Chapter 14. Wetlands and Floodplains

14.1 Overview

This chapter provides information about wetlands and floodplains at ARC. Applicable regulations are discussed, as well as relevant policies and measures that minimize harm to lives and property, and that preserve the natural and beneficial values of wetlands and floodplains. The information presented in this chapter was drawn from the November 2009 NASA ARC ERD (NASA 2009), NADP EIS (Design, Community & Environment 2002), *Storm Water Retention Pond Tidal Restoration Feasibility Study* (Brown and Caldwell et al. 2005), current flood hazard data for the area, and other sources.

14.2 Regulatory Background

14.2.1 Federal Regulations

14.2.1.1 *Clean Water Act*

The CWA is an amendment to the Federal Water Pollution Control Act of 1972, which outlined the basic structure for regulating discharges of pollutants to waters of the United States. Several sections of this act pertain to regulating impacts to wetlands. Section 401 (Water Quality Certification) specifies requirements for permit review, particularly at the state level. The discharge of dredged or fill material into waters of the United States is subject to permitting under Section 404 (Discharge of Dredged and Fill Materials into Waters of the United States). The Corps and the EPA administer the CWA.

14.2.1.2 *Section 401: Water Quality Certification*

Section 401 of the federal CWA gives individual states the authority to issue, waive, or deny certification that a proposed activity is in conformance with state water quality standards. Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the applicable state RQWCB in which the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401. The ARC site is under the jurisdiction of the San Francisco Bay RWQCB.

14.2.1.3 *Section 404: Discharge of Dredged and Fill Materials into Waters of the United States*

The Corps and EPA regulate the placement of fill and dredged materials into waters of the United States under CWA Section 404. Waters of the United States include lakes, rivers, streams, and their tributaries, as well as wetlands. Wetlands are defined for regulatory purposes as areas "inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Applicants

must obtain a permit from the Corps for all discharges of dredged or fill material into waters of the United States, including adjacent wetlands, before proceeding with a proposed activity.

The Corps may either issue individual permits on a case-by-case basis or general permits at a program level. General permits are pre-authorized, and are issued to cover similar activities that are expected to cause only minimal adverse environmental effects. Nationwide permits are a type of general permit issued to cover particular fill activities. Nationwide permits have a set of conditions that must be met for the permits to apply to a particular project, as well as specific conditions that apply to each nationwide permit.

Compliance with CWA Section 404 requires compliance with several other environmental laws and regulations. The Corps cannot issue an individual permit or verify the use of a general permit until the requirements of the NEPA, the Endangered Species Act (ESA), and the NHPA have been met. In addition, the Corps cannot issue or verify any permit until a water quality certification or a waiver of certification has been issued pursuant to CWA Section 401.

14.2.1.4 *National Environmental Policy Act*

NEPA requires federal agencies to include in their decision-making process appropriate and careful consideration of all environmental effects of a proposed action and of possible alternative actions. Measures to avoid or minimize the adverse effects of proposed actions and to restore and enhance environmental quality as much as possible must be developed and discussed where feasible.

14.2.1.5 *Federal Flood Insurance Program*

Alarmed by the increasing costs of disaster relief, Congress passed the National Flood Insurance Act in 1968 and the Flood Disaster Protection Act in 1973. The intent of these acts was to reduce the need for large publicly funded flood control structures and decrease disaster relief costs by restricting development on floodplains.

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development on floodplains. FEMA issues Flood Insurance Rate Maps (FIRMs) delineating flood hazard zones for communities participating in the NFIP.

14.2.1.6 *Executive Order 11990 – Protection of wetlands*

EO 11990 directs federal agencies to minimize the destruction, loss, and degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetland communities. Agencies must avoid undertaking or providing assistance for new construction located in wetlands unless they determine that: (1) there is no practical alternative to such construction and (2) the proposed action includes all practical measures to minimize harm to wetlands that may result from such use. Agencies must also provide opportunity for early public review of any plans or proposals for new construction in wetlands. For major NASA actions significantly affecting the quality of the human

environment, an analysis and determination of wetland impacts will be included in any statement prepared under Section 102(2)(C) of NEPA. EO 11990 is codified for NASA in 14 CFR 1216.205 and incorporated into the NASA Management Directives System.

14.2.1.7 *Executive Order 11988 – Floodplain Management*

EO 11988 requires federal agencies to take action to minimize occupancy and modification of the floodplain. Specifically, EO 11988 prohibits federal agencies from funding construction in the 100-year floodplain unless there are no practicable alternatives. The 100-year or base floodplain designates the area that is predicted to flood during a 100-year storm, which has a 1 percent chance of occurring in any given year. For critical actions[9], federal agencies must avoid modifying the base or 500-year floodplain. The 500-year floodplain designates the area with a 0.2 percent chance of flooding in any given year.

EO 11988 requires that federal agencies provide early public notice and evaluation of actions that may impact the floodplain, and provide opportunities for public input if no practicable alternative to floodplain development exists. For major NASA actions significantly affecting the quality of the human environment, a floodplain evaluation will be included in any statement prepared under Section 102(2)(C) of NEPA. EO 11988 is codified for NASA in 14 CFR 1216.205 and incorporated into the NASA Management Directives System.

14.2.1.8 *Title 14 Code of Federal Regulations 1216.205 - Procedures for Evaluating NASA Actions Impacting Floodplains and Wetlands*

As set forth in 14 CFR 1216.205, NASA must avoid taking any action in a floodplain unless there are no practicable alternatives. Upon considering a proposed action in the base floodplain (or 500-year floodplain for critical actions), the proposed action and alternatives must be comparatively evaluated taking into account the identified impacts, the steps necessary to minimize these impacts, and opportunities to restore and preserve floodplain values. If there is no practicable alternative to locating a proposed action in the floodplain, statement of funding and public explanation must be provided to all those who have received the early public notice. If there are no or only minor challenges to the proposed development, the action may then proceed through the normal NASA approval process. If significant issues arise during the 15- to 30-day public review process, a re-evaluation of the proposal and alternatives must be repeated.

Evaluations of floodplain impacts must be made at the earliest stage of advance planning, such as during facilities master plan development. Once approved, construction of facilities in the floodplain area must be in accordance with the standards and criteria of the NFIP and wherever practicable, structures should be elevated above the applicable flood level.

[9] Per 44 CFR §9.4, Floodplain Management and Protection of Wetlands, A "*Critical Action* means an action for which even a slight chance of flooding is too great." Roughly stated, a critical action includes any activity or project that creates, maintains, or extends the life of a facility that may use or store hazardous materials, provide emergency services, store irreplaceable documents or files, house or shelter mobility impaired individuals, or generate or store water, power, or gas for general use.

For actions affecting wetlands or floodplains, applicable NEPA procedures shall be used to provide the opportunity for early public review of the proposed action. A notice of intent to prepare an EIS may be used to satisfy the requirement for NASA to publish a notice of proposed action in a wetland or floodplain.

14.2.1.9 *Congressional Authorizations for the South San Francisco Bay Shoreline Study*

Section 142 of the Water Resources Development Act (WRDA) of 1976 authorized the Corps to investigate, among other things, the feasibility of providing protection against tidal and fluvial flooding along the San Francisco Bay shoreline. Following the Corps' completion of the initial San Francisco Bay Shoreline Study for San Mateo, Alameda, and Santa Clara Counties, the U.S. House of Representatives' Committee on Transportation and Infrastructure authorized the Corps in 2002 to perform a reconnaissance phase study, in accordance with Section 905(b) of the 1986 WRDA, to determine if there was federal interest in a cost shared feasibility phase study of the South San Francisco Bay shoreline (USACE 2004). The Corps completed the study and published a Section 905(b) analysis report in 2004 recommending that the Shoreline Study proceed into the feasibility phase. Congress then authorized the Corps, under Section 4027 of the 2007 WRDA, to conduct a feasibility study in cooperation with the SCVWD and California State Coastal Conservancy for flood damage reduction along the South San Francisco Bay Shoreline, restoration of the South San Francisco salt ponds, and other related purposes (HDR Engineering, Inc. 2014). This congressionally authorized study, currently in progress, is called the South San Francisco Bay Shoreline Study.

14.2.2 **State Regulations**

Fish and Game Code 1602 – Lake and Streambed Alteration Permits

The California Department of Fish and Wildlife (CDFW) has jurisdiction over ephemeral intermittent, and perennial waterways, including ephemeral streams, desert washes, and watercourses with a subsurface flow. It may also apply to work undertaken within natural lakes, manmade reservoirs, or the floodplain of a body of water. Under Section 1602, CDFW must be notified of any activity that substantially diverts or obstructs a waterway; changes or uses material from the bed, channel, or bank of a waterway; or deposits or disposes of debris, waste, or other material containing ground pavement where it may pass into any waterway. Notification to CDFW (through a Lake or Streambed Alteration Agreement) is required prior to the start of construction. The Agreement includes reasonable conditions necessary to protect sensitive fish and wildlife resources and, as applicable, must comply with CEQA.

14.2.3 **Local Regulations**

14.2.3.1 *Santa Clara County*

Existing County policies require that development in flood hazard areas: (a) not be located in a floodway or areas of highest risk; or (b) if located in hazard areas, to be designed, elevated and/or constructed to withstand or mitigate the risk of flooding. At a minimum,

new development must be placed to ensure that the finish floor elevation of the first story is above the 100-year flood level, which may require padding up the building location or by elevated building design measures. These requirements are implemented through the building permit process according to regulations contained in the County Floodplain Management Ordinance, Title C, Division C12, Chapter VII, of the Santa Clara County Ordinance Code.

14.2.3.2 *City of Mountain View*

Mountain View's Drainage and Flood Control Ordinance, as codified in the Mountain View City Code, Chap. 8, Article IX, were established to reduce hazards associated with development on parcels at risk for flooding. All properties in flood hazard zones must comply with this ordinance. Areas at ARC to which these provisions could apply[10] include portions of the Bay View area, the Eastern and Western Diked Marshes, and the SWRP.

14.2.3.3 *City of Sunnyvale*

Sunnyvale enforces specific building code requirements in flood prone areas to minimize potential property damage from flooding. Specific requirements for development in these areas, as set forth in the Buildings and Construction Ordinance, Title 16 of the Sunnyvale Municipal Code, include minimum foundation pad heights above the projected flood depth as specified on the applicable FIRM.

14.3 **Regional Setting**

ARC is located in northern Santa Clara County at the southern end of the San Francisco Bay. U.S. Highway 101, adjacent to the southern boundary of the ARC, provides primary transportation access to the facility. ARC is part of the metropolitan Bay Area; San Francisco is located 65 kilometers (40 miles) to the northwest, and San Jose is located 16 kilometers (10 miles) to the southeast. The cities of Mountain View and Sunnyvale are adjacent to ARC, across U.S. Highway 101. The USFWS owns the salt ponds and marshes north of Moffett Field, which were previously used for salt production by Cargill Salt Company. North of the USFWS property is the San Francisco Bay, approximately 1.6 kilometers (1 mile) to the north of Moffett Field. Stevens Creek forms the western boundary of ARC and discharges to San Francisco Bay. Along with three other area streams, Stevens Creek receives stormwater discharge from the City of Mountain View storm drain system, as well as treated groundwater from the MEW and NASA sites. There is also a limited connection between ARC and Guadalupe Slough via gates and pumps located to the northeast of Moffett Field, which discharge to the Northern Channel and Moffett Channel.

The Corps, together with the SCVWD and CSCC, is currently developing the South San Francisco Bay Shoreline Study to identify and recommend flood risk management and ecosystem restoration projects along South San Francisco Bay for federal funding. The study is being conducted through several "Interim Feasibility Studies," the first of which is an investigation of flood protection for all Santa Clara County Baylands, from Palo Alto

[10] To the extent that these areas are within the City of Mountain View limits. Most of ARC is in unincorporated Santa Clara County.

through Alviso to Southern Santa Clara County, in addition to the restoration of former salt production ponds within the Alviso Pond complex and adjacent properties such as areas around ARC (HDR Engineering, Inc. 2014). The scope of the current phase of the Shoreline Study is focusing on the most flood-prone section of the Santa Clara County shoreline: the area between Alviso Slough and Coyote Creek, which includes the Alviso community and the San Jose/Santa Clara Water Pollution Control Plant (South San Francisco Bay Shoreline Study 2014). The Corps is in the process of developing a draft feasibility study and EIS on project alternatives for the Alviso area.

A separate but related project, the SBSPRP, is a collaborative effort among federal, state, and local agencies working with scientists and the public to develop a programmatic plan for habitat restoration, flood management, and wildlife-oriented public access within the approximately 15,100 acres of former Cargill Inc. salt ponds in South San Francisco Bay acquired in 2003 (EDAW et al. 2007). With an initial goal to restore 7,500 acres to tidal marsh, the SBSPRP has to date achieved approximately 41% of that goal, with over 3,040 acres of former salt ponds restored to tidal flow. The Project has also enhanced a total of 477 acres of pond habitat for wildlife use toward a Project goal of 1,600 acres and has created 2.9 miles of public access trails along with interpretive signage and a new viewing platform at Pond A16 in Alviso (South Bay Salt Pond Restoration Project 2013).

Although the SBSPRP is separate from the Shoreline Study, it has similar objectives, shares the same geographic scope, and includes complementary restoration and flood management components; consequently, the planning and management of these two projects is being closely integrated.

14.4 Existing Site Conditions

14.4.1 Wetlands

A total of 51 acres of waters of the United States, including 42.4 acres of seasonal wetland and 8.6 acres of other waters of the United States were formally delineated at ARC in 2000 based on the Corps' 1987 Wetlands Delineation Manual (Environmental Laboratory 1987). Waters of the U.S. were identified in the Bay View area, the Eastside/Airfield area (excluding the golf course), and the area immediately north of the Bay View area (North of Bay View area). Results of the wetland delineation were verified by the Corps in May 2001 and are incorporated by reference in the 2002 NADP PEIS.

The wetland delineation identified the wetlands located within the Bay View planning area and the Eastern and Western Diked Marshes in the North of Bay View area as seasonal wetlands. Specifically, two principle types of wetlands, as classified by the USFWS (Cowardin et al. 1979), were identified in these areas: PEMCh (Palustrine, emergent, seasonally flooded, diked) and PEMYKh (Palustrine, emergent, saturated, semipermanent; seasonal, artificially flooded, diked).

Wetland mosaics[11] and seasonal wetlands classified as PEMA (palustrine, emergent, temporarily flooded) and PEMWr (Palustrine, emergent, intermittently flooded/temporary, artificial substrate) were identified within the airfield itself, at the northern end. In addition, a number of drainage features delineated as "other waters of the U.S." were identified in a northwest quadrant of the Eastside/Airfield area along North and East Patrol Roads and on the golf course. These include the Northern Channel, classified as E1UBN (Estuarine, subtidal, unconsolidated bottom, regularly flooded), and the East Patrol Road, North Patrol Road, and Marriage Road ditches, all of which were classified as PEMJxr (Palustrine, emergent, intermittently flooded, excavated, artificial substrate).

Wetlands and other waters of the U.S. at ARC are described in Table 14-1.

Table 14-1. Wetlands and Other Waters of the U.S. Present at ARC

Area	Description	Dominant Plant Spp
Bay View	Approximately 5.3 acres of seasonally inundated wetlands are located within the Bay View planning area in the northwest portion of ARC. Wetland types include PEMCh and PEMYKh.	Pickleweed (*Salicornia virginica*) Alkali heath (*Frankenia salina*) Salt grass (*Distichlis spicata*) Salt heliotrope (*Heliotropum curassavicum*) Baltic rush (*Juncus balticus*) Curly dock (*Rumex crispus*) Birdsfoot trefoil (*Lotus corniculatus*) Mediterranean Rye (*Lolium multflorum*) Bristly ox-tongue (*Picris echioides*) Perennial pepperweed (*Lepidium Latifolium*)
North of Bay View	Approximately 16.8 acres of seasonally inundated wetlands are located north of the Bay View planning area. Wetland types include PEMCh and PEMYKh.	Pickleweed (*Salicornia virginica*) Alkali heath (*Frankenia salina*) Salt grass (*Distichlis spicata*) Salt heliotrope (*Heliotropum curassavicum*) Baltic rush (*Juncus balticus*) Curly dock (*Rumex crispus*) Birdsfoot trefoil (*Lotus corniculatus*) Bristly ox-tongue (*Picris echioides*) Perennial pepperweed (*Lepidium Latifolium*)
Eastside/Airfield (excluding drainage ditches)	Approximately 20.3 acres of seasonal wetlands are located in the northern sections of the airfield. Wetland types include PEMA, PEMWr, and wetland mosaics.	Pickleweed (*Salicornia virginica*) Alkali heath (*Frankenia salina*) Salt grass (*Distichlis spicata*) Baltic rush (*Juncus balticus*) Creeping wild rye (*Leymus triticoides*) Spearscale (*Atriplex triangularis*) Clustered field sedge (*Carex praegracilis*) Perennial pepperweed (*Lepidium Latifolium*)
Northern Channel, North and East Patrol Road ditches, and Marriage Road ditch	Approximately 8.6 acres of other waters of the U.S. are located along North and East Patrol Roads and on the golf course. Wetland types include E1UBN and PEMJxr.	Pickleweed (*Salicornia virginica*) Salt grass (*Distichlis spicata*) Prairie bulrush (*Scirpus maritimus*) Cattail (*Typha latifolia*) Dallis grass (*Paspalum dilatatum*)
Source: Jones & Stokes 2001.		

[11] A "wetland mosaic" refers to a landscape where wetland and non-wetland components are too numerous and closely associated to be appropriately delineated.

In 2009, the Corps issued a revised jurisdictional delineation based on a formal request from NASA Ames. The revised delineation eliminated some of the seasonal wetlands previously identified in the Bay View area, reducing the total area of verified wetlands in the Bay View area to 2.1 hectares (5.3 acres) from 2.2 hectares (5.5 acres). In addition, East Patrol Road ditch, which was formerly delineated as "other waters of the U.S.," was reclassified as "wetlands." Figure 14-1 shows the location of wetlands and other waters at ARC per the revised determination.

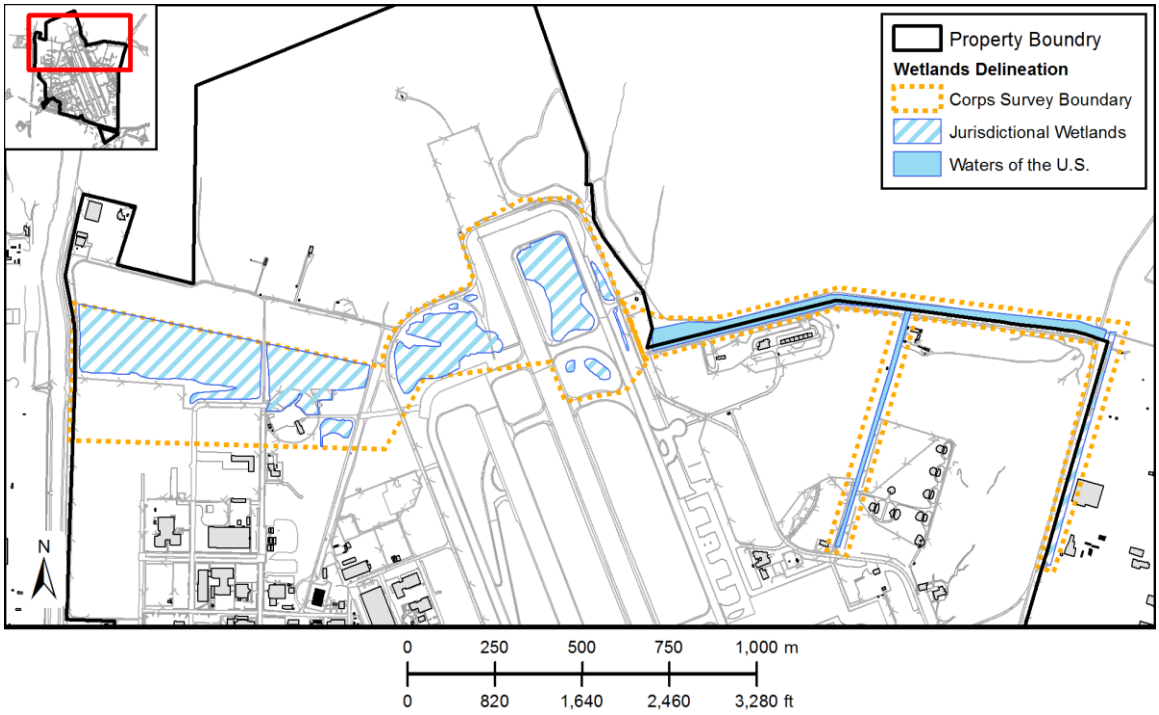

Figure 14-1. Army Corps of Engineers' 2009 Wetlands Delineation

(Sources: NASA Ames Research Center, Environmental Management Division;
U.S. Army Corps of Engineers, San Francisco District Regulatory Branch)

Currently, NASA is responding to an administrative order from the EPA requiring NASA to take corrective measures to address soil contamination in Area of Investigation (AOI) 14, an area located adjacent to the SWRP and surrounded by diked wetlands. The order concerns the cleanup of three fill peninsulas -- the 8-acre former soil fill area (FSFA); the Building N217 fill area; and the Building 217A fill area.

The wetlands area surrounding AOI 14, designated Navy Installation Restoration (IR) Site 25, had previously been determined to contain toxic chemicals above site ecological cleanup levels and was recently cleaned up by the Navy under the Comprehensive Environmental Response, Compensation, and Liability Act. Because AOI 14 had not been stabilized and the contamination not addressed during the Navy's Site 25 cleanup, the EPA has determined that leaving AOI 14 in an unremediated state presents a danger to the environment and threatens to re-contaminate the Navy's Site 25 clean up (USEPA 2013b).

The required corrective measures for AOI 14 are considered necessary due to the presence of chemicals of concern, primarily, PCB, DDT, lead, and zinc, in excess of NASA's site-specific soil action levels. To address the contamination and protect the surrounding wetlands, NASA developed an Interim Corrective Action Measures Work Plan and installed a temporary silt fence around the northern portion of the FSFA in coordination with the USFWS, the Corps, and the RWQCB. Final corrective measures for AOI 14 have not been determined.

ARC is not engaged in a wetlands banking program.

14.4.2 **Floodplains**

Historically, flooding at ARC, primarily in the northern portions of the site, has originated from two sources: San Francisco Bay and Stevens Creek. Improvements to the bay-side levees surrounding the former Cargill salt ponds in San Francisco Bay and subsequent flood control improvements to Stevens Creek have provided greater protection from flooding in recent years but have not removed the risk entirely. In addition, the stormwater drainage and retention systems at ARC lack the capacity to handle high water volumes and have on occasion caused general and localized flooding in certain areas of the Center during peak rainfall events (see additional information on flood hazards in Chapter 11, *Hydrology and Water Quality*).

Much of the Bay View area and parts of the Ames Campus area are located within the 100-year and 500-year floodplain boundaries as delineated on FIRMs produced by FEMA (Figure 14–2). Geographic areas within floodplains are further divided into one or more flood zones, which FEMA uses to assign levels of flood risk for flood management and insurance purposes. At ARC, areas located in the 100-year floodplain are considered at high risk for flooding and thus are assigned to Zone AE, while areas in the 500-year floodplain, which are at minimal to moderate risk of flooding, are assigned to Zone X (hatched). The northern Eastside/Airfield area, the NRP area, and the majority of the Ames Campus area south of Hunsaker Road, which FEMA has not studied, have possible but undetermined flood hazards; consequently, all of these areas are designated as Zone D. FEMA flood hazard zones present at ARC are described in Table 14-2.

Table 14-2. FEMA Flood Hazard Zones Present at ARC

Zone	Definition
AE (Stippled)	Areas subject to inundation by the 1-percent-annual-chance flood event. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown.
X (Hatched)	Moderate risk areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by a levee. No BFEs or base flood depths are shown within these zones. (Zone X (hatched) is used on new and revised maps in place of Zone B.)
D	Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.
Source: FEMA 2014a.	

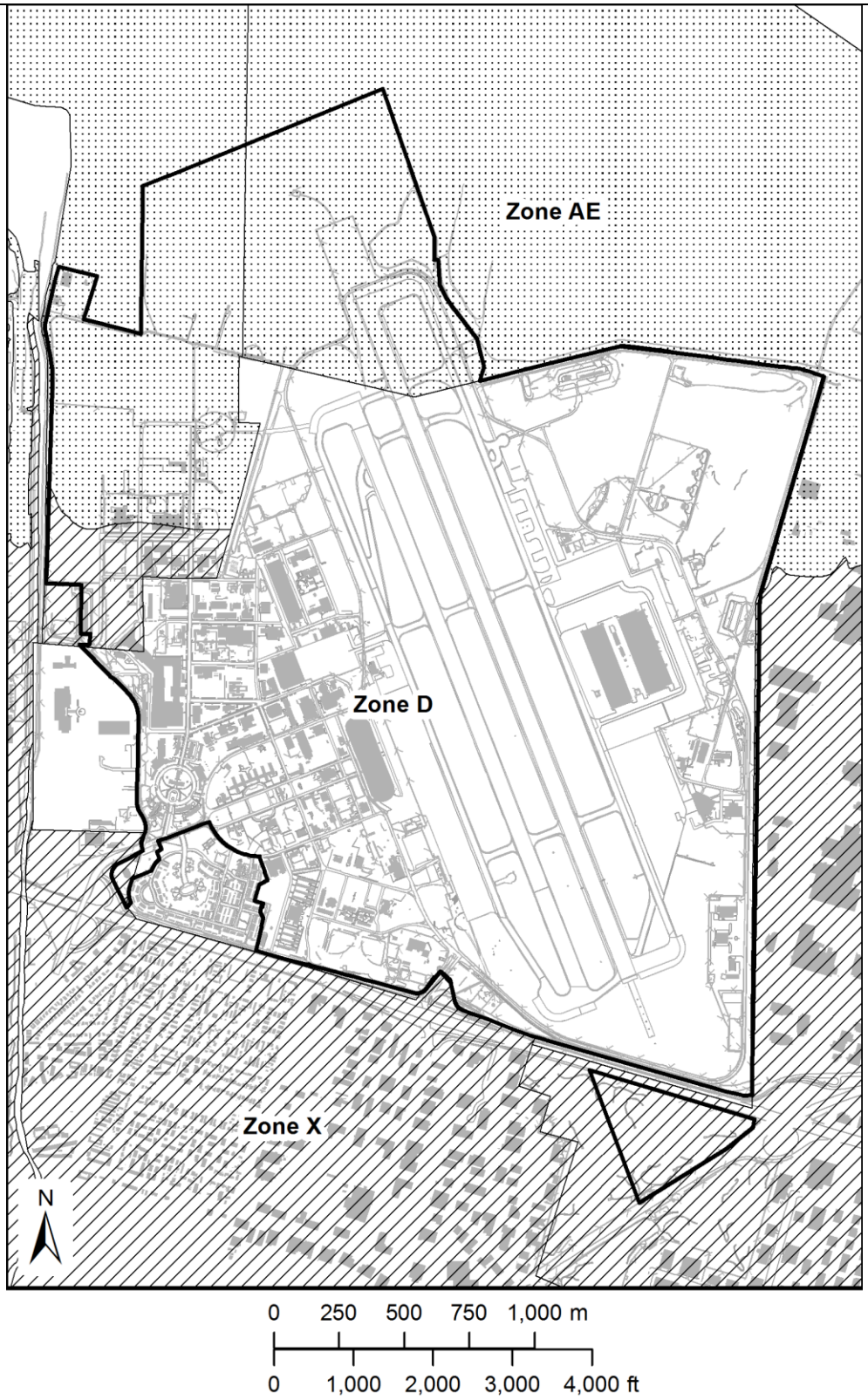

Figure 14-2. Flood Risk at ARC

(FEMA 2014b)

Google's 1.2 million-square-foot Bay View campus is currently under construction in the Bay View area of ARC, much of it within the 100-year floodplain. To mitigate for future flood risk associated with the development of new housing in the Bay View area, fill was placed in Bay View Parcels 1, 2, and 4, effectively raising the existing site elevations in those areas above the 100-year flood level of 11+ feet above grade (based on the North American Vertical Datum of 1988 [NAVD88]). The minimum entry floor level for occupiable buildings on the Bay View campus is anticipated to be at 12+ feet above grade, or 1 foot above the base floodplain, which is consistent with the design assumptions presented in the floodplain analysis in Chapter 6 of the NADP EIS. The analysis determined that the addition of fill above the 100-year tide elevation "would not cause changes in tidal water levels at other locations and would not have a cumulative impact." Additionally, the current design of the Bay View campus incorporates many of the stormwater management practices proposed in the EIS to reduce the impact of stormwater runoff on the floodplain, including green roofs, bioswales, and stormwater detention basins.

No other development activities are currently located in, or proposed for, floodplains at ARC.

14.5 Environmental Requirements

NASA has identified the following environmental policies and measures that are designed to minimize harm to lives and property, and preserve the natural and beneficial values of wetlands and floodplains.

14.5.1 NASA Procedural Directive 8500.1, NASA Environmental Management

Per NPD 8500.1, it is NASA policy to: maintain compliance with all applicable federal, state, and local environmental requirements; to incorporate environmental risk reduction and sustainable practices to the extent practicable throughout NASA's programs, projects, and activities; and to consider environmental factors throughout the life cycle of programs, projects, and activities (as defined in NPD 7120.4, *NASA Engineering and Program/Project Management Policy*, and related documents), including planning, development, execution, and disposition activities. Examples of environmental factors include consideration of environmental impacts as required by the NEPA and NHPA; the proposed use of hazardous materials; the potential for waste generation; the need to acquire necessary permits, waivers, and authorizations; and the use of environmentally-preferable materials and processes wherever practicable.

14.5.2 Ames Procedural Requirements 8500.1, Ames Environmental Procedural Requirements

APR 8500.1 sets forth general procedural requirements to ensure compliance with applicable federal, state, and local environmental laws; regulations and EOs; and NASA policies and procedures. Organizational directors, division chiefs, branch chiefs, section heads, supervisors, managers, and CORs are responsible for planning, designing, constructing, managing, operating, and maintaining facilities in conformance with applicable regulatory directives, and should obtain environmental review from the Environmental Management Division early in project planning consistent with NASA's

NEPA implementing procedures (NPR 8580.1 and EO 12114), NASA policies and procedures for programs and projects (NPR 7120), and NASA regulations related to environmental quality (14 CFR 1216). Program and project managers should coordinate with the Environmental Management Division in a timely manner to ensure that any new or modified programs, projects, and activities comply with regulatory requirements.

14.5.3 Ames Environmental Work Instructions

Ames's EWIs, which replace the previous Ames Environmental Handbook (APR 8800.3), set forth requirements to ensure that programs, projects, and activities at ARC comply with applicable federal, state, and local laws; regulations and EOs; and NASA policies and procedures. Each EWI lists relevant regulatory authorities and documents, assigns individual and organizational responsibilities within ARC, and identifies specific requirements applicable to the work being performed.

The following EWIs are relevant to operations and future development at ARC with the potential to impact wetlands and floodplains.

- EWI 2-4, Wetlands and Flood Plains (Under review)
- EWI 12, Public Involvement
- EWI 14, NEPA and Environmental Justice
- EWI 18, Environmental Requirements for Construction Projects (Under review)

14.5.4 NASA Ames Development Plan Final Programmatic Environmental Impact Statement

The NADP EIS identifies the following mitigation measures to address impacts to wetlands from build out of NADP Mitigated Alternative 5.

14.5.4.1 *Mitigation Measure BIO-3*

> *Landscaping would be designed with native species (with the possible exception of lawn areas). Invasive plants would not be used in any landscaping. Any imported soil used for landscaping must be certified as weed-free. Similarly, any erosion-control structures that contain hay or other dried plant material (e.g., hay bales) must be certified as weed-free. Any construction equipment operating within 76 meters (250 feet) of jurisdictional wetlands or other sensitive habitats in the Bay View area would be washed with reclaimed water prior to use in this area to remove potential weed seeds. The construction zone would be surveyed periodically by a qualified botanist, so that any infestations of invasive species that establish within the construction zone of the Bay View area can be eradicated before the plants can flower and set seed. Project proponents must obtain all applicable permits and approvals for discharges of dredged or fill material into waters of the United States, including wetlands, before proceeding with a proposed action.*

14.5.4.2 *Mitigation Measure BIO-18*

Potentially contaminated runoff would be managed using stormwater BMPs. Swales would be constructed adjacent to wetlands in upland areas to intercept and filter any runoff before it reaches the wetland. Construction of swales would be permitted within the 61-meter (200-foot) buffer zone around wetlands, but not within the wetlands themselves.

14.5.4.3 *Mitigation Measure BIO-19*

To minimize impacts on wetlands, construction would be avoided in the jurisdictional wetlands along the northern boundary of the Bay View area and within 61 meters (200 feet) of these wetlands. Fill activities and other disturbances would be minimized in jurisdictional wetlands elsewhere.