Physical Environment

2.8 Hydrology and Floodplain

2.8.1 Regulatory Setting

Executive Order 11988 (Floodplain Management) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. The Federal Highway Administration requirements for compliance are outlined in 23 CFR 650 Subpart A.

In order to comply, the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments
- Risks of the action
- Impacts on natural and beneficial floodplain values
- Support of incompatible floodplain development
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by the project.

The base floodplain is defined as "the area subject to flooding by the flood or tide having a one percent chance of being exceeded in any given year." An encroachment is defined as "an action within the limits of the base floodplain."

2.8.2 Affected Environment

The potential for the proposed project to affect hydrology and floodplains is documented in the Summary Floodplain Encroachment Report (June 2010). The findings of this report are discussed in the paragraphs below.

As shown in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Nos. 06059C0509J and 06059C0528J (December 3, 2009), (Figures 2.8-1 and 2.8-2) the study area along I-5 is located within the following 100-year floodplains:

- Zone AE (base flood elevations determined) of the Prima Deshecha Cañada 100-year floodplain and floodway
- Zone AE (base flood elevations determined) of the Segunda Deshecha Cañada 100-year floodway
- Zones A (no base flood elevations determined) and AE (base flood elevations determined) of the Cascadita Creek 100-year floodplain

This page intentionally left blank

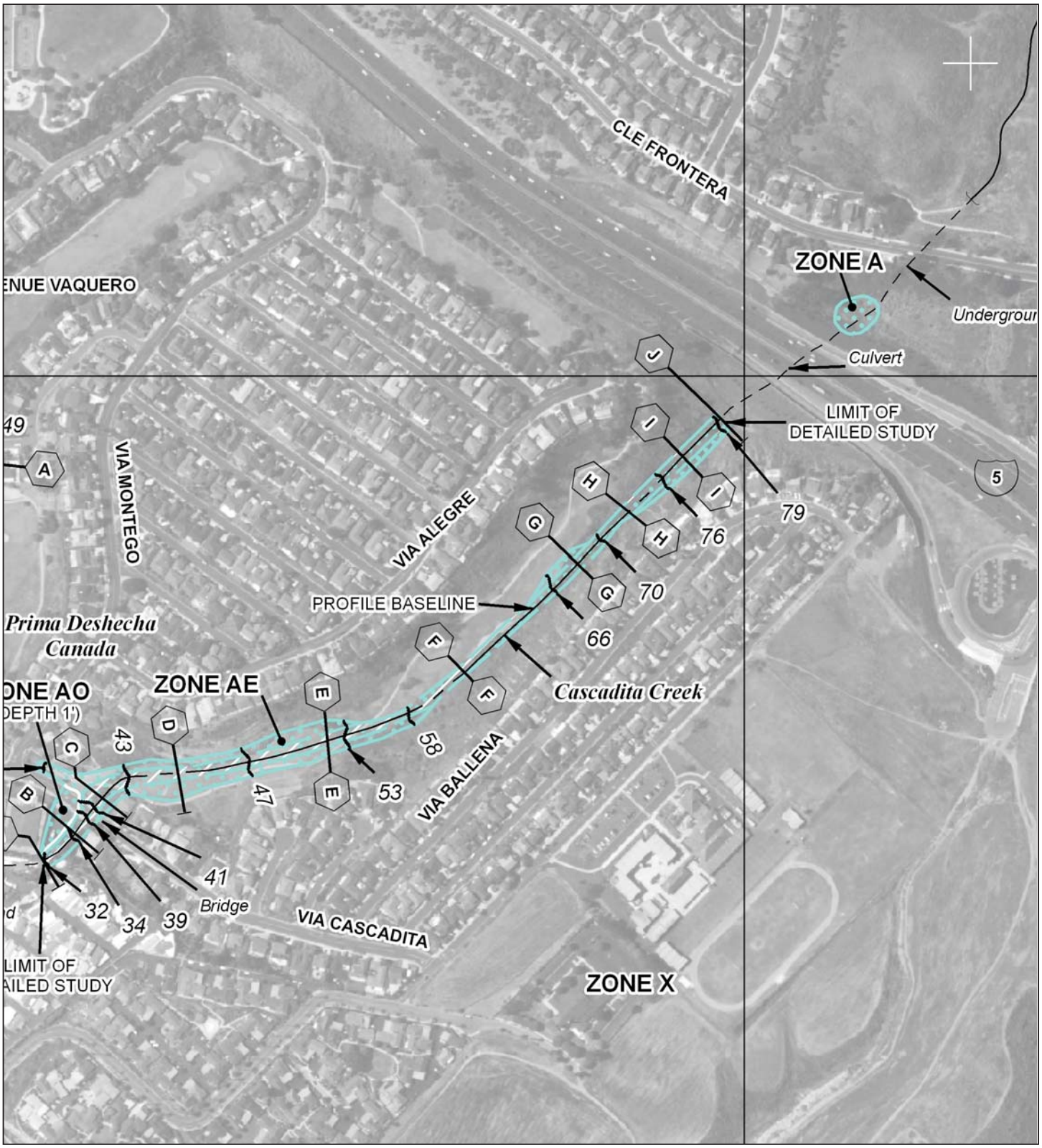

FIGURE 2.8-1

N

0 250 500
FEET

SOURCE: Federal Emergency Management Agency, Flood Insurance Rate Maps

I-5 HOV Lane Extension
FEMA Map No. 06059C0529J
12-ORA-5 PM 3.0/8.7
EA# 0F9600

I:\RMN0901\G\FEMA Map-1.cdr (11/22/10)

This page intentionally left blank

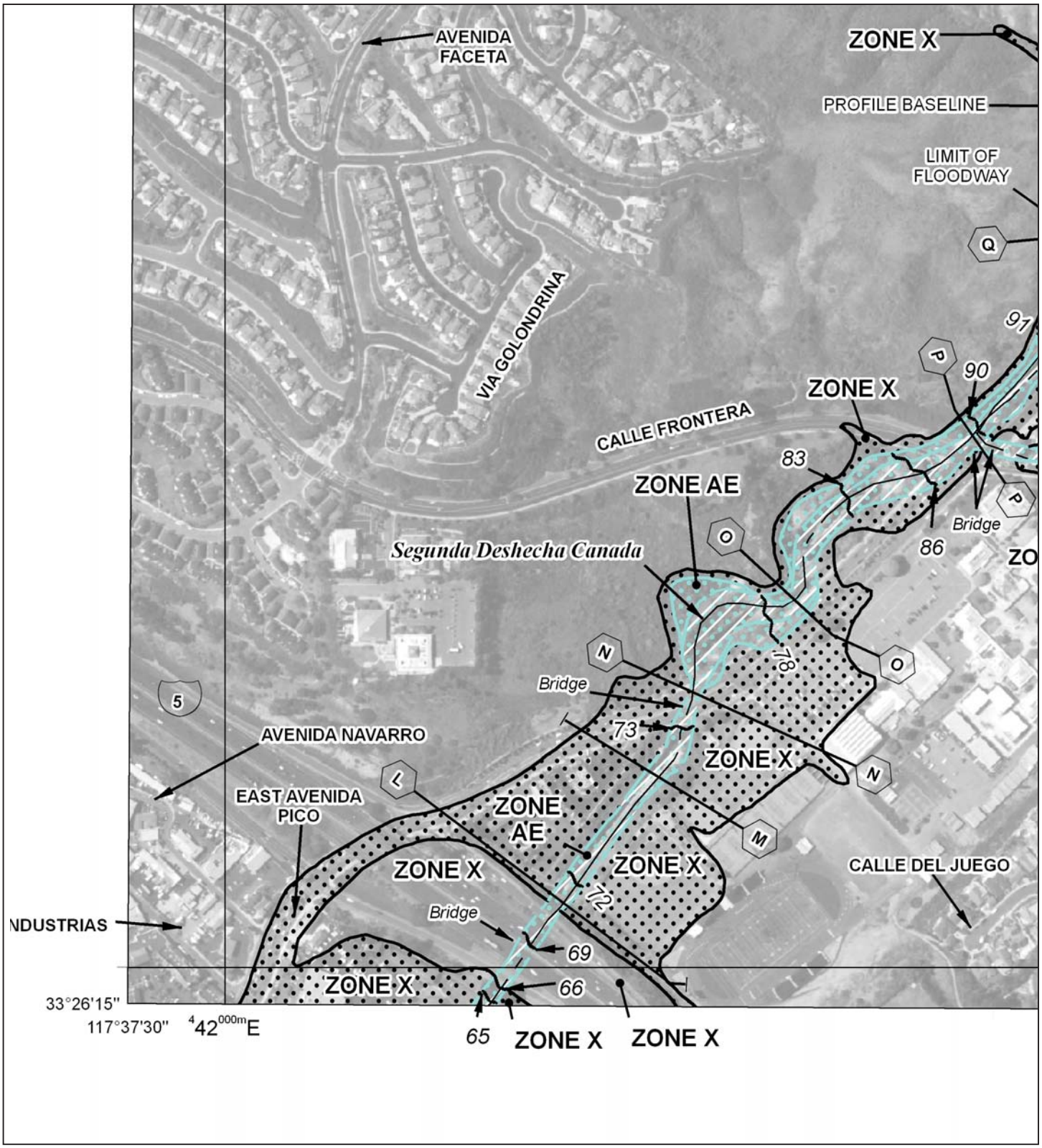

FIGURE 2.8-2

N

0 250 500
FEET

SOURCE: Federal Emergency Management Agency, Flood Insurance Rate Maps

I-5 HOV Lane Extension
FEMA Map No. 06059C0528J
12-ORA-5 PM 3.0/8.7
EA# 0F9600

I:\RMN0901\G\FEMA Map-2.cdr (11/22/10)

This page intentionally left blank

Prima Deshecha Cañada and Cascadita Creek would not be affected by the proposed project, and therefore, no further discussion is provided.

Floodplains and wetlands in their natural or relatively undisturbed state provide natural and beneficial water resource values (e.g., natural moderation of floods, water quality maintenance, groundwater recharge), living resource values (e.g., fish, wildlife, plant species), and cultural resource values (e.g., open space, archaeological and historical resources, natural beauty, scientific study, outdoor education, recreation). Within the study area, the Segunda Deshecha Cañada is concrete-lined, with disturbed vegetation on the banks and with a few cracks in the culvert. However, the majority of the vegetation is above the floodplain. In addition, the existing channel is not in a natural or relatively undisturbed state. Therefore, the channel does not provide natural or beneficial living resource or cultural resource values.

Beneficial water resource values are identified in the Water Quality Control Plan for the San Diego Basin (Basin Plan, September 8, 1994). The following beneficial uses are identified in the Basin Plan for the Segunda Deshecha Cañada:

- **MUN:** Municipal and Domestic Supply
- **AGR:** Agricultural Supply
- **REC1:** Contact Water Recreation (swimming/wading)
- **REC2:** Noncontact Water Recreation (boating/fishing)
- **WARM:** Warm Freshwater Habitat
- **WILD:** Wildlife Habitat

2.8.3 Environmental Consequences

2.8.3.1 Temporary Impacts

Alternative 1 – No Build Alternative

The No Build Alternative would not result in the construction of any improvements to the Segunda Deshecha Cañada Creek. Therefore, the No Build Alternative would not result in temporary adverse impacts related to natural and beneficial floodplain values.

Build Alternatives 2 and 4 – Design Options A and B

The proposed project would widen I-5 between Avenida Pico and San Juan Creek Road to provide HOV and auxiliary lanes. As part of the freeway widening, the arch culvert over Segunda Deshecha Cañada Creek would be extended 50 ft to the northeast to accommodate the freeway improvements under Design Option B only.

Construction equipment would operate in the floodplain during construction of the arch culvert.

Construction activities have the potential to impact the intermittent beneficial water resource values of the Segunda Deshecha Cañada Creek discussed above by impacting water quality. As discussed in detail later in Section 2.9, Water Quality and Storm Water Runoff, potential impacts to water quality could occur during construction of the proposed project due to increased erosion or accidental spills. However, Best Management Practices (BMPs), including erosion control measures, would be implemented during construction of the proposed project to reduce impacts to water quality and beneficial water resource values. Therefore, construction of the proposed project would not result in short-term direct or indirect adverse impacts to natural and beneficial floodplain values.

2.8.3.2 Permanent Impacts

Alternative 1 – No Build Alternative

The No Build Alternative would not result in the construction of any improvements to the Segunda Deshecha Cañada Creek. Therefore, the No Build Alternative would not result in permanent adverse impacts related to floodplains.

Build Alternatives 2 and 4 – Design Option A

Alternatives 2 and 4 with Design Option A would not result in any 100-year floodplain or floodway encroachments; therefore, no impacts would result from implementation of Build Alternatives 2 and 4 under Design Option A.

Build Alternatives 2 and 4 – Design Option B

As part of the proposed freeway widening, the arch culvert over the Segunda Deshecha Cañada channel would be extended 50 ft to the northeast to accommodate the freeway improvements. The slope of the existing trapezoidal channel upstream of the extended arch culvert would be modified from 1.1 percent to 3 percent for approximately 20 ft to connect the proposed and existing facilities. The culvert improvements would result in a transverse encroachment (i.e., perpendicular to the direction of flow) on the Segunda Deshecha Cañada 100-year floodway. During the design phase and prior to the connection of the proposed drainage systems, it will be necessary to examine the operational and physical conditions of this drainage facility and its culvert.

The arch culvert extension and trapezoidal channel slope modification would result in a maximum increase of 0.13 ft of the base flood elevation in the Segunda Deshecha

Cañada floodway. At the location of the 0.13 ft base flood elevation increase, the Segunda Deshecha Cañada channel has approximately 16 ft of freeboard (i.e., the distance between the 100-year flood elevation and the top of the channel). After project construction, a 100-year flood would continue to be contained within the Segunda Deshecha Cañada channel. In addition, the proposed project would not increase the risk of flood damage or result in flood-related interruption of emergency services or routes. The proposed project would reduce congestion by modifying existing facilities and would not promote incompatible floodplain development. Therefore, there would be no adverse flood-related risks to life or property associated with implementation of the proposed project.

Section 60.3 (d) (3) of the National Flood Insurance Program (NFIP) regulations states that a community shall "prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base (100-year) flood discharge." As discussed above, the proposed arch culvert extension and trapezoidal channel slope modification would result in a maximum potential increase of 0.13 ft of the base flood elevation in the Segunda Deshecha Cañada floodway. Updated models using the actual as-built conditions would have a higher level of accuracy and would be required to show a zero increase to the floodway base flood elevations in the final design phase.

As specified below in Measure FP-1, a detailed survey of the existing channel facilities would be performed during final design to determine actual as-built conditions. A Final Location Hydraulic Study using fully updated models that utilize the survey results would be prepared during final design. In addition, these updated models would be the basis of the preparation of a Conditional Letter of Map Revision (CLOMR) and Letter of Map Revision (LOMR). As specified below in Measures FP-2 and FP-3, the CLOMR and LOMR would be processed through the City of San Clemente, the Capistrano Unified School District, and FEMA.

A "significant encroachment," as defined in 23 CFR 650.105(q), is a highway encroachment that would result in (1) a significant potential for interruption or termination of a transportation facility that is needed for emergency vehicles or provides a community's only evacuation route, (2) a significant risk, or (3) a

significant adverse impact to natural and beneficial floodplain values. The proposed action does not constitute a significant floodplain encroachment as defined in 23 CFR, Section 650.105(q). The proposed project is a highway widening project that would require the extension of an existing arch culvert within the 100-year floodway. The proposed project would not substantially change the capacity of the Segunda Deshecha Cañada channel to carry water. The proposed project would not substantially change the 100-year base flood elevation or freeboard in the channel. The proposed encroachment would not result in any significant adverse direct or indirect permanent impacts to the natural and beneficial floodplain values, would not result in a significant change in flood risks or damage, and does not have significant potential for interruption or termination of emergency services or emergency routes. Measures FP-1 through FP-3, below, will minimize impacts to floodplains in the project study area for Design Option B; no measures are needed for Design Option A. Therefore, the proposed encroachment is not considered a significant encroachment.

2.8.4 Avoidance, Minimization, and/or Mitigation Measures

The following measures are required for Alternatives 2 and 4, Design Option B, to minimize impacts to the Segunda Deshecha Cañada 100-year floodway.

FP-1 During final project design, the agency shall ensure that the project engineer prepares a Final Location Hydraulic Study (LHS) based on an updated hydraulic model for the Segunda Deshecha Cañada 100-year floodway. In addition, a detailed survey of the existing channel facilities will be conducted to determine actual as-built conditions. The results of the survey will be incorporated into an updated hydraulic model for both existing and proposed conditions.

FP-2 During final project design, the agency shall process a Conditional Letter of Map Revision (CLOMR) for the Segunda Deshecha Cañada 100-year floodway through the City of San Clemente, the Capistrano Unified School District, and the Federal Emergency Management Agency (FEMA). The culvert improvements within the Segunda Deshecha Cañada 100-year floodway shall not be constructed until the CLOMR is approved by City of San Clemente, the Capistrano Unified School District, and FEMA.

FP-3 Upon completion of construction, the agency shall process a Letter of Map Revision (LOMR) for the Segunda Deshecha Cañada 100-year

floodway through the City of San Clemente, the Capistrano Unified School District, and FEMA.

No measures are required for Alternatives 2 and 4 under Design Option A because these alternatives would not impact a 100-year floodplain or floodway.

This page intentionally left blank