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**Project name:**  
MFA 115kV Main Substation Refurbishment  
Project

**Project reference:**  
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**From:**  
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**Date:**  
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**CC:**  
Katie O'Brien, CBRE for Google

# Memo

**Subject:** Section 106 Consultation on Moffett Federal Airfield 115kV Main Substation Refurbishment Project, NASA Ames Research Center, Moffett Field, Santa Clara County, California

## 1. Introduction

The National Aeronautics and Space Administration (NASA) Ames Research Center (ARC) proposes the Moffett Federal Airfield (MFA) 115-kilovolt (kV) Main Substation (Building 591) Refurbishment Project (project or undertaking) at ARC, Moffett Field, Santa Clara County, California. As the lead federal agency, NASA is responsible for compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (54 United States Code 300101 et seq.), which requires federal agencies to take into account the effects of their activities and programs on historic properties, and its implementing regulations in 36 Code of Federal Regulations (CFR) Part 800. The purpose of this memorandum is to provide necessary information for compliance with Section 106, including a description of the undertaking and the Area of Potential Effects (APE), the methodology used to identify and evaluate historic properties within the APE, a description of the affected historic properties, and an assessment of potential effects resulting from the undertaking.

### 1.1 Project Location

The project is located at ARC on the eastside of MFA within the expanded boundary of the Naval Air Station (NAS) Sunnyvale Historic District (**Appendix A; Figures 1 and 2**). 

### 1.2 Project Personnel

This study was conducted by cultural resources professionals who meet the Secretary of the Interior's Professional Qualifications Standards (48 Federal Register 44738). Trina Meiser, M.A., Senior Architectural Historian, served as the Principal Investigator; Jay Rehor, M.A., RPA, addressed archaeological resources; Alec Stevenson, M.A., RPA, provided mapping; and Kirsten Johnson, M.A., served as the lead verifier of this document.

## 2. Description of the Undertaking

The substation's existing 115kV breaker is beyond its service life and a single point of failure for the electrical power that services MFA and other buildings/facilities. Should the breaker fail, power would be lost to all facilities powered through the substation. The project proposes to replace the existing breaker and add redundancy/resiliency with a second breaker to prevent disturbance to these critical facilities (see **Appendix B; Exhibits 2 and 3**).

The project scope of work includes:

1. Addition of a new 115kV breaker and reconfigure the substation yard to accommodate the new breaker, which involves:
  - a. replacement of an existing 115kV oil breaker with a new gas breaker;
  - b. installation of a new, secondary dead-end structure and a second 115kV gas breaker;
  - c. installation of new concrete footings under the new steel structure (less than 6-feet deep);
  - d. installation of a new concrete slab under the new breaker [(N) 52-2] (less than 6-feet deep);
  - e. installation of a duct bank (approximately 3 feet deep) to [(N) 52-2] from switch room (in yard);  
and
  - f. modification of transmission infrastructure by Pacific Gas & Electric Company as needed to accommodate project.
2. Repair of existing transformers in situ.
3. Addition of cameras and card readers to the switch room.

## 3. Area of Potential Effects

The APE was defined to address both direct and indirect impacts on historic properties. The APE encompasses areas that may be affected by both temporary and permanent construction activities (see **Appendix A; Figure 3**). All project activities would occur at the existing 115kV Main Substation. Below-grade activities include disturbance to install concrete slabs, footings, and duct banks. These areas are included in the APE for direct impacts, with a vertical APE of approximately 3' maximum depth for duct banks, and 6' for new concrete slabs and footings. The current substation is supported on a grid of drilled piers that extend to a depth of 12' below grade (see **Appendix B; Exhibits 4 and 5**). It may be necessary to replace and/or augment these footings to support the new proposed facilities. No visual impacts resulting from the aboveground alterations are anticipated to affect the setting of the NAS Sunnyvale Historic District, its contributors, or other nearby historic properties due to the limited visibility of the proposed project; therefore, the APE is limited to the substation complex where project activities will occur.

## 4. Identification of Historic Properties

Historic properties are defined as any district, site, building, structure, or object that is included in or is eligible for listing in the National Register of Historic Places (NRHP). The following sections address the methodology and efforts to identify historic properties in the APE.

### 4.1 Archaeological Resources

The land that comprises ARC has changed dramatically since the early twentieth century from predominantly agricultural to an extensive military airfield installation beginning in 1931, and aeronautical research and development beginning in 1939. Extensive surface disturbance occurred throughout ARC with grading and fill to create the airfield and the campuses with hundreds of buildings and structures to support operations.

A comprehensive evaluation of the archaeological and geoarchaeological sensitivity of ARC was completed in 2017 (AECOM 2017). This investigation involved a desktop survey of archival resources, including a records

search at the Northwest Information Center of the California Historical Resources Information System (NWIC), which is the official repository of archaeological data for Santa Clara County; a search of the Sacred Lands File held by the California Native American Heritage Commission; and a geoarchaeological assessment of the entire ARC. An updated records search at the NWIC was conducted by AECOM in November 2023. The records search indicated much of the ARC has been previously surveyed and no new archaeological sites have been identified within its boundaries since the early twentieth century (though some of these have been reidentified in the last 10 years). The 2017 ARC study identified areas of near-surface historical and precontact archaeological sensitivity based on the locations of documented archaeological sites and features on historical maps. The geoarchaeological assessment, which included a review of soils maps and prior geoarchaeological studies in the vicinity, concluded that there is low potential for more deeply buried precontact archaeological resources across ARC. In a letter dated June 22, 2017, the State Historic Preservation Officer (SHPO) found the study results acceptable as a baseline for future investigation and treatment of archaeological resources at ARC and as a reference for professionally qualified staff for future undertakings (NASA\_2015\_0928\_001).

[REDACTED]

[REDACTED]

[REDACTED]

## 4.2 Architectural Resources

The APE is within the NRHP-eligible expanded boundary of the NRHP-listed NAS Sunnyvale Historic District and has been previously surveyed for historical significance. The APE covers the 115kV Main Substation (Building 591; P-43-002585), which does not contribute to the district. The closest district contributors to the APE are Hangar 2 and Hangar 3.

### 4.2.1 NAS Sunnyvale Historic District

Listed in the NRHP in 1994, the NAS Sunnyvale Historic District is significant under NRHP Criteria A and C. The original district boundary included only the earliest Spanish Colonial campus buildings around Shenandoah Plaza and Hangars 1, 2, and 3 (NRHP 1994). The original periods of significance of the district were identified as 1930 through 1935 and 1942 through 1946. The utilitarian style of later buildings was noted in the NRHP nomination; however, at the time of the nomination, several buildings were not yet 50 years old and were not

considered contributing under the statement of significance that focused on Spanish Colonial Revival-style architecture and the engineering feat related to the airfield hangars.

In 2013, a historic property survey of Moffett Field was conducted to evaluate the significance of additional resources related to the airfield and concluded that the airfield and related resources are eligible for the NRHP under an expanded context for the NAS Sunnyvale Historic District (AECOM 2013). The SHPO concurred on expanding the boundary of the district on June 6, 2013 (NASA\_2013\_0417\_001) with a revised period of significance of 1942 to 1961 for the airfield (see Appendix A, Figure 2 for expanded historic district boundary). The district's statement of significance was also revised to include the World War II and Cold War military missions. No major alterations to the district have occurred since it was listed in 1994, with the exception of removal of the exterior materials of Hangar 1 to remediate hazardous materials. The district retains its integrity and remains eligible for the NRHP.

Hangars 2 and 3 are large, wood-framed dirigible hangars located on the east side of the airfield (**Photograph 1**). Constructed between 1942 and 1943, Hangars 2 and 3 are nearly identical hangars with designs based upon a standardized plan utilized for similar hangars at a handful of other airfields in operation during World War II. Hangar 2, located directly east adjacent to the airfield, was constructed first, whereas Hangar 3 was constructed second. Both were designed to facilitate the lighter-than-air coastal defense program at MFA during World War II, and used to house fixed-wing aircraft that operated out of MFA over the following decades.



**Photograph 1. Hangar 2 (right) and Hangar 3 (left)**

In 1988, both hangars were determined individually eligible for listing in the NRHP for significance associated with events during World War II, and for their overall engineering and design. In 1994, Hangars 2 and 3 were both listed in the NRHP as contributors to the NAS Sunnyvale Historic District as excellent examples of military engineering and design during World War II. In 2013, Hangars 2 and 3 were also identified as contributors to the NRHP-eligible expanded NAS Sunnyvale Historic District, which also includes the airfield features at MFA that were significant to the various missions that took place between 1933 and 1961.

The most significant character-defining features of both hangars include the distinctively large massing; parabolic roof with corrugated aluminum siding; massive sliding hangar doors with supporting concrete towers, wood box beams and adjoining clamshell roof; the flanking brick masonry sheds; wood-framed truss construction set on repeating concrete bents; expansive interior concrete decking; and the vast open interior volumes. Additionally, the two structures are unique for the parallel siting and nearly identical composition, which creates the paired hangars appearance.

The 115kV Main Substation (Building 591) (**Photograph 2**) consists of a concrete pad with various transformers and switch room. Built in 1985, the substation serves a support function. It was previously recorded as P-43-002585 and evaluated for eligibility for listing in the NRHP in 1998 (see **Appendix C**). It does not meet the NRHP criteria because it is not 50 years old and does not exhibit exceptional historical significance tied to any particular themes, events, individuals, or architectural significance related to its design, materials, or type. The substation is not eligible for the NRHP.



## 5. Affected Historic Properties

No known archaeological sites are in the APE, and the substation (Building 591) is not eligible for the NRHP.

## 6. Assessment of Effects

Per 36 CFR Part 800.5(a)(1), an adverse effect results when an undertaking may alter, either directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the historic property's integrity.

There are no known archaeological resources in the APE, and the APE is in an area with a low potential for deeply buried precontact sites. [REDACTED]

[REDACTED]

The amount of prior disturbance of the APE appears high due to development of the 1984 substation, and the associated installation of subsurface infrastructure, including 12-foot-deep drilled foundation piers. As such, the potential for affecting potentially significant archaeological historical resources is considered low. Nonetheless, the potential for encountering unanticipated archaeological resources cannot be completely discounted. Should the project uncover previously unknown subsurface archaeological resources, contractors would immediately halt construction, secure the site, and notify NASA of the unanticipated discovery. NASA would follow the standard operating procedure for unanticipated discoveries as outlined in the Integrated Cultural Resources Management Plan for ARC (AECOM 2014). Through implementation of mitigation measures outlined in the standard operating procedure for unanticipated discoveries, the undertaking would have no adverse effect on archaeological historic properties.

The survey identified one historic property within the APE, the NRHP-listed NAS Sunnyvale Historic District. However, no contributing elements of the district are within the APE. The project would be limited to the substation that does not contribute to the significance of the district. While the undertaking is in proximity to contributing elements of the district, due to the scale and nature of the project, no effects on the district or its closest contributors, Hangar 2 and Hangar 3, are anticipated. Therefore, the undertaking would result in no adverse effect on historic properties.

## 7. Summary of Findings

The proposed undertaking would not alter, directly or indirectly, any of the characteristics of a historic property that qualify it for inclusion in the NRHP. Therefore, a finding of No Adverse Effect per 36 CFR Part 800.5(b) would be appropriate for this undertaking.

## 8. References

AECOM, 2013. *Historic Property Survey Report for the Airfield at NASA Ames Research Center, Moffett Field, California*. Accessible online at [https://historicproperties.arc.nasa.gov/downloads/hpsr\\_airfield.pdf](https://historicproperties.arc.nasa.gov/downloads/hpsr_airfield.pdf).

AECOM, 2014. *Integrated Cultural Resources Management Plan for NASA Ames Research Center, Moffett Field, California*. Accessible online at [https://historicproperties.arc.nasa.gov/downloads/icrmp\\_nasa\\_arc\\_all.pdf](https://historicproperties.arc.nasa.gov/downloads/icrmp_nasa_arc_all.pdf).

AECOM, 2017. *NASA Ames Research Center Archaeological Resources Study*. Accessible online (redacted) at [https://historicproperties.arc.nasa.gov/downloads/section106\\_achaeology\\_20170224\\_nasa\\_att.pdf](https://historicproperties.arc.nasa.gov/downloads/section106_achaeology_20170224_nasa_att.pdf).

National Register of Historic Places (NRHP), 1994. U.S. Naval Air Station Sunnyvale, California, Moffett Field, Santa Clara County, California, NRHP # 94000045. Accessible online at [https://historicproperties.arc.nasa.gov/downloads/nrhp\\_registration.pdf](https://historicproperties.arc.nasa.gov/downloads/nrhp_registration.pdf).

## Appendices

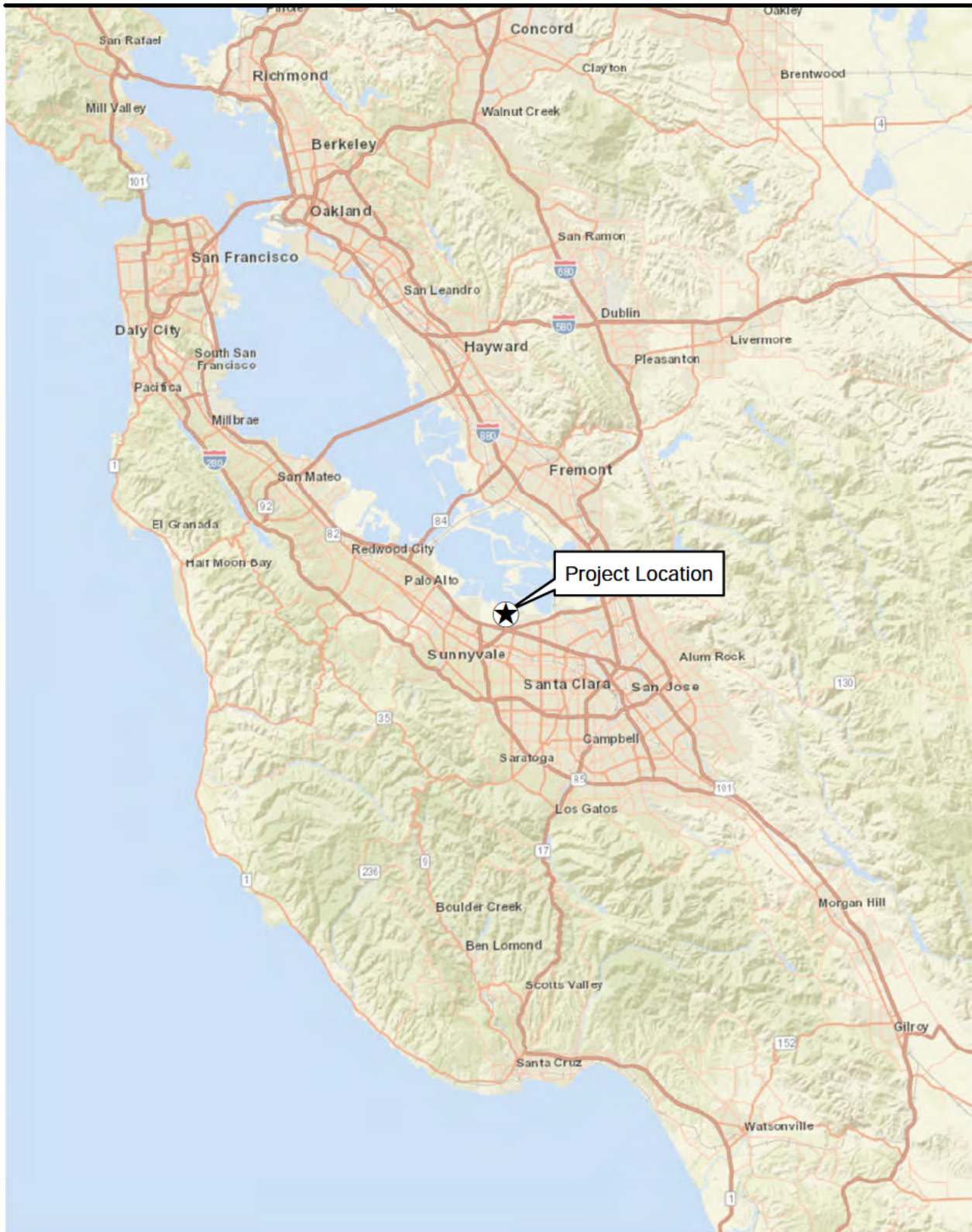
Appendix A: Figures 1–4 (Project Location, Project Site, APE, and Archaeological Sensitivity)

Appendix B: Project Exhibits

Appendix C: DPR Forms

**Appendix A**  
**Figures**





Source: ESRI, AECOM, NASA



0 5 10 20 Miles



Scale: 1 = 633,600; 1 inch = 10 mile(s)

**Figure 1**  
**Project Location**

**MFA Substation Refurbishment Project**

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**The following content was redacted from this public posting:**

Figure 2: Project Area

Figure 3: APE Map

Figure 4: Archaeological Sensitivity Map

Appendix B: Project Exhibits

Appendix C: DPR Forms