



**U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Golden, CO**

**Floodplain Assessment for
Installation of a Renewable Energy Anaerobic Digester Facility
at the University of California, Davis
in Yolo County, California**

January 11, 2013

1.0 Introduction

This floodplain assessment has been prepared in accordance with 10 Code of Federal Regulations (CFR) 1022, “Compliance with Floodplain and Wetland Environmental Review Requirements” which were promulgated to implement the requirements of the U.S. Department of Energy’s (DOE’s) responsibilities under Executive Order 11988, *Floodplain Management*, and Executive Order 11990, *Wetlands Protection*. According to 10 CFR 1022, a floodplain is defined as the lowlands adjoining inland and coastal waters and relatively flat areas and flood prone areas of offshore islands, including, at a minimum, that area inundated by a 1% or greater chance flood in any given year (the “100-year floodplain”).

The U.S. Department of Energy (DOE) is proposing to provide federal funding to the University of California, Davis (UC Davis) for the installation of a Renewable Energy Anaerobic Digester facility (READ) and an internal combustion engine generator that would be located in a 100-year floodplain. The proposed facility is part of the DOE Community Renewable Energy Deployment effort which is funded by the *American Recovery and Reinvestment Act of 2009*. The intent of the proposed project is to develop and construct a waste-to-renewable energy facility to benefit UC Davis.

UC Davis recently completed a California Environmental Quality Act (CEQA) Initial Study analysis with a Negative Declaration which states that the proposed project would not have a significant effect on the environment. The CEQA Initial Study was tiered from a 2003 UC Davis Long Range Development Plan and Final Environmental Impact Report (2003 LRDP EIR) which is a comprehensive campus land use plan.

Accordingly, DOE has prepared this floodplain assessment to evaluate the potential impacts of implementing the project within a floodplain, as required by 10 CFR 1022, *Compliance with Floodplain and Wetland Environmental Review Requirements*. The proposed project is not located within a wetland.

2.0 Project Description

UC Davis proposes to install a renewable energy anaerobic digester facility (READ facility) at a closed campus Class 3 municipal solid waste landfill located at 28068 County Road 98, Davis, California, which is south of Hutchinson Drive, one half mile north of the Putah Creek corridor in the west campus area of the UC Davis campus within a Zone A 100-year floodplain (see Figure A). The proposed READ facility would accept organic wastes (feedstock) from campus operations as well as off campus sources, process the feedstock in a biodigester, and use the biogas produced in the biodigester and the biogas collected from the campus landfill to generate electricity in a 1200 kW internal combustion engine.

The proposed project site is on the previous receiving and weighing area of the closed 39 acre landfill (see Figure B). The landfill stopped receiving waste in August 2011 and is in the final closure process, scheduled for completion in the summer of 2013. The proposed project site has been heavily disturbed due to landfill activities, is graded nearly flat, and is covered primarily with compacted gravel. A small modular office building (scale-house) and a truck scale are currently located on site. These facilities would be retained for use as part of the proposed project and no new access roads would be required for construction or operation. The site also has a landfill gas collection system and flare that were installed to manage gases generated by the landfill.

The proposed site does not support any native vegetation and there are four non-native trees located on the project site; however, they are not located within the footprint of the proposed facility and would not be removed. The surrounding land outside of the former landfill is currently used for campus support facilities and teaching and research agricultural fields.

The proposed project would consist of the installation of the following equipment: material separation and grinding equipment; biodigester tanks, piping and control equipment; solid and liquid separation equipment; biogas refining equipment and new flare; and a 1200 kW internal combustion engine unit for electricity generation. The READ facility would have the capacity to handle up to 50 tons of organic wastes feedstock per day.

The READ facility and equipment would sit on concrete pads or compacted gravel. Approximately 35,000 square feet of ground disturbance would occur and 3,000 cubic yards of material would be moved during construction of this facility. The final footprint of the project site and facility would be approximately 22,000 square feet and approximately 7,500 square feet of it would be paved and/or concrete pads.

The proposed facility (see Figure C) would include modular equipment that would be manufactured off site and brought to the site by truck for installation. The modular components would be mounted on skids placed on cement pads installed on the site as follows: the digester skids would sit on a 12 inch thick concrete pad 9.5 feet by 56 feet; the conveyor would sit within a four foot deep concrete pit that is 20 feet by 35 feet; the separator would sit on a six inch thick concrete pad 34 feet by 34 feet; the combustion engines would sit on six inch thick concrete pads 14 feet by 44 feet; and the effluent processing pad would be a six inches thick and 50 feet by 50 feet. The system would include cylindrical process tanks that would be constructed on site and sized as follows: two 75,000-gallon tanks 28 feet in diameter and 16 feet tall; two 150,000-gallon tanks 40 feet in diameter and 16 feet tall; and a 30,000-gallon tank 20 feet in diameter and 16 feet tall. All tanks would be placed on six inches of compacted gravel.

All process solids (digestate) would be handled in one of the following manners: hauled to an existing off-site composting facility; composted on site using an "Ag Bag" system or an in-vessel

composting drum, then packed for wholesale and hauled off site for sale and distribution; or hauled to an existing off-site facility for pelletizing and distribution as a fertilizer product.

If on-site composting is selected as the method to handle solid digestate, composting would occur in windrows on the effluent processing pad within the proposed project site. The maximum amount of compost on the site at any one time would be 2,425 tons. The windrows would be placed on a surface with 1 to 3 degree grade to facilitate leachate collection. The grade would lead to a collection drain which would feed into a sump pump. The pump would be triggered by a float switch, which senses that there is water present and the water would be pumped into one of onsite digester process tanks referenced above. Water would not leave the site as a raised concrete barrier would be put in place to direct the flow to the collection drain and the sump.

The proposed project would be connected to existing campus utilities and infrastructure including electricity, domestic and fire suppression water, wastewater, storm drainage and the landfill biogas collection system. Currently, there is no wastewater connection located within the project site. To accommodate this need, a new wastewater line would be installed to deliver wastewater from the READ project to an existing sewer facility system north of the project site. This existing facility is connected to the campus Wastewater Treatment Plant. The wastewater line would be installed via a 2,500 foot trench, which would be within the floodplain. The proposed point of connection for electricity would be at the existing electrical line on the northeast corner of the project site, which extends onto the property to the existing scale-house. The electrical lines are underground and accessible from a manhole to the northeast of the site and there is a transformer pad on the northeastern corner of the project site. The current landfill biogas collection system output and flare are within the proposed project site and would be connected to the READ facility via an underground gas line. Other utilities required for this project are immediately adjacent to the proposed facilities or within the footprint of the proposed project site and would be connected via underground trenches.

All trenching would be approximately two feet wide by three feet deep and all disturbed land would be backfilled, compacted and restored to its previous condition. As is done currently, the storm water runoff from this project would be directed via an existing storm water drainage system to a detention pond located to the south of the project site. When necessary, this pond can be pumped to a series of detention ponds to the south and eventually discharged to Putah Creek.

Since the proposed project site is located within a 100-year floodplain, UC Davis would implement measures identified in the 2003 LRDP EIR and the UC Davis CEQA Initial Study to mitigate potential impacts to structures from the development within the 100-year floodplain. This includes reviewing plans for all structures for compliance with FEMA National Flood Insurance Program's Building Standards requirements for nonresidential structures which

requires elevating the lowest floor to or above the base flood level. To ensure the READ facility and related equipment meet the FEMA requirements, the facility and equipment (approximately 22,000 square feet of area) within the project site would be raised approximately three feet to an elevation equal to or higher than County Road 98 which is adjacent to the project site. County Road 98 is outside the influence of the 100-year floodplain.

3.0 Description of Floodplain

The UC Davis campus is located in the Lower Sacramento Valley and the Lower Sacramento River watershed, and is bordered on the south by Putah Creek. It is within the Putah Creek Plain of California's Great Valley geomorphic province, and is topographically flat, except for the somewhat raised elevation along a levee adjacent to Putah Creek. Putah Creek, the principal waterway in the local area, originates from springs in the Coast Range Mountains northwest of campus, flows southeast into Lake Berryessa. From the Monticello Dam on Lake Berryessa, Putah Creek flows east to the Putah Diversion Dam and then through the town of Winters, eventually along the southern boundary of UC Davis' west and south campuses, and into the Yolo Bypass, an overflow channel for the Sacramento River. The quantity and quality of flows in Putah Creek are highly variable and depend on releases from Lake Berryessa, precipitation, storm water runoff, and treated effluent discharge. The campus is located approximately 23 miles downstream of the Monticello Dam and approximately 15 miles downstream of the Putah Diversion Dam.

The proposed project site is within a *Special Flood Hazard Areas Subject To Inundation By The 1% Annual Chance Flood, Zone A – No Base Flood Elevations* determined 100-year floodplain area as identified by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps for the City of Davis area (FEMA, Map No. 06113C0591G, 6/18/2010) (see Figure D).

Per the 2003 LRDP EIR, the South Fork of Putah Creek, the North Fork Cutoff, and the Arboretum Waterway channels are designated as FEMA 100-year floodplain areas on campus. In addition, a portion of Russell Ranch along County Road 31 and a portion of the west campus along County Road 98, including the proposed project site, are also subject to flooding during a 100-year storm event (see Figure E). The 100-year floodplain area within the west campus is designated as a floodplain area due to backup and ponding effects associated with the City of Davis' Covell Drainage system and the campus drainage system serving land around the University Airport.

3.1 Floodplain Impacts

Construction activities associated with the proposed project and subsequent trenching efforts to install underground utilities would involve work within the 100-year floodplain. The existing

elevations and flow paths of the area within the floodplain are not expected to change with any significance. The nature and extent of the flood hazard caused by the proposed project is not expected to change from the present conditions.

The presence of the READ facility and tank structures would not cause a detectable change in base flood elevations, and the facility and tank structures would not substantially obstruct the flow of flood water as flood control devices will be designed to direct flows via an existing storm water drainage system to a detention pond located to the south of the project site. As is done currently, this pond can be pumped when necessary to a series of detention ponds to the south and eventually discharged to Putah Creek. Furthermore, the proposed project would not substantially increase impervious surfaces from its current condition as the project site is covered primarily with compacted gravel.

Construction activities at UC Davis, managed by outside contractors, are covered under the National Pollutant Discharge Elimination System General Permit for Discharge of Storm Water Associated with Construction Activity. UC Davis would implement a Storm Water Pollution Prevention Plan (SWPPP) which specifies Best Management Practices (BMPs) to reduce construction-related pollutants to storm water runoff, and to minimize potential for soil erosion in the floodplain during construction of the facility.

Short-term direct impacts to the floodplain would result from the temporary disturbance of the area during excavation and trenching activities associated with the construction of the READ facility and installation of utilities. Additionally, the possibility of sediment run-off or erosion could occur as a result of a storm during the construction/installation period. However, sediment and erosion controls would minimize any disturbance to the floodplain and adjacent areas. Additionally, all stormwater from the project area would be directed into a detention pond located to the south of the project site. As is done currently, this pond can be pumped when necessary to a series of detention ponds to the south and eventually discharged to Putah Creek. Thus, water quality would not be impacted in the nearby Putah Creek. Spill control measures would be utilized when necessary and spill control kits would be readily available for use at all locations where heavy equipment would be utilized. After excavation, trenching and installation activities are completed, the affected floodplain areas would be restored to their previous condition.

No long-term negative direct or indirect impacts to the beneficial values of the 100 year floodplain would be expected under the proposed project. No effects to lives and property associated with floodplain disturbance are anticipated.

4.0 Alternatives

The alternatives available to DOE are to provide federal funding to support the project proposed by UC Davis or to not provide funding. There are no project design or site alternatives available to DOE. UC Davis selected this site because it is heavily disturbed due to prior landfill activities, is graded nearly flat, is covered primarily with compacted gravel and existing landfill facilities and the storm water drainage system could be utilized by the new facility; therefore, minimizing the amount of new ground disturbance associated with the installation of the facility. As well, the biogas from the current onsite landfill biogas collection system would be incorporated in to the project allowing for a larger capacity internal combustion engine and greater energy production.

5.0 Conclusions

It is anticipated that this project would not result in adverse impacts to the 100-year floodplain. Temporary disturbance within the floodplain would cease following completion of construction activities associated with this proposed project. Proper erosion and sediment control measures would be utilized during construction and the site would be restored to pre-construction conditions. This proposed project would not significantly modify existing elevations and flow paths of the area within the floodplain from pre-project conditions to post-project conditions or result in other long-term impacts to the floodplain and its functionality. No effects to lives and property associated with floodplain disturbance are anticipated.

In accordance with 10 CFR Part 1022, a Statement of Findings based on the information in this document will be published. The Statement of Findings will include a brief description of the proposed project, an explanation of why it is located in a floodplain, the alternatives considered, a statement indicating if the action conforms to state and local floodplain requirements and a brief description of the steps to be taken to minimize potential harm within the floodplain.

After publication, a 15-day public review period is required before implementing the proposed project.

Enclosures:

Figure A: Location of the proposed project site within the 100-year floodplain on the UC Davis campus in Davis, California.

Figure B: Location of the proposed project site within the closed UC Davis Landfill in Davis, California.

Figure C: Proposed project site plan on the closed UC Davis Landfill in Davis, California.

Figure D: Location of the proposed project site within the FEMA Flood Insurance Rate Maps for the City of Davis area (FEMA, Map No. 06113C0591G, 6/18/2010).

Figure E: FEMA 100-year floodplain areas on the UC Davis campus.

References:

1. UC Davis. 2012. UC Davis Renewable Energy Anaerobic Digester Project Final Tiered Initial Study. Prepared by Impact Sciences, Inc. and the UC Davis Environmental Stewardship and Sustainability Office. October.
2. UC Davis. 2003. 2003 Long Range Development Plan Final Environmental Impact Report. Section 4.8 Hydrology and Water Quality. State Clearinghouse No. 2002102092. Prepared by URS Corporation. October.

Figure A: Location of the proposed project site within the 100-year floodplain on the UC Davis campus in Davis, California.



Figure B: Location of the proposed project site within the closed UC Davis Landfill in Davis, California.



Figure C: Proposed project site plan on the closed UC Davis Landfill in Davis, California.

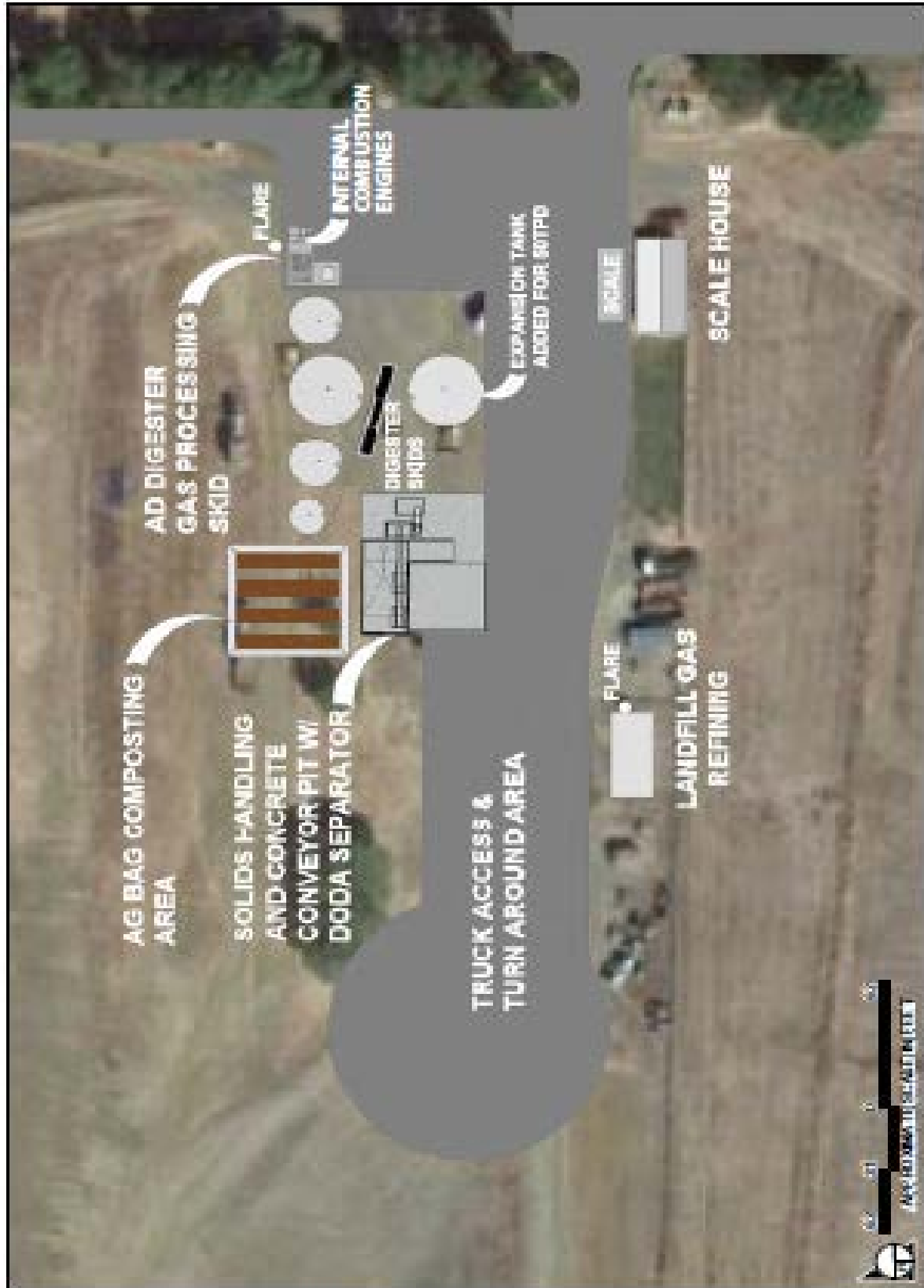


Figure D: Location of the proposed project site within the FEMA Flood Insurance Rate Maps for the City of Davis area (FEMA, Map No. 06113C0591G, 6/18/2010).

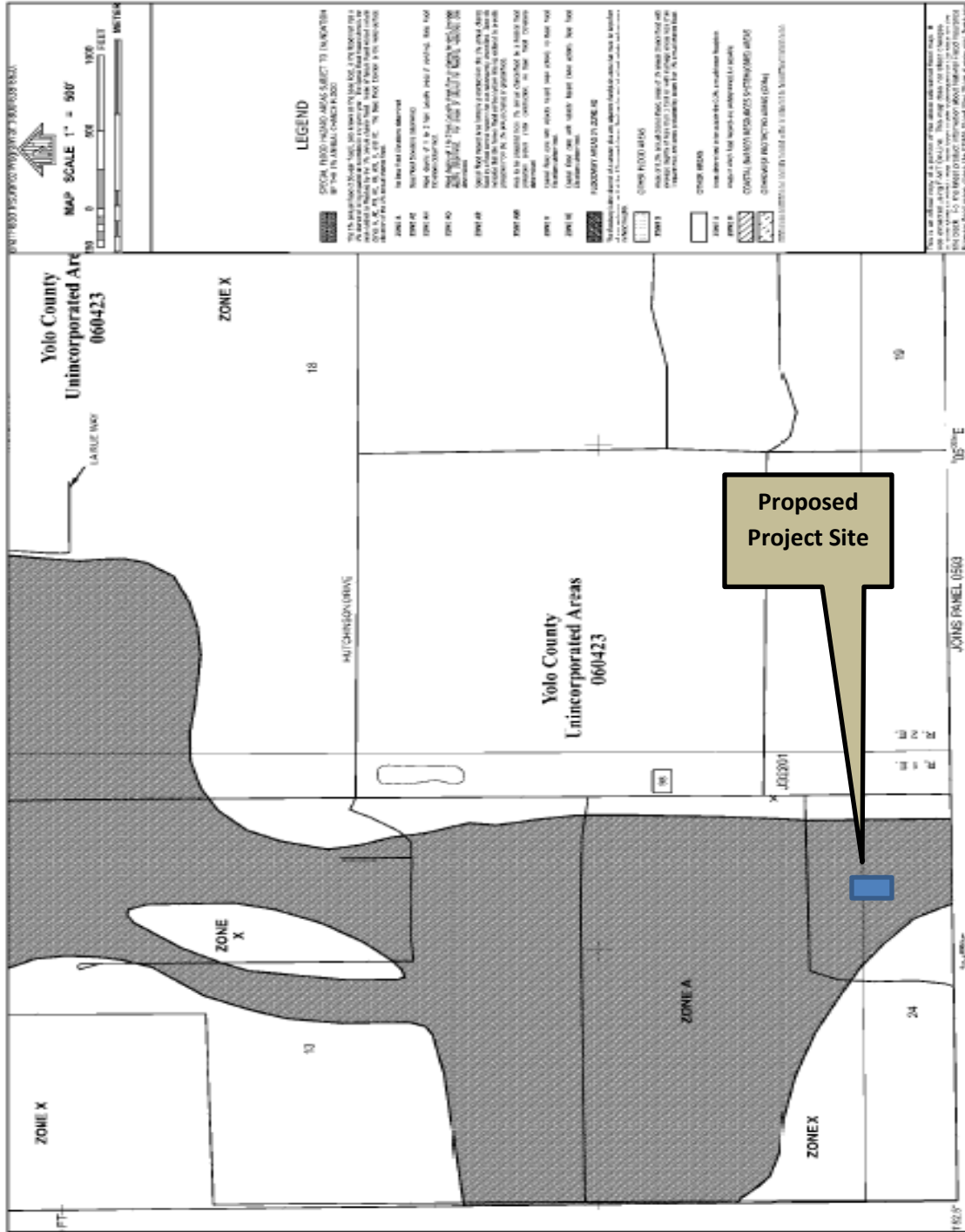


Figure E: FEMA 100-year floodplain areas on the UC Davis campus.

