National Aeronautics and Space Administration

Ames Research Center
Moffett Field, California 94035

October 15, 2018

Ms. Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
Department of Parks & Recreation
1725 23rd Street, Suite 100
Sacramento, CA 95816

Attn: Mr. Mark Beason

Subject: Continuing Section 106 Consultation for Building 2 Seismic Retrofit Project at Ames Research Center, Moffett Field, California (NASA_2018_0621_001)

Dear Ms. Polanco:

Thank you for your letter dated August 3, 2018, in response to NASA Ames Research Center (ARC)'s request for concurrence on its Finding of Adverse Effect related to the Building 2 Seismic Retrofit Project at ARC, Moffett Field, Santa Clara County, California. Below are NASA ARC's responses to your comments.

1. Comment: *Describe the typical condition of the spandrels where the epoxy treatment is proposed. In some cases where cracks in concrete are extensive and wide, the epoxy treatment might not be an appropriate long-term solution.*

Response: The spandrels where epoxy treatment is proposed are typically exposed or painted concrete with most cracks approximately 1/16" or less, with few exceptions that may by closer to 1/8." Typical cracking is roughly vertical from the upper window sills down (Figure 1).

2. Comment: *Provide the reason for removal and replacement of window and door glazing throughout the building*.

Response: As part of the planning for this undertaking, the structural engineer identified a safety concern that the window panes could fail during a seismic event and fall to the ground. The majority of the window glazing has been painted over and many panes have been replaced with dissimilar glass (Figure 2). Many windows are covered with expanded wire mesh due to direct breakage caused by errant basketballs. Because the intent of the undertaking is to return to an open feeling and uniform aesthetic, the project will repair the window frames to operate as originally intended and replace the glazing to match.

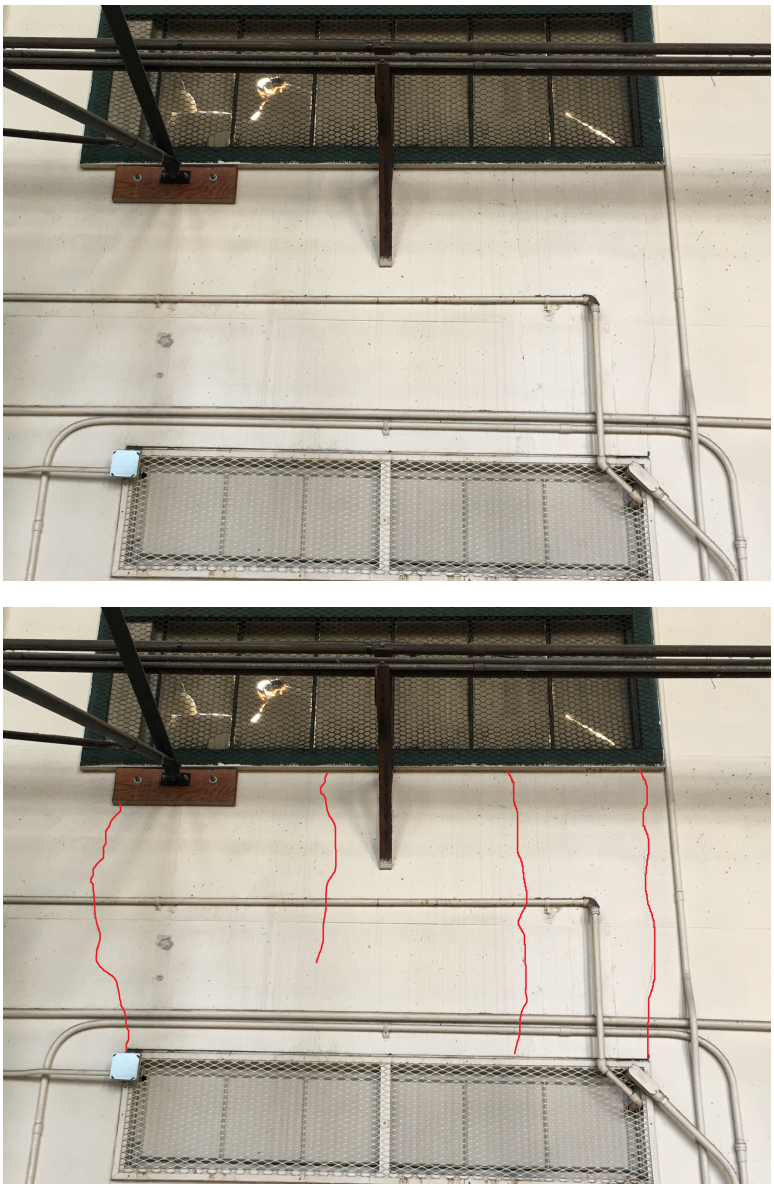

Figure 1. Top: Typical concrete cracking at spandrel; bottom: cracking outlined in red to illustrate typical cracking patterns.

At the same time, double pane safety glass will be installed to reduce the huge energy footprint of the glazing, which makes up a high percentage of the exterior enclosure, and to improve safety in a seismic event. The configuration, patterns, and functionality of the windows will remain the same.

The exterior doors that originally contained glazing are not intact and will be replaced with doors that do contain glazing and complement the patterns of the original doors as documented in the as-built drawings for Building 2. The single exterior door on the west side is currently boarded with plywood. The double exterior doors on the south side contain metal panels within the window panels instead of glazing. Historic interior doors are wood paneled and do not contain glazing.

Figure 2. Building 2 interior; west wall windows painted over.

3. Comment: *Provide a description for the proposed interior finishes after demolition and construction work and how it will compare to the existing finishes*.

Response: The interior finishes of the building will be altered by the installation of additional bracing in the exposed roof trusses and the removal of the basketball court and furnishings. The large, open space of the hangar/gymnasium will remain open, with its concrete board-formed walls and trusses exposed. Non-original suspended heaters and ducts will be removed. The modern gymnasium floor will removed and the concrete slab flooring will be repaired, as necessary. The original hanging light fixtures will be repaired and maintained.

Figure 3. Building 2 interior; south wall with exposed bracing and trusses.

4. Comment: *The APE appears to be sufficient to take direct effects of the undertaking into account.*

However, as Building 2 is a contributor to the NAS Sunnyvale Historic District, it would be appropriate to expand the APE to include the district's boundaries.

At the least, the APE should include the buildings north, northeast, and northwest of Building 2 across Bushnell Road to account for visual effects.

Response: As previously indicated, the APE is located within the NAS Sunnyvale Historic District (see Attachment A, NAS Sunnyvale Historic District Map) and accounts for potential effects on the district as a whole, but is represented to address potential indirect effects on adjacent historic properties. Although somewhat obscured from areas north of Bushnell Road by fencing, trees, and landscaping related to the border between the NASA Ames Research Park and the Ames Campus, in response to your comment, the APE has been expanded to include the buildings across Bushnell Road that are located on the Ames Campus for potential visual effects (see Attachment B, Revised APE Map). The APE now also includes Buildings N239A, N210, and N243.

5. Comment: *Clarify the National Register status for Building 480 and the buildings to the north, northeast, and northwest of Building 2 across Bushnell Road*.

Response: The following describes the National Register of Historic Places (NRHP) status for Buildings 480, N210, N239A, and N243, and includes an effects assessment related to the historic properties.

- Building 480, located near the southwest corner of Building 2, houses two racquetball courts (Figures 4 and 5). According to NASA ARC facilities records, the standalone frame building was constructed in 1963. The building has a rectangular plan, a concrete slab foundation, plywood board and batten siding, and a medium-pitched roof covered with corrugated metal over exposed eaves and rafter tails. The building has large vented sections and single hatch doors on the east and west ends and contains back-to-back racquetball courts. The east gable also contains an attic opening accessed by an affixed exterior ladder. The interior contains smooth paneled walls and ceilings with recessed lights and painted wood floors.

  Significance: Building 480 was not specifically mentioned in the NAS Sunnyvale Historic District in its nomination (NRHP #94000045). The nomination stated: "Most of the non-contributing buildings were constructed after the period of significance and are primarily small utilitarian constructions." The periods of significance listed in the nomination were from 1930 to 1935 and 1942 to 1946. In 2013, the airfield and several airfield structures were found eligible as contributors to an expanded NAS Sunnyvale Historic District (see Attachment A) with a revised period of significance from 1930 to 1961 for the district's continuous association with significant Navy and NASA missions during World War II and the Cold War, primarily based on district features that functionally related to the operations of the airfield. Building 480 was built in 1963 and therefore does not date to the period of significance for the NAS Sunnyvale Historic District and is not a contributor to the district.

  As an individual property, Building 480 is a recreational facility associated with Building 2, which has served as a gymnasium since the 1940s. As a secondary recreational facility, it has tangential associations with significant themes in the history, planning, and construction of a working military base. It has no known associations with any specific person. The standard materials and design of this

building do not embody any distinctive characteristics or represent the work of a master or high artistic values; it is not an important example of racquetball courts. It has minimal potential to yield additional historic information. In summary, Building 480 does not meet NRHP criteria A through D.

Effects Assessment: The project will demolish Building 480, but this action will not result in an adverse effect, because Building 480 is not a historic property.

Figure 4. Building 480.

Figure 5. Building 480 interior; racquetball court.

- Building N210, the Flight System Research Laboratory, was the first building constructed at the Ames Aeronautical Laboratory in 1940. It was originally constructed as a large, high-ceiling hangar

with two-story office extensions attached to the east and west walls. The original portions of the building are designed in simplified Art Deco style with unpainted, cast-in-place concrete exterior walls and paired, steel sash windows stacked vertically in bays, which are recessed from the wall planes in a series of shallow setbacks (Figure 6). A circa 1960 addition on the south end of the building (facing Building 2) was constructed of cast-in-place concrete exterior walls, two rows of banded windows, and exposed aggregate finish and ceramic tile surrounding the entrance on the east side of the south elevation. The building's interior has been remodeled several times over the years with the 1960 renovation being the most significant.

Significance: Building N210 was determined not eligible for the NRHP in 1995 due to loss of integrity. It was reevaluated in 2005 as eligible for the California Register of Historical Resources under criteria 1, 2, and 3, but not individually eligible for the NRHP (Page & Turnbull 2006). The building requires further evaluation to determine its NRHP status; however, NASA ARC has not made a new determination of its eligibility. For the purposes of this undertaking, NASA ARC proposes to treat this property as an eligible historic property.

Effects Assessment: Building N210 is associated with early research and development at the Ames Aeronautical Laboratory. Located on the NASA Ames Campus, Building N210 and its setting have undergone many changes since its construction in 1940 as a result of subsequent development. Potential indirect effects of this undertaking on Building N210 would be limited to audible and/or visual changes. The north side of Building 2 and the south side of Building N210 (1960 addition) are directly opposite Bushnell Road and divided by a fence (Figure 7). The only exterior changes to Building 2 that will be within view of Building N210 are the repair of the windows and the installation of the crosswalk, which pose no visual intrusion on Building N210. The intent of the project is to prepare Building 2 as a potential assembly hall or for program uses. No associated audible intrusions have been identified that would affect Building N210 or its operation. The undertaking would result in no effects on Building N210.

Figure 6. Building N210, view facing southwest (Building 2 parapet visible at left).

Figure 7. Building 2 (left) and Building N210 (right), view facing west.

- Building N239A, the Life Sciences Research Laboratory Centrifuges, built in 1966, is a two-story research facility with a concrete foundation, concrete exterior, and flat roof (Figure 8). The smooth concrete exterior is interrupted by evenly spaced concrete piers. The west side contains steel overhead doors, metal doors, and a concrete loading dock and canopy. The south side features a large steel overhead door. On the east side is a metal stair with access to the first and second floors and a concrete block wall, which forms an exterior storage shed. This building housed a dynamic flight simulator, the vertical acceleration and roll device, and other simulators. It is 30,140 square feet.

  Significance: The building was evaluated in 2005 as not eligible because it was not architecturally or historically significant and did not meet the 50-year threshold (Page & Turnbull 2006). The building requires further evaluation to determine its NRHP status; however, NASA ARC has not made a determination of its eligibility. For the purposes of this undertaking, NASA ARC proposes to treat this property as an eligible historic property.

  Effects Assessment: Building N239A is associated with scientific research, with a specific design for its function. The building has had the same setting within the NASA Ames Campus since its construction in 1966. Potential indirect effects of this undertaking on Building N239A would be limited to audible and/or visual changes related to the alteration of Building 2. Views are limited between the northwest portion of Building 2 and the southeast (rear) portion of Building N239A, which are divided by fencing and trees (Figure 9). The only exterior changes to Building 2 that will be within view of Building N239A are the repair of the windows and the installation of the crosswalk, which pose no visual intrusion on Building N239A. The intent of the project is to prepare Building 2 as a potential assembly hall or for program uses. No associated audible intrusions have been identified that would affect Building N239A or its operation. The undertaking would result in no effects on Building N239A.

Figure 8. Building N239A, view facing south.

Figure 9. Building N239A opposite Building 2, view facing north from Bushnell Road.

- Building N243, the Flight and Guidance Simulation Laboratory built in 1967, is a large three-story building designed in the Brutalist style (Figure 10). It covers 108,670 square feet and includes three flight simulation machines. One of the simulators, the Vertical Motion Simulator, is a significant feature of the building.

  Significance: The Flight and Guidance Simulation Laboratory meets Criterion A at the national level of significance for its association with NASA's Space Shuttle Program and specifically with the Vertical Motion Simulator, which was an integral part of astronaut pilot training. The period of

significance is 1967 to 2011, the year of its construction to the end of the Space Shuttle Program. The property is eligible under Criteria Consideration G for properties that have achieved significance within the past 50 years. The building retains historic integrity to its period of significance. It was listed in the NRHP in January 2017 (NRHP #100000469).

Effects Assessment: Building N243 is significant for both its research importance and its architectural design. The building has had approximately the same setting since its construction in 1967, located on the NASA Ames Campus and adjacent to Moffett Field. Potential indirect effects of this undertaking would be limited to audible and/or visual changes. Views are limited between the northeast portion of Building 2 and the southwest (rear) portion of Building N243, which are divided by fencing and trees (Figures 11 and 12). The only exterior changes to Building 2 that will be within view of Building N243 are the repair of the windows and the installation of the crosswalk, which pose no visual intrusion on Building N243. The intent of the project is to prepare Building 2 as a potential assembly hall or for program uses. No associated audible intrusions have been identified that would affect Building N243 or its operation. The undertaking would result in no effects on Building N243.

Figure 10. Building N243, view facing southeast.

Figure 11. South side of Building N243 opposite Building 2, facing Bushnell Road.

Figure 12. View of Building 2 from Building N243, view facing south.

6. Comment: *Clarify the National Register status of landscaping and hardscaping around Building 2, including plantings, pathways, and curbs*.

Response: Building 2 is primarily surrounded by pavement and minimal landscaping. The north side of the building has a concrete apron with curved curbs in front of the massive hangar doors that is currently used for parking. On each side of the apron is an area covered with grass. A modern, partial sidewalk and Americans with Disabilities Act (ADA)-accessible ramp are located at the southwest corner of the intersection of Bushnell Road and Severyns Avenue. To the south of the building is an asphalt parking

lot. A sidewalk runs parallel to Severyns Avenue along the east addition of Building 2, and a perpendicular sidewalk leads from the central entrance of the east addition to the curb of the street. The area between the sidewalk and the street is covered with grass, and the area between the sidewalk and the building contains a variety of small shrubs, bushes, and trees. On the west side of the building, the ground is covered in pavement, with diagonal, remnant sidewalks leading to the entrance of the west addition.

Significance: As stated in the NRHP nomination for the NAS Sunnyvale Historic District, the landscaping, including "ubiquitous mature trees, the huge green spaces, and the careful placement of plants and shrubs," is a supportive element of the district (NRHP #94000045). These features particularly contribute to the formality of Shenandoah Plaza and the residential and administrative campus areas of the district. Building 2 was originally an aircraft hangar and located in the industrial portion of NAS Sunnyvale/Moffett Field closer to the airfield and Hangar 1 (east of McCord Avenue) (see ARG 2004, page 5, for an illustration of the 1933 landscape plan). In the industrial area, the streets were laid out with rounded corners and bordered with curbs and lawn strips, but without significant green spaces or plantings. The sidewalks on the east and west sides of the buildings are associated with the respective additions to the building. The age of the bushes and trees on the east side of the building is unknown; however, these plantings do not appear to have specific associations related to the design or use of the building. The landscape feature associated with the immediate surroundings of Building 2 that potentially contributes to the district is the curvature of the curbs at the hangar apron and street corners, which the new sidewalk along Severyns Avenue will follow. The curb at the southwest corner of Bushnell Road and Severyns Avenue was previously altered with the addition of a sidewalk and ADA-compliant ramp, and is not significant.

7. Comment: *Clarify if NASA supports the ARG list of character defining features for Building 2. Many of the features on the list are proposed for removal and need to be accounted for in the assessment of effect*.

Response: NASA supports the character-defining features for Building 2 listed below, as proposed in the *Building 2 Reuse Guidelines* (ARG 2004). The original assessment of effect was premised on the reuse guidelines, which were produced for the purpose of identifying the building's character-defining features and their appropriate treatments in adherence to the Secretary of the Interior's Standards for Rehabilitation. Recent survey (2018) confirmed that the previously identified character-defining features were intact, and that the list of character-defining features below is appropriate for the conveyance of Building 2's significance as a contributor to the NAS Sunnyvale Historic District.

The assessment of effect in the technical memorandum (AECOM 2018) stated on page 9: "The project will include demolition of the east and west additions and Building 480; removal of the roof, windows, interior flooring, sidewalks, and landscaping; and abatement of hazardous materials. The physical destruction or damage associated with these activities would be mitigated by repair of any damages to historic materials and finishes to match the original, and in-kind replacement of significant and contributing features in adherence to the Standards, with the exception of the east and west additions." The character-defining features and anticipated effects on each are as follows:

- Overall form – large, central block with door wings and one-story eastern addition: Will be maintained, with the exception of the removal of the later east addition, which has been identified as an adverse effect.
- Stucco-covered reinforced-concrete walls: Exterior stucco currently painted; will be repainted to match the original stucco color; no substantial exterior alterations; interior concrete reinforcements will not result in an adverse effect on this exterior character-defining feature.
- Shaped parapets on the north and south elevations: No alterations.

- Stringcourses: No alterations.
- Stepped watertable: No alterations.
- Massive steel-frame and metal panel sliding doors at north elevation: No alterations.
- Windows (vertical bands of windows on east, west, and all wing elevations; clerestory windows; tripled windows on the first floor; and divided-light windows with metal frames and sashes): All existing original window frames and hardware will be repaired and returned to operable status; window glazing will be replaced for improved safety and thermal performance and a uniform appearance; see discussion under Comment #2.
- Metal doors with glazed divided lights: All existing original doors will be repaired and returned to operable status; glazing (currently painted over) will be replaced as discussed above under Comment #2.
- Interior space: large, open, central space with exposed trusses: Exposed trusses will be reinforced with bracing that will be partially visible within the space; however, the introduction of the reinforcements will not diminish the integrity of this feature; see discussion under Comments #3 and #8.
- Concrete stairways in door wings: No alterations.
- Original interior panel wood doors: Will be maintained and repaired, as necessary.
- Original lighting fixtures: Will be maintained and repaired, as necessary.

In addition, NASA supports the list of noncontributing features identified by ARG; removal of those features will not result in an adverse effect:

- Second-story additions in the door wings
- Aluminum windows in east addition
- Recently applied interior finishes, including the wood gymnasium floor
- Building 480 – Racquetball Court

8. Comment: *While the removal of the east and west wings of Building 2 would constitute adverse effects, at this time, the SHPO has insufficient information to offer formal concurrence with the proposed Finding of Adverse Effect. Please provide the information requested above, as well as the following:*

a. Clarify why NASA finds the proposed seismic retrofit would not adversely affect Building 2.

Response: The proposed activities associated with seismic retrofitting, including the reinforcement of the concrete piers and floor and the roof trusses, will not diminish the integrity of Building 2 as a contributor to the NAS Sunnyvale Historic District. The physical changes associated with the retrofit will occur in the interior of the building. The interior open space of the building is a character-defining feature for its openness and utilitarian form related to its construction as a balloon hangar; no specific interior furnishings have been identified as character-defining features, including the basketball court and related apparatuses that appear less than 50 years old (research did not reveal the date of the installation of the floor or related fixtures). Although partially visible within the open bay of the building, the appearance of new structural members and fiber wrap will not detract from the volume of the open space and the exposure of the board-formed concrete walls and piers and the superstructure of trusses and bracing. The new reinforcements and bracing will not diminish the character-defining feature of the open space or diminish the integrity of the historic property. Building 2's only affected interior character-defining feature will remain intact and retain integrity to convey its historical significance, and the seismic retrofit will not have an adverse effect on Building 2.

b. Once the character defining features of Building 2 have been clarified and agreed upon, the assessment of effect may need to be revisited to account for removal of other features such as the basketball court.

Response: Additional information regarding the potential effects of the undertaking on the individual character-defining features of Building 2 is provided above in the response to Comment #7. Overall, the features of the building that convey its historic significance as a contributor to the NAS Sunnyvale Historic District will remain intact, with the exception of the east and west additions, which will be removed. Therefore, the only activities that would result in an adverse effect are related to the removal of the east and west additions.

Summary:

- NASA ARC has determined that Building 480 does not meet the NRHP criteria and is not a historic property, and requests the State Historic Preservation Officer's concurrence on this determination of eligibility.
- The APE has been expanded and now also includes Buildings N239A, N210, and N243. Building N243 is listed in the NRHP, and, for the purposes of this undertaking, NASA ARC proposes to treat Buildings N239A and N210 as eligible historic properties. No indirect effects that would affect these properties are anticipated.
- NASA ARC has determined that the undertaking will have an adverse effect on Building 2 due to the removal of the east and west additions, which were identified as character-defining or contributing features of the property; however, other changes to the property, including the addition of bracing and the replacement of glazing in historic windows and doors, will not result in an adverse effect because the integrity of the character-defining features will remain sufficiently intact to convey the significance of Building 2 as a contributor to the NAS Sunnyvale Historic District.
- Because Building 2 will retain sufficient integrity as a contributor to the NAS Sunnyvale Historic District, and no other adverse effects on other district contributors are anticipated, the undertaking will not have an adverse effect on the district as a whole.
- Based on the nature of the adverse effect that will result from this undertaking, NASA ARC proposes archival documentation as outlined in the draft Memorandum of Agreement provided on June 21, 2018, as appropriate mitigation. NASA ARC requests the State Historic Preservation Officer's response within 30 days of receipt of this letter.

The evaluations and assessment of effects herein were provided by Trina Meiser, M.A., who meets the Secretary of the Interior's professional qualifications standards in Architectural History and History.

Please contact me at jonathan.d.ikan@nasa.gov or at (650) 604-6859 with your comments or questions.

Sincerely,

Jonathan Ikan
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cc:
HQ/EMD/Ms. Rebecca Klein, Ph.D., RPA

References:

AECOM. 2018. Memorandum about Ames Research Center (ARC) Building 2 Seismic Retrofit Project; dated June 18, 2018.

ARG (Architectural Resources Group, Inc.). 2004. *Building 2 Reuse Guidelines (Draft Report), Moffett Federal Air Field, California*. On file at ARC.

Page & Turnbull, Inc. 2006. *NASA Ames Research Center, Moffett Field, California, Survey & Rehabilitation Recommendations*. On file at ARC.