office/Institutional/Industrial Square Footage: 8713000

NSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                        PM10      PM10        PM10
  Source                        ROG        NOx         CO        SO2   TOTAL   EXHAUST        DUST
** 2006***
ase 1 - Demolition Emissions
gitive Dust                       -          -          -          -     0.00         -       0.00
f-Road Diesel                  0.00       0.00       0.00          -     0.00      0.00       0.00
-Road Diesel                   0.00       0.00       0.00       0.00     0.00      0.00       0.00
rker Trips                     0.00       0.00       0.00       0.00     0.00      0.00       0.00
Maximum lbs/day                0.00       0.00       0.00       0.00     0.00      0.00       0.00

ase 2 - Site Grading Emissions
gitive Dust                       -          -          -          - 5,252.50         -   5,252.50
f-Road Diesel                 93.67     619.57     768.71          -    26.55     26.55       0.00
-Road Diesel                   5.42     108.14      20.00       1.58     2.72      2.32       0.40
rker Trips                     0.83       0.85      15.64       0.01     0.05      0.02       0.03
Maximum lbs/day               99.92     728.56     804.35       1.59 5,281.82     28.89   5,252.93

ase 3 - Building Construction
dg Const Off-Road Diesel      64.22     513.75     457.24          -    23.76     23.76       0.00
dg Const Worker Trips         26.64      16.01     338.58       0.04     2.64      0.27       2.37
ch Coatings Off-Gas            0.00          -          -          -        -         -          -
ch Coatings Worker Trips       0.00       0.00       0.00       0.00     0.00      0.00       0.00
phalt Off-Gas                  0.00          -          -          -        -         -          -
phalt Off-Road Diesel          0.00       0.00       0.00          -     0.00      0.00       0.00
phalt On-Road Diesel           0.00       0.00       0.00       0.00     0.00      0.00       0.00
phalt Worker Trips             0.00       0.00       0.00       0.00     0.00      0.00       0.00
Maximum lbs/day               90.86     529.76     795.82       0.04    26.40     24.03       2.37

Max lbs/day all phases        99.92     728.56     804.35       1.59 5,281.82     28.89   5,252.93


** 2007***
ase 1 - Demolition Emissions
gitive Dust                       -          -          -          -     0.00         -       0.00
f-Road Diesel                  0.00       0.00       0.00          -     0.00      0.00       0.00
-Road Diesel                   0.00       0.00       0.00       0.00     0.00      0.00       0.00
rker Trips                     0.00       0.00       0.00       0.00     0.00      0.00       0.00
Maximum lbs/day                0.00       0.00       0.00       0.00     0.00      0.00       0.00

ase 2 - Site Grading Emissions
gitive Dust                       -          -          -          -     0.00         -       0.00
f-Road Diesel                  0.00       0.00       0.00          -     0.00      0.00       0.00
-Road Diesel                   0.00       0.00       0.00       0.00     0.00      0.00       0.00
rker Trips                     0.00       0.00       0.00       0.00     0.00      0.00       0.00
Maximum lbs/day                0.00       0.00       0.00       0.00     0.00      0.00       0.00

ase 3 - Building Construction
dg Const Off-Road Diesel      64.22     489.99     475.22          -    21.83     21.83       0.00
dg Const Worker Trips         24.76      15.07     318.25       0.04     2.64      0.27       2.37
ch Coatings Off-Gas            0.00          -          -          -        -         -          -
ch Coatings Worker Trips       0.00       0.00       0.00       0.00     0.00      0.00       0.00
phalt Off-Gas                  0.00          -          -          -        -         -          -
phalt Off-Road Diesel          0.00       0.00       0.00          -     0.00      0.00       0.00
phalt On-Road Diesel           0.00       0.00       0.00       0.00     0.00      0.00       0.00
phalt Worker Trips             0.00       0.00       0.00       0.00     0.00      0.00       0.00
Maximum lbs/day               88.98     505.06     793.47       0.04    24.47     22.10       2.37

Max lbs/day all phases        88.98     505.06     793.47       0.04    24.47     22.10       2.37


** 2008***
```

```
ase 1 - Demolition Emissions
gitive Dust                     -         -         -         -       0.00        -       0.00
f-Road Diesel                 0.00      0.00      0.00        -       0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 2 - Site Grading Emissions
gitive Dust                     -         -         -         -       0.00        -       0.00
f-Road Diesel                 0.00      0.00      0.00        -       0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 3 - Building Construction
dg Const Off-Road Diesel     64.22    466.23    492.56        -      19.91     19.91      0.00
dg Const Worker Trips        22.78     14.04    296.62      0.04      2.64      0.27      2.37
ch Coatings Off-Gas           0.00        -         -         -         -         -         -
ch Coatings Worker Trips      0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Off-Gas                 0.00        -         -         -         -         -         -
phalt Off-Road Diesel         0.00      0.00      0.00        -       0.00      0.00      0.00
phalt On-Road Diesel          0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Worker Trips            0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day              87.00    480.27    789.18      0.04     22.55     20.18      2.37

Max lbs/day all phases       87.00    480.27    789.18      0.04     22.55     20.18      2.37


** 2009***
ase 1 - Demolition Emissions
gitive Dust                     -         -         -         -       0.00        -       0.00
f-Road Diesel                 0.00      0.00      0.00        -       0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 2 - Site Grading Emissions
gitive Dust                     -         -         -         -       0.00        -       0.00
f-Road Diesel                 0.00      0.00      0.00        -       0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 3 - Building Construction
dg Const Off-Road Diesel     64.22    441.83    510.54        -      18.62     18.62      0.00
dg Const Worker Trips        20.72     12.89    273.57      0.04      2.64      0.27      2.37
ch Coatings Off-Gas           0.00        -         -         -         -         -         -
ch Coatings Worker Trips      0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Off-Gas                 0.00        -         -         -         -         -         -
phalt Off-Road Diesel         0.00      0.00      0.00        -       0.00      0.00      0.00
phalt On-Road Diesel          0.00      0.00      0.00      0.00      0.00      0.00      0.00
phalt Worker Trips            0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day              84.94    454.72    784.11      0.04     21.26     18.89      2.37

Max lbs/day all phases       84.94    454.72    784.11      0.04     21.26     18.89      2.37


** 2010***
ase 1 - Demolition Emissions
gitive Dust                     -         -         -         -       0.00        -       0.00
f-Road Diesel                 0.00      0.00      0.00        -       0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 2 - Site Grading Emissions
gitive Dust                     -         -         -         -       0.00        -       0.00
f-Road Diesel                 0.00      0.00      0.00        -       0.00      0.00      0.00
-Road Diesel                  0.00      0.00      0.00      0.00      0.00      0.00      0.00
rker Trips                    0.00      0.00      0.00      0.00      0.00      0.00      0.00
Maximum lbs/day               0.00      0.00      0.00      0.00      0.00      0.00      0.00

ase 3 - Building Construction
dg Const Off-Road Diesel     64.22    418.07    527.88        -      16.70     16.70      0.00
dg Const Worker Trips        18.81     11.79    251.78      0.04      2.64      0.27      2.37
ch Coatings Off-Gas         313.31        -         -         -         -         -         -
ch Coatings Worker Trips     18.81     11.79    251.78      0.04      2.64      0.27      2.37
phalt Off-Gas                 2.10        -         -         -         -         -         -
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phalt Off-Road Diesel          8.27     47.99      70.33          -       1.32       1.32       0.00
phalt On-Road Diesel           0.21      3.84       0.77       0.01       0.10       0.09       0.01
phalt Worker Trips             0.04      0.03       0.56       0.00       0.01       0.00       0.01
Maximum lbs/day              425.77    493.50   1,103.09       0.09      23.40      18.65       4.75

Max lbs/day all phases       425.77    493.50   1,103.09       0.09      23.40      18.65       4.75



ase 1 - Demolition Assumptions:  Phase Turned OFF

ase 2 - Site Grading Assumptions
art Month/Year for Phase 2: Jun '06
ase 2 Duration: 5.3 months
-Road Truck Travel (VMT): 3806
f-Road Equipment
No.     Type                                 Horsepower    Load Factor     Hours/Day
  14    Crawler Tractors                         143           0.575           8.0
  14    Graders                                  174           0.575           8.0
  14    Off Highway Trucks                       417           0.490           8.0

ase 3 - Building Construction Assumptions
art Month/Year for Phase 3: Nov '06
ase 3 Duration: 42.7 months
Start Month/Year for SubPhase Building: Nov '06
SubPhase Building Duration: 42.7 months
Off-Road Equipment
No.     Type                                 Horsepower    Load Factor     Hours/Day
  41    Other Equipment                          190           0.620           6.0
Start Month/Year for SubPhase Architectural Coatings: Jan '10
SubPhase Architectural Coatings Duration: 4.3 months
Start Month/Year for SubPhase Asphalt: Mar '10
SubPhase Asphalt Duration: 2.1 months
Acres to be Paved: 37
Off-Road Equipment
No.     Type                                 Horsepower    Load Factor     Hours/Day
   4    Pavers                                   132           0.590           8.0
   4    Rollers                                  114           0.430           8.0
```

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anges made to the default values for Land Use Trip Percentages


anges made to the default values for Construction

te Grading Fugitive Dust Emission Rate changed from 10 to 38.2
chitectural Coatings: # ROG/ft2 (residential) changed from 0.0185 to 0.0013
chitectural Coatings: # ROG/ft2 (non-res) changed from 0.0185 to 0.0013
ase 2 mitigation measure Soil Disturbance:
   has been changed from off to on.
ase 2 mitigation measure Off-Road Diesel Exhaust:
   has been changed from off to on.
ase 3 mitigation measure Off-Road Diesel Exhaust:
   has been changed from off to on.
ase 3 mitigation measure Off-Road Diesel Exhaust:
   has been changed from off to on.

anges made to the default values for Area

e landscape year changed from 2005 to 2015.
e residential Arch. Coatings ROG emission factor changed from 0.0185 to 0.0013.
e nonresidential Arch. Coatings ROG emission factor changed from 0.0185 to 0.0013.

anges made to the default values for Operations

e operational emission year changed from 2005 to 2015.
e home based work selection item changed from  8 to 7.
e home based work urban trip length changed from 9.7 to 6.3.
e home based work rural trip length changed from 16.8 to 6.3.
e home based shopping selection item changed from  8 to 7.
e home based shopping urban trip length changed from 3.8 to 6.3.
e home based shopping rural trip length changed from 7.1 to 6.3.
e home based other selection item changed from  8 to 7.
e home based other urban trip length changed from 4.6 to 6.3.
e home based other rural trip length changed from 7.9 to 6.3.
e commercial based commute selection item changed from  8 to 7.
e commercial based commute urban trip length changed from 7.8 to 6.3.
e commercial based commute rural trip length changed from 14.7 to 6.3.
e commercial based non-work selection item changed from  8 to 7.
e commercial based non-work urban trip length changed from 4.5 to 6.3.
e commercial based non-work rural trip length changed from 6.6 to 6.3.
e commercial based customer selection item changed from  8 to 7.
e commercial based customer urban trip length changed from 4.5 to 6.3.
e commercial based customer rural trip length changed from 6.6 to 6.3.
```

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'31/2006 10:48 AM



             URBEMIS 2002 For Windows   8.7.0

.e Name:                        C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio HD construction part II.urb
)ject Name:                     Rio Del Oro HD
)ject Location:                 Lower Sacramento Valley Air Basin
-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                     SUMMARY REPORT
                  (Pounds/Day - Summer)

ISTRUCTION EMISSION ESTIMATES
                                                                        PM10      PM10      PM10
** 2010 ***                          ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
)TALS (lbs/day,unmitigated)    108.97    464.13  1,418.75      0.52     20.68     18.31      2.37
)TALS (lbs/day, mitigated)     105.75    380.52  1,418.75      0.52     13.17     10.80      2.37

                                                                        PM10      PM10      PM10
** 2011 ***                          ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
)TALS (lbs/day,unmitigated)    108.97    464.13  1,418.75      0.52     20.68     18.31      2.37
)TALS (lbs/day, mitigated)     105.75    380.52  1,418.75      0.52     13.17     10.80      2.37

                                                                        PM10      PM10      PM10
** 2012 ***                          ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
)TALS (lbs/day,unmitigated)    108.97    464.13  1,418.75      0.52     20.68     18.31      2.37
)TALS (lbs/day, mitigated)     105.75    380.52  1,418.75      0.52     13.17     10.80      2.37

                                                                        PM10      PM10      PM10
** 2013 ***                          ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
)TALS (lbs/day,unmitigated)    108.97    464.13  1,418.75      0.52     20.68     18.31      2.37
)TALS (lbs/day, mitigated)     105.75    380.52  1,418.75      0.52     13.17     10.80      2.37

                                                                        PM10      PM10      PM10
** 2014 ***                          ROG       NOx        CO       SO2     TOTAL   EXHAUST      DUST
)TALS (lbs/day,unmitigated)    418.78    527.30  1,742.09      0.57     24.73     19.98      4.75
)TALS (lbs/day, mitigated)     415.15    434.09  1,742.09      0.57     16.62     11.87      4.75


EA SOURCE EMISSION ESTIMATES
                                     ROG       NOx        CO       SO2      PM10
)TALS (lbs/day,unmitigated)     94.15     60.93     72.32      0.15      0.19


ERATIONAL (VEHICLE) EMISSION ESTIMATES
                                     ROG       NOx        CO       SO2      PM10

)TALS (lbs/day,unmitigated)    692.76    779.47  8,107.24     10.27  1,570.46

I OF AREA AND OPERATIONAL EMISSION ESTIMATES
                                     ROG       NOx        CO       SO2      PM10
)TALS (lbs/day,unmitigated)    786.92    840.40  8,179.55     10.42  1,570.66
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              URBEMIS 2002 For Windows   8.7.0

le Name:                      C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio HD construction part II.urb
oject Name:                   Rio Del Oro HD
oject Location:               Lower Sacramento Valley Air Basin
-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       DETAIL REPORT
                   (Pounds/Day - Summer)

nstruction Start Month and Year: June, 2010
nstruction Duration: 48
tal Land Use Area to be Developed: 550 acres
ximum Acreage Disturbed Per Day: 137.5 acres
ngle Family Units: 725 Multi-Family Units: 806
tail/Office/Institutional/Industrial Square Footage: 8713000

NSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                        PM10      PM10        PM10
  Source                      ROG         NOx          CO        SO2    TOTAL   EXHAUST       DUST
** 2010***
ase 1 - Demolition Emissions
gitive Dust                     -           -           -          -     0.00         -       0.00
f-Road Diesel                0.00        0.00        0.00          -     0.00      0.00       0.00
-Road Diesel                 0.00        0.00        0.00       0.00     0.00      0.00       0.00
rker Trips                   0.00        0.00        0.00       0.00     0.00      0.00       0.00
Maximum lbs/day              0.00        0.00        0.00       0.00     0.00      0.00       0.00

ase 2 - Site Grading Emissions
gitive Dust                     -           -           -          -     0.00         -       0.00
f-Road Diesel                0.00        0.00        0.00          -     0.00      0.00       0.00
-Road Diesel                 0.00        0.00        0.00       0.00     0.00      0.00       0.00
rker Trips                   0.00        0.00        0.00       0.00     0.00      0.00       0.00
Maximum lbs/day              0.00        0.00        0.00       0.00     0.00      0.00       0.00

ase 3 - Building Construction
dg Const Off-Road Diesel    64.22      418.07      527.88          -    16.70     16.70       0.00
dg Const Worker Trips       44.75       46.06      890.87       0.52     3.98      1.61       2.37
ch Coatings Off-Gas          0.00           -           -          -        -         -          -
ch Coatings Worker Trips     0.00        0.00        0.00       0.00     0.00      0.00       0.00
phalt Off-Gas                0.00           -           -          -        -         -          -
phalt Off-Road Diesel        0.00        0.00        0.00          -     0.00      0.00       0.00
phalt On-Road Diesel         0.00        0.00        0.00       0.00     0.00      0.00       0.00
phalt Worker Trips           0.00        0.00        0.00       0.00     0.00      0.00       0.00
Maximum lbs/day            108.97      464.13    1,418.75       0.52    20.68     18.31       2.37

Max lbs/day all phases     108.97      464.13    1,418.75       0.52    20.68     18.31       2.37


** 2011***
ase 1 - Demolition Emissions
gitive Dust                     -           -           -          -     0.00         -       0.00
f-Road Diesel                0.00        0.00        0.00          -     0.00      0.00       0.00
-Road Diesel                 0.00        0.00        0.00       0.00     0.00      0.00       0.00
rker Trips                   0.00        0.00        0.00       0.00     0.00      0.00       0.00
Maximum lbs/day              0.00        0.00        0.00       0.00     0.00      0.00       0.00

ase 2 - Site Grading Emissions
gitive Dust                     -           -           -          -     0.00         -       0.00
f-Road Diesel                0.00        0.00        0.00          -     0.00      0.00       0.00
-Road Diesel                 0.00        0.00        0.00       0.00     0.00      0.00       0.00
rker Trips                   0.00        0.00        0.00       0.00     0.00      0.00       0.00
Maximum lbs/day              0.00        0.00        0.00       0.00     0.00      0.00       0.00

ase 3 - Building Construction
dg Const Off-Road Diesel    64.22      418.07      527.88          -    16.70     16.70       0.00
dg Const Worker Trips       44.75       46.06      890.87       0.52     3.98      1.61       2.37
ch Coatings Off-Gas          0.00           -           -          -        -         -          -
ch Coatings Worker Trips     0.00        0.00        0.00       0.00     0.00      0.00       0.00
phalt Off-Gas                0.00           -           -          -        -         -          -
phalt Off-Road Diesel        0.00        0.00        0.00          -     0.00      0.00       0.00
phalt On-Road Diesel         0.00        0.00        0.00       0.00     0.00      0.00       0.00
phalt Worker Trips           0.00        0.00        0.00       0.00     0.00      0.00       0.00
Maximum lbs/day            108.97      464.13    1,418.75       0.52    20.68     18.31       2.37

Max lbs/day all phases     108.97      464.13    1,418.75       0.52    20.68     18.31       2.37


** 2012***
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```
ase 1 - Demolition Emissions
gitive Dust                    -         -         -          -        0.00        -         0.00
f-Road Diesel               0.00      0.00      0.00          -        0.00      0.00        0.00
-Road Diesel                0.00      0.00      0.00       0.00        0.00      0.00        0.00
rker Trips                  0.00      0.00      0.00       0.00        0.00      0.00        0.00
Maximum lbs/day             0.00      0.00      0.00       0.00        0.00      0.00        0.00

ase 2 - Site Grading Emissions
gitive Dust                    -         -         -          -        0.00        -         0.00
f-Road Diesel               0.00      0.00      0.00          -        0.00      0.00        0.00
-Road Diesel                0.00      0.00      0.00       0.00        0.00      0.00        0.00
rker Trips                  0.00      0.00      0.00       0.00        0.00      0.00        0.00
Maximum lbs/day             0.00      0.00      0.00       0.00        0.00      0.00        0.00

ase 3 - Building Construction
dg Const Off-Road Diesel   64.22    418.07    527.88          -       16.70     16.70        0.00
dg Const Worker Trips      44.75     46.06    890.87       0.52        3.98      1.61        2.37
ch Coatings Off-Gas         0.00         -         -          -           -         -           -
ch Coatings Worker Trips    0.00      0.00      0.00       0.00        0.00      0.00        0.00
phalt Off-Gas               0.00         -         -          -           -         -           -
phalt Off-Road Diesel       0.00      0.00      0.00          -        0.00      0.00        0.00
phalt On-Road Diesel        0.00      0.00      0.00       0.00        0.00      0.00        0.00
phalt Worker Trips          0.00      0.00      0.00       0.00        0.00      0.00        0.00
Maximum lbs/day           108.97    464.13  1,418.75       0.52       20.68     18.31        2.37

Max lbs/day all phases    108.97    464.13  1,418.75       0.52       20.68     18.31        2.37


** 2013***
ase 1 - Demolition Emissions
gitive Dust                    -         -         -          -        0.00        -         0.00
f-Road Diesel               0.00      0.00      0.00          -        0.00      0.00        0.00
-Road Diesel                0.00      0.00      0.00       0.00        0.00      0.00        0.00
rker Trips                  0.00      0.00      0.00       0.00        0.00      0.00        0.00
Maximum lbs/day             0.00      0.00      0.00       0.00        0.00      0.00        0.00

ase 2 - Site Grading Emissions
gitive Dust                    -         -         -          -        0.00        -         0.00
f-Road Diesel               0.00      0.00      0.00          -        0.00      0.00        0.00
-Road Diesel                0.00      0.00      0.00       0.00        0.00      0.00        0.00
rker Trips                  0.00      0.00      0.00       0.00        0.00      0.00        0.00
Maximum lbs/day             0.00      0.00      0.00       0.00        0.00      0.00        0.00

ase 3 - Building Construction
dg Const Off-Road Diesel   64.22    418.07    527.88          -       16.70     16.70        0.00
dg Const Worker Trips      44.75     46.06    890.87       0.52        3.98      1.61        2.37
ch Coatings Off-Gas         0.00         -         -          -           -         -           -
ch Coatings Worker Trips    0.00      0.00      0.00       0.00        0.00      0.00        0.00
phalt Off-Gas               0.00         -         -          -           -         -           -
phalt Off-Road Diesel       0.00      0.00      0.00          -        0.00      0.00        0.00
phalt On-Road Diesel        0.00      0.00      0.00       0.00        0.00      0.00        0.00
phalt Worker Trips          0.00      0.00      0.00       0.00        0.00      0.00        0.00
Maximum lbs/day           108.97    464.13  1,418.75       0.52       20.68     18.31        2.37

Max lbs/day all phases    108.97    464.13  1,418.75       0.52       20.68     18.31        2.37


** 2014***
ase 1 - Demolition Emissions
gitive Dust                    -         -         -          -        0.00        -         0.00
f-Road Diesel               0.00      0.00      0.00          -        0.00      0.00        0.00
-Road Diesel                0.00      0.00      0.00       0.00        0.00      0.00        0.00
rker Trips                  0.00      0.00      0.00       0.00        0.00      0.00        0.00
Maximum lbs/day             0.00      0.00      0.00       0.00        0.00      0.00        0.00

ase 2 - Site Grading Emissions
gitive Dust                    -         -         -          -        0.00        -         0.00
f-Road Diesel               0.00      0.00      0.00          -        0.00      0.00        0.00
-Road Diesel                0.00      0.00      0.00       0.00        0.00      0.00        0.00
rker Trips                  0.00      0.00      0.00       0.00        0.00      0.00        0.00
Maximum lbs/day             0.00      0.00      0.00       0.00        0.00      0.00        0.00

ase 3 - Building Construction
dg Const Off-Road Diesel   64.22    418.07    527.88          -       16.70     16.70        0.00
dg Const Worker Trips      44.75     46.06    890.87       0.52        3.98      1.61        2.37
ch Coatings Off-Gas       280.67         -         -          -           -         -           -
ch Coatings Worker Trips   18.81     11.79    251.78       0.04        2.64      0.27        2.37
phalt Off-Gas               1.84         -         -          -           -         -           -
```

```
phalt Off-Road Diesel         8.27     47.99     70.33         -       1.32      1.32       0.00
phalt On-Road Diesel          0.18      3.36      0.68      0.01       0.08      0.07       0.01
phalt Worker Trips            0.04      0.03      0.56      0.00       0.01      0.00       0.01
Maximum lbs/day             418.78    527.30  1,742.09      0.57      24.73     19.98       4.75

Max lbs/day all phases      418.78    527.30  1,742.09      0.57      24.73     19.98       4.75



ase 2 - Site Grading Assumptions:  Phase Turned OFF


ase 3 - Building Construction Assumptions
art Month/Year for Phase 3: Jun '10
ase 3 Duration: 48 months
Start Month/Year for SubPhase Building: Jun '10
SubPhase Building Duration: 48 months
Off-Road Equipment
No.     Type                               Horsepower    Load Factor     Hours/Day
  41    Other Equipment                       190          0.620           6.0
Start Month/Year for SubPhase Architectural Coatings: Jan '14
SubPhase Architectural Coatings Duration: 4.8 months
Start Month/Year for SubPhase Asphalt: Mar '14
SubPhase Asphalt Duration: 2.4 months
Acres to be Paved: 37
Off-Road Equipment
No.     Type                               Horsepower    Load Factor     Hours/Day
   4    Pavers                                132          0.590           8.0
   4    Rollers                               114          0.430           8.0
```

```
anges made to the default values for Land Use Trip Percentages


anges made to the default values for Construction

chitectural Coatings: # ROG/ft2 (residential) changed from 0.0185 to 0.0013
chitectural Coatings: # ROG/ft2 (non-res) changed from 0.0185 to 0.0013
ase 3 mitigation measure Off-Road Diesel Exhaust:
   has been changed from off to on.
ase 3 mitigation measure Off-Road Diesel Exhaust:
   has been changed from off to on.

anges made to the default values for Area

e landscape year changed from 2005 to 2015.
e residential Arch. Coatings ROG emission factor changed from 0.0185 to 0.0013.
e nonresidential Arch. Coatings ROG emission factor changed from 0.0185 to 0.0013.

anges made to the default values for Operations

e operational emission year changed from 2005 to 2015.
e home based work selection item changed from  8 to 7.
e home based work urban trip length changed from 9.7 to 6.3.
e home based work rural trip length changed from 16.8 to 6.3.
e home based shopping selection item changed from  8 to 7.
e home based shopping urban trip length changed from 3.8 to 6.3.
e home based shopping rural trip length changed from 7.1 to 6.3.
e home based other selection item changed from  8 to 7.
e home based other urban trip length changed from 4.6 to 6.3.
e home based other rural trip length changed from 7.9 to 6.3.
e commercial based commute selection item changed from  8 to 7.
e commercial based commute urban trip length changed from 7.8 to 6.3.
e commercial based commute rural trip length changed from 14.7 to 6.3.
e commercial based non-work selection item changed from  8 to 7.
e commercial based non-work urban trip length changed from 4.5 to 6.3.
e commercial based non-work rural trip length changed from 6.6 to 6.3.
e commercial based customer selection item changed from  8 to 7.
e commercial based customer urban trip length changed from 4.5 to 6.3.
e commercial based customer rural trip length changed from 6.6 to 6.3.
```

High Density Alternative, Phase 1: Area-Source Emissions

```
                URBEMIS 2002 For Windows   8.7.0

le Name:                      C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio HD.urb
oject Name:                   Rio Del Oro HD
oject Location:               Lower Sacramento Valley Air Basin
-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       DETAIL REPORT
                    (Pounds/Day - Summer)

EA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)
  Source                          ROG       NOx        CO       SO2      PM10
atural Gas                       8.83    119.75     88.19         0      0.22
earth - No summer emissions
andscaping                       6.32      0.81     49.90      0.29      0.16
onsumer Prdcts                 147.16         -         -         -         -
rchitectural Coatings           22.39         -         -         -         -
OTALS(lbs/day,unmitigated)     184.70    120.56    138.09      0.29      0.38
```

High Density Alternative, Phase 1: Operational Emissions Relative to Proposed Project Alternative

```
/08/2005 11:21 AM


              URBEMIS 2002 For Windows   8.7.0

le Name:                        C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio HD net.urb
oject Name:                     Rio Del Oro HD
oject Location:                 Lower Sacramento Valley Air Basin
.-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        DETAIL REPORT
                     (Pounds/Day - Summer)


               UNMITIGATED OPERATIONAL EMISSIONS

                                ROG        NOx         CO        SO2       PM10
artments low rise +            0.14       0.13       1.45       0.00       0.26
artments mid rise +            0.31       0.28       3.01       0.00       0.55
gnl shop. center -             7.20       8.93      91.06       0.12      18.06
fice park -                    1.15       1.20      13.04       0.02       2.40
dustrial park -               18.30      17.40     187.03       0.23      34.82

TAL EMISSIONS (lbs/day)       27.10      27.94     295.59       0.37      56.10

es not include correction for passby trips.
es not include double counting adjustment for internal trips.

ERATIONAL (Vehicle) EMISSION ESTIMATES

alysis Year: 2015  Temperature (F): 85   Season: Summer

FAC Version: EMFAC2002 (9/2002)

mmary of Land Uses:

                                                                   No.     Total
it Type                  Acreage    Trip Rate                     Units    Trips

artments low rise           0.25    6.90 trips/dwelling unit      4.00     27.60
artments mid rise           0.26    5.75 trips/dwelling unit     10.00     57.50
gnl shop. center                   42.94 trips/1000 sq. ft.      44.00 1,889.36
fice park                          11.42 trips/1000 sq. ft.      22.00   251.24
dustrial park                       6.96 trips/1000 sq. ft.     523.00 3,640.08

                                             Sum of Total Trips     5,865.78
                                    Total Vehicle Miles Traveled   36,954.41

hicle Assumptions:

eet Mix:

hicle Type                Percent Type    Non-Catalyst     Catalyst         Diesel
ght Auto                      54.40           0.40          99.40            0.20
ght Truck < 3,750   lbs       15.30           0.70          98.00            1.30
ght Truck  3,751- 5,750       16.40           0.60          98.80            0.60
d Truck    5,751- 8,500        7.30           0.00          98.60            1.40
te-Heavy   8,501-10,000        1.10           0.00          81.80           18.20
te-Heavy  10,001-14,000        0.30           0.00          66.70           33.30
d-Heavy   14,001-33,000        1.00           0.00          20.00           80.00
avy-Heavy 33,001-60,000        0.80           0.00           0.00          100.00
ne Haul > 60,000    lbs        0.00           0.00           0.00          100.00
ban Bus                        0.20           0.00          50.00           50.00
torcycle                       1.60          50.00          50.00            0.00
hool Bus                       0.10           0.00           0.00          100.00
tor Home                       1.50           0.00          93.30            6.70

avel Conditions
                                 Residential                     Commercial
                         Home-     Home-     Home-
                         Work      Shop      Other    Commute  Non-Work Customer
ban Trip Length (miles)  6.3       6.3       6.3       6.3       6.3       6.3
ral Trip Length (miles)  6.3       6.3       6.3       6.3       6.3       6.3
ip Speeds (mph)         35.0      35.0      35.0      35.0      35.0      35.0
of Trips - Residential  27.3      21.2      51.5

of Trips - Commercial (by land use)
gnl shop. center                                       2.0       1.0      97.0
fice park                                             48.0      24.0      28.0
dustrial park                                         41.5      20.8      37.8
```

APPENDIX K-4

IMPACT MINIMIZATION ALTERNATIVE, PHASE 1: EMISSION FACTORS FOR PM_{10}

Impact Minimization Alternative - Phase 1

*This spreadsheet is derived from SMAQMD BEEST PM Modeling Guidance - Appendix C

Bold cells = formulae or constant (do not

Target year = 2006

Developing Emission Factors

1. GRADING / SOIL VOLUME

Volume soil removed = [(A x B x C)/27] + (A x 2 x C x D)
A = Length of area (ft) 4,510.00
B = Width of area (ft) 4,510.00
C = Depth of grading (ft) (use 2.0 unless data available) 0.50
D = Fall-in factor (use 0.0 unless data available) 0.00

TABLE 1

Cubic yards of soil removed	**376,668.52**

2. GRADING / SOIL DENSITY

Tons soil removed = (A x B)/2000
A = Amount of soil removed (cubic yds) (Table 1) **376,668.52**
B = Soild density (lbs/cubic yd) (use 2528.0 unless data available) 2,528.00

TABLE 2

Tons of soil removed	**476,109.01**

3. EMISSION RATE

Emission factor x Operational time

TABLE 3

1. Emission Factor (lbs/hr)	0.75	(default)
2. Operational Time (hrs/day)	8.00	
3. Emission Rate (lbs/day)	**6.02**	

4. STOCKPILE LOADING EMISSONS

Emission Factor = k(0.0032) x (U/5)^1.3 x (M/2)^-1.4
k = Particle size multiplier (use 0.35) 0.35
U = Mean wind speed (mph) (use 5.1 unless data available) 5.10
M = Material moisture content (%) (use 7.9 unless available) 7.90

TABLE 4

1. Emission Factor (lbs/ton)	**0.00017**
2. Tons Transferred (from Table 2)	**476,109.01**
3. Emission Rate (lbs/day)	**79.96**

5. STOCKPILE WIND EROSION EMISSIONS

Emission Rate = 1.6 x U x 0.5 x A
U = mean wind speed (m/s) (use 2.3 unless data available) 2.30
A = acres 117.00 URBEMIS

TABLE 5

1. Emission Rate (lbs/hr)	**215.28**
2. Emission Rate (lbs/day)	**5,166.72**

6. MOBILE SOURCE EMISSIONS

TABLE 6

1. Type of Equipment	Crawler tractors

2. Equipment Used (#)	11.70	URBEMIS
3. Operational Time (hrs/day)	8.00	
4. Emission Factor (lbs/hp-hr)	0.43	SMAQMD
5. Emission Rate (lbs/day)	**5.03**	

1. Type of Equipment	Graders	
2. Equipment Used (#)	11.70	URBEMIS
3. Operational Time (hrs/day)	8.00	
4. Emission Factor (lbs/hp-hr)	0.28	SMAQMD
5. Emission Rate (lbs/day)	**3.28**	

1. Type of Equipment	Off-highway truck	
2. Equipment Used (#)	11.70	URBEMIS
3. Operational Time (hrs/day)	8.00	
4. Emission Factor (lbs/hp-hr)	0.58	SMAQMD
5. Emission Rate (lbs/day)	**6.79**	

TABLE 7

Mobile Equipment Emission Rate Totals (lbs/day)	**15.09**

7. TOTALS

TABLE 8

1. Table 3, Row 3	**6.02**	
2. Table 4, Row 3	**79.96**	
3. Table 5, Row 2	**5,166.72**	
4. Total	**5,252.70**	Fugitive Emissions (lbs/day)
5. Table 7	**15.09**	Mobile Emissions (lbs/day)

8. CONVERTING TO GRAMS PER SECOND

Emission Factor (grams/sec) = (A / 24 / 60 / 60) x 453.592 grams/lb
A = Emission factor (lbs/day)

TABLE 9

Fugitive Dust Emissions	**27.58**
Mobile PM Emissions	**0.08**

9. DISTRIBUTE POINT SOURCES OVER SITE

If project =< 10 acres, divide by 49
if project > 10 acres, divide by 64

TABLE 10

		Mitigated PM Emission
Fugitive Dust Emissions	**0.4309**	**0.1077**
Mobile PM Emissions	**0.0012**	**0.0007**

Impact Minimization Alternative, Phase 1: Construction Emissions
(See Assumptions)

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 e. 1
'31/2006 10:48 AM


             URBEMIS 2002 For Windows   8.7.0

.e Name:                         C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio IM construction.urb
)ject Name:                      Rio Del Oro IM
)ject Location:                  Lower Sacramento Valley Air Basin
-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                     SUMMARY REPORT
                  (Pounds/Day - Summer)

ISTRUCTION EMISSION ESTIMATES
                                                                        PM10       PM10       PM10
'* 2006 ***                          ROG        NOx         CO        SO2       TOTAL    EXHAUST       DUST
)TALS (lbs/day,unmitigated)        85.01     619.74     710.23       1.35    4,494.35      24.58   4,469.77
)TALS (lbs/day, mitigated)         81.02     514.30     710.23       1.35    1,132.14      14.41   1,117.72

                                                                        PM10       PM10       PM10
'* 2007 ***                          ROG        NOx         CO        SO2       TOTAL    EXHAUST       DUST
)TALS (lbs/day,unmitigated)        78.13     431.23     706.25       0.04       21.08      18.83       2.25
)TALS (lbs/day, mitigated)         75.40     347.84     706.25       0.04       12.72      10.47       2.25

                                                                        PM10       PM10       PM10
'* 2008 ***                          ROG        NOx         CO        SO2       TOTAL    EXHAUST       DUST
)TALS (lbs/day,unmitigated)        76.25     410.03     700.49       0.03       19.45      17.20       2.25
)TALS (lbs/day, mitigated)         73.52     330.69     700.49       0.03       11.82       9.57       2.25

                                                                        PM10       PM10       PM10
'* 2009 ***                          ROG        NOx         CO        SO2       TOTAL    EXHAUST       DUST
)TALS (lbs/day,unmitigated)        74.30     388.18     693.92       0.03       18.35      16.10       2.25
)TALS (lbs/day, mitigated)         71.57     312.99     693.92       0.03       11.22       8.97       2.25

                                                                        PM10       PM10       PM10
'* 2010 ***                          ROG        NOx         CO        SO2       TOTAL    EXHAUST       DUST
)TALS (lbs/day,unmitigated)       394.28     429.96     998.49       0.07       20.64      16.13       4.51
)TALS (lbs/day, mitigated)        391.13     349.21     998.49       0.07       13.65       9.14       4.51


EA SOURCE EMISSION ESTIMATES
                                     ROG        NOx         CO        SO2        PM10
)TALS (lbs/day,unmitigated)       246.23      56.07      53.63       0.05        0.14


ERATIONAL (VEHICLE) EMISSION ESTIMATES
                                     ROG        NOx         CO        SO2        PM10

)TALS (lbs/day,unmitigated)       614.45     678.68   7,079.29       8.94    1,366.56

1 OF AREA AND OPERATIONAL EMISSION ESTIMATES
                                     ROG        NOx         CO        SO2        PM10
)TALS (lbs/day,unmitigated)       860.68     734.75   7,132.92       8.99    1,366.70
```

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'31/2006 10:48 AM


             URBEMIS 2002 For Windows   8.7.0

.e Name:                      C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio IM construction.urb
)ject Name:                   Rio Del Oro IM
)ject Location:               Lower Sacramento Valley Air Basin
-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                      DETAIL REPORT
                  (Pounds/Day - Summer)

istruction Start Month and Year: June, 2006
istruction Duration: 48
:al Land Use Area to be Developed: 467 acres
:imum Acreage Disturbed Per Day: 117 acres
igle Family Units: 240 Multi-Family Units: 1616
:ail/Office/Institutional/Industrial Square Footage: 8235000

ISTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                    PM10      PM10        PM10
 Source                        ROG        NOx         CO        SO2    TOTAL   EXHAUST        DUST
'* 2006***
ase 1 - Demolition Emissions
jitive Dust                      -          -          -          -       0.00         -       0.00
=-Road Diesel                 0.00       0.00       0.00          -       0.00      0.00       0.00
-Road Diesel                  0.00       0.00       0.00       0.00       0.00      0.00       0.00
:ker Trips                    0.00       0.00       0.00       0.00       0.00      0.00       0.00
Maximum lbs/day               0.00       0.00       0.00       0.00       0.00      0.00       0.00

ase 2 - Site Grading Emissions
jitive Dust                      -          -          -          -   4,469.40         -   4,469.40
=-Road Diesel                79.71     527.20     654.10          -      22.59     22.59       0.00
-Road Diesel                  4.60      91.82      16.98       1.34       2.31      1.97       0.34
:ker Trips                    0.70       0.72      13.23       0.01       0.05      0.02       0.03
Maximum lbs/day              85.01     619.74     684.31       1.35   4,494.35     24.58   4,469.77

ase 3 - Building Construction
ig Const Off-Road Diesel     54.64     437.16     389.07          -      20.22     20.22       0.00
ig Const Worker Trips        25.27      15.19     321.16       0.04       2.51      0.26       2.25
:h Coatings Off-Gas           0.00          -          -          -          -         -          -
:h Coatings Worker Trips      0.00       0.00       0.00       0.00       0.00      0.00       0.00
)halt Off-Gas                 0.00          -          -          -          -         -          -
)halt Off-Road Diesel         0.00       0.00       0.00          -       0.00      0.00       0.00
)halt On-Road Diesel          0.00       0.00       0.00       0.00       0.00      0.00       0.00
)halt Worker Trips            0.00       0.00       0.00       0.00       0.00      0.00       0.00
Maximum lbs/day              79.91     452.34     710.23       0.04      22.72     20.47       2.25

Max lbs/day all phases       85.01     619.74     710.23       1.35   4,494.35     24.58   4,469.77


'* 2007***
ase 1 - Demolition Emissions
jitive Dust                      -          -          -          -       0.00         -       0.00
=-Road Diesel                 0.00       0.00       0.00          -       0.00      0.00       0.00
-Road Diesel                  0.00       0.00       0.00       0.00       0.00      0.00       0.00
:ker Trips                    0.00       0.00       0.00       0.00       0.00      0.00       0.00
Maximum lbs/day               0.00       0.00       0.00       0.00       0.00      0.00       0.00

ase 2 - Site Grading Emissions
jitive Dust                      -          -          -          -       0.00         -       0.00
=-Road Diesel                 0.00       0.00       0.00          -       0.00      0.00       0.00
-Road Diesel                  0.00       0.00       0.00       0.00       0.00      0.00       0.00
:ker Trips                    0.00       0.00       0.00       0.00       0.00      0.00       0.00
Maximum lbs/day               0.00       0.00       0.00       0.00       0.00      0.00       0.00

ase 3 - Building Construction
ig Const Off-Road Diesel     54.64     416.94     404.37          -      18.58     18.58       0.00
ig Const Worker Trips        23.49      14.29     301.88       0.04       2.51      0.26       2.25
:h Coatings Off-Gas           0.00          -          -          -          -         -          -
:h Coatings Worker Trips      0.00       0.00       0.00       0.00       0.00      0.00       0.00
)halt Off-Gas                 0.00          -          -          -          -         -          -
)halt Off-Road Diesel         0.00       0.00       0.00          -       0.00      0.00       0.00
)halt On-Road Diesel          0.00       0.00       0.00       0.00       0.00      0.00       0.00
)halt Worker Trips            0.00       0.00       0.00       0.00       0.00      0.00       0.00
Maximum lbs/day              78.13     431.23     706.25       0.04      21.08     18.83       2.25

Max lbs/day all phases       78.13     431.23     706.25       0.04      21.08     18.83       2.25


'* 2008***
```

```
ase 1 - Demolition Emissions
gitive Dust                      -          -          -          -        0.00         -        0.00
f-Road Diesel                  0.00       0.00       0.00         -        0.00       0.00       0.00
-Road Diesel                   0.00       0.00       0.00       0.00       0.00       0.00       0.00
rker Trips                     0.00       0.00       0.00       0.00       0.00       0.00       0.00
Maximum lbs/day                0.00       0.00       0.00       0.00       0.00       0.00       0.00

ase 2 - Site Grading Emissions
gitive Dust                      -          -          -          -        0.00         -        0.00
f-Road Diesel                  0.00       0.00       0.00         -        0.00       0.00       0.00
-Road Diesel                   0.00       0.00       0.00       0.00       0.00       0.00       0.00
rker Trips                     0.00       0.00       0.00       0.00       0.00       0.00       0.00
Maximum lbs/day                0.00       0.00       0.00       0.00       0.00       0.00       0.00

ase 3 - Building Construction
dg Const Off-Road Diesel      54.64     396.72     419.12         -       16.94      16.94       0.00
dg Const Worker Trips         21.61      13.31     281.36       0.03       2.51       0.26       2.25
ch Coatings Off-Gas            0.00         -          -          -          -          -          -
ch Coatings Worker Trips       0.00       0.00       0.00       0.00       0.00       0.00       0.00
phalt Off-Gas                  0.00         -          -          -          -          -          -
phalt Off-Road Diesel          0.00       0.00       0.00         -        0.00       0.00       0.00
phalt On-Road Diesel           0.00       0.00       0.00       0.00       0.00       0.00       0.00
phalt Worker Trips             0.00       0.00       0.00       0.00       0.00       0.00       0.00
Maximum lbs/day               76.25     410.03     700.49       0.03      19.45      17.20       2.25

Max lbs/day all phases        76.25     410.03     700.49       0.03      19.45      17.20       2.25


** 2009***
ase 1 - Demolition Emissions
gitive Dust                      -          -          -          -        0.00         -        0.00
f-Road Diesel                  0.00       0.00       0.00         -        0.00       0.00       0.00
-Road Diesel                   0.00       0.00       0.00       0.00       0.00       0.00       0.00
rker Trips                     0.00       0.00       0.00       0.00       0.00       0.00       0.00
Maximum lbs/day                0.00       0.00       0.00       0.00       0.00       0.00       0.00

ase 2 - Site Grading Emissions
gitive Dust                      -          -          -          -        0.00         -        0.00
f-Road Diesel                  0.00       0.00       0.00         -        0.00       0.00       0.00
-Road Diesel                   0.00       0.00       0.00       0.00       0.00       0.00       0.00
rker Trips                     0.00       0.00       0.00       0.00       0.00       0.00       0.00
Maximum lbs/day                0.00       0.00       0.00       0.00       0.00       0.00       0.00

ase 3 - Building Construction
dg Const Off-Road Diesel      54.64     375.96     434.43         -       15.85      15.85       0.00
dg Const Worker Trips         19.65      12.23     259.50       0.03       2.51       0.26       2.25
ch Coatings Off-Gas            0.00         -          -          -          -          -          -
ch Coatings Worker Trips       0.00       0.00       0.00       0.00       0.00       0.00       0.00
phalt Off-Gas                  0.00         -          -          -          -          -          -
phalt Off-Road Diesel          0.00       0.00       0.00         -        0.00       0.00       0.00
phalt On-Road Diesel           0.00       0.00       0.00       0.00       0.00       0.00       0.00
phalt Worker Trips             0.00       0.00       0.00       0.00       0.00       0.00       0.00
Maximum lbs/day               74.30     388.18     693.92       0.03      18.35      16.10       2.25

Max lbs/day all phases        74.30     388.18     693.92       0.03      18.35      16.10       2.25


** 2010***
ase 1 - Demolition Emissions
gitive Dust                      -          -          -          -        0.00         -        0.00
f-Road Diesel                  0.00       0.00       0.00         -        0.00       0.00       0.00
-Road Diesel                   0.00       0.00       0.00       0.00       0.00       0.00       0.00
rker Trips                     0.00       0.00       0.00       0.00       0.00       0.00       0.00
Maximum lbs/day                0.00       0.00       0.00       0.00       0.00       0.00       0.00

ase 2 - Site Grading Emissions
gitive Dust                      -          -          -          -        0.00         -        0.00
f-Road Diesel                  0.00       0.00       0.00         -        0.00       0.00       0.00
-Road Diesel                   0.00       0.00       0.00       0.00       0.00       0.00       0.00
rker Trips                     0.00       0.00       0.00       0.00       0.00       0.00       0.00
Maximum lbs/day                0.00       0.00       0.00       0.00       0.00       0.00       0.00

ase 3 - Building Construction
dg Const Off-Road Diesel      54.64     355.74     449.18         -       14.21      14.21       0.00
dg Const Worker Trips         17.84      11.18     238.83       0.03       2.51       0.26       2.25
ch Coatings Off-Gas          293.33         -          -          -          -          -          -
ch Coatings Worker Trips      17.84      11.18     238.83       0.03       2.51       0.26       2.25
phalt Off-Gas                  2.10         -          -          -          -          -          -
```

```
phalt Off-Road Diesel          8.27     47.99     70.33         -      1.32      1.32      0.00
phalt On-Road Diesel           0.21      3.84      0.77      0.01      0.10      0.09      0.01
phalt Worker Trips             0.04      0.03      0.56      0.00      0.01      0.00      0.01
aximum lbs/day               394.28    429.96    998.49      0.07     20.64     16.13      4.51

ax lbs/day all phases        394.28    429.96    998.49      0.07     20.64     16.13      4.51



ase 1 - Demolition Assumptions:  Phase Turned OFF

ase 2 - Site Grading Assumptions
art Month/Year for Phase 2: Jun '06
ase 2 Duration: 5.3 months
-Road Truck Travel (VMT): 3230
f-Road Equipment
No.     Type                                 Horsepower    Load Factor     Hours/Day
 12     Crawler Tractors                        143           0.575           8.0
 12     Graders                                 174           0.575           8.0
 12     Off Highway Trucks                      417           0.490           8.0

ase 3 - Building Construction Assumptions
art Month/Year for Phase 3: Nov '06
ase 3 Duration: 42.7 months
Start Month/Year for SubPhase Building: Nov '06
SubPhase Building Duration: 42.7 months
Off-Road Equipment
No.     Type                                 Horsepower    Load Factor     Hours/Day
 35     Other Equipment                         190           0.620           6.0
Start Month/Year for SubPhase Architectural Coatings: Jan '10
SubPhase Architectural Coatings Duration: 4.3 months
Start Month/Year for SubPhase Asphalt: Mar '10
SubPhase Asphalt Duration: 2.1 months
Acres to be Paved: 37
Off-Road Equipment
No.     Type                                 Horsepower    Load Factor     Hours/Day
  4     Pavers                                  132           0.590           8.0
  4     Rollers                                 114           0.430           8.0
```

```
anges made to the default values for Land Use Trip Percentages


anges made to the default values for Construction

te Grading Fugitive Dust Emission Rate changed from 10 to 38.2
:hitectural Coatings: # ROG/ft2 (residential) changed from 0.0185 to 0.0013
:hitectural Coatings: # ROG/ft2 (non-res) changed from 0.0185 to 0.0013
ase 2 mitigation measure Soil Disturbance:
   has been changed from off to on.
ase 2 mitigation measure Off-Road Diesel Exhaust:
   has been changed from off to on.
ase 3 mitigation measure Off-Road Diesel Exhaust:
   has been changed from off to on.
ase 3 mitigation measure Off-Road Diesel Exhaust:
   has been changed from off to on.

anges made to the default values for Area

e landscape year changed from 2005 to 2015.

anges made to the default values for Operations

e operational emission year changed from 2005 to 2015.
e home based work selection item changed from  8 to 7.
e home based work urban trip length changed from 9.7 to 6.3.
e home based work rural trip length changed from 16.8 to 6.3.
e home based shopping selection item changed from  8 to 7.
e home based shopping urban trip length changed from 3.8 to 6.3.
e home based shopping rural trip length changed from 7.1 to 6.3.
e home based other selection item changed from  8 to 7.
e home based other urban trip length changed from 4.6 to 6.3.
e home based other rural trip length changed from 7.9 to 6.3.
e commercial based commute selection item changed from  8 to 7.
e commercial based commute urban trip length changed from 7.8 to 6.3.
e commercial based commute rural trip length changed from 14.7 to 6.3.
e commercial based non-work selection item changed from  8 to 7.
e commercial based non-work urban trip length changed from 4.5 to 6.3.
e commercial based non-work rural trip length changed from 6.6 to 6.3.
e commercial based customer selection item changed from  8 to 7.
e commercial based customer urban trip length changed from 4.5 to 6.3.
e commercial based customer rural trip length changed from 6.6 to 6.3.
```

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31/2006 10:49 AM


            URBEMIS 2002 For Windows   8.7.0

e Name:                        C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio IM construction part II.urb
ject Name:                     Rio Del Oro IM
ject Location:                 Lower Sacramento Valley Air Basin
Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                    SUMMARY REPORT
                 (Pounds/Day - Summer)

STRUCTION EMISSION ESTIMATES
                                                                        PM10      PM10      PM10
* 2010 ***                        ROG       NOx        CO       SO2    TOTAL   EXHAUST      DUST
TALS (lbs/day,unmitigated)      97.09    399.43  1,294.22      0.50    17.99     15.74      2.25
TALS (lbs/day, mitigated)       94.36    328.28  1,294.22      0.50    11.59      9.34      2.25

                                                                        PM10      PM10      PM10
* 2011 ***                        ROG       NOx        CO       SO2    TOTAL   EXHAUST      DUST
TALS (lbs/day,unmitigated)      97.09    399.43  1,294.22      0.50    17.99     15.74      2.25
TALS (lbs/day, mitigated)       94.36    328.28  1,294.22      0.50    11.59      9.34      2.25

                                                                        PM10      PM10      PM10
* 2012 ***                        ROG       NOx        CO       SO2    TOTAL   EXHAUST      DUST
TALS (lbs/day,unmitigated)      97.09    399.43  1,294.22      0.50    17.99     15.74      2.25
TALS (lbs/day, mitigated)       94.36    328.28  1,294.22      0.50    11.59      9.34      2.25

                                                                        PM10      PM10      PM10
* 2013 ***                        ROG       NOx        CO       SO2    TOTAL   EXHAUST      DUST
TALS (lbs/day,unmitigated)      97.09    399.43  1,294.22      0.50    17.99     15.74      2.25
TALS (lbs/day, mitigated)       94.36    328.28  1,294.22      0.50    11.59      9.34      2.25

                                                                        PM10      PM10      PM10
* 2014 ***                        ROG       NOx        CO       SO2    TOTAL   EXHAUST      DUST
TALS (lbs/day,unmitigated)     388.03    461.99  1,604.61      0.54    21.91     17.40      4.51
TALS (lbs/day, mitigated)      384.89    381.24  1,604.61      0.54    14.91     10.40      4.51


A SOURCE EMISSION ESTIMATES
                                  ROG       NOx        CO       SO2     PM10
TALS (lbs/day,unmitigated)     246.23     56.07     53.63      0.05     0.14


RATIONAL (VEHICLE) EMISSION ESTIMATES
                                  ROG       NOx        CO       SO2     PM10

TALS (lbs/day,unmitigated)     614.45    678.68  7,079.29      8.94 1,366.56

 OF AREA AND OPERATIONAL EMISSION ESTIMATES
                                  ROG       NOx        CO       SO2     PM10
TALS (lbs/day,unmitigated)     860.68    734.75  7,132.92      8.99 1,366.70
```

```
             URBEMIS 2002 For Windows   8.7.0

le Name:                      C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio IM construction part II.urb
oject Name:                   Rio Del Oro IM
oject Location:               Lower Sacramento Valley Air Basin
-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                      DETAIL REPORT
                  (Pounds/Day - Summer)

nstruction Start Month and Year: June, 2010
nstruction Duration: 48
tal Land Use Area to be Developed: 467 acres
ximum Acreage Disturbed Per Day: 117 acres
ngle Family Units: 240 Multi-Family Units: 1616
tail/Office/Institutional/Industrial Square Footage: 8235000

NSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)
                                                                     PM10      PM10        PM10
  Source                       ROG       NOx         CO        SO2   TOTAL   EXHAUST       DUST
** 2010***
ase 1 - Demolition Emissions
gitive Dust                      -         -          -          -    0.00         -       0.00
f-Road Diesel                 0.00      0.00       0.00          -    0.00      0.00       0.00
-Road Diesel                  0.00      0.00       0.00       0.00    0.00      0.00       0.00
rker Trips                    0.00      0.00       0.00       0.00    0.00      0.00       0.00
Maximum lbs/day               0.00      0.00       0.00       0.00    0.00      0.00       0.00

ase 2 - Site Grading Emissions
gitive Dust                      -         -          -          -    0.00         -       0.00
f-Road Diesel                 0.00      0.00       0.00          -    0.00      0.00       0.00
-Road Diesel                  0.00      0.00       0.00       0.00    0.00      0.00       0.00
rker Trips                    0.00      0.00       0.00       0.00    0.00      0.00       0.00
Maximum lbs/day               0.00      0.00       0.00       0.00    0.00      0.00       0.00

ase 3 - Building Construction
dg Const Off-Road Diesel     54.64    355.74     449.18          -   14.21     14.21       0.00
dg Const Worker Trips        42.44     43.69     845.04       0.50    3.78      1.53       2.25
ch Coatings Off-Gas           0.00         -          -          -       -         -          -
ch Coatings Worker Trips      0.00      0.00       0.00       0.00    0.00      0.00       0.00
phalt Off-Gas                 0.00         -          -          -       -         -          -
phalt Off-Road Diesel         0.00      0.00       0.00          -    0.00      0.00       0.00
phalt On-Road Diesel          0.00      0.00       0.00       0.00    0.00      0.00       0.00
phalt Worker Trips            0.00      0.00       0.00       0.00    0.00      0.00       0.00
Maximum lbs/day              97.09    399.43   1,294.22       0.50   17.99     15.74       2.25

Max lbs/day all phases       97.09    399.43   1,294.22       0.50   17.99     15.74       2.25


** 2011***
ase 1 - Demolition Emissions
gitive Dust                      -         -          -          -    0.00         -       0.00
f-Road Diesel                 0.00      0.00       0.00          -    0.00      0.00       0.00
-Road Diesel                  0.00      0.00       0.00       0.00    0.00      0.00       0.00
rker Trips                    0.00      0.00       0.00       0.00    0.00      0.00       0.00
Maximum lbs/day               0.00      0.00       0.00       0.00    0.00      0.00       0.00

ase 2 - Site Grading Emissions
gitive Dust                      -         -          -          -    0.00         -       0.00
f-Road Diesel                 0.00      0.00       0.00          -    0.00      0.00       0.00
-Road Diesel                  0.00      0.00       0.00       0.00    0.00      0.00       0.00
rker Trips                    0.00      0.00       0.00       0.00    0.00      0.00       0.00
Maximum lbs/day               0.00      0.00       0.00       0.00    0.00      0.00       0.00

ase 3 - Building Construction
dg Const Off-Road Diesel     54.64    355.74     449.18          -   14.21     14.21       0.00
dg Const Worker Trips        42.44     43.69     845.04       0.50    3.78      1.53       2.25
ch Coatings Off-Gas           0.00         -          -          -       -         -          -
ch Coatings Worker Trips      0.00      0.00       0.00       0.00    0.00      0.00       0.00
phalt Off-Gas                 0.00         -          -          -       -         -          -
phalt Off-Road Diesel         0.00      0.00       0.00          -    0.00      0.00       0.00
phalt On-Road Diesel          0.00      0.00       0.00       0.00    0.00      0.00       0.00
phalt Worker Trips            0.00      0.00       0.00       0.00    0.00      0.00       0.00
Maximum lbs/day              97.09    399.43   1,294.22       0.50   17.99     15.74       2.25

Max lbs/day all phases       97.09    399.43   1,294.22       0.50   17.99     15.74       2.25


** 2012***
```

```
.se 1 - Demolition Emissions
:itive Dust                      -         -          -          -       0.00         -       0.00
:-Road Diesel                 0.00      0.00       0.00          -       0.00      0.00       0.00
 Road Diesel                  0.00      0.00       0.00       0.00       0.00      0.00       0.00
·ker Trips                    0.00      0.00       0.00       0.00       0.00      0.00       0.00
laximum lbs/day               0.00      0.00       0.00       0.00       0.00      0.00       0.00

ıse 2 - Site Grading Emissions
ɾitive Dust                      -         -          -          -       0.00         -       0.00
:-Road Diesel                 0.00      0.00       0.00          -       0.00      0.00       0.00
·Road Diesel                  0.00      0.00       0.00       0.00       0.00      0.00       0.00
:ker Trips                    0.00      0.00       0.00       0.00       0.00      0.00       0.00
laximum lbs/day               0.00      0.00       0.00       0.00       0.00      0.00       0.00

ıse 3 - Building Construction
ıg Const Off-Road Diesel     54.64    355.74     449.18          -      14.21     14.21       0.00
ıg Const Worker Trips        42.44     43.69     845.04       0.50       3.78      1.53       2.25
:h Coatings Off-Gas           0.00         -          -          -          -         -          -
:h Coatings Worker Trips      0.00      0.00       0.00       0.00       0.00      0.00       0.00
ɔhalt Off-Gas                 0.00         -          -          -          -         -          -
ɔhalt Off-Road Diesel         0.00      0.00       0.00          -       0.00      0.00       0.00
ɔhalt On-Road Diesel          0.00      0.00       0.00       0.00       0.00      0.00       0.00
ɔhalt Worker Trips            0.00      0.00       0.00       0.00       0.00      0.00       0.00
laximum lbs/day              97.09    399.43   1,294.22       0.50      17.99     15.74       2.25

lax lbs/day all phases       97.09    399.43   1,294.22       0.50      17.99     15.74       2.25


:* 2013***
ıse 1 - Demolition Emissions
ʒitive Dust                      -         -          -          -       0.00         -       0.00
:-Road Diesel                 0.00      0.00       0.00          -       0.00      0.00       0.00
-Road Diesel                  0.00      0.00       0.00       0.00       0.00      0.00       0.00
:ker Trips                    0.00      0.00       0.00       0.00       0.00      0.00       0.00
laximum lbs/day               0.00      0.00       0.00       0.00       0.00      0.00       0.00

ıse 2 - Site Grading Emissions
ʒitive Dust                      -         -          -          -       0.00         -       0.00
:-Road Diesel                 0.00      0.00       0.00          -       0.00      0.00       0.00
-Road Diesel                  0.00      0.00       0.00       0.00       0.00      0.00       0.00
:ker Trips                    0.00      0.00       0.00       0.00       0.00      0.00       0.00
laximum lbs/day               0.00      0.00       0.00       0.00       0.00      0.00       0.00

ıse 3 - Building Construction
ıg Const Off-Road Diesel     54.64    355.74     449.18          -      14.21     14.21       0.00
ıg Const Worker Trips        42.44     43.69     845.04       0.50       3.78      1.53       2.25
:h Coatings Off-Gas           0.00         -          -          -          -         -          -
:h Coatings Worker Trips      0.00      0.00       0.00       0.00       0.00      0.00       0.00
ɔhalt Off-Gas                 0.00         -          -          -          -         -          -
ɔhalt Off-Road Diesel         0.00      0.00       0.00          -       0.00      0.00       0.00
ɔhalt On-Road Diesel          0.00      0.00       0.00       0.00       0.00      0.00       0.00
ɔhalt Worker Trips            0.00      0.00       0.00       0.00       0.00      0.00       0.00
laximum lbs/day              97.09    399.43   1,294.22       0.50      17.99     15.74       2.25

lax lbs/day all phases       97.09    399.43   1,294.22       0.50      17.99     15.74       2.25


:* 2014***
ıse 1 - Demolition Emissions
ʒitive Dust                      -         -          -          -       0.00         -       0.00
:-Road Diesel                 0.00      0.00       0.00          -       0.00      0.00       0.00
-Road Diesel                  0.00      0.00       0.00       0.00       0.00      0.00       0.00
:ker Trips                    0.00      0.00       0.00       0.00       0.00      0.00       0.00
laximum lbs/day               0.00      0.00       0.00       0.00       0.00      0.00       0.00

ıse 2 - Site Grading Emissions
ʒitive Dust                      -         -          -          -       0.00         -       0.00
:-Road Diesel                 0.00      0.00       0.00          -       0.00      0.00       0.00
-Road Diesel                  0.00      0.00       0.00       0.00       0.00      0.00       0.00
:ker Trips                    0.00      0.00       0.00       0.00       0.00      0.00       0.00
laximum lbs/day               0.00      0.00       0.00       0.00       0.00      0.00       0.00

ıse 3 - Building Construction
ıg Const Off-Road Diesel     54.64    355.74     449.18          -      14.21     14.21       0.00
ıg Const Worker Trips        42.44     43.69     845.04       0.50       3.78      1.53       2.25
:h Coatings Off-Gas         262.77         -          -          -          -         -          -
:h Coatings Worker Trips     17.84     11.18     238.83       0.03       2.51      0.26       2.25
ɔhalt Off-Gas                 1.84         -          -          -          -         -          -
```

```
phalt Off-Road Diesel         8.27     47.99      70.33          -       1.32       1.32       0.00
phalt On-Road Diesel          0.18      3.36       0.68       0.01       0.08       0.07       0.01
phalt Worker Trips            0.04      0.03       0.56       0.00       0.01       0.00       0.01
Maximum lbs/day             388.03    461.99   1,604.61       0.54      21.91      17.40       4.51

Max lbs/day all phases      388.03    461.99   1,604.61       0.54      21.91      17.40       4.51


ase 2 - Site Grading Assumptions:  Phase Turned OFF


ase 3 - Building Construction Assumptions
art Month/Year for Phase 3: Jun '10
ase 3 Duration: 48 months
Start Month/Year for SubPhase Building: Jun '10
SubPhase Building Duration: 48 months
Off-Road Equipment
No.     Type                                Horsepower    Load Factor     Hours/Day
 35     Other Equipment                        190           0.620            6.0
Start Month/Year for SubPhase Architectural Coatings: Jan '14
SubPhase Architectural Coatings Duration: 4.8 months
Start Month/Year for SubPhase Asphalt: Mar '14
SubPhase Asphalt Duration: 2.4 months
Acres to be Paved: 37
Off-Road Equipment
No.     Type                                Horsepower    Load Factor     Hours/Day
  4     Pavers                                 132           0.590            8.0
  4     Rollers                                114           0.430            8.0
```

```
anges made to the default values for Land Use Trip Percentages


anges made to the default values for Construction

chitectural Coatings: # ROG/ft2 (residential) changed from 0.0185 to 0.0013
chitectural Coatings: # ROG/ft2 (non-res) changed from 0.0185 to 0.0013
ase 3 mitigation measure Off-Road Diesel Exhaust:
   has been changed from off to on.
ase 3 mitigation measure Off-Road Diesel Exhaust:
   has been changed from off to on.

anges made to the default values for Area

e landscape year changed from 2005 to 2015.

anges made to the default values for Operations

e operational emission year changed from 2005 to 2015.
e home based work selection item changed from  8 to 7.
e home based work urban trip length changed from 9.7 to 6.3.
e home based work rural trip length changed from 16.8 to 6.3.
e home based shopping selection item changed from  8 to 7.
e home based shopping urban trip length changed from 3.8 to 6.3.
e home based shopping rural trip length changed from 7.1 to 6.3.
e home based other selection item changed from  8 to 7.
e home based other urban trip length changed from 4.6 to 6.3.
e home based other rural trip length changed from 7.9 to 6.3.
e commercial based commute selection item changed from  8 to 7.
e commercial based commute urban trip length changed from 7.8 to 6.3.
e commercial based commute rural trip length changed from 14.7 to 6.3.
e commercial based non-work selection item changed from  8 to 7.
e commercial based non-work urban trip length changed from 4.5 to 6.3.
e commercial based non-work rural trip length changed from 6.6 to 6.3.
e commercial based customer selection item changed from  8 to 7.
e commercial based customer urban trip length changed from 4.5 to 6.3.
e commercial based customer rural trip length changed from 6.6 to 6.3.
```

Impact Minimization Alternative, Phase 1: Area-Source Emissions

```
              URBEMIS 2002 For Windows   8.7.0

le Name:                     C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio IM.urb
oject Name:                  Rio Del Oro IM
oject Location:              Lower Sacramento Valley Air Basin
-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                      DETAIL REPORT
                   (Pounds/Day - Summer)

EA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)
  Source                        ROG        NOx        CO        SO2       PM10
atural Gas                     8.18     110.68     80.38          0       0.20
earth - No summer emissions
andscaping                     2.63       0.32     20.32       0.10       0.06
onsumer Prdcts               181.60          -         -          -          -
rchitectural Coatings         21.00          -         -          -          -
OTALS(lbs/day,unmitigated)   213.41     111.01    100.70       0.10       0.26
```

Impact Minimization Alternative, Phase 1: Operational Emissions Relative to the Proposed Project Alternative (Based on Net Change in Land Use)

```
/08/2005 1:47 PM


              URBEMIS 2002 For Windows   8.7.0

le Name:                         C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\Rio\Rio IM net.urb
oject Name:                      Rio Del Oro IM
oject Location:                  Lower Sacramento Valley Air Basin
-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                          DETAIL REPORT
                       (Pounds/Day - Summer)


                 UNMITIGATED OPERATIONAL EMISSIONS

                                  ROG       NOx        CO        SO2      PM10
ngle family housing -            44.25     44.56    486.15      0.59     88.82
artments low rise -               1.41      1.32     14.45      0.02      2.64
artments mid rise +              59.28     53.09    579.17      0.70    105.81
ty park +                         0.22      0.11      1.16      0.00      0.23
gnl shop. center -              171.24    212.22  2,164.70      2.79    429.34
dustrial park -                  18.30     17.40    187.03      0.23     34.82

TAL EMISSIONS (lbs/day)         294.71    328.71  3,432.66      4.33    661.65

es not include correction for passby trips.
es not include double counting adjustment for internal trips.

ERATIONAL (Vehicle) EMISSION ESTIMATES

alysis Year: 2015  Temperature (F): 85   Season: Summer

FAC Version: EMFAC2002 (9/2002)

mmary of Land Uses:

                                                                  No.      Total
it Type                    Acreage    Trip Rate                   Units     Trips

ngle family housing         323.33    9.57 trips/dwelling unit    970.00 9,282.90
artments low rise             2.50    6.90 trips/dwelling unit     40.00   276.00
artments mid rise            50.53    5.76 trips/dwelling unit  1,920.0011,059.20
ty park                               1.59 trips/acres             15.00    23.85
gnl shop. center                     42.94 trips/1000 sq. ft.   1,046.0044,915.24
dustrial park                         6.96 trips/1000 sq. ft.     523.00 3,640.08

                                                Sum of Total Trips    69,197.27
                                         Total Vehicle Miles Traveled 435,942.80

hicle Assumptions:

eet Mix:

hicle Type                 Percent Type    Non-Catalyst      Catalyst          Diesel
ght Auto                       54.40           0.40           99.40             0.20
ght Truck < 3,750   lbs        15.30           0.70           98.00             1.30
ght Truck  3,751- 5,750        16.40           0.60           98.80             0.60
d Truck     5,751- 8,500        7.30           0.00           98.60             1.40
te-Heavy    8,501-10,000        1.10           0.00           81.80            18.20
te-Heavy  10,001-14,000         0.30           0.00           66.70            33.30
d-Heavy   14,001-33,000         1.00           0.00           20.00            80.00
avy-Heavy 33,001-60,000         0.80           0.00            0.00           100.00
ne Haul > 60,000     lbs        0.00           0.00            0.00           100.00
ban Bus                         0.20           0.00           50.00            50.00
torcycle                        1.60          50.00           50.00             0.00
hool Bus                        0.10           0.00            0.00           100.00
tor Home                        1.50           0.00           93.30             6.70

avel Conditions
                               Residential                    Commercial
                         Home-      Home-      Home-
                         Work       Shop       Other     Commute   Non-Work Customer
ban Trip Length (miles)  6.3        6.3        6.3        6.3        6.3        6.3
ral Trip Length (miles)  6.3        6.3        6.3        6.3        6.3        6.3
ip Speeds (mph)         35.0       35.0       35.0       35.0       35.0       35.0
 of Trips - Residential 27.3       21.2       51.5

 of Trips - Commercial (by land use)
ty park                                                   5.0        2.5       92.5
gnl shop. center                                          2.0        1.0       97.0
dustrial park                                            41.5       20.8       37.8
```

APPENDIX K-5

CARBON MONOXIDE MODELING DATA FOR AFFECTED INTERSECTIONS—PROPOSED PROJECT ALTERNATIVE ONLY

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                   JUNE 1989 VERSION
                   PAGE   1

              JOB: Intersection 5 - baseline
              RUN: Hour 1          (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

       U=    .5 M/S            Z0= 100. CM            ALT=    50. (M)
     BRG= WORST CASE           VD=    .0 CM/S
    CLAS=     7 (G)            VS=    .0 CM/S
    MIXH= 1000. M             AMB=    .0 PPM
   SIGTH=    5. DEGREES      TEMP=   7.2 DEGREE (C)


  II.  LINK VARIABLES

      LINK        *  LINK COORDINATES (M)    *                 EF      H     W
   DESCRIPTION    *   X1    Y1    X2    Y2   * TYPE  VPH  (G/MI)  (M)   (M)
 -----------------*--------------------------*--------------------------------
 A. SB Apr        *     0     6     0   150 *  AG   990    5.3     .0  11.0
 B. NB Dep        *     4     6     4   150 *  AG   360    5.3     .0  11.0
 C. NB Apr        *     2    -6     2  -150 *  AG   240    5.0     .0  14.6
 D. SB Dep        *    -4    -6    -4  -150 *  AG   820    5.3     .0  14.6
 E. EB Apr        *    -4    -2  -150    -2 *  AG   230    5.3     .0  14.6
 F. WB Dep        *    -4     4  -150     4 *  AG   280    4.1     .0  14.6


 III.  RECEPTOR LOCATIONS

              *    COORDINATES (M)
   RECEPTOR   *    X        Y      Z
 -------------*---------------------
 1. Recpt 1   *      9       0   1.8
 2. Recpt 2   *     -9      -9   1.8
 3. Recpt 3   *     -5       9   1.8
 4. Recpt 4   *     13       0   1.8
 5. Recpt 5   *    -13     -13   1.8
 6. Recpt 6   *     -9      13   1.8


  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

              *        * PRED  *             CONC/LINK
              *  BRG   * CONC  *               (PPM)
   RECEPTOR   * (DEG)  * (PPM) *    A     B     C     D     E     F
 -------------*--------*-------*-------------------------------------
 1. Recpt 1   *  354.  *   1.0 *    .6    .4    .0    .0    .0    .0
 2. Recpt 2   *    8.  *   1.1 *    .7    .2    .0    .0    .0    .0
 3. Recpt 3   *    5.  *   1.5 *   1.2    .2    .0    .0    .0    .0
 4. Recpt 4   *  351.  *    .7 *    .5    .3    .0    .0    .0    .0
 5. Recpt 5   *   10.  *    .8 *    .5    .2    .0    .0    .0    .0
 6. Recpt 6   *    9.  *    .8 *    .6    .2    .0    .0    .0    .0
```

```
           CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                    JUNE 1989 VERSION
                    PAGE   1

               JOB: Intersection 5 - baseline+ph1
               RUN: Hour 1          (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

      U=    .5 M/S            Z0= 100. CM             ALT=    50. (M)
    BRG= WORST CASE           VD=    .0 CM/S
   CLAS=     7 (G)            VS=    .0 CM/S
   MIXH= 1000. M             AMB=    .0 PPM
  SIGTH=     5. DEGREES     TEMP=   7.2 DEGREE (C)


 II.  LINK VARIABLES

      LINK        *  LINK COORDINATES (M)    *                  EF      H      W
   DESCRIPTION    *   X1     Y1     X2    Y2  * TYPE  VPH   (G/MI)  (M)    (M)
------------------*--------------------------*------------------------------
A. SB Apr         *     0      6      0   150 *  AG   1240    5.3     .0   11.0
B. NB Dep         *     4      6      4   150 *  AG    540    5.3     .0   11.0
C. NB Apr         *     2     -6      2  -150 *  AG    350    5.3     .0   14.6
D. SB Dep         *    -4     -6     -4  -150 *  AG    980    5.3     .0   14.6
E. EB Apr         *    -4     -2   -150    -2 *  AG    300    5.3     .0   14.6
F. WB Dep         *    -4      4   -150     4 *  AG    370    5.1     .0   14.6


III.  RECEPTOR LOCATIONS

              *    COORDINATES (M)
  RECEPTOR    *    X       Y      Z
--------------*----------------------
1. Recpt 1    *      9       0    1.8
2. Recpt 2    *     -9      -9    1.8
3. Recpt 3    *     -5       9    1.8
4. Recpt 4    *     13       0    1.8
5. Recpt 5    *    -13     -13    1.8
6. Recpt 6    *     -9      13    1.8


 IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

              *       * PRED   *          CONC/LINK
              *  BRG  * CONC   *            (PPM)
 RECEPTOR     * (DEG) * (PPM)  *   A     B     C     D     E     F
--------------*-------*--------*------------------------------------
1. Recpt 1    *  354. *   1.4  *   .8    .6    .0    .0    .0    .0
2. Recpt 2    *    8. *   1.3  *   .8    .3    .0    .0    .0    .0
3. Recpt 3    *    5. *   1.8  *  1.5    .3    .0    .0    .0    .0
4. Recpt 4    *  351. *    .9  *   .6    .4    .0    .0    .0    .0
5. Recpt 5    *   11. *   1.0  *   .6    .2    .0    .0    .0    .0
6. Recpt 6    *    9. *   1.0  *   .8    .3    .0    .0    .0    .0
```

```
       CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   1

           JOB: intersection 9 - baseline
           RUN: Hour 1            (WORST CASE ANGLE)
     POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

       U=    .5 M/S             Z0= 100. CM            ALT=    50. (M)
     BRG= WORST CASE            VD=   .0 CM/S
    CLAS=     7 (G)             VS=   .0 CM/S
    MIXH= 1000. M              AMB=   .0 PPM
   SIGTH=    5. DEGREES       TEMP=  7.2 DEGREE (C)


 II.  LINK VARIABLES

      LINK       *  LINK COORDINATES (M)    *                   EF      H      W
   DESCRIPTION   *   X1     Y1     X2     Y2  * TYPE  VPH   (G/MI)  (M)    (M)
-----------------*--------------------------*-----------------------------
A. SB Apr        *    -4      7     -4    150 *  AG   3210    5.3      .0  29.3
B. NB Dep        *     9      7      9    150 *  AG   1050    5.3      .0  29.3
C. WB Apr        *    13      2    150      2 *  AG    570    5.3      .0  18.3
D. EB Dep        *    13     -6    150     -6 *  AG   1620    5.3      .0  18.3
E. NB Apr        *     4     -7      4   -150 *  AG    810    5.3      .0  25.6
F. SB Dep        *    -7     -7     -7   -150 *  AG   2010    5.3      .0  25.6
G. EB Apr        *  -150     -2    -13     -2 *  AG    700    5.3      .0  18.3
H. WB Dep        *  -150      6    -13      6 *  AG    610    5.0      .0  18.3


III.  RECEPTOR LOCATIONS

            *    COORDINATES (M)
  RECEPTOR  *    X       Y      Z
------------*---------------------
1. Recpt 1  *      16      10    1.8
2. Recpt 2  *      16     -10    1.8
3. Recpt 3  *     -16     -10    1.8
4. Recpt 4  *     -16      10    1.8
5. Recpt 5  *      20      14    1.8
6. Recpt 6  *      20     -14    1.8
7. Recpt 7  *     -20     -14    1.8
8. Recpt 8  *     -20      14    1.8


 IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

            *       * PRED   *               CONC/LINK
            *  BRG  * CONC   *                 (PPM)
  RECEPTOR  * (DEG) * (PPM)  *   A     B     C     D     E     F     G     H
------------*-------*-------*--------------------------------------------
1. Recpt 1  *  347. *    1.6 *  1.1    .5    .0    .0    .0    .0    .0    .0
2. Recpt 2  *  350. *    2.0 *  1.1    .4    .1    .4    .0    .0    .0    .0
3. Recpt 3  *    8. *    1.8 *  1.3    .2    .0    .0    .0    .0    .2    .1
4. Recpt 4  *   11. *    1.9 *  1.6    .2    .0    .0    .0    .0    .0    .0
5. Recpt 5  *  263. *    1.4 *   .6    .2    .0    .0    .0    .0    .3    .3
6. Recpt 6  *  347. *    1.9 *   .9    .3    .1    .5    .0    .0    .0    .0
7. Recpt 7  *   11. *    1.8 *  1.2    .2    .0    .0    .0    .1    .2    .1
```

```
8. Recpt 8  *  100. *   1.8 *   .8   .1   .3   .5   .0   .0   .0   .0
```

```
         CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                  JUNE 1989 VERSION
                  PAGE   1

             JOB: intersection 9 - baseline+ph1
             RUN: Hour 1           (WORST CASE ANGLE)
       POLLUTANT: Carbon Monoxide


  I.   SITE VARIABLES

      U=    .5 M/S             Z0= 100. CM            ALT=     50. (M)
    BRG= WORST CASE            VD=    .0 CM/S
   CLAS=      7 (G)            VS=    .0 CM/S
   MIXH= 1000. M              AMB=    .0 PPM
  SIGTH=     5. DEGREES       TEMP=   7.2 DEGREE (C)


 II.   LINK VARIABLES

    LINK        *  LINK COORDINATES (M)   *                   EF     H     W
 DESCRIPTION    *   X1    Y1    X2    Y2  * TYPE  VPH   (G/MI)  (M)   (M)
----------------*-------------------------*------------------------------
A. SB Apr       *    -4     7    -4   150 *  AG   4030   5.3     .0  29.3
B. NB Dep       *     9     7     9   150 *  AG   1520   5.3     .0  29.3
C. WB Apr       *    13     2   150     2 *  AG    860   5.3     .0  18.3
D. EB Dep       *    13    -6   150    -6 *  AG   1880   5.3     .0  18.3
E. NB Apr       *     4    -7     4  -150 *  AG   1260   5.3     .0  25.6
F. SB Dep       *    -7    -7    -7  -150 *  AG   2710   5.3     .0  25.6
G. EB Apr       *  -150    -2   -13    -2 *  AG    900   5.3     .0  18.3
H. WB Dep       *  -150     6   -13     6 *  AG    940   5.3     .0  18.3


III.   RECEPTOR LOCATIONS

            *    COORDINATES (M)
  RECEPTOR  *    X       Y      Z
------------*---------------------
1. Recpt 1  *     16      10    1.8
2. Recpt 2  *     16     -10    1.8
3. Recpt 3  *    -16     -10    1.8
4. Recpt 4  *    -16      10    1.8
5. Recpt 5  *     20      14    1.8
6. Recpt 6  *     20     -14    1.8
7. Recpt 7  *    -20     -14    1.8
8. Recpt 8  *    -20      14    1.8


 IV.   MODEL RESULTS (WORST CASE WIND ANGLE )

            *       * PRED  *                 CONC/LINK
            *  BRG  * CONC  *                   (PPM)
  RECEPTOR  * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
------------*-------*-------*---------------------------------------
1. Recpt 1  *  347. *   2.1 *  1.4   .7   .0   .0   .0   .0   .0   .0
2. Recpt 2  *  350. *   2.5 *  1.3   .6   .2   .4   .0   .0   .0   .0
3. Recpt 3  *    8. *   2.4 *  1.6   .3   .0   .0   .0   .0   .3   .2
4. Recpt 4  *   11. *   2.4 *  2.0   .3   .0   .0   .0   .0   .0   .0
5. Recpt 5  *  263. *   1.9 *   .7   .3   .0   .0   .0   .0   .3   .5
6. Recpt 6  *  347. *   2.4 *  1.1   .5   .2   .6   .0   .0   .0   .0
7. Recpt 7  *   11. *   2.3 *  1.4   .3   .0   .0   .0   .2   .2   .2
```

```
8. Recpt 8  *   99. *   2.3 *  1.0   .2   .4   .6   .0   .0   .0   .0
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                   JUNE 1989 VERSION
                   PAGE   1

              JOB: intersection 15 - baseline
              RUN: Hour 1           (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

       U=    .5 M/S              Z0= 100. CM             ALT=     50. (M)
     BRG= WORST CASE             VD=    .0 CM/S
    CLAS=     7 (G)              VS=    .0 CM/S
    MIXH= 1000. M               AMB=    .0 PPM
   SIGTH=     5. DEGREES       TEMP=   7.2 DEGREE (C)


  II.  LINK VARIABLES

       LINK       *  LINK COORDINATES (M)    *                   EF     H      W
   DESCRIPTION    *   X1    Y1    X2    Y2   * TYPE  VPH  (G/MI)  (M)    (M)
-----------------*-------------------------*-----------------------------
A. SB Apr        *    -7    13    -7   150 *  AG   1550    5.3      .0  36.6
B. NB Dep        *    11    13    11   150 *  AG   3100    5.3      .0  36.6
C. WB Apr        *    18     6   150     6 *  AG   1300    5.3      .0  29.3
D. EB Dep        *    18    -7   150    -7 *  AG    850    5.3      .0  29.3
E. NB Apr        *     7   -13     7  -150 *  AG   1490    5.3      .0  36.6
F. SB Dep        *    -9   -13    -9  -150 *  AG    570    5.3      .0  36.6
G. EB Apr        *   -18    -4  -150    -4 *  AG    740    5.3      .0  29.3
H. WB Dep        *   -18     9  -150     9 *  AG    560    5.3      .0  29.3


III.  RECEPTOR LOCATIONS

              *    COORDINATES (M)
  RECEPTOR    *    X       Y      Z
-------------*---------------------
1. Recpt 1   *      21      16    1.8
2. Recpt 2   *      21     -16    1.8
3. Recpt 3   *     -20     -16    1.8
4. Recpt 4   *     -21      16    1.8
5. Recpt 5   *      25      20    1.8
6. Recpt 6   *      25     -20    1.8
7. Recpt 7   *     -24     -20    1.8
8. Recpt 8   *     -25      20    1.8


  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

              *        * PRED  *                CONC/LINK
              *  BRG   * CONC  *                  (PPM)
  RECEPTOR    * (DEG)  * (PPM) *   A    B    C    D    E    F    G    H
-------------*-------*-------*-----------------------------------------
1. Recpt 1   *  347. *   1.5 *   .3  1.2   .0   .0   .0   .0   .0   .0
2. Recpt 2   *  354. *   1.4 *   .2   .9   .2   .2   .0   .0   .0   .0
3. Recpt 3   *   15. *   1.1 *   .4   .7   .0   .0   .0   .0   .0   .0
4. Recpt 4   *   20. *   1.2 *   .5   .6   .0   .0   .0   .0   .0   .0
5. Recpt 5   *  345. *   1.4 *   .3  1.2   .0   .0   .0   .0   .0   .0
6. Recpt 6   *  350. *   1.5 *   .2   .8   .2   .2   .0   .0   .0   .0
7. Recpt 7   *   14. *   1.1 *   .4   .5   .0   .0   .0   .0   .1   .0
```

```
8. Recpt 8  *   97. *   1.3 *   .3   .4   .4   .1   .0   .0   .0   .0
```

```
      CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
               JUNE 1989 VERSION
               PAGE   1

          JOB: intersection 15 - baseline+ph1
          RUN: Hour 1            (WORST CASE ANGLE)
    POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

        U=    .5 M/S             Z0= 100. CM            ALT=    50. (M)
      BRG= WORST CASE            VD=    .0 CM/S
     CLAS=     7 (G)             VS=    .0 CM/S
     MIXH= 1000. M              AMB=    .0 PPM
    SIGTH=    5. DEGREES       TEMP=   7.2 DEGREE (C)


 II.  LINK VARIABLES

      LINK        *  LINK COORDINATES (M)   *                     EF      H     W
   DESCRIPTION    *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 -----------------*-------------------------*-----------------------------
 A. SB Apr        *     -7    13    -7   150 *  AG   2050   5.3     .0  36.6
 B. NB Dep        *     11    13    11   150 *  AG   3730   5.3     .0  36.6
 C. WB Apr        *     18     6   150     6 *  AG   1930   5.3     .0  29.3
 D. EB Dep        *     18    -7   150    -7 *  AG   1360   5.3     .0  29.3
 E. NB Apr        *      7   -13     7  -150 *  AG   1500   5.3     .0  36.6
 F. SB Dep        *     -9   -13    -9  -150 *  AG    570   5.3     .0  36.6
 G. EB Apr        *    -18    -4  -150    -4 *  AG    750   5.3     .0  29.3
 H. WB Dep        *    -18     9  -150     9 *  AG    570   5.3     .0  29.3


 III.  RECEPTOR LOCATIONS

               *    COORDINATES (M)
   RECEPTOR    *    X       Y       Z
 ------------*---------------------
 1. Recpt 1  *      21      16    1.8
 2. Recpt 2  *      21     -16    1.8
 3. Recpt 3  *     -20     -16    1.8
 4. Recpt 4  *     -21      16    1.8
 5. Recpt 5  *      25      20    1.8
 6. Recpt 6  *      25     -20    1.8
 7. Recpt 7  *     -24     -20    1.8
 8. Recpt 8  *     -25      20    1.8


  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

              *       * PRED  *                  CONC/LINK
              *  BRG  * CONC  *                    (PPM)
  RECEPTOR    * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
 -------------*-------*-------*----------------------------------------
 1. Recpt 1   *  343. *   1.8 *   .5  1.3   .0   .0   .0   .0   .0   .0
 2. Recpt 2   *  354. *   1.8 *   .2  1.0   .3   .3   .0   .0   .0   .0
 3. Recpt 3   *   15. *   1.3 *   .5   .8   .0   .0   .0   .0   .0   .0
 4. Recpt 4   *   20. *   1.5 *   .7   .8   .0   .0   .0   .0   .0   .0
 5. Recpt 5   *  344. *   1.7 *   .3  1.4   .0   .0   .0   .0   .0   .0
 6. Recpt 6   *  350. *   1.9 *   .3  1.0   .3   .3   .0   .0   .0   .0
 7. Recpt 7   *   14. *   1.3 *   .5   .6   .0   .0   .0   .0   .1   .0
```

```
8. Recpt 8  *   97. *   1.7 *   .4   .4   .6   .2   .0   .0   .0   .0
```

```
        CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                 JUNE 1989 VERSION
                 PAGE   1

            JOB: intersection 19 - baseline
            RUN: Hour 1           (WORST CASE ANGLE)
      POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

       U=    .5 M/S             Z0= 100. CM             ALT=    50. (M)
     BRG= WORST CASE            VD=   .0 CM/S
    CLAS=     7 (G)             VS=   .0 CM/S
    MIXH= 1000. M              AMB=   .0 PPM
   SIGTH=    5. DEGREES       TEMP=  7.2 DEGREE (C)


 II.  LINK VARIABLES

      LINK        *  LINK COORDINATES (M)   *                EF      H      W
   DESCRIPTION    *   X1    Y1    X2    Y2  * TYPE  VPH   (G/MI)   (M)    (M)
------------------*-------------------------*------------------------------
A. SB Apr         *    -7    13    -7   150 *  AG   1800    5.3      .0   36.6
B. NB Dep         *    11    13    11   150 *  AG   2730    5.3      .0   36.6
C. WB Apr         *    18     4   150     4 *  AG    960    5.3      .0   29.3
D. EB Dep         *    18    -9   150    -9 *  AG    890    5.3      .0   29.3
E. NB Apr         *     7   -13     7  -150 *  AG   2230    5.3      .0   36.6
F. SB Dep         *    -9   -13    -9  -150 *  AG   1680    5.3      .0   36.6
G. EB Apr         *   -18    -4  -150    -4 *  AG    940    5.3      .0   29.3
H. WB Dep         *   -18     9  -150     9 *  AG    630    5.0      .0   29.3


III.  RECEPTOR LOCATIONS

            *    COORDINATES (M)
  RECEPTOR  *    X       Y      Z
------------*----------------------
1. Recpt 1  *     21      16    1.8
2. Recpt 2  *     21     -16    1.8
3. Recpt 3  *    -20     -16    1.8
4. Recpt 4  *    -21      16    1.8
5. Recpt 5  *     25      20    1.8
6. Recpt 6  *     25     -20    1.8
7. Recpt 7  *    -24     -20    1.8
8. Recpt 8  *    -25      20    1.8


 IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

            *       * PRED  *                CONC/LINK
            *  BRG  * CONC  *                  (PPM)
  RECEPTOR  * (DEG) * (PPM) *   A    B    C    D    E    F    G    H
------------*-------*-------*----------------------------------------
1. Recpt 1  *  343. *   1.4 *  .4  1.0   .0   .0   .0   .0   .0   .0
2. Recpt 2  *  352. *   1.3 *  .3   .8   .1   .1   .0   .0   .0   .0
3. Recpt 3  *  163. *   1.2 *  .0   .0   .0   .0   .6   .6   .0   .0
4. Recpt 4  *   20. *   1.2 *  .6   .6   .0   .0   .0   .0   .0   .0
5. Recpt 5  *  344. *   1.3 *  .3  1.0   .0   .0   .0   .0   .0   .0
6. Recpt 6  *  349. *   1.4 *  .3   .7   .2   .2   .0   .0   .0   .0
7. Recpt 7  *   83. *   1.2 *  .0   .0   .2   .3   .3   .3   .0   .0
8. Recpt 8  *  167. *   1.2 *  .0   .0   .0   .0   .4   .4   .1   .1
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                   JUNE 1989 VERSION
                   PAGE   1

              JOB: intersection 19 - baseline+ph1
              RUN: Hour 1            (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


    I.  SITE VARIABLES

         U=    .5 M/S              Z0= 100. CM             ALT=    50. (M)
       BRG= WORST CASE             VD=   .0 CM/S
      CLAS=     7 (G)              VS=   .0 CM/S
      MIXH= 1000. M               AMB=   .0 PPM
     SIGTH=    5. DEGREES        TEMP=  7.2 DEGREE (C)


   II.  LINK VARIABLES

       LINK      *  LINK COORDINATES (M)    *                EF      H     W
    DESCRIPTION  *   X1    Y1    X2    Y2   * TYPE  VPH   (G/MI)  (M)   (M)
  ---------------*--------------------------*------------------------------
  A. SB Apr      *    -7    13    -7   150  *  AG   2310    5.3     .0  36.6
  B. NB Dep      *    11    13    11   150  *  AG   3610    5.3     .0  36.6
  C. WB Apr      *    18     4   150     4  *  AG   1000    5.3     .0  29.3
  D. EB Dep      *    18    -9   150    -9  *  AG    910    5.3     .0  29.3
  E. NB Apr      *     7   -13     7  -150  *  AG   3230    5.3     .0  36.6
  F. SB Dep      *    -9   -13    -9  -150  *  AG   2300    5.3     .0  36.6
  G. EB Apr      *   -18    -4  -150    -4  *  AG   1010    5.3     .0  29.3
  H. WB Dep      *   -18     9  -150     9  *  AG    730    5.3     .0  29.3


  III.  RECEPTOR LOCATIONS

              *    COORDINATES (M)
    RECEPTOR  *    X       Y      Z
  ------------*---------------------
  1. Recpt 1  *     21      16    1.8
  2. Recpt 2  *     21     -16    1.8
  3. Recpt 3  *    -20     -16    1.8
  4. Recpt 4  *    -21      16    1.8
  5. Recpt 5  *     25      20    1.8
  6. Recpt 6  *     25     -20    1.8
  7. Recpt 7  *    -24     -20    1.8
  8. Recpt 8  *    -25      20    1.8


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

              *       * PRED  *                 CONC/LINK
              *  BRG  * CONC  *                   (PPM)
   RECEPTOR   * (DEG) * (PPM) *   A     B     C     D     E     F     G     H
  ------------*-------*-------*------------------------------------------------
  1. Recpt 1  *  343. *   1.8 *   .5   1.2    .0    .0    .0    .0    .0    .0
  2. Recpt 2  *  196. *   1.7 *   .0    .0    .0    .0   1.2    .5    .0    .0
  3. Recpt 3  *  163. *   1.6 *   .0    .0    .0    .0    .8    .8    .0    .0
  4. Recpt 4  *   20. *   1.6 *   .8    .7    .0    .0    .0    .0    .0    .0
  5. Recpt 5  *  344. *   1.7 *   .4   1.3    .0    .0    .0    .0    .0    .0
  6. Recpt 6  *  349. *   1.7 *   .4    .9    .2    .2    .1    .0    .0    .0
```

```
7. Recpt 7   *   160. *   1.5 *    .0    .0    .0    .0    .7    .8    .0    .0
8. Recpt 8   *   167. *   1.5 *    .0    .0    .0    .0    .6    .6    .1    .2
```

```
          CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                   JUNE 1989 VERSION
                   PAGE   1

              JOB: intersection 22 - baseline
              RUN: Hour 1            (WORST CASE ANGLE)
        POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

        U=     .5 M/S            Z0= 100. CM           ALT=     50. (M)
      BRG= WORST CASE            VD=    .0 CM/S
     CLAS=      7 (G)            VS=    .0 CM/S
     MIXH= 1000. M              AMB=    .0 PPM
    SIGTH=     5. DEGREES      TEMP=   7.2 DEGREE (C)


  II.  LINK VARIABLES

       LINK        *  LINK COORDINATES (M)    *                   EF       H      W
    DESCRIPTION    *   X1     Y1     X2     Y2 * TYPE  VPH   (G/MI)   (M)    (M)
  -----------------*--------------------------*------------------------------
  A. SB Apr        *     -6     7     -6    150 *  AG   2370    5.3       .0  32.9
  B. NB Dep        *      9     7      9    150 *  AG   2880    5.3       .0  32.9
  C. WB Apr        *     15     4    150      4 *  AG    160    5.3       .0  18.3
  D. EB Dep        *     15    -4    150     -4 *  AG     60    3.5       .0  18.3
  E. NB Apr        *      6    -7      6   -150 *  AG   2760    5.3       .0  32.9
  F. SB Dep        *     -9    -7     -9   -150 *  AG   2430    5.3       .0  32.9
  G. EB Apr        *    -15    -4   -150     -4 *  AG    380    5.3       .0  18.3
  H. WB Dep        *    -15     4   -150      4 *  AG    300    4.1       .0  18.3


  III.  RECEPTOR LOCATIONS

               *     COORDINATES (M)
    RECEPTOR   *     X        Y       Z
  -------------*---------------------
  1. Recpt 1   *     18       10     1.8
  2. Recpt 2   *     18      -10     1.8
  3. Recpt 3   *    -18      -10     1.8
  4. Recpt 4   *    -18       10     1.8
  5. Recpt 5   *     22       14     1.8
  6. Recpt 6   *     22      -14     1.8
  7. Recpt 7   *    -22      -14     1.8
  8. Recpt 8   *    -22       14     1.8


   IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

               *        * PRED   *                  CONC/LINK
               *   BRG  * CONC   *                    (PPM)
    RECEPTOR   * (DEG)  * (PPM)  *    A     B     C     D     E     F     G     H
  -------------*--------*--------*------------------------------------------------
  1. Recpt 1   *  348.  *   1.9  *   .6   1.2    .0    .0    .0    .0    .0    .0
  2. Recpt 2   *  350.  *   1.7  *   .6   1.0    .0    .0    .0    .0    .0    .0
  3. Recpt 3   *  166.  *   1.8  *   .0    .0    .0    .0    .8   1.0    .0    .0
  4. Recpt 4   *  170.  *   1.7  *   .0    .0    .0    .0    .7    .8    .0    .0
  5. Recpt 5   *  345.  *   1.7  *   .5   1.2    .0    .0    .0    .0    .0    .0
  6. Recpt 6   *  349.  *   1.6  *   .5    .9    .0    .0    .1    .0    .0    .0
  7. Recpt 7   *  164.  *   1.6  *   .0    .0    .0    .0    .7   1.0    .0    .0
```

```
8. Recpt 8  *  168. *   1.6 *   .0   .0   .0   .0   .6   .8   .0   .0
```

```
        CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                 JUNE 1989 VERSION
                 PAGE   1

            JOB: intersection 22 - baseline+ph1
            RUN: Hour 1            (WORST CASE ANGLE)
      POLLUTANT: Carbon Monoxide

  I.  SITE VARIABLES

       U=    .5 M/S            Z0= 100. CM           ALT=    50. (M)
     BRG= WORST CASE           VD=   .0 CM/S
    CLAS=     7 (G)            VS=   .0 CM/S
    MIXH= 1000. M             AMB=   .0 PPM
   SIGTH=    5. DEGREES      TEMP=  7.2 DEGREE (C)

  II.  LINK VARIABLES

      LINK       *  LINK COORDINATES (M)   *                EF      H     W
   DESCRIPTION   *   X1     Y1     X2     Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*------------------------*------------------------------
 A. SB Apr       *    -6      7     -6    150 *  AG   2740   5.3     .0  32.9
 B. NB Dep       *     9      7      9    150 *  AG   3420   5.3     .0  32.9
 C. WB Apr       *    15      4    150      4 *  AG    160   5.3     .0  18.3
 D. EB Dep       *    15     -4    150     -4 *  AG     60   3.5     .0  18.3
 E. NB Apr       *     6     -7      6   -150 *  AG   3310   5.3     .0  32.9
 F. SB Dep       *    -9     -7     -9   -150 *  AG   2800   5.3     .0  32.9
 G. EB Apr       *   -15     -4   -150     -4 *  AG    380   5.3     .0  18.3
 H. WB Dep       *   -15      4   -150      4 *  AG    310   4.1     .0  18.3

 III.  RECEPTOR LOCATIONS

             *    COORDINATES (M)
   RECEPTOR  *    X         Y       Z
 ------------*---------------------
 1. Recpt 1  *      18       10     1.8
 2. Recpt 2  *      18      -10     1.8
 3. Recpt 3  *     -18      -10     1.8
 4. Recpt 4  *     -18       10     1.8
 5. Recpt 5  *      22       14     1.8
 6. Recpt 6  *      22      -14     1.8
 7. Recpt 7  *     -22      -14     1.8
 8. Recpt 8  *     -22       14     1.8

  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

             *        * PRED   *                 CONC/LINK
             *  BRG   * CONC   *                   (PPM)
  RECEPTOR   * (DEG)  * (PPM)  *   A     B     C     D     E     F     G     H
 ------------*-------*-------*-------------------------------------------------
 1. Recpt 1  *  348.  *   2.2  *   .7   1.4    .0    .0    .0    .0    .0    .0
 2. Recpt 2  *  195.  *   2.0  *   .0    .0    .0    .0   1.4    .7    .0    .0
 3. Recpt 3  *  166.  *   2.1  *   .0    .0    .0    .0   1.0   1.1    .0    .0
 4. Recpt 4  *  169.  *   2.0  *   .0    .0    .0    .0    .9    .9    .0    .0
 5. Recpt 5  *  346.  *   2.0  *   .6   1.4    .0    .0    .0    .0    .0    .0
 6. Recpt 6  *  349.  *   1.9  *   .6   1.1    .0    .0    .1    .0    .0    .0
 7. Recpt 7  *  164.  *   1.9  *   .0    .0    .0    .0    .8   1.1    .0    .0
```

```
8. Recpt 8  *  167. *   1.9 *   .1   .0   .0   .0   .8   .8   .0   .0
```

```
       CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   1

           JOB: intersection 24 - baseline
           RUN: Hour 1            (WORST CASE ANGLE)
     POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

       U=    .5 M/S            Z0= 100. CM          ALT=    50. (M)
     BRG= WORST CASE           VD=    .0 CM/S
    CLAS=     7 (G)            VS=    .0 CM/S
    MIXH= 1000. M             AMB=    .0 PPM
   SIGTH=    5. DEGREES      TEMP=   7.2 DEGREE (C)


  II.  LINK VARIABLES

     LINK       *  LINK COORDINATES (M)    *                EF      H     W
  DESCRIPTION   *   X1     Y1     X2     Y2 * TYPE  VPH  (G/MI)  (M)   (M)
 ---------------*--------------------------*---------------------------------
 A. SB Apr      *    -7      6     -7    150 *  AG   1240    5.3     .0  25.6
 B. NB Dep      *     9      7      9    150 *  AG   2940    5.3     .0  25.6
 C. EB Dep      *    11      0    106    106 *  AG    290    3.0     .0  11.0
 D. NB Apr      *     6     -6      6   -150 *  AG   1680    5.3     .0  25.6
 E. SB Dep      *    -6     -6     -6   -150 *  AG    610    5.3     .0  25.6
 F. EB Apr      *   -11      0   -150      0 *  AG   1690    5.3     .0  14.6


 III.  RECEPTOR LOCATIONS

               *    COORDINATES (M)
   RECEPTOR    *     X      Y      Z
 --------------*----------------------
 1. Recpt 1    *     15    -11    1.8
 2. Recpt 2    *    -14     -9    1.8
 3. Recpt 3    *     19    -15    1.8
 4. Recpt 4    *    -18    -13    1.8


  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

               *       * PRED   *           CONC/LINK
               *  BRG  * CONC   *             (PPM)
  RECEPTOR     * (DEG) * (PPM)  *   A     B     C     D     E     F
 --------------*-------*--------*-------------------------------------
 1. Recpt 1    *  353. *   1.6  *   .3   1.2    .0    .0    .0    .0
 2. Recpt 2    *   11. *   1.8  *   .5    .8    .0    .0    .0    .5
 3. Recpt 3    *  352. *   1.5  *   .2   1.2    .0    .0    .0    .0
 4. Recpt 4    *   14. *   1.6  *   .4    .7    .0    .0    .0    .4
```

```
       CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                JUNE 1989 VERSION
                PAGE   1

            JOB: intersection 24 - baseline+ph1
            RUN: Hour 1            (WORST CASE ANGLE)
      POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

       U=    .5 M/S            Z0= 100. CM            ALT=    50. (M)
     BRG= WORST CASE           VD=    .0 CM/S
    CLAS=     7 (G)            VS=    .0 CM/S
    MIXH= 1000. M             AMB=    .0 PPM
   SIGTH=    5. DEGREES      TEMP=   7.2 DEGREE (C)


 II.  LINK VARIABLES

      LINK       *  LINK COORDINATES (M)   *                 EF      H     W
   DESCRIPTION   *   X1    Y1    X2    Y2  * TYPE  VPH   (G/MI)   (M)   (M)
 ----------------*-------------------------*------------------------------
 A. SB Apr       *    -7     6    -7   150 *  AG   1240    5.3     .0  25.6
 B. NB Dep       *     9     7     9   150 *  AG   3310    5.3     .0  25.6
 C. EB Dep       *    11     0   106   106 *  AG    290    3.0     .0  11.0
 D. NB Apr       *     6    -6     6  -150 *  AG   1870    5.3     .0  25.6
 E. SB Dep       *    -6    -6    -6  -150 *  AG    630    5.3     .0  25.6
 F. EB Apr       *   -11     0  -150     0 *  AG   1890    5.3     .0  14.6


 III.  RECEPTOR LOCATIONS

              *   COORDINATES (M)
   RECEPTOR   *    X      Y      Z
 ------------*---------------------
 1. Recpt 1   *    15    -11    1.8
 2. Recpt 2   *   -14     -9    1.8
 3. Recpt 3   *    19    -15    1.8
 4. Recpt 4   *   -18    -13    1.8


  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

              *       * PRED  *           CONC/LINK
              *  BRG  * CONC  *             (PPM)
  RECEPTOR    * (DEG) * (PPM) *   A    B    C    D    E    F
 -------------*-------*-------*------------------------------
 1. Recpt 1   *  354. *   1.8 *  .2  1.4   .0   .0   .0   .0
 2. Recpt 2   *   11. *   1.9 *  .5   .8   .0   .0   .0   .6
 3. Recpt 3   *  352. *   1.7 *  .2  1.3   .0   .0   .0   .0
 4. Recpt 4   *   14. *   1.8 *  .4   .8   .0   .0   .0   .5
```

```
         CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                  JUNE 1989 VERSION
                  PAGE   1

             JOB: intersection 25 - baseline
             RUN: Hour 1           (WORST CASE ANGLE)
       POLLUTANT: Carbon Monoxide


  I.  SITE VARIABLES

       U=    .5 M/S           Z0= 100. CM          ALT=    50. (M)
     BRG= WORST CASE          VD=    .0 CM/S
    CLAS=     7 (G)           VS=    .0 CM/S
    MIXH= 1000. M            AMB=    .0 PPM
   SIGTH=     5. DEGREES    TEMP=   7.2 DEGREE (C)


 II.  LINK VARIABLES

     LINK       *  LINK COORDINATES (M)   *                  EF      H     W
  DESCRIPTION   *   X1    Y1    X2    Y2  * TYPE  VPH    (G/MI)   (M)   (M)
----------------*-------------------------*------------------------------
A. SB Apr       *    -6     6    -6   150 *  AG   1990     5.3      .0  29.3
B. NB Dep       *     7     6     7   150 *  AG   3040     5.3      .0  29.3
C. WB Apr       *    13     0   150     0 *  AG    810     5.3      .0  14.6
D. NB Apr       *     6    -6     6  -150 *  AG   2940     5.3      .0  29.3
E. SB Dep       *    -7    -6    -7  -150 *  AG   2620     5.3      .0  29.3
F. EB Apr       *   -13    -2  -150    -2 *  AG    650     5.3      .0  11.0
G. WB Dep       *   -13     2  -150     2 *  AG    510     5.3      .0  11.0


III.  RECEPTOR LOCATIONS

            *    COORDINATES (M)
  RECEPTOR  *    X      Y      Z
------------*---------------------
1. Recpt 1  *    16      9    1.8
2. Recpt 2  *   -16     -7    1.8
3. Recpt 3  *   -16      7    1.8
4. Recpt 4  *    20     13    1.8
5. Recpt 5  *   -20    -11    1.8
6. Recpt 6  *   -20     11    1.8


 IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

             *        * PRED  *               CONC/LINK
             *  BRG   * CONC  *                 (PPM)
  RECEPTOR   * (DEG)  * (PPM) *   A     B     C     D     E     F     G
-------------*--------*-------*-------------------------------------------
1. Recpt 1   *  190.  *   2.2 *   .0    .0    .2   1.2    .7    .0    .0
2. Recpt 2   *  168.  *   2.1 *   .0    .0    .0    .9   1.2    .0    .0
3. Recpt 3   *  170.  *   2.3 *   .0    .0    .0    .8   1.1    .2    .2
4. Recpt 4   *  192.  *   2.0 *   .0    .2    .2   1.1    .6    .0    .0
5. Recpt 5   *  166.  *   1.9 *   .0    .0    .0    .7   1.2    .0    .0
6. Recpt 6   *  168.  *   2.1 *   .0    .0    .0    .7   1.0    .2    .2
```

```
           CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                    JUNE 1989 VERSION
                    PAGE   1

               JOB: intersection 25 - baseline+ph1
               RUN: Hour 1           (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

        U=    .5 M/S             Z0= 100. CM            ALT=     50. (M)
      BRG= WORST CASE            VD=    .0 CM/S
     CLAS=     7 (G)             VS=    .0 CM/S
     MIXH= 1000. M              AMB=    .0 PPM
    SIGTH=     5. DEGREES      TEMP=   7.2 DEGREE (C)


  II.  LINK VARIABLES

      LINK         *  LINK COORDINATES (M)    *                 EF      H      W
   DESCRIPTION     *   X1     Y1     X2     Y2  * TYPE   VPH  (G/MI)  (M)    (M)
-----------------*------------------------*-------------------------------
A. SB Apr          *    -6      6     -6    150 *  AG   2040    5.3     .0   29.3
B. NB Dep          *     7      6      7    150 *  AG   3400    5.3     .0   29.3
C. WB Apr          *    13      0    150      0 *  AG    820    5.3     .0   14.6
D. NB Apr          *     6     -6      6   -150 *  AG   3310    5.3     .0   29.3
E. SB Dep          *    -7     -6     -7   -150 *  AG   2680    5.3     .0   29.3
F. EB Apr          *   -13     -2   -150     -2 *  AG    660    5.3     .0   11.0
G. WB Dep          *   -13      2   -150      2 *  AG    530    5.3     .0   11.0


III.  RECEPTOR LOCATIONS

               *    COORDINATES (M)
  RECEPTOR     *     X        Y       Z
-------------*---------------------
1. Recpt 1     *     16        9     1.8
2. Recpt 2     *    -16       -7     1.8
3. Recpt 3     *    -16        7     1.8
4. Recpt 4     *     20       13     1.8
5. Recpt 5     *    -20      -11     1.8
6. Recpt 6     *    -20       11     1.8


  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

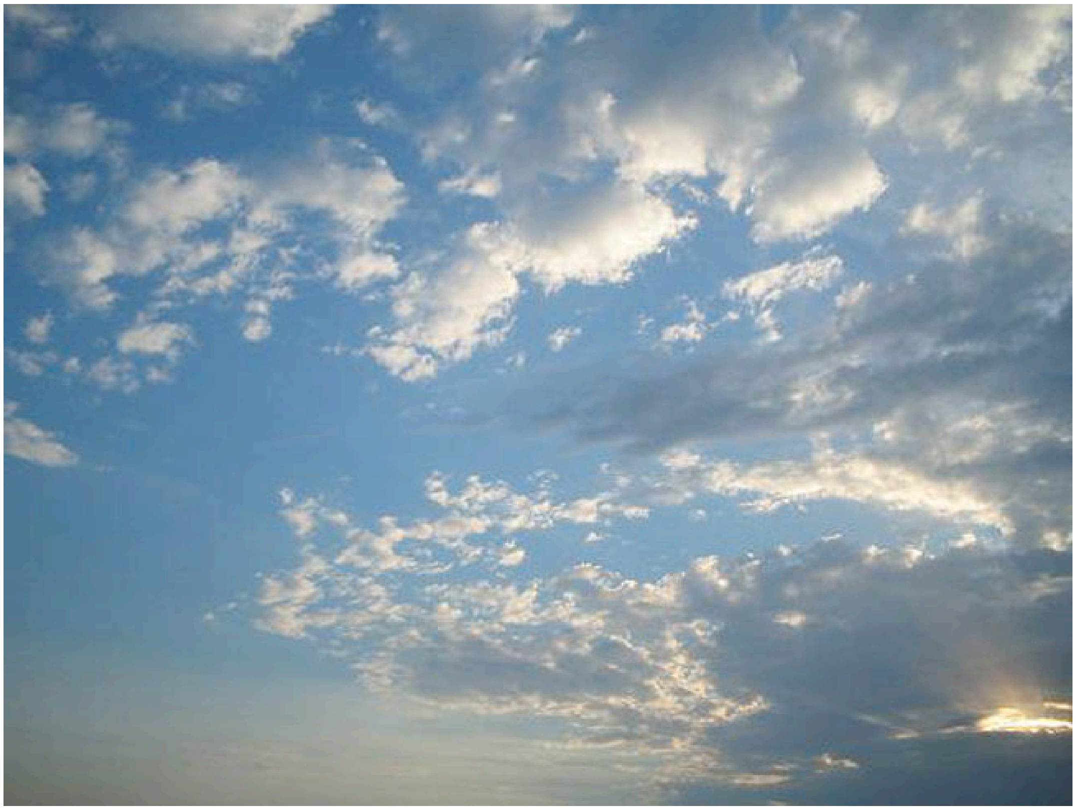
               *        * PRED   *                  CONC/LINK
               *   BRG  * CONC   *                    (PPM)
  RECEPTOR     * (DEG)  * (PPM)  *    A     B     C     D     E     F     G
-------------*-------*-------*-----------------------------------------
1. Recpt 1     *  190.  *    2.3 *    .0    .0    .3   1.3    .7    .0    .0
2. Recpt 2     *  168.  *    2.2 *    .0    .0    .0   1.0   1.3    .0    .0
3. Recpt 3     *  169.  *    2.4 *    .0    .0    .0   1.0   1.0    .2    .2
4. Recpt 4     *  192.  *    2.2 *    .0    .2    .2   1.2    .6    .0    .0
5. Recpt 5     *  165.  *    2.0 *    .0    .0    .0    .8   1.2    .0    .0
6. Recpt 6     *  168.  *    2.2 *    .0    .0    .0    .8   1.0    .2    .2
```

APPENDIX L

RIO DEL ORO AIR QUALITY AND EMISSIONS REDUCTION PLAN

AIR QUALITY AND EMISSIONS REDUCTION PLAN

RIO DEL ORO



CITY OF RANCHO CORDOVA

Submitted to:

City of Rancho Cordova &

Sacramento Metropolitan Air Quality Management District

November 2006

Elliott Homes, Inc. • 80 Iron Point Circle, Suite 110 • Folsom, CA 95630
GenCorp Real Estate • 620 Coolidge Drive, Suite 100 • Folsom, CA 95630

EXECUTIVE SUMMARY

This document presents the Air Quality and Emissions Reduction Plan for the proposed Rio del Oro project in the City of Rancho Cordova.

The City of Rancho Cordova General Plan Policy AQ.1.2.3 requires all new development projects that exceed the Sacramento Air Quality Management District's (SMAQMD) operational threshold of significance to incorporate design, construction and/or operational features that will result in a reduction in emissions when compared to an "unmitigated baseline" project. Under Policy AQ.1.2.3, emissions reductions measures should consider cost-effectiveness, maximum cost and the provision of credits for emissions reductions already in place.

The measures contained in this Plan are also consistent with County of Sacramento General Plan Policy AQ-15, which requires "a 15% reduction in emissions from the level that would be produced by a base-case project assuming full trip generation per the current ITE Trip Generation Handbook."

Rio del Oro is a 3,828-acre mixed use project proposed in eastern Sacramento County, in the City of Rancho Cordova. The project site is located south of White Rock Road, north of Douglas Road, and east of Sunrise Boulevard. Rio del Oro features approximately 11,601 residential units at a range of density levels, and a mix of commercial, business park, industrial park, school, park and open space uses.

Numerous trip reduction and emission reduction measures are proposed for the project and are identified below. Collectively, these measures will reduce peak hour vehicle trips by employees and reduce emissions from both mobile and direct sources by 15.0%.

Rio Del Oro

Summary of proposed Air Quality and Emissions Reduction Plan

CATEGORY Measure	Description
BICYCLE/PEDESTRIAN/TRANSIT	
1. Bicycle Lockers and Racks	Non-residential projects provide bicycle lockers and/or racks
2. Additional Bicycle Parking Facilities	Provide an additional 20% or required Class I and Class II bicycle facilities within each commercial development in the project area.
3. Shower and Locker Facilities	Non-residential projects provide personal showers and lockers
4. Class I Bicycle Storage - Residential	Bicycle storage (Class I) at apartment complexes or condos without garages
5. Class I and Class II Bicycle Facilities	Entire project is located within 1/2 mile of an existing Class I or Class II bike lane and provides a comparable bikeway connection to that existing facility
6. Pedestrian Facilities	The project provides for pedestrian facilities and improvements
7. Uses Proximate to Planned Transit	Bus service provides headways of 15 minutes or less for stops within 1/4 mile; project provides essential bus stop improvements
8. Transportation Information Kiosk	Provide a display case or kiosk within each commercial development, displaying transportation information
PARKING	
17. Carpool/Vanpool Parking	Provide preferential parking for carpool//vanpools
21. Parking Lot Design	Provide a parking lot design that includes clearly marked and shaded pedestrian pathways between transit facilities and building entrances.
MIXED USE	
30. Mixed Use	Have at least 3 of the following on-site and/or within 1/4 mile: Residential Development, Retail Development, Personal Services, Open Space, Office
31. Neighborhood as Focal Point	Neighborhood serving as focal point with parks, school and civic uses within 1/4 mile

Rio Del Oro

Summary of proposed Air Quality and Emissions Reduction Plan

32. Bicycle and Pedestrian Paths	Separate, safe and convenient bicycle and pedestrian paths connecting residential, commercial and office uses.
33. Elimination of Barriers	The project provides a development pattern that eliminates physical barriers such as walls, berms, landscaping, and slopes between residential and non-residential land uses that impede bicycle or pedestrian circulation.
BUILDING COMPONENTS	
41. Natural Gas Fireplace	Install lowest emitting commercially available fireplace in all residences where fireplaces installed.
42. Energy Efficient Heating	Install lowest emitting commercially available furnaces in all project buildings.
43. Ozone Destruction Catalyst	Install ozone destruction catalyst air conditioners in all residential units
45. High Speed Data Connection	Install a connection for high speed data transmission to each residential unit through the installation of fiber optic cable, T-1 wiring or other comparable technology.
TRANSPORTATION DEMAND MANAGEMENT & MISC.	
51. TMA Membership	Include permanent TMA membership and funding requirement. Funding to be provided by Community Facilities District or County Service Area or other non-revocable funding mechanism
65. Lawnmowers	Provide a complimentary cordless electric lawnmower to each residential buyer

1.0 INTRODUCTION

The City of Rancho Cordova General Plan Policy AQ.1.2.3 requires large development projects to incorporate design, construction and/or operational features that will result in a reduction in emissions when compared to an "unmitigated baseline" project. The purpose of this document is to describe the design features and other mechanisms that will achieve the required reduction in emissions to comply with this policy. The Rio del Oro project will reduce impacts to traffic and air quality through the following means:

- Reduce total vehicle emissions in the City of Rancho Cordova by reducing the number of vehicle trips that might otherwise be generated by residents and visitors to the project area and by utilizing building materials and machinery that will reduce emissions;
- Reduce peak hour traffic congestion by reducing both the number of vehicle trips and vehicular miles to travel that might otherwise be generated by residents and visitors; and
- Increase the efficiency of the existing transportation network and achieve the highest possible level or service at existing critical intersections

The Sacramento Metropolitan Air Quality Management District (SMAQMD) *Guide to Air Quality Assessment* (July 2004) and *Indirect Source Review Program Implementation Guidelines* (February 1995) provide guidance to local land use agencies in implementing an indirect source review program. The SMAQMD has prepared a list of measures and corresponding reduction credits that can be applied to meet the targeted 15% reduction in emissions. Each emission reduction measure is assigned a point value, which is approximately equivalent to the percentage reduction in emissions from the level that would be produced by a base-case project assuming full trip generation per the current ITE Trip Generation Handbook. See County of Sacramento General Plan Policy AQ-15. The emission reduction measures are organized into the following categories:

- Bicycle, Pedestrian and Transit
- Parking
- Mixed Use
- Building Components
- Transportation Demand Management and Miscellaneous

Section 2 of this document describes the proposed project and the current transportation setting. Section 3 describes each measure that will be implemented in the project to reduce both emissions and employee-generated, single-occupant vehicle trips during peak hours. Section 4 summarizes the proposed measures and identifies credits for each measure toward the emissions reduction requirements.

Implementation of the measures identified in this report will be required as a condition of approval of the Rio del Oro project and enforceable by the City as lead agency under the requirements of the California Environmental Quality Act (CEQA) and applicable provisions of the Municipal Code.

2.0 PROJECT DESCRIPTION AND TRANSPORTATION SETTING

Rio del Oro is a 3,828-acre mixed use project proposed in eastern Sacramento County, in the City of Rancho Cordova. The project site is located south of White Rock Road, north of Douglas Road, and east of Sunrise Boulevard, as shown on **Figure 1**. Rio del Oro features approximately 11,601 residential units at a range of density levels, and a mix of commercial, business park, industrial park, school, park and open space uses, as described in Table 1.

Table 1 - Land Use Summary

LAND USE	ACRES	DENSITY	FIXED COUNT	UNIT COUNT
Single Family Residential	1,597	2.1 to 6.0	5 du/acre	7,985
Medium Density Residential	237	6.1 to 18.0	8 du/ac	1,896
High Density Residential	86	18.1 to 40.0	20 du/acre	1,720
Village Commercial	20			
Local Town Center	22			
Regional Town Center	111			
Business Park	86			
Industrial Park	282			
Public/Quasi-Public	9.5			
School Campus	78			
Middle School	20			
Elementary School	54			
Community Park	107			
Neighborhood Parks	63			
Storm Water Detention	39			
Wetland Preserve	507			
Drainage Parkway	143			
Private Recreation	54			
Open Space	12			
Open Space Preserve	24			

LAND USE	ACRES	DENSITY	FIXED COUNT	UNIT COUNT
Landscape Corridors	44			
Greenbelts	50			
Major Roads	183			
TOTAL	3,828			11,601

An illustrative site plan of the Rio del Oro project is shown as **Figure 2**.

The concept plan for Rio del Oro is intended to encourage internal pedestrian circulation and ease of access through the following design and land use features: a network of pathways, greenbelts and landscaped boulevards that will provide a pleasant pedestrian experience; the location of compatible and complementary land uses is close proximity; and many linkages between the internal pedestrian/bicycle network to new paths and trails or existing and planned regional serving facilities on the periphery of the project site. Design standards and guidelines will ensure that such pedestrian-friendly features such as a street tree planting program, open space corridors, pedestrian and vehicular linkages and connections between parking lots and development sites as well as between residential and commercial development, will be liberally incorporated into the project.

2.1 Access Characteristics

Vehicular access to the project site will be primarily from White Rock Road, Sunrise Boulevard, and Douglas Road. Primary access to U.S. 50 would be from the existing Zinfandel Drive and Sunrise Boulevard interchanges, and under long-range conditions, from a new "Sunrise Reliever" interchange located to the east of the existing Sunrise Boulevard interchange.

2.2 Bicycle Facilities

Bicycle facilities are currently limited near the project site. A Class I off-street bike path parallels Sunrise Boulevard from White Rock Road south to Grant Line Road along the Folsom South Canal. However, the City of Rancho Cordova's Bikeway and Trails Plan (incorporated into the General Plan Circulation Element) includes on-street bicycle lanes on Sunrise Boulevard, Grant Line Road, Jackson Road (past Grant Line Road), Kiefer Road, Douglas Road, Eagles Nest Road, and White Rock Road. See **Figure 3.**

2.3 Transit Service and Facilities

Sacramento Regional Transit (RT) operates bus and light rail transit (LRT) service in Sacramento County. The existing and planned fixed-route bus service in the vicinity of the project site are described below and shown on **Figure 4**.

Fixed-Route Bus Service

Fixed-route bus service is provided northwest of the project site. Routes 73 and 74 provide service along White Rock Road, terminating at Sunrise Boulevard. Route 109 is operated during weekday peak period only along U.S. 50. The following describes these individual routes in greater detail.

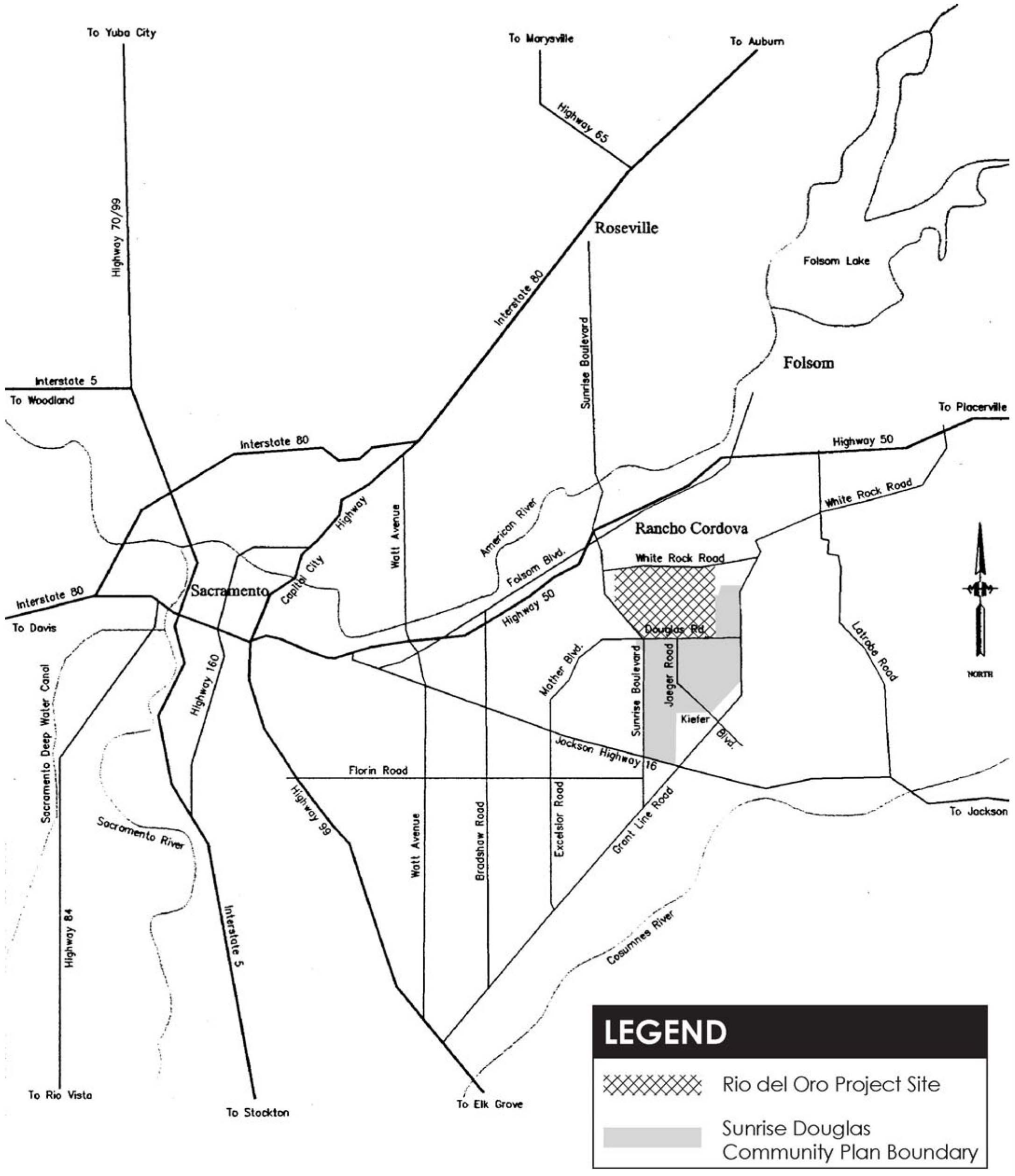
Route 73 provides service between the Mather Field/Mills light rail station and Kilgore Road near the U.S. 50/Sunrise Boulevard interchange. Weekday service is provided between 6:20 A.M. and 6:45 P.M. on 15- to 60-minute headways. Saturday service is provided between provided between 8:00 A.M. and 6:20 P.M. on 60-minute headways. No Sunday or holiday service is provided.

Route 74 provides fixed-route service between the Mather Field/Mills Light Rail station and Kilgore Road on weekdays only. The route operates between 6:00 A.M. and 6:20 P.M. on 60-minute headways. No Saturday, Sunday or holiday service is provided.

Route 109 (Hazel Express) is an express bus route between Orangevale and Downtown Sacramento. During the morning commute period, the bus operates from 6:30 A.M. to 8:00 A.M. on approximately 30-minute headways in the westbound direction only. During the evening commute period, the route operates from 4:35 P.M. to 6:20 P.M. on 45- to 50-minute headways in the eastbound direction only.

LRT Service

Light Rail Transit (LRT) is provided from Downtown Sacramento along the U.S. 50 corridor to the Sunrise Boulevard Station. A LRT extension eastward to the City of Folsom was completed in 2005. The Sunrise Boulevard Station is the nearest to the project site and has a 489-space park and ride lot.



Source: MHM, 2003

FIGURE 1
RIO DEL ORO
PROJECT LOCATION MAP

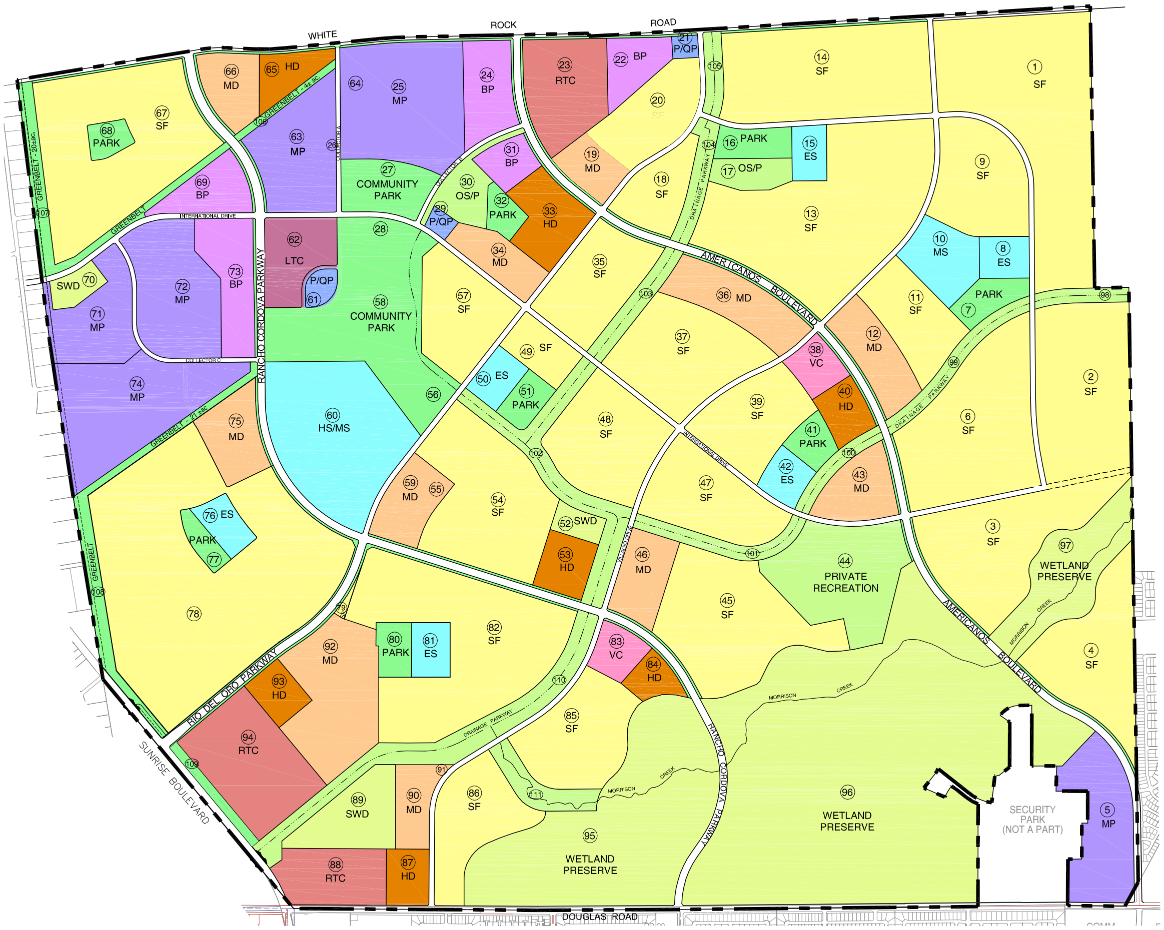
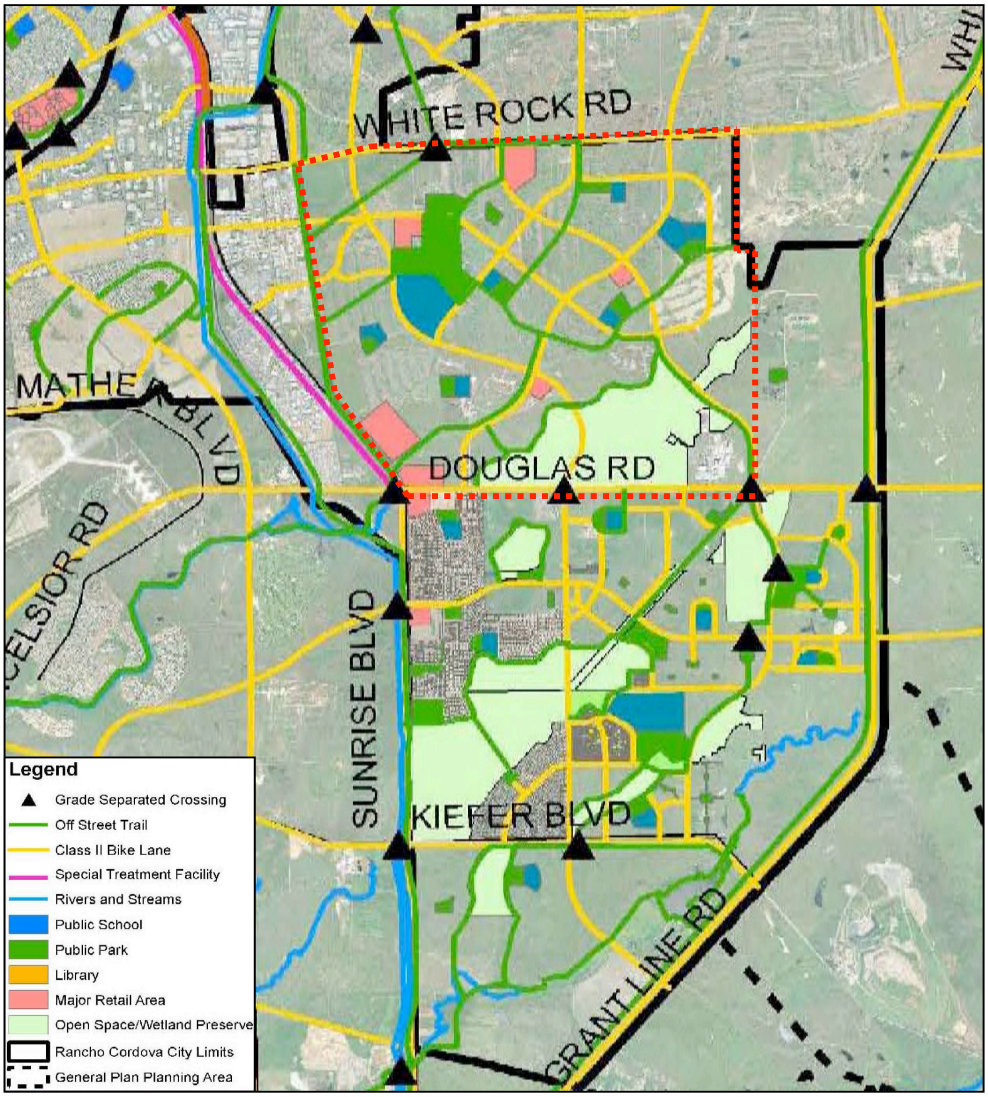
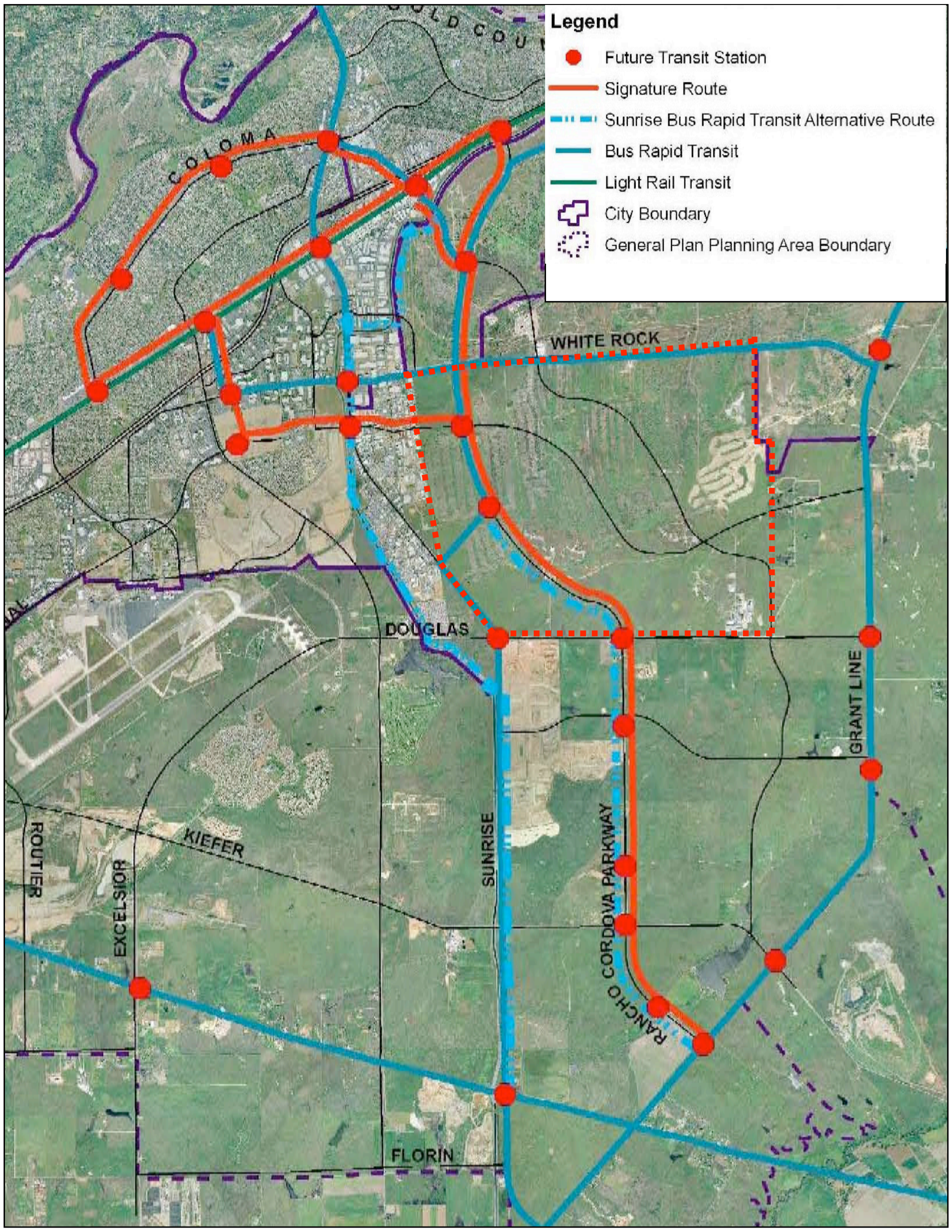


Figure 2
Rio del Oro
Land Use Plan



Portion of Bikeway & Trails Plan
(Figure C-2)
Rancho Cordova General Plan

FIGURE 3
CITY OF RANCHO CORDOVA BIKEWAY AND TRAIL PLAN



Portion of Transit System Map
(Figure C-3)
Rancho Cordova General Plan

FIGURE 4
CITY OF RANCHO CORDOVA TRANSIT SYSTEM PLAN

3.0 PROPOSED MEASURES

This section presents measures to reduce emissions as required by General Plan Policy AQ.1.2.3. Each measure is consistent (in scope and numbering) with the menu of creditable measures for emissions reduction developed by the SMAQMD. Measures are applicable to Residential (R), Commercial (C) and Mixed-Use (M) projects as identified by SMAQMD criteria.

3.1 Bicycle/Pedestrian/Transit Measures

Measure 1 - Bicycle Lockers and Racks (C)

Commercial uses within the project will install bicycle lockers and/or racks, which will provide employees with safe and convenient bicycle storage. The Rio del Oro Development Standards and Design Guidelines (Section 3.4.2) provide that "on-site amenities for bicycle parking shall be provided in a convenient location within each center and designed as an integral part of the site. The City Zoning Code requires one Class I or Class II bicycle storage space for every 25 vehicle parking spaces, and one Class II bicycle storage space for every 33 patron vehicle spaces. This measure is intended to reduce vehicle trips and associated emissions by encouraging employees to ride bicycles to work and for services. Locations of bicycle racks and storage will be clearly identified prior to City approval of commercial, business park and industrial park site plans. This measure applies to parcels within the plan area designated as Village Commercial (VC), Local Town Center (LTC), Regional Town Center (RTC), Business Park (BP) and Industrial Park (MP) on **Figure 5**.

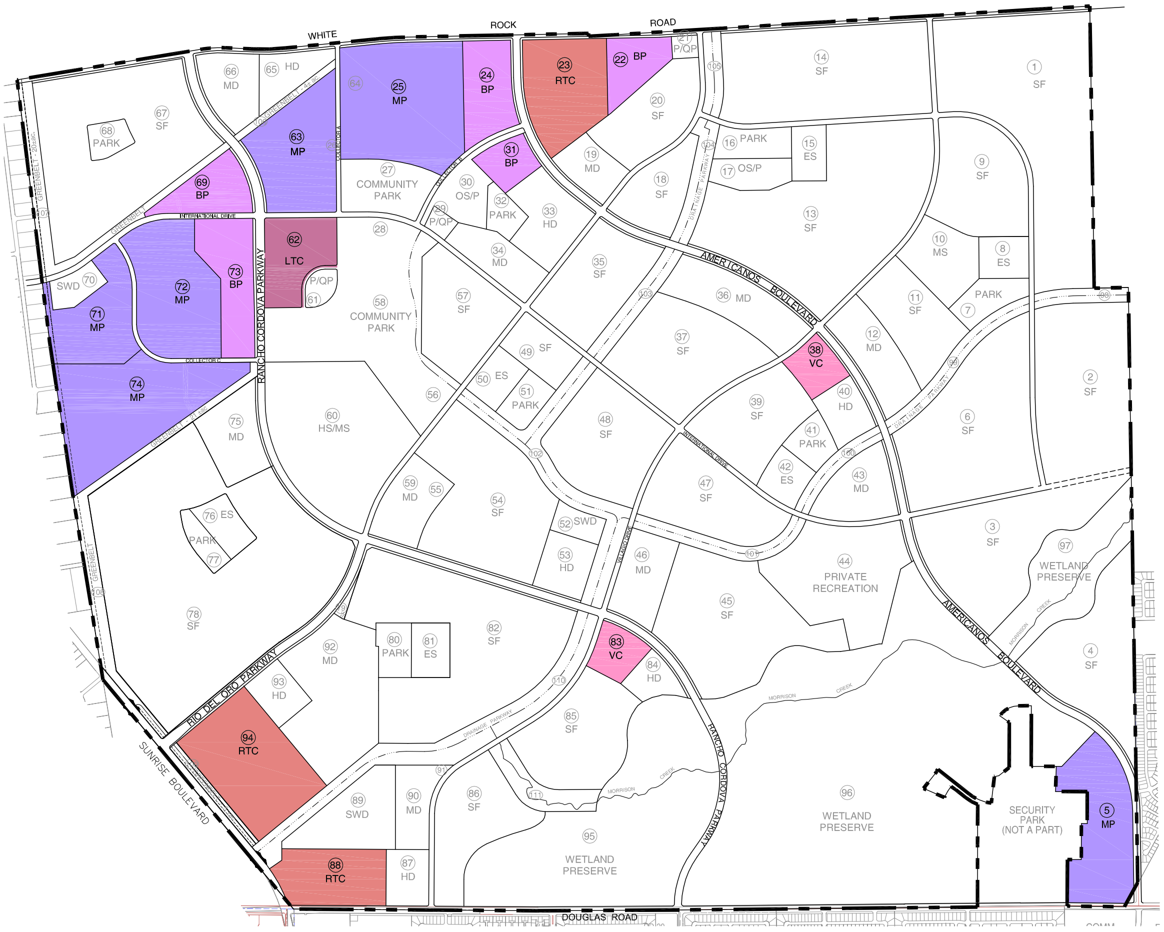


Figure 5
Commercial and Employment Land Uses

Measure 2 - Additional Bicycle Parking Facilities (C)

As described above with respect to Measure 1, the City Zoning Code requires one Class I or Class II bicycle storage space for every 25 vehicle parking spaces, and one Class II bicycle storage space for every 33 patron vehicle spaces. The project will provide an additional 20% of required Class I and Class II bicycle facilities within each commercial, office and industrial development in the plan area. This measure is intended to reduce vehicle trips and associated emissions by encouraging employees to ride bicycles to work and for services. Locations of bicycle racks and storage will be clearly identified prior to City approval of commercial, business park and industrial park site plans. This measure applies to areas within the project site designated as Village Commercial (VC), Local Town Center (LTC), Regional Town Center (RTC), Business Park (BP) and Industrial Park (MP) on **Figure 5**.

Measure 3 - Shower and Locker Facilities (C)

Showers for both men and women as well as lockers will be located in accordance with the City Zoning Code, at all commercial development sites with more than 200 employees, as support for bicycle use and walking. See City Zoning Code Section 330-145. Under Section 330-142 of the City Zoning Code, square-footage equivalents are defined as follows:

TYPE OF USE	MINIMUM DEVELOPMENT SIZE (IN SQUARE FEET) EQUIVALENT TO 200 EMPLOYEES
Office (excluding medical)	50,000
Industrial Office Park (MP)	60,000
Hospital and Medical Offices	80,000
Commercial	100,000
Light Industrial (M-1)	95,000
Heavy Industrial (M-2)	130,000
Mixed or Multiple Uses	(a)

One (1) shower and eight (8) lockers with minimum dimensions of 12 inches X 18 inches X 36 inches shall be provided for each two hundred (200) employees or fraction thereof, based on the equivalent development size data in Section 330-142 shown above. The design and/or management of the shower and locker facilities shall provide for access by both male and female employees. The shower and locker facilities must be located convenient to one another and located within 200 feet of the employee bicycle parking facilities. This measure applies to areas within the plan area designated as Village Commercial (VC), Local Town Center (LTC), Regional Town Center (RTC), Business Park (BP) and Industrial Park (MP) on **Figure 5**.

Measure 4 - Bicycle Storage for Residential Projects (R)

Any multi-family development within the plan area that does not provide a private garage for each unit, Class I bicycle storage will be provided, including bicycle lockers and racks. Bicycle storage facilities shall be provided in accordance with Zoning Code Section 330-131 standards for multi-family development as follows:

- 1 bicycle space for every 3 units for complexes of 30 units or less
- 1 bicycle space for every 4 units for complexes of 31 to 100 units
- 1 bicycle space for every 5 units for complexes of 101 or more units

Locations of bicycle storage facilities will be clearly identified on multi-family residential site plans prior to City approval. This measure applies to areas within the plan area designated as Medium Density Residential (MD) and High Density Residential (HD) on **Figure 6**.

FIGURE 6
MEDIUM AND HIGH DENSITY RESIDENTIAL LAND USES

Measure 5 - Class I and Class II Bicycle Facilities (R,C,M)

The Rio del Oro project include Class II bicycle facilities as part of roadway improvements on Rio del Oro Parkway, Jaeger Road, Americanos Boulevard, Villagio Parkway and White Rock Road. These facilities will be constructed to City standards, and will include all appropriate signage and striping. Bicycle facilities will be constructed concurrently with parallel roadways through the plan area, connecting with adjacent facilities to become part of the overall bicycle circulation network within the City. Bicycle facilities within the plan area are shown in **Figure 7.1**. As described above, a Class I off-street bike path parallels Sunrise Boulevard from White Rock Road south to Grant Line Road along the Folsom South Canal. In addition, Class II bike lanes currently exist along the north side of White Rock Road immediately to the west of the Plan Area, providing for eventual connection to the Folsom South Canal bicycle trail. Class II bike lanes presently exist (or are under construction) along Sunrise Boulevard between White Rock Road and Douglas Road as well as along Douglas Road and a connection to the Folsom South Canal bike trail at Douglas Road. See **Figure 7.2.** The City of Rancho Cordova's Bikeway and Trails Plan (incorporated into the General Plan Circulation Element) includes on-street bicycle lanes on Sunrise Boulevard, Grant Line Road, Jackson Road (past Grant Line Road), Kiefer Road, Douglas Road, Eagles Nest Road, and White Rock Road. See **Figure 3**. The Plan would provide for Class 1 off-street trails in six separate but connecting networks through the Plan area. See **Figure 7.1**.

Consistent with General Plan policies C.2.5, C.2.6, C.2.7 and associated actions, the City will require that Rio del Oro Specific Plan planned Class I and II bikeway improvements and connections be provided concurrent with associated project and roadway development to the satisfaction of the City as part of conditions of approval for tentative map applications.

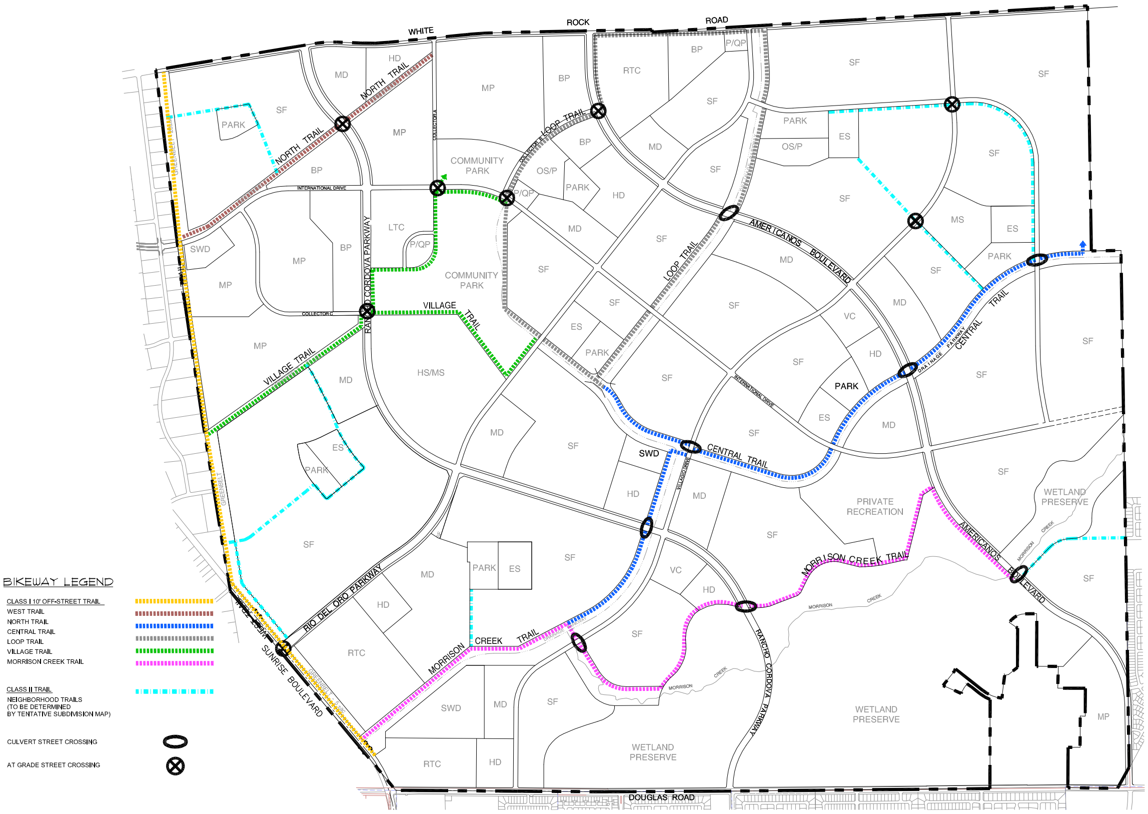


FIGURE 7.1
RIO DEL ORO BIKEWAYS PLAN

EXISTING BICYCLE FACILITIES

RIO DEL ORO

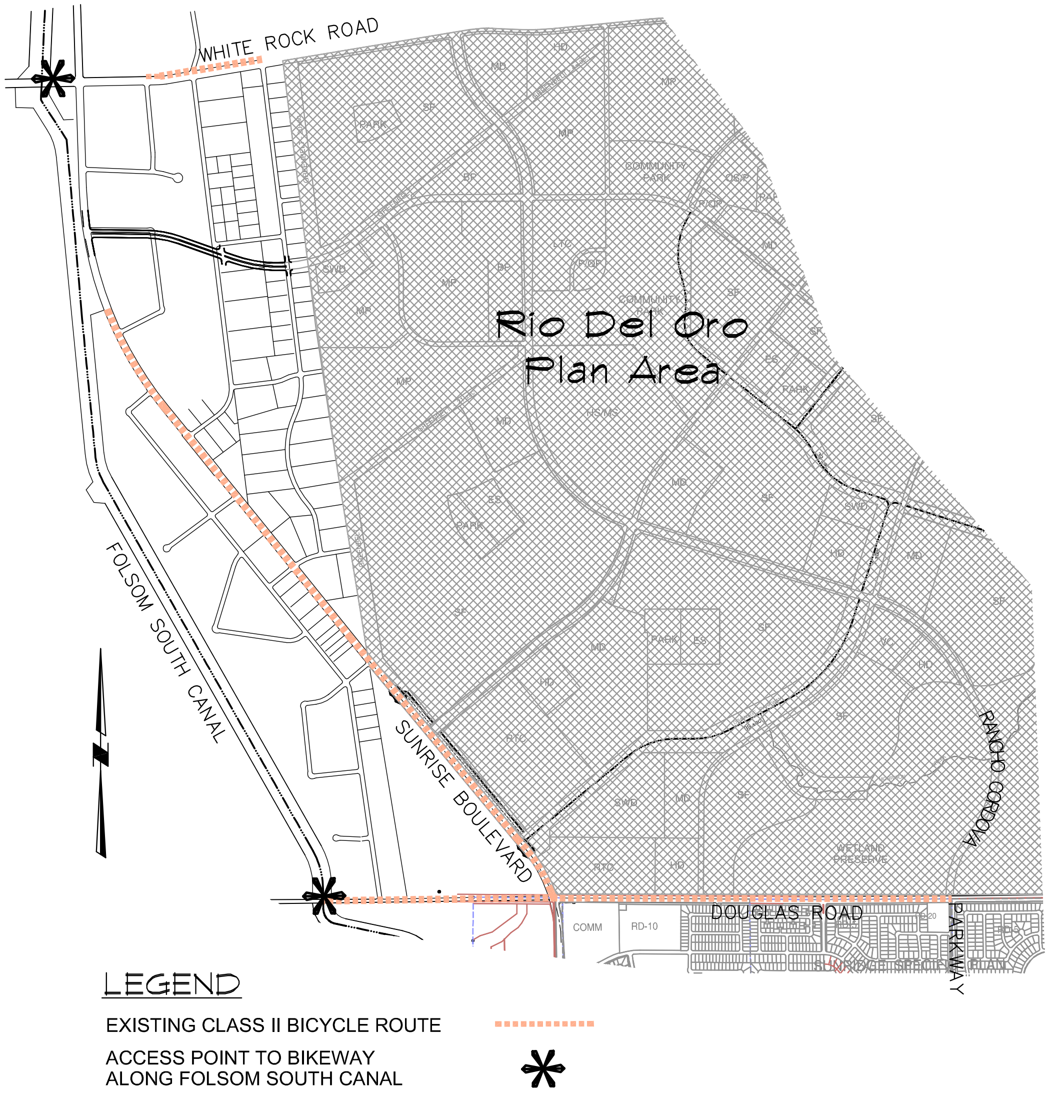


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Figure 7.2
Existing Class II Bikeway Facilities

Measure 6 - Pedestrian Facilities (R,C,M)

The design of the Rio del Oro project features pathways and connections between land uses and buildings as well as to and from bus stops that are direct, shaded and lighted. All pathways will meet ADA requirements for width, slope, grade and access. Per the City Design Guidelines, sidewalks will be designed and maintained at the following minimum width:

- 5 feet where the sidewalk is separated from the roadway
- 7 feet where the sidewalk is not separated from the roadway
- 8 feet in front of schools and commercial uses
- Sidewalks internal to the site (and not part of a public right-of-way) shall be a minimum of 6 feet in width.

As described in the Rio del Oro Design Guidelines (Section 3.2.4), highly visible crosswalks will be constructed at each intersection, incorporating changes in paving materials to safety, visibility and aesthetics. Pedestrian pathways will be shown on improvement plans for each use, and will connect adjacent land uses and provide connections to sidewalks and other pedestrian features within the plan area. Consistent with General Plan Policy C.2.3 and associated actions, the City will require that Rio del Oro Specific Plan sidewalks, high visible crosswalks, trails and other associated planned pedestrian facilities and connections be provided concurrent with associated project and roadway development to the satisfaction of the City as part of conditions of approval for tentative map applications.

Measure 7 - Commercial Uses Proximate (1/4 Mile) to Planned Transit (7)

Sacramento Regional Transit currently provides bus service in the vicinity of the plan area, Monday through Friday, on Routes 73, 74 and 109. Saturday service is provided by Route 73. The Rio del Oro project includes plans for bus stop improvements, bus turnouts and bus shelters to accommodate future extension of bus service to the project site. The exact location of these facilities will be determined in consultation with City staff and transit district staff. Bus stops will be designed in consultation with the transit service provider and are expected to include transit route information, benches, shelter and lighting, electrical connections, easements and pads. Planned transit stops within the plan area would be located nearby (within 1/4 mile) to high density residential and employment-generating land uses along arterial roadways, and these planned uses will be able to easily access transit services when extended to the site. This planning approach is intended to achieve a nucleus of ridership sufficient to warrant transit service at 15-minute headways. As shown on **Figure 4** above, transit service is proposed along White Rock Road, Douglas Road, and International Drive through the Plan Area.

In addition, Bus Rapid Transit (BRT) service is planned along Rancho Cordova Parkway, which is designated as an Enhanced Transit Corridor, all connecting the Plan Area to existing and proposed transit throughout the City. This measure applies to parcels within the plan area designated as High Density Residential (HD)Village Commercial (VC), Local Town Center (LTC), Regional Town Center (RTC), Business Park (BP) and Industrial Park (MP) on **Figure 8**.

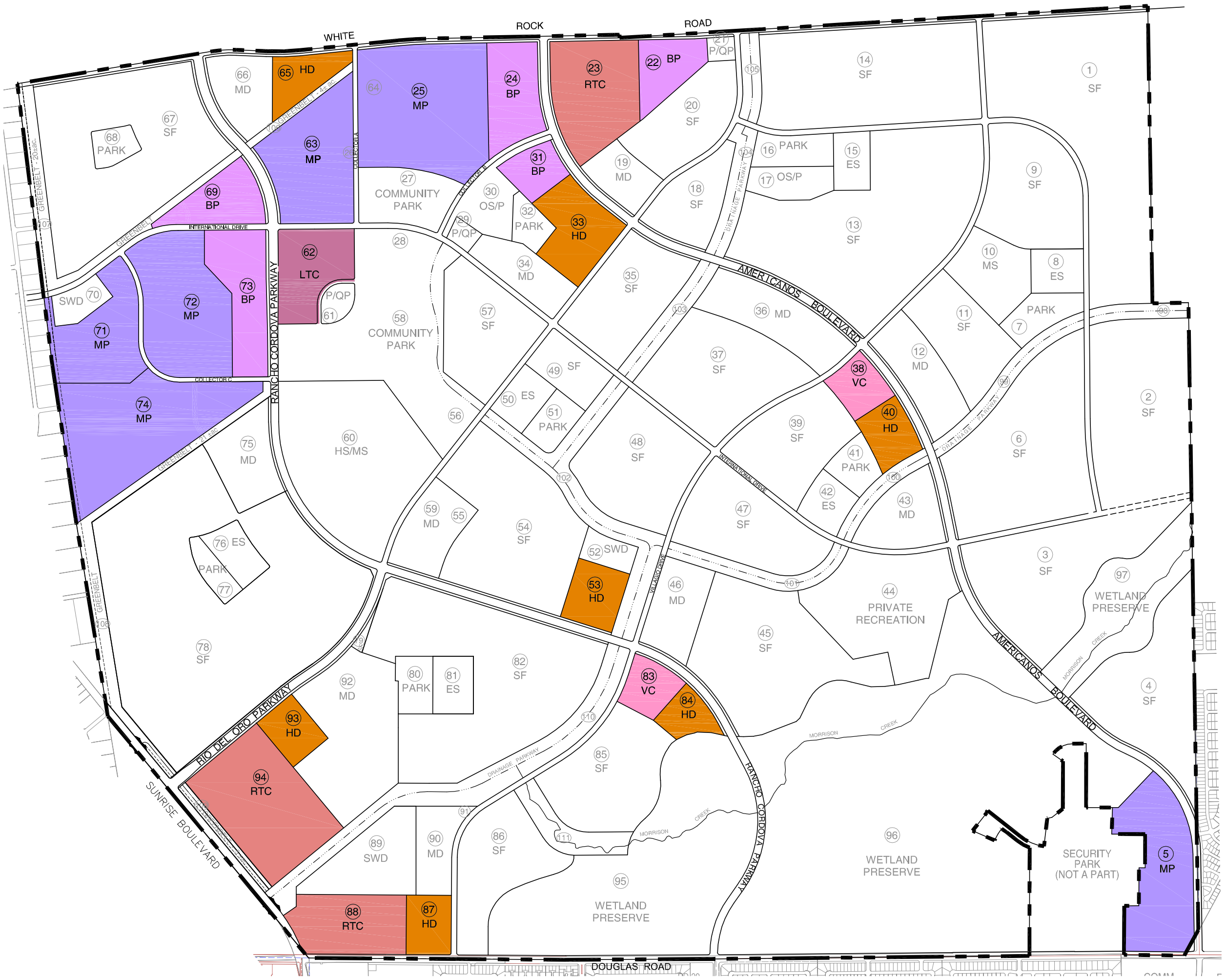


FIGURE 8
COMMERCIAL, EMPLOYMENT AND HIGH DENSITY RESIDENTIAL LAND USES

Measure 8 - Transportation Information Kiosk (R,C,M)

The project will provide a display case or kiosk within each commercial development, displaying transportation information in a prominent area accessible to employees and residents. The following is a brief list of the potential information that could be available at the kiosk:

- Carpool and Vanpool Matching
- Telecommuting Information
- Transit Schedules
- Emergency Ride Home Programs
- Park and Ride Information
- Air Quality Information
- Bicycle Discount Program
- TMA Meeting Schedule
- Newsletters

Materials within each transportation information kiosk shall be replenished and/or updated by management personnel for commercial, employment and high-density residential uses as appropriate to maintain currency. This measure applies to parcels within the plan area designated as High Density Residential (HD),Village Commercial (VC), Local Town Center (LTC), Regional Town Center (RTC), Business Park (BP) and Industrial Park (MP) on **Figure 8**.

3.2 Parking Measures

Measure 17 - Preferred Carpool/Vanpool Parking (C)

The City Zoning Code, Section 330-144, states that at least 10 percent of employee spaces will be for carpool/vanpool purposes. Under this Section, requirements for employee parking are determined as follows:

TYPE OF USE	PERCENT OF TOTAL PARKING DEVOTED TO EMPLOYEE PARKING
Office (excluding medical)	70%
Hospital and Medical Office	50%
Commercial	30%
Industrial	70%

The Rio del Oro project will comply with the City Zoning Code requirement for employee parking spaces, as well as carpool/vanpool spaces. Designated carpool/vanpool spaces will be located as close to employee entrances as possible. The location of carpool/vanpool spaces shall be identified on improvement plans, to the satisfaction of City staff, and shall be clearly marked when built. All carpool/vanpool spaces shall be covered, shaded, or in some other obvious way be designated as preferential. This measure applies to parcels within the plan area designated as Business Park (BP) and Industrial Park (MP) on **Figure 9**.

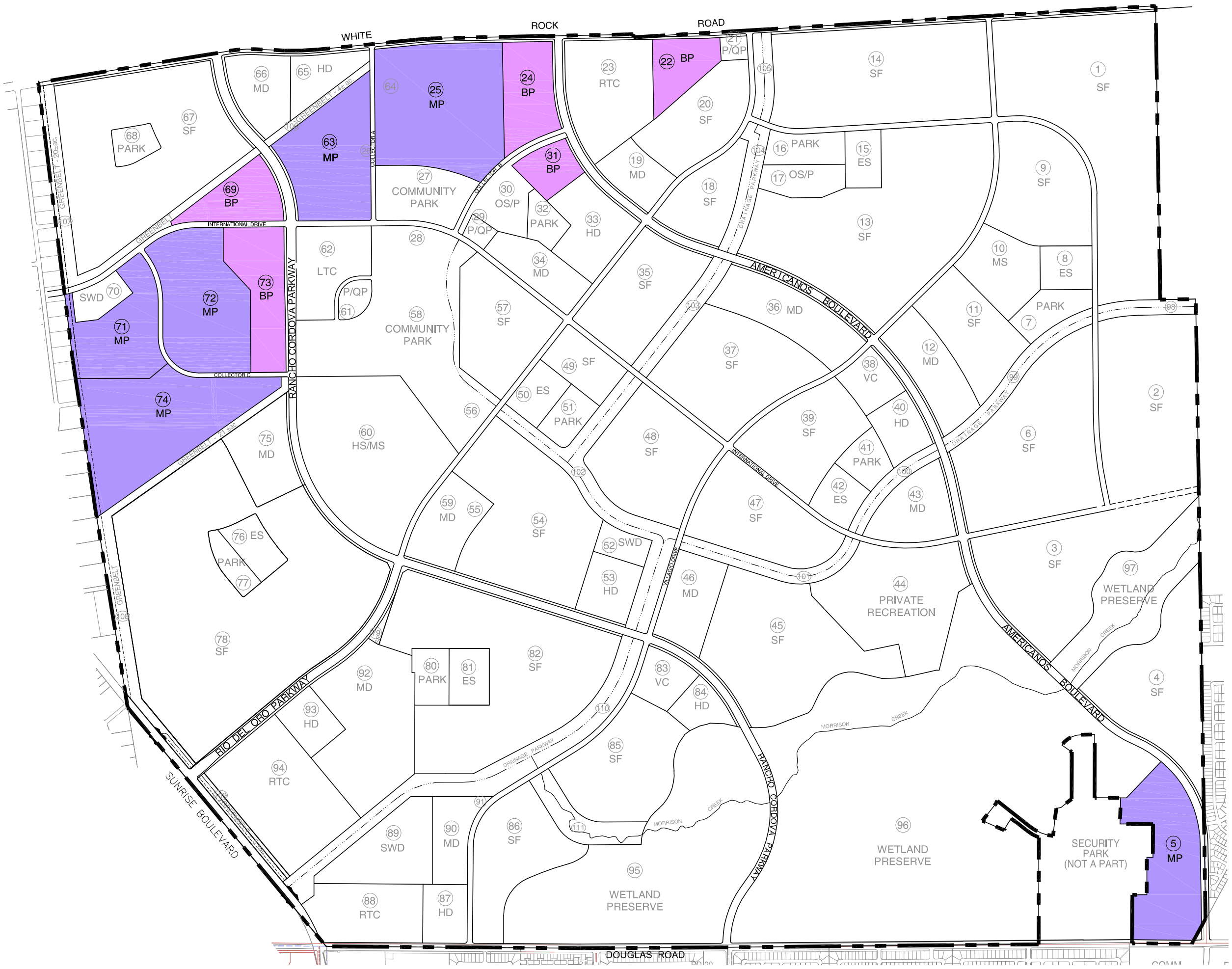


FIGURE 9
EMPLOYMENT LAND USES

Measure 21 - Parking Lot Design (C)

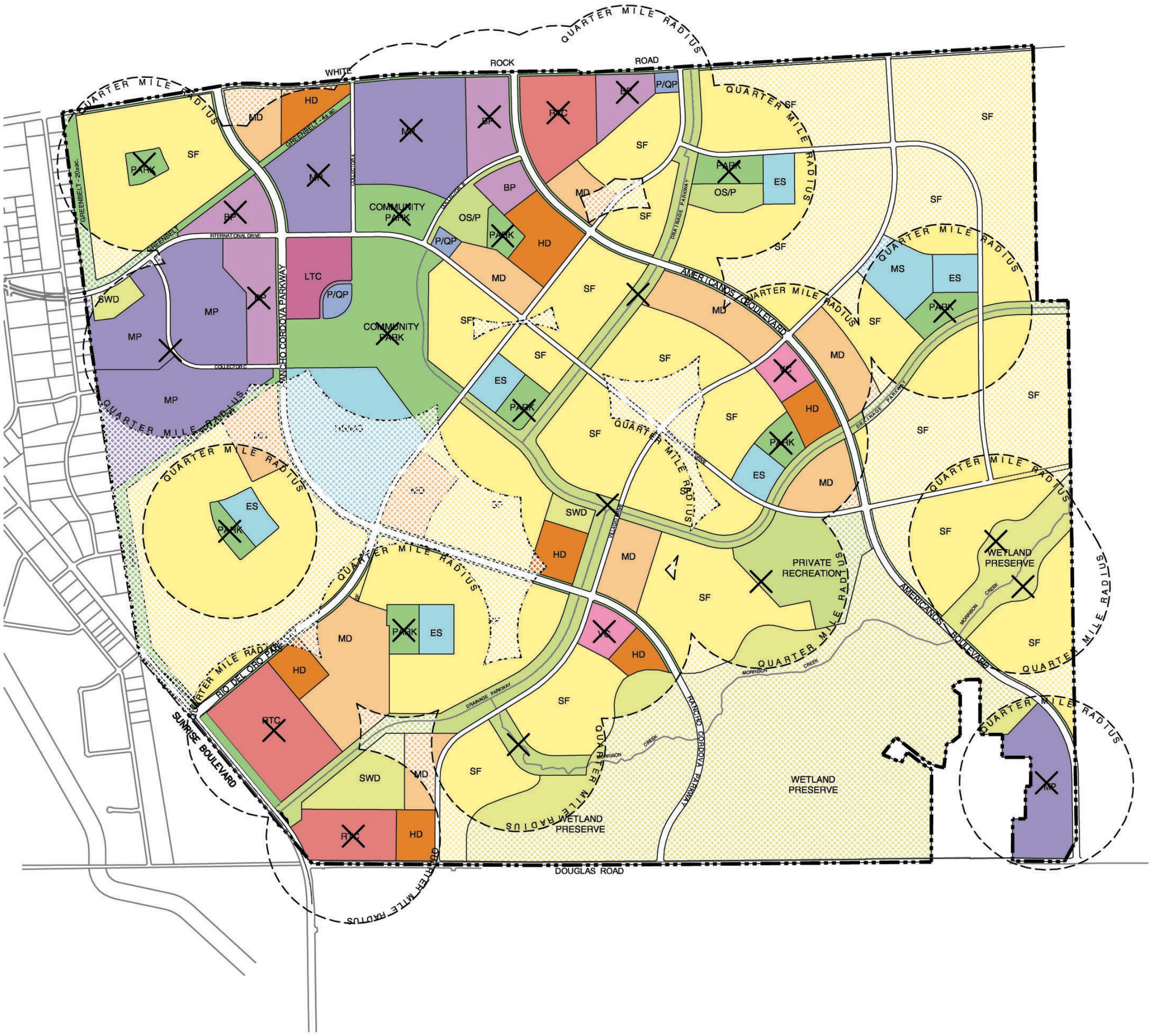
Surface parking lots utilized by non-residential development within the project will include clearly marked and shaded pedestrian pathways between transit facilities and business entrances. The Rio del Oro Design Guidelines Section 3.4.2.8 provide that surface parking lots shall be designed with clear visible access ways to major building entries, and shall contain landscaped areas with large shade trees to provide coverage. The Design Guidelines further require a green landscape buffer between parking areas and pedestrian ways. Pedestrian pathways shall be designed to minimize conflicts with vehicular traffic through the use of measures such as changes in paving and lighting to delineate a pedestrian path. Pathways may utilize tree cover or structures for shading purposes, as appropriate. Pedestrian pathways will be shown on improvement plans for each commercial use prior to City approval. This measure applies to parcels within the plan area designated as Village Commercial (VC), Local Town

Center (LTC), Regional Town Center (RTC), Business Park (BP) and Industrial Park (MP) on **Figure 5**.

3.3 Mixed Use Development Measures

Measure 30 - Mixed Use within a Single Site (R,C,M)

The Rio del Oro project includes a mix of land zoned for commercial uses and multi-family land uses within close proximity, providing at least 3 of the following on-site and/or within 1/4 mile: Residential Development, Retail Development, Personal Services, Open Space, Office. Approximately 76% of the plan area is within a 1/4 mile walking distance from parks, open space, commercial and office/light industrial employment areas. See **Figure 9**.



× Indicates center of 1/4 mile radius

Approximately 76% of all land uses are within 1/4 mile of retail, office / employment centers, open space and parks.

FIGURE 9
PROXIMITY OF MIXED USES

Measure 31 - Neighborhood Serving as Focal Point (R,M)

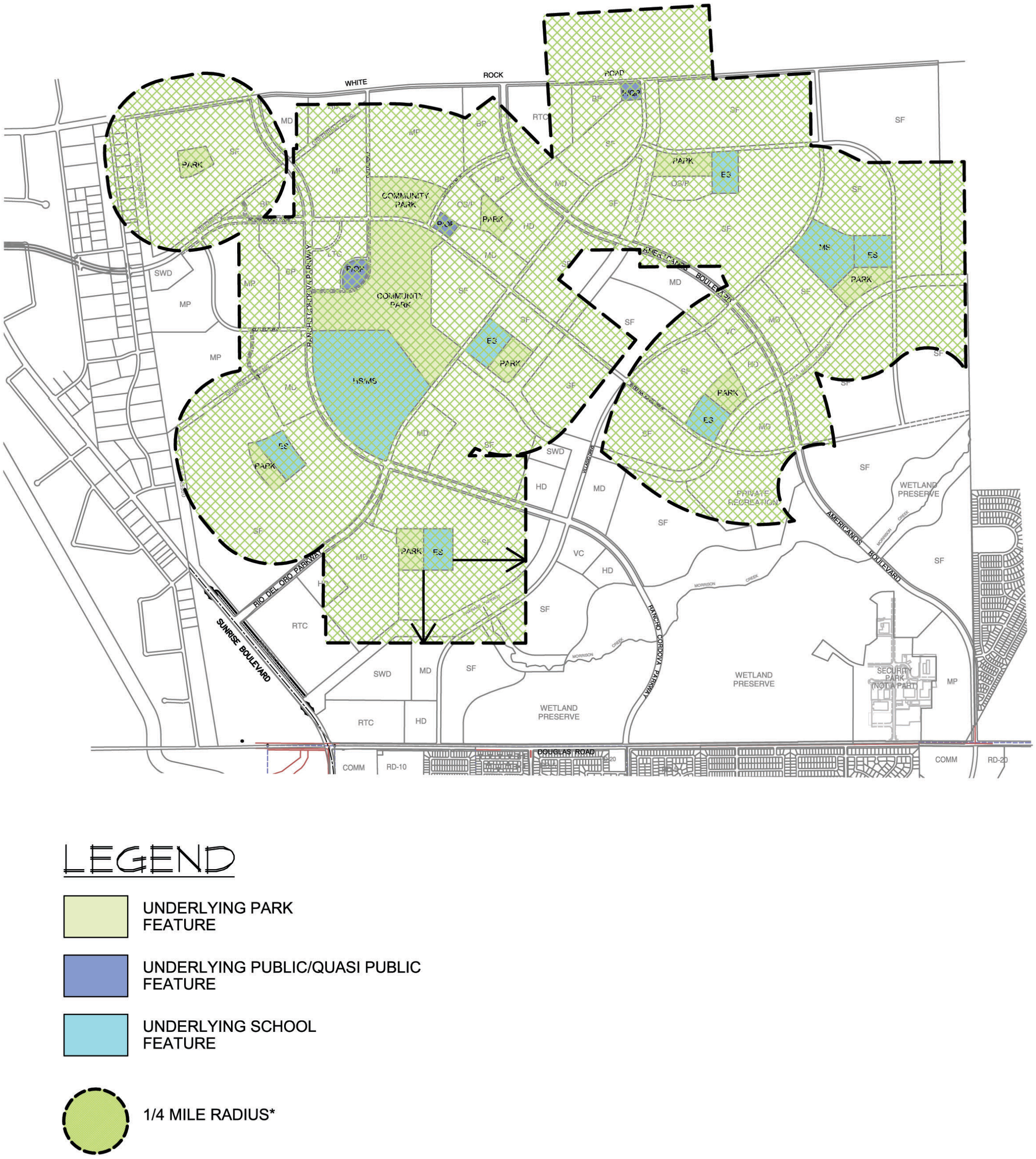
The Rio del Oro project features neighborhoods in close proximity to parks, schools and civic uses within 1/4 mile. The relationship between residential communities and focal point land uses (including parks, schools and civic uses) is shown on **Figure 10**. Approximately 77 percent of all land uses within the Plan area are within 1/4 mile of parks, schools or public/ quasi-public facilities.

Measure 32 - Bicycle and Pedestrian Paths (R,C,M).

The design of the Rio del Oro project features pathways and connections between land uses and buildings as well as to and from bus stops that are direct, shaded and lighted as appropriate. All pathways will meet ADA requirements for width, slope, grade and access, and shall be designed in accordance with City Design Guidelines 2:20 to 2:21, which provide for a linked system of bicycle paths through the plan area by:

- Direct connections to regional bicycle systems (streets with bike lanes, open spaces with bike paths, etc.)
- Bicycle routes shall continue to the property boundary to connect to existing systems on adjacent development or to allow future connections when adjacent properties develop
- Provide bicycle facilities and part of roadways/driveways with painted lanes and signage or provide a separate bicycle system

The Rio del Oro project include Class II bicycle facilities as part of roadway improvements on Rio del Oro Parkway, Jaeger Road, Americanos Boulevard, Villagio Parkway and White Rock Road. These facilities will be constructed to City standards, and will include all appropriate signage and striping. Bicycle facilities will be constructed concurrently with parallel roadways through the plan area, connecting with adjacent facilities to become part of the overall bicycle circulation network within the City. Bicycle facilities within the Plan area are shown on **Figure 7**. As described above, a Class I off-street bike path parallels Sunrise Boulevard from White Rock Road south to Grant Line Road along the Folsom South Canal. However, the City of Rancho Cordova's Bikeway and Trails Plan (incorporated into the General Plan Circulation Element) includes on-street bicycle lanes on Sunrise Boulevard, Grant Line Road, Jackson Road (past Grant Line Road), Kiefer Road, Douglas Road, Eagles Nest Road, and White Rock Road. See **Figure 3**. In addition, Class II bike lanes currently exist along the north side of White Rock Road immediately to the west of the Plan Area, providing for eventual connection to the Folsom South Canal bicycle trail. Class II bike lanes presently exist (or are under construction) along Sunrise Boulevard between White Rock Road and Douglas Road as well as along Douglas Road and a connection to the Folsom South Canal bike trail at Douglas Road. See **Figure 7.2** Pedestrian and bicycle pathways will be shown on improvement plans for each use, and will connect adjacent land uses and provide connections to sidewalks and other features within the plan area.



APPROXIMATLEY 77% OF ALL LAND USES ARE WITHIN
1/4 MILE OF PARKS, PUBLIC/QUASI PUBLIC AREAS OR SCHOOLS.

* Note: 1/4 MILE RADIUS WAS CALCULATED AT
THE PERIMETER OF THE UNDERLYING FEATURE

FIGURE 10
WALKING DISTANCES (1/4 MILE)

Measure 33 - Elimination of Barriers (C,M)

The complete elimination of barriers is not practical in a large mixed use project such as Rio Del Oro, due to the wide variety of land uses. However, in providing a mix of uses within close proximity, greater opportunities are created to promote non- vehicular use. It is understood that barriers such as walls, fences and berms will be necessary in some areas to provide for security, noise attenuation, to maintain compatibility between uses and for aesthetic enhancements.

The key is to ensure that the development pattern facilitates easy access between uses. The following design techniques shall be incorporated into the layout of residential and non-residential sites.

- Placement of physical barriers between compatible land uses, such as walls and fences, shall be limited.
- Residential subdivisions or housing site layouts shall provide a pedestrian/ bicycle access connection to any adjacent non-residential or public/quasi public use.
- The site design for all parcels shall incorporate a direct on-site connection to an adjacent pedestrian or bicycle facility.

As identified in the Rio Del Oro Design Guidelines and as required by the Rancho Cordova Open Space Standards, extensive pedestrian access to open space, parks and neighboring residential and non-residential uses is required, and the use of walls or other barriers that preclude connection between uses is limited. Project design will create meaningful public spaces and buildings that form a dialogue between uses and promote interactions. The intent of this design feature is to allow pedestrian and bicycle circulation to occur away from public streets as appropriate, and to increase direct internal connectivity. This is contrast to typical suburban site designs where each building or development is sealed off by curbs, walls, fences or other barriers from its neighbors.

The City will condition (consistent with the policy provisions of the General Plan Urban Design Element) subsequent non-residential development that no parcel perimeter walls (except for noise attenuation) or building orientation shall be included in site design without the provision of pedestrian and bicycle access for adjoining residential uses.

3.4 Building Component Measures

Measure 41 - Low Emissions Fireplaces (R)

The project will install lowest emitting commercially available natural gas fireplaces in all residential units where fireplaces are installed.

Measure 42 - Energy Efficient Heating (R, C, M)

The project will install lowest emitting commercially available furnaces in all project buildings.

Measure 43 - Ozone Destruction Catalyst (R)

The project will install ozone destruction catalyst air conditioners in all residential units

Measure 45 - High Speed Data Connection (R)

The project will install a connection for high speed data transmission to each residential unit through the installation of fiber optic cable, T-1 wiring or other comparable technology. Connection jacks will be installed as a standard feature within each residential unit.

3.5 Transportation Demand Management and Miscellaneous Measures

Measure 51 - TMA Membership (R,C,M)

Transportation Management Associations (TMA) are private, non-profit organizations run by a voluntary Board of Directors and a small staff. TMAs assist businesses, developers, building owners, local government representatives and others to work together to collectively establish policies, programs and services to address local transportation problems and issues. The key to a successful TMA lies in the synergism of multiple businesses banding together to address and accomplish more than any employer, building operator or developer could do alone. TMAs typically provide a number of services, including:

- Carpool and Vanpool Matching
- Advocacy
- Telecommuting Information
- Transit Schedules
- Emergency Ride Home Program
- Park and Ride Information
- Air Quality Information
- Transportation Roundtable

- Bicycle Discount Program
- Newsletters

The Rio del Oro project intends to join together with an existing TMA already operating in the area, known as the Folsom/El Dorado /Cordova TMA. Project area funding contributions for TMA activities would be from annual assessments pursuant to the establishment of a new Benefit Zone within the existing County Service Area 10. Currently, Benefit Zones within County Service Area 10 have been established for Villages of Zinfandel (Benefit Zone 1), SunRidge (Benefit Zone 2) and North Vineyard Station (Benefit Zone 3).

Measure 65 - Complimentary Cordless Electric Lawnmower (R)

The project will provide a complimentary cordless electric lawnmower to purchasers of single-family residential homes.

4.0 Credits Toward Emission Reduction Requirements

Table 2 identifies credits for each measure toward General Plan Policy AQ.1.2.3 emission reduction requirements. For each measure, points are derived from Appendix E of SMAQMD's *Guide to Air Quality Assessment*. As shown in Table 2, the Rio del Oro project achieves a reduction of 15.00 points based upon SMAQMD criteria.

TABLE 2 - RIO DEL ORO

CREDIT TOWARD EMISSIONS REDUCTION REQUIREMENTS

CATEGORY Measure	Description	Point Value	Reduction Credit by SMAQMD
BICYCLE/PEDESTRIAN/ TRANSIT			
1. Bicycle Lockers and Racks	Non-residential projects provide bicycle lockers and/or racks	0.5	0.25
2. Additional Bicycle Parking Facilities	Provide an additional 20% or required Class I and Class II bicycle facilities within each commercial development in the project area.	0.5	0.25
3. Shower and Locker Facilities	Non-residential projects provide personal showers and lockers	0.5	0.25
4. Class I Bicycle Storage - Residential	Bicycle storage (Class I) at apartment complexes or condos without garages	0.5	0.25
5. Class I and Class II Bicycle Facilities	Entire project is located within 1/2 mile of an existing Class I or Class II bike lane and provides a comparable bikeway connection to that existing facility	1.0	1.0
6. Pedestrian Facilities	The project provides for pedestrian facilities and improvements	1.0	1.0
7. Uses Proximate to Planned Transit	Bus service provides headways of 15 minutes or less for stops within 1/4 mile; project provides essential bus stop improvements	1.0	0.5

TABLE 2 - RIO DEL ORO

CREDIT TOWARD EMISSIONS REDUCTION REQUIREMENTS

8. Transportation Information Kiosk	Provide a display case or kiosk within each commercial development, displaying transportation information	0.5	0.5
PARKING			
17. Carpool//Vanpool Parking	Provide preferential parking for carpools/vanpools	0.5	0.25
21. Parking Lot Design	Provide a parking lot design that includes clearly marked and shaded pedestrian pathways between transit facilities and building entrances.	0.5	0.5
MIXED USE			
30. Mixed Use	Have at least 3 of the following on-site and/or within 1/4 mile: Residential Development, Retail Development, Personal Services, Open Space, Office	1.0	0.75
31. Neighborhood as Focal Point	Neighborhood serving as focal point with parks, school and civic uses within 1/4 mile	0.5	0.25
32. Pedestrian and Bicycle Paths	Separate, safe and convenient bicycle and pedestrian paths connecting residential, commercial and office uses	2.0	2.0
33. Elimination of Barriers	The project provides a development pattern that eliminates physical barriers such as walls, berms, landscaping, and slopes between residential and non-residential land uses that impede bicycle or pedestrian circulation.	1.0	1.0
BUILDING COMPONENTS			
41. Natural Gas Fireplace	Install lowest emitting commercially available fireplace in all residences where fireplaces installed.	1.0	1.0

TABLE 2 - RIO DEL ORO
CREDIT TOWARD EMISSIONS REDUCTION REQUIREMENTS

42. Energy Efficient Heating	Install lowest emitting commercially available furnaces in all project buildings.	0.5	0.5
43. Ozone Destruction Catalyst	Install ozone destruction catalyst air conditioners in all residential units	1.25	1.25
45. High Speed Data Connection	Install a connection for high speed data transmission to each residential unit through the installation of fiber optic cable, T-1 wiring or other comparable technology.	0.5	0.5
TRANSPORTATION DEMAND MANAGEMENT & MISC.			
51. TMA Membership	Include permanent TMA membership and funding requirement. Funding to be provided by Community Facilities District or County Service Area or other non-revocable funding mechanism	2.5	1.0
65. Lawnmowers	Provide a complimentary cordless electric lawnmower to each residential buyer	2.0	2.0
	TOTAL CREDIT	**18.75**	**15.00**
	Emissions Reduction Target		**15**

APPENDIX M

TRAFFIC NOISE MEASUREMENTS

APPENDIX M-1	FHWA OUTPUT – CUMULATIVE CONDITIONS (2030)
APPENDIX M-2	FHWA OUTPUT – CUMULATIVE PLUS PROJECT CONDITIONS (2030)

APPENDIX M-1

FHWA OUTPUT – CUMULATIVE CONDITIONS (2030)

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FHWA OUTPUT - CUMULATIVE CONDITIONS (2030) - revised 10/06

       TRAFFIC DISTRIBUTION PERCENTAGES
       DAY         EVENING     NIGHT
       ---         -------     -----
AUTOS
       67.30       10.98        8.32
M-TRUCKS
        8.78        1.43        1.09
H-TRUCKS
        1.63        0.27        0.20


   RUN NAME: SR16 BETW EXCELSIOR & EAGLES NEST         RUN DATE: 100606

ADT:  19200      SPEED:  55      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.88
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  120.3      256.8      552.1     1188.8

   RUN NAME: SR16 BETW SUNRISE & GRANT LINE         RUN DATE: 100606

ADT:  19700      SPEED:  55      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.99
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  122.3      261.2      561.7     1209.3

   RUN NAME: KIEFER BETW GRANT LINE & N OF SR16         RUN DATE: 100606

ADT:  13300      SPEED:  45      ACTIVE HALF WIDTH (FT):  6
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  71.36
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   68.9      147.9      318.4      685.7

   RUN NAME: MATHER BETW FEMOYER & DOUGLAS         RUN DATE: 100606

ADT:  19600      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  71.97
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   90.5      192.0      412.1      886.9

   RUN NAME: DOUGLAS BETW MATHER & SUNRISE         RUN DATE: 100606

ADT:  18100      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.82
```

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* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  118.1      247.9      530.8     1141.9

   RUN NAME: INTERNATIONAL BETW S WHITE ROCK & ZINFANDEL      RUN DATE: 100606

ADT:  53900      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  75.56
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  176.5      375.9      807.7     1738.8

   RUN NAME: INTERNATIONAL BETW ZINFANDEL & KILGORE         RUN DATE: 100606

ADT:  38300      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.07
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  141.7      299.9      643.4     1384.7

   RUN NAME: WHITE ROCK BETW ZINFANDEL & SUNRISE         RUN DATE: 100606

ADT:  19700      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  71.18
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   93.9      193.9      413.7      889.3

   RUN NAME: WHITE ROCK BETW SUNRISE & GRANT LINE         RUN DATE: 100606

ADT:  20900      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.44
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  129.2      272.5      584.1     1256.8

   RUN NAME: FOLSOM BETW ZINFANDEL & SUNRISE         RUN DATE: 100606

ADT:  23700      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.80
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  102.3      217.7      467.6     1006.6

   RUN NAME: FOLSOM BETW SUNRISE & HAZEL         RUN DATE: 100606

ADT:  19700      SPEED:  55      ACTIVE HALF WIDTH (FT):  18
```

```
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.99
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  122.3      261.2      561.7     1209.3

   RUN NAME: MATHER FIELD BETW FOLSOM & US50         RUN DATE: 100606

ADT:  31200      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.99
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  122.3      261.2      561.5     1209.0

   RUN NAME: MATHER FIELD BETW US50 & INTERNATIONAL      RUN DATE: 100606

ADT:  52500      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  75.44
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  173.5      369.4      793.7     1708.6

   RUN NAME: ZINFANDEL BETW FOLSOM & US50         RUN DATE: 100606

ADT:  22000      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.47
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   97.5      207.2      445.0      957.9

   RUN NAME: ZINFANDEL BETW US50 & WHITE ROCK         RUN DATE: 100606

ADT:  64000      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  76.30
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  197.4      421.2      905.5     1949.7

   RUN NAME: ZINFANDEL BETW WHITE ROCK & INTERNATIONAL    RUN DATE: 100606

ADT:  42400      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.51
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  151.2      320.7      688.5     1481.8
```

```
   RUN NAME: SUNRISE BETW GOLD COUNTRY & COLOMA         RUN DATE: 100606

ADT:  84400      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  77.50
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  236.5      506.2     1088.8     2344.5

   RUN NAME: SUNRISE BETW COLOMA & US50         RUN DATE: 100606

ADT:  95500      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  78.04
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  256.5      549.5     1182.2     2545.8

   RUN NAME: SUNRISE BETW US50 & FOLSOM         RUN DATE: 100606

ADT:  49600      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  75.19
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  167.3      355.8      764.2     1645.1

   RUN NAME: SUNRISE BETW FOLSOM & WHITE ROCK         RUN DATE: 100606

ADT:  40000      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.26
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  145.7      308.6      662.3     1425.4

   RUN NAME: SUNRISE BETW WHITE ROCK & DOUGLAS         RUN DATE: 100606

ADT:  33700      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  75.51
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  175.5      373.6      802.6     1727.9

   RUN NAME: SUNRISE BETW SR16 & GRANT LINE         RUN DATE: 100606

ADT:  28100      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.73
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
```

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-------  -------   -------   -------
  116.6      244.6      523.7     1126.6

   RUN NAME: HAZEL BETW WINDING WY & US50         RUN DATE: 100606

ADT:  90100      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  77.79
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  246.9      528.6     1137.2     2448.9

   RUN NAME: GRANT LINE BETW WHITE ROCK & DOUGLAS         RUN DATE: 100606

ADT:  26700      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.50
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  151.0      320.2      687.4     1479.6

   RUN NAME: GRANT LINE BETW DOUGLAS & SR16        RUN DATE: 100606

ADT:  21200      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.50
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  130.4      275.0      589.6     1268.8

   RUN NAME: GRANT LINE BETW SR16 & SUNRISE         RUN DATE: 100606

ADT:  15100      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.03
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  105.6      220.1      470.6     1012.1

   RUN NAME: US50 BETW MATHER FIELD & ZINFANDEL         RUN DATE: 100606

ADT:  169100      SPEED:  65      ACTIVE HALF WIDTH (FT):  60
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  82.78
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  658.5     1413.7     3043.0     6553.7

   RUN NAME: US50 BETW ZINFANDEL & SUNRISE         RUN DATE: 100606

ADT:  136700      SPEED:  65      ACTIVE HALF WIDTH (FT):  60
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
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CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  81.86
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  572.2    1227.2    2640.9    5687.4

   RUN NAME: US50 BETW SUNRISE & RANCHO CORDOVA PKWY         RUN DATE: 100606

ADT:  135200      SPEED:  65      ACTIVE HALF WIDTH (FT):  48
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  82.31
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  567.4    1218.8    2623.6    5650.6

   RUN NAME: US50 BETW RANCHO CORDOVA PKWY & HAZEL         RUN DATE: 100606

ADT:  147200      SPEED:  65      ACTIVE HALF WIDTH (FT):  48
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  82.68
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  600.3    1289.7    2776.6    5980.1

   RUN NAME: US50 BETW HAZEL & FOLSOM         RUN DATE: 100606

ADT:  114900      SPEED:  65      ACTIVE HALF WIDTH (FT):  48
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  81.61
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  509.5    1093.7    2354.1    5069.8

   RUN NAME: DOUGLAS BETW SUNRISE & JAEGER         RUN DATE: 100606

ADT:  22500      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.76
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  135.4     286.0     613.4    1320.1

   RUN NAME: DOUGLAS BETW AMERICANOS & GRANT LINE         RUN DATE: 100606

ADT:  11700      SPEED:  55      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  71.73
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   87.4     185.0     397.1     854.6

   RUN NAME: DOUGLAS BETW JAEGER & AMERICANOS         RUN DATE: 100606
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ADT:  11500      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  70.85
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   89.6      184.3      392.8      844.2

   RUN NAME: CHRYSTANTHY BETW SUNRISE & JAEGER         RUN DATE: 100606

ADT:  8400      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  68.29
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   53.6      110.1      234.7      504.4

   RUN NAME: CHRYSTANTHY BETW JAEGER & AMERICANOS         RUN DATE: 100606

ADT:  13100      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  70.22
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   70.2      147.2      315.2      678.1

   RUN NAME: KIEFER BETW EAGLES NEST & SUNRISE         RUN DATE: 100606

ADT:  17000      SPEED:  45      ACTIVE HALF WIDTH (FT):  6
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.43
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   81.0      174.1      374.9      807.5

   RUN NAME: KIEFER BETW SUNRISE & JAEGER        RUN DATE: 100606

ADT:  9100      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  68.64
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   56.2      116.0      247.5      532.0

   RUN NAME: EAGLES NEST BETW MATHER & DOUGLAS         RUN DATE: 100606

ADT:  34800      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.66
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  133.4      281.5      603.7     1299.1
```

```
   RUN NAME: EAGLES NEST BETW DOUGLAS & KIEFER         RUN DATE: 100606

ADT:  14000      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  70.51
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   73.1      153.8      329.4      708.8

   RUN NAME: EAGLES NEST BETW KIEFER & SR16         RUN DATE: 100606

ADT:  9400      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  68.78
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   57.3      118.5      252.9      543.6

   RUN NAME: SUNRISE BETW DOUGLAS & CHRYSANTHY         RUN DATE: 100606

ADT:  47000      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.96
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  161.6      343.3      737.3     1587.1

   RUN NAME: SUNRISE BETW CHRYSANTHY & KIEFER         RUN DATE: 100606

ADT:  35000      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.68
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  133.9      282.6      606.0     1304.1

   RUN NAME: SUNRISE BETW KIEFER & SR16         RUN DATE: 100606

ADT:  40700      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.34
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  147.3      312.2      670.0     1442.0

   RUN NAME: RANCHO CORDOVA PKWY BETW US50 & EASTON VALLEY     RUN DATE: 100606

ADT:  49600      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  75.19
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
```

```
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  167.3      355.8      764.2     1645.1

   RUN NAME: RANCHO CORDOVA PKWY BETW EASTON VALLEY & WHITE ROCK    RUN DATE: 100606

ADT:  40600      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.33
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  147.1      311.7      668.9     1439.6

   RUN NAME: RANCHO CORDOVA PKWY BETW WHITE ROCK & DOUGLAS         RUN DATE: 100606

ADT:  23000      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  71.86
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  103.1      214.5      458.5      985.9

   RUN NAME: JAEGER BETW DOUGLAS & CHRYSANTHY         RUN DATE: 100606

ADT:  19800      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  71.21
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   94.1      194.5      415.1      892.3

   RUN NAME: JAEGER BETW CHRYSANTHY & KIEFER         RUN DATE: 100606

ADT:  9900      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  69.01
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   59.1      122.5      261.7      562.7

   RUN NAME: AMERICANOS BETW WHITE ROCK & DOUGLAS         RUN DATE: 100606

ADT:  18100      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  71.63
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   86.0      182.1      390.8      841.1

   RUN NAME: AMERICANOS BETW DOUGLAS & CHRYSANTHY         RUN DATE: 100606

ADT:  15600      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
```

```
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  70.98
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   78.3      165.1      354.0      761.8

   RUN NAME: EXCELSIOR N OF SR16         RUN DATE: 100606

ADT:  7800      SPEED:  55      ACTIVE HALF WIDTH (FT):  6
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  71.04
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   65.6      140.8      303.2      652.9

   RUN NAME: SR16 W OF EXCELSIOR         RUN DATE: 100606

ADT:  18800      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.98
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  120.9      254.1      544.4     1171.2
```

APPENDIX M-2

FHWA OUTPUT – CUMULATIVE PLUS PROJECT CONDITIONS (2030)

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FHWA OUTPUT - CUMULATIVE + PROJECT CONDITIONS (2030) - revised 10/06

       TRAFFIC DISTRIBUTION PERCENTAGES
       DAY         EVENING     NIGHT
       ---         -------     -----
AUTOS
       67.30       10.98        8.32
M-TRUCKS
        8.78        1.43        1.09
H-TRUCKS
        1.63        0.27        0.20


   RUN NAME: SR16 BETW EXCELSIOR & EAGLES NEST         RUN DATE: 100606

ADT:  19200      SPEED:  55      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.88
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  120.3      256.8      552.1     1188.8

   RUN NAME: SR16 BETW SUNRISE & GRANT LINE         RUN DATE: 100606

ADT:  19900      SPEED:  55      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.04
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  123.1      263.0      565.5     1217.5

   RUN NAME: KIEFER BETW GRANT LINE & N OF SR16         RUN DATE: 100606

ADT:  15300      SPEED:  45      ACTIVE HALF WIDTH (FT):  6
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  71.97
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   75.6      162.4      349.5      752.8

   RUN NAME: MATHER BETW FEMOYER & DOUGLAS         RUN DATE: 100606

ADT:  20800      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.23
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   94.1      199.7      428.7      922.8

   RUN NAME: DOUGLAS BETW MATHER & SUNRISE         RUN DATE: 100606

ADT:  23300      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.91
```

```
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  138.5      292.7      627.9     1351.2

   RUN NAME: INTERNATIONAL BETW S WHITE ROCK & ZINFANDEL      RUN DATE: 100606

ADT:  73500      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  76.90
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  216.0      461.8      993.0     2138.1

   RUN NAME: INTERNATIONAL BETW ZINFANDEL & KILGORE         RUN DATE: 100606

ADT:  68400      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  76.59
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  206.1      440.2      946.5     2038.0

   RUN NAME: WHITE ROCK BETW ZINFANDEL & SUNRISE         RUN DATE: 100606

ADT:  30300      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.05
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  122.2      257.0      550.6     1184.6

   RUN NAME: WHITE ROCK BETW SUNRISE & GRANT LINE         RUN DATE: 100606

ADT:  36100      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  75.81
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  183.4      391.0      840.2     1809.0

   RUN NAME: FOLSOM BETW ZINFANDEL & SUNRISE         RUN DATE: 100606

ADT:  24400      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.92
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  104.2      221.9      476.7     1026.3

   RUN NAME: FOLSOM BETW SUNRISE & HAZEL         RUN DATE: 100606

ADT:  20000      SPEED:  55      ACTIVE HALF WIDTH (FT):  18
```

```
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.06
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  123.5      263.9      567.4     1221.6

   RUN NAME: MATHER FIELD BETW FOLSOM & US50         RUN DATE: 100606

ADT:  32900      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.22
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  126.6      270.5      581.7     1252.6

   RUN NAME: MATHER FIELD BETW US50 & INTERNATIONAL      RUN DATE: 100606

ADT:  61600      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  76.14
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  192.5      410.7      882.8     1900.7

   RUN NAME: ZINFANDEL BETW FOLSOM & US50         RUN DATE: 100606

ADT:  23700      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.80
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  102.3      217.7      467.6     1006.6

   RUN NAME: ZINFANDEL BETW US50 & WHITE ROCK         RUN DATE: 100606

ADT:  78000      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  77.16
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  224.6      480.3     1033.1     2224.5

   RUN NAME: ZINFANDEL BETW WHITE ROCK & INTERNATIONAL    RUN DATE: 100606

ADT:  46100      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.88
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  159.6      339.0      727.9     1566.8
```

```
   RUN NAME: SUNRISE BETW GOLD COUNTRY & COLOMA         RUN DATE: 100606

ADT:  95300      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  78.03
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  256.1      548.7     1180.5     2542.2

   RUN NAME: SUNRISE BETW COLOMA & US50         RUN DATE: 100606

ADT:  108700      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  78.60
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  279.3      598.9     1288.7     2775.2

   RUN NAME: SUNRISE BETW US50 & FOLSOM         RUN DATE: 100606

ADT:  63000      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  76.23
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  195.3      416.9      896.1     1929.3

   RUN NAME: SUNRISE BETW FOLSOM & WHITE ROCK         RUN DATE: 100606

ADT:  55800      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  75.71
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  180.5      384.6      826.5     1779.4

   RUN NAME: SUNRISE BETW WHITE ROCK & DOUGLAS         RUN DATE: 100606

ADT:  44900      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  76.76
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  211.4      451.9      971.6     2092.1

   RUN NAME: SUNRISE BETW SR16 & GRANT LINE         RUN DATE: 100606

ADT:  32200      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.32
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
```

```
-------  -------   -------   -------
  127.0      267.5      573.3     1233.6

   RUN NAME: HAZEL BETW WINDING WY & US50         RUN DATE: 100606

ADT:  96600      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  78.09
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  258.4      553.7     1191.2     2565.3

   RUN NAME: GRANT LINE BETW WHITE ROCK & DOUGLAS         RUN DATE: 100606

ADT:  27500      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.63
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  153.9      326.5      701.0     1509.0

   RUN NAME: GRANT LINE BETW DOUGLAS & SR16        RUN DATE: 100606

ADT:  21600      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.58
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  132.0      278.4      597.0     1284.7

   RUN NAME: GRANT LINE BETW SR16 & SUNRISE         RUN DATE: 100606

ADT:  16500      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.41
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  111.5      233.3      499.2     1073.7

   RUN NAME: US50 BETW MATHER FIELD & ZINFANDEL         RUN DATE: 100606

ADT:  179200      SPEED:  65      ACTIVE HALF WIDTH (FT):  60
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  83.03
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  684.2     1469.4     3163.0     6812.1

   RUN NAME: US50 BETW ZINFANDEL & SUNRISE         RUN DATE: 100606

ADT:  163700      SPEED:  65      ACTIVE HALF WIDTH (FT):  60
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
```

```
CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  82.64
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  644.5     1383.5     2977.9     6413.4

   RUN NAME: US50 BETW SUNRISE & RANCHO CORDOVA PKWY         RUN DATE: 100606

ADT:  135200      SPEED:  65      ACTIVE HALF WIDTH (FT):  48
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  82.31
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  567.4     1218.8     2623.6     5650.6

   RUN NAME: US50 BETW RANCHO CORDOVA PKWY & HAZEL         RUN DATE: 100606

ADT:  165300      SPEED:  65      ACTIVE HALF WIDTH (FT):  48
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  83.18
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  648.2     1393.3     2999.7     6460.7

   RUN NAME: US50 BETW HAZEL & FOLSOM         RUN DATE: 100606

ADT:  126100      SPEED:  65      ACTIVE HALF WIDTH (FT):  48
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  82.01
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  541.8     1163.5     2504.6     5394.1

   RUN NAME: DOUGLAS BETW SUNRISE & JAEGER         RUN DATE: 100606

ADT:  27300      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.60
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  153.2      325.0      697.6     1501.6

   RUN NAME: DOUGLAS BETW AMERICANOS & GRANT LINE         RUN DATE: 100606

ADT:  14600      SPEED:  55      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.69
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  100.7      214.2      460.1      990.5

   RUN NAME: DOUGLAS BETW JAEGER & AMERICANOS         RUN DATE: 100606
```

```
ADT:  14600      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  71.88
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  103.4      215.3      460.2      989.6

   RUN NAME: CHRYSTANTHY BETW SUNRISE & JAEGER         RUN DATE: 100606

ADT:  9600      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  68.87
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   58.0      120.1      256.4      551.3

   RUN NAME: CHRYSTANTHY BETW JAEGER & AMERICANOS         RUN DATE: 100606

ADT:  16200      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  71.14
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   80.2      169.3      363.0      781.2

   RUN NAME: KIEFER BETW EAGLES NEST & SUNRISE         RUN DATE: 100606

ADT:  17100      SPEED:  45      ACTIVE HALF WIDTH (FT):  6
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.45
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   81.3      174.8      376.4      810.7

   RUN NAME: KIEFER BETW SUNRISE & JAEGER        RUN DATE: 100606

ADT:  9300      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  68.73
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   56.9      117.7      251.1      539.8

   RUN NAME: EAGLES NEST BETW MATHER & DOUGLAS         RUN DATE: 100606

ADT:  36100      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.81
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  136.5      288.4      618.6     1331.2
```

```
   RUN NAME: EAGLES NEST BETW DOUGLAS & KIEFER         RUN DATE: 100606

ADT:  14400      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  70.63
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   74.5      156.7      335.7      722.2

   RUN NAME: EAGLES NEST BETW KIEFER & SR16         RUN DATE: 100606

ADT:  9700      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  68.92
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   58.4      120.9      258.2      555.1

   RUN NAME: SUNRISE BETW DOUGLAS & CHRYSANTHY         RUN DATE: 100606

ADT:  59400      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  75.98
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  188.0      400.9      861.7     1855.1

   RUN NAME: SUNRISE BETW CHRYSANTHY & KIEFER         RUN DATE: 100606

ADT:  43700      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.64
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  154.2      327.2      702.4     1512.0

   RUN NAME: SUNRISE BETW KIEFER & SR16         RUN DATE: 100606

ADT:  47200      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.98
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  162.0      344.3      739.4     1591.6

   RUN NAME: RANCHO CORDOVA PKWY BETW US50 & EASTON VALLEY     RUN DATE: 100606

ADT:  67800      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  76.55
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
```

```
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  204.9      437.7      941.0     2026.1

   RUN NAME: RANCHO CORDOVA PKWY BETW EASTON VALLEY & WHITE ROCK    RUN DATE: 100606

ADT:  63900      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  76.29
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  197.2      420.8      904.6     1947.7

   RUN NAME: RANCHO CORDOVA PKWY BETW WHITE ROCK & DOUGLAS         RUN DATE: 100606

ADT:  47300      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  74.99
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  162.3      344.8      740.4     1593.9

   RUN NAME: JAEGER BETW DOUGLAS & CHRYSANTHY         RUN DATE: 100606

ADT:  35100      SPEED:  45      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.69
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  134.1      283.1      607.1     1306.5

   RUN NAME: JAEGER BETW CHRYSANTHY & KIEFER         RUN DATE: 100606

ADT:  15400      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  70.92
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   77.7      163.7      351.0      755.3

   RUN NAME: AMERICANOS BETW WHITE ROCK & DOUGLAS         RUN DATE: 100606

ADT:  30400      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.88
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  120.2      256.7      551.9     1188.3

   RUN NAME: AMERICANOS BETW DOUGLAS & CHRYSANTHY         RUN DATE: 100606

ADT:  21800      SPEED:  45      ACTIVE HALF WIDTH (FT):  18
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5
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CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.43
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   96.9      206.0      442.3      952.1

   RUN NAME: EXCELSIOR N OF SR16         RUN DATE: 100606

ADT:  10400      SPEED:  55      ACTIVE HALF WIDTH (FT):  6
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  72.29
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
   79.4      170.6      367.2      790.9

   RUN NAME: SR16 W OF EXCELSIOR         RUN DATE: 100606

ADT:  19000      SPEED:  55      ACTIVE HALF WIDTH (FT):  30
SITE CHARACTERISTICS: SOFT     GRADE (PERCENT):  .5

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  73.03
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL   60 CNEL   55 CNEL
-------  -------   -------   -------
  121.7      255.9      548.2     1179.5
```