LOCATION HYDRAULIC STUDY

Park Avenue Bridge Replacement Project

Federal Project No.: BRLO-5151(026)

Prepared for:

The City of Newport Beach
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Newport Beach, CA 92660

And

California Department of Transportation

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BKR JN 130307

July 21, 2014

REGISTERED CIVIL ENGINEER CERTIFICATION

This Location Hydraulic Study Report has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

Bradley M. Losey
REGISTERED CIVIL ENGINEER C65140

7/21/14
DATE

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Executive Summary

The City of Newport Beach proposes to replace the existing Park Avenue Bridge over Grand Canal with an improved bridge structure. The Park Avenue Bridge is the only connection between Balboa Island and Little Balboa Island, traversing over the Grand Canal in an east-west direction. Built in 1930, although the bridge has gone through several rehabilitations through the years it does not meet current engineering and safety standards. The replacement bridge would maintain the existing two-lane configuration (one lane in each direction) of the existing bridge, but would incorporate wider vehicle lanes and sidewalks within existing City right-of-way (ROW).

The project is within Lower Newport Bay. The site falls within a FEMA mapped Zone AE floodplain. Zone AE at this location is an area of one percent (1.0%) annual chance (100-yr) flood. The applicable FEMA map numbers for the project are 06059C0382J dated December 3, 2009 and revised by Letter of Map Revision (LOMR) Case Number 14-09-1450P on February 19, 2014.

The results contained herein indicate that the Floodplain Encroachment can be classified as "MINIMAL."

Section 1 – Introduction

1.1 Purpose of the Report

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. Federal financial assistance and/or issuance of a federal permit(s) required for a proposed state/local project constitute federal support and/or allowing actions. The Federal Highway Administration requirements for compliance are outlined in 23 CFR 650 Subpart A.

In order to comply with 23 CFR 650 Subpart A and determine if an encroachment itself is "minimal," or "significant," the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments
- Risks of the action (to life and property)
- Impacts on natural and beneficial floodplain values
- Support of incompatible floodplain development (inconsistencies with existing watershed and floodplain management programs)
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by the project.

1.2 Definitions

1.2.1 Base Flood

The term "base flood" shall mean that flood which has a one percent or greater chance of occurrence in any given year.

-Executive Order 11988 Section 6 (b)

The one percent or greater chance of occurrence flood is commonly referenced as the "100-year" flood.

1.2.2 Floodplain

The term "floodplain" shall mean the lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year.

-Executive Order 11988 Section 6 (c)

1.2.3 Special Flood Hazard Areas – High Risk

Special Flood Hazard Areas represent the area subject to inundation by one-percent-annual chance flood. The land area covered by the floodwaters of the base flood is the Special Flood Hazard Area (SFHA) on National Flood Insurance Program (NFIP) maps. The SFHA is the area where the National Flood Insurance Program's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. The SFHA includes Zones A, AO, AH, A1-30, AE, A99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, VO, V1-30, VE, and V. (http://www.fema.gov/floodplain-management/special-flood-hazard-area)

1.3 Project Need and Purpose

1.3.1 Need

The existing Park Avenue Bridge is over 80 years old and does not meet current bridge design and seismic safety standards. The City has identified structural and functional deficiencies with the bridge, such as severely deteriorated concrete in girders, pile caps, and piles. As such, through the Caltrans Sufficiency Rating process, Caltrans has identified the bridge as "functionally obsolete."

1.3.2 Purpose

The proposed project would construct a new bridge meeting current engineering standards in order to enhance the safety of motorists, bicyclists, and pedestrians in the project area.

1.4 Project Description

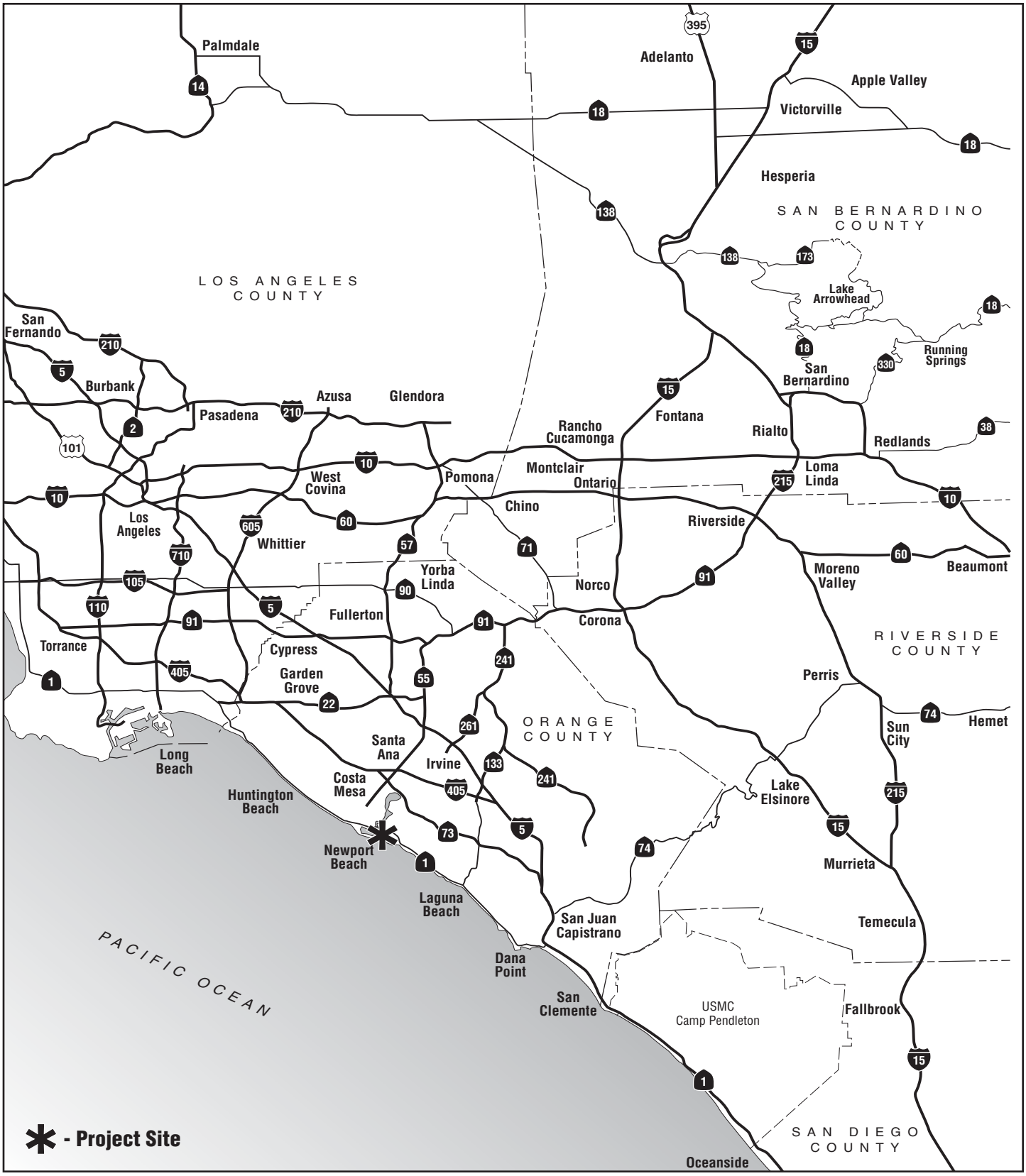
The proposed project includes the demolition of the existing Park Avenue Bridge and construction of an improved seismically-reinforced bridge over the Grand Canal. The primary components of the project are as follows:

- **Precast Post-Tensioned Bridge Structure.** The proposed project would implement a precast post-tensioned bridge structure at the project site. The new bridge would remain 100 feet long and would include 11-foot vehicle lanes and 6-foot raised sidewalks. The proposed bridge would be slightly wider than the existing bridge, with a width of approximately 36 feet (compared to the existing width of approximately 30 feet). The bridge would be supported by abutments at each bank of the canal and two bents comprised of 24-inch diameter piles within the canal. The number of spans associated with the bridge would be reduced from the current five to the proposed three. The improved bridge structure would be positioned within existing City ROW, and does not include nor require any ROW acquisition. All utilities attached to the existing bridge structure would be relocated during construction, and will be concealed and protected within utility openings in the new bridge. It should be noted that the City of Newport Beach proposes to rebuild the immediate adjacent deteriorating seawalls at the bridge abutment as part of final design and construction.
- **Vertical Curve.** The profile of the existing bridge is on a vertical curve, which provides sufficient freeboard between the bridge and the high water surface of the canal. The vertical curve also accommodates boat navigation. The existing vertical curve provides a design speed of 24 miles per hour (MPH), which does not meet the American Association of State Highway and Transportation Officials (AASHTO) criteria of 25 MPH for this classification of roadway. In order to meet the AASHTO criteria, the

bridge would need to be lowered by six inches at the crest of the vertical curve, which would not provide adequate freeboard between the bridge and the high water surface of the canal. The lowering of the bridge profile would also not provide adequate freeboard for boat navigation. Because the travel speeds on Balboa Island and Little Balboa Island are relatively low, it was decided that the proposed bridge structure would maintain the existing vertical curve profile and match the existing freeboard.

- **ADA Switchback Ramps.** ADA-compliant switchback ramps are currently provided from the at-grade sidewalks to the bridge-mounted sidewalks to the east and west of the existing Park Avenue Bridge. Both existing switchback ramps on the east side of the Grand Canal have a two-foot landscape strip that would be eliminated to accommodate the proposed bridge structure. The switchback ramps on the west side of the existing bridge are currently five feet, six inches wide; the project would reduce the width of each switchback ramp by one foot, resulting in four-foot, six inch-wide switchback ramps. Reducing the switchback ramps by two feet on all sides of the bridge to accommodate the wider traffic lanes and sidewalks.
- **Bridge Architecture.** The proposed bridge architecture would generally be consistent with the existing bridge to maintain the character of the project area. Entry monumentation would be given special attention in the design, providing a combination of landscaping and appropriate signage as an entrance to Little Balboa Island. Bridge lighting would be provided for both pedestrian safety and architectural character. The existing style of concrete light poles and lamps would replicate the existing luminaires and would line both sidewalks.

The project location and vicinity are shown in Exhibits 1 and 2. The project area is within existing City of Newport Beach right-of-way.



NOT TO SCALE

PRELIMINARY ENVIRONMENTAL STUDY FORM
PARK AVENUE BRIDGE REPLACEMENT PROJECT

Regional Location

02/14 • JN 130307

Exhibit 1

Source: Google Earth, October 2013.

- Project Boundary

- Temporary Bridge Option

PRELIMINARY ENVIRONMENTAL STUDY FORM
PARK AVENUE BRIDGE REPLACEMENT PROJECT

Site Vicinity

02/14 • JN 130307

Exhibit 2

1.5 Project Alternatives

This section describes the proposed action and the project alternatives that were developed to meet the identified need through accomplishing the project purposes outlined above, while avoiding or minimizing environmental impacts.

Since the Park Avenue Bridge is the only connection between Balboa Island and Little Balboa Island, access over the Grand Canal must be maintained at all times. The City has identified two potential options for construction of the new bridge: 1) stage construction, where the Park Avenue Bridge would be demolished and reconstructed one half at a time; and 2) installation of a temporary bridge at Balboa Avenue, which would allow for demolition of the entire Park Avenue Bridge at one time and reconstruction in a single phase

Three alternatives are being analyzed in this document: Alternative 1 (Bridge Replacement with Stage Construction), Alternative 2 (Bridge Replacement with Temporary Bridge), and the No Build Alternative.

1.5.1 Alternative 1 (Bridge Replacement with Stage Construction)

Alternative 1 includes the demolition of the existing Park Avenue Bridge and construction of an improved seismically-reinforced bridge over the Grand Canal.

The stage construction methodology would be phased such that approximately half the bridge would remain open for vehicle, bicycle, and pedestrian use at all times. Boat access along the Grand Canal beneath the bridge would also be maintained continuously. Existing utilities along the bridge would be relocated to allow for demolition of half the bridge while maintaining utility service throughout the duration of the construction process.

Construction would be phased as follows:

1. Removal of 13 feet of the existing bridge, with 17 feet of the bridge remaining for a 4-foot sidewalk, 2-foot concrete barrier, and 10-foot travel lane.
2. Construct 15 feet of new bridge.
3. Relocate utilities and traffic to the new structure, which would consist of a temporary 4-foot sidewalk and 11-foot travel lane. A temporary cantilevered pedestrian walkway would need to be constructed onto the exterior of the new bridge to allow for pedestrian and bicycle travel.
4. Remove the remainder of the existing bridge.
5. Complete construction of approximately 21 feet of the new bridge.

Since the phased construction would provide for a single 10-foot travel lane, one-way traffic would be controlled by a temporary traffic signal to allow for alternating travel in each direction. Emergency response vehicles would have preemptive control over the traffic control system. As noted above, access over the Grand Canal would be maintained at all times throughout the duration of construction.

Bridge construction activities would be facilitated by barge-mounted equipment in the Grand Canal. Although dredging would be necessary within the canal to accommodate the barge platforms, the City is currently developing a separate project to dredge the Grand

Canal and it is scheduled to occur prior to initiation of construction of the proposed bridge replacement. Utilities would remain in full service throughout the construction period and the relocations would be coordinated as part of the stage construction. Utilities within the portion of the bridge that would be removed in the first stage would be relocated to the remaining portion of the existing bridge. In the second stage of construction, all utilities would be relocated to the new bridge structure constructed in the first phase. The stage construction option would require approximately 12 months for completion.

1.5.2 Alternative 2 (Bridge Replacement with Temporary Bridge)

Alternative 2 includes the demolition of the existing Park Avenue Bridge and construction of an improved seismically-reinforced bridge over the Grand Canal.

This approach would involve construction of a temporary bridge over Grand Canal at Balboa Avenue; refer to Exhibit 2, *Site Vicinity*. Balboa Avenue is a local two-lane roadway (one vehicle lane and sidewalk in each direction) trending in an east-west direction across Balboa Island and Little Balboa Island. There is no bridge crossing over the Grand Canal along Balboa Avenue, and the roadway currently terminates at each end of the canal. This location is immediately surrounded by single-family residential uses on all sides. Retail/commercial uses are situated to the west along Marine Avenue.

The temporary bridge would maintain access to Little Balboa Island with two 10-foot lanes of traffic. No form of additional traffic control would be necessary once the temporary bridge is in place. Bicycle and pedestrian access would also be provided via a 5-foot wide walkway to be located adjacent to the vehicle travel lanes.

Construction of the temporary bridge requires approximately eight temporary piles to be located within the channel (four piles on each side of Grand Canal). The piles would be located approximately five feet away from the existing seawall, and the piles would be spaced approximately three to four feet apart. It is expected that the piles would be a maximum of 18 inches in diameter. The proposed temporary piles would be vibrated into place in lieu of driving to minimize noise/vibration impacts to adjacent receptors.

Under the temporary bridge option, bridge construction activities would be facilitated from the adjacent approaches on Park Avenue and Balboa Avenue for the replaced bridge and temporary bridge, respectively. Construction activities within the Grand Canal would be limited to geotechnical investigations, reconstruction of the sea wall within the project limits, and the removal and reconstruction of the bridge piers. Utilities would remain in full service throughout the construction period and the relocations would be coordinated as part of the bridge removal and reconstruction. Since the temporary bridge option would allow for the complete demolition of the existing Park Avenue Bridge, utilities within the existing bridge would be relocated to a temporary “utility bridge” immediately adjacent to the existing bridge prior to demolition. After construction of the new bridge, the utilities would be relocated to the new bridge.

Construction of the temporary bridge at Balboa Avenue would occur within existing City ROW and no ROW acquisition would be required.

Utilizing the temporary bridge option at Balboa Avenue, the replacement of the Park Avenue Bridge would take approximately10 months to complete.

1.5.3 No Build Alternative

Under this alternative, no bridge replacement would occur. This alternative would not address the existing functional and seismic deficiencies of the Park Avenue Bridge.

1.6 Permits and Approvals Needed

Table 1: Required Permits, Reviews, and Approvals

Agency	Permit / Approval	Status
ACOE	Section 404 Nationwide Permit	City to obtain permit
CCC	Coastal Zone Permit	City to obtain permit
SARWQCB	Section 401 Water Quality Certification	City is to obtain certification
SWRCB	Section 402 NPDES (Construction Activity)/Department NPDES Permit CAS000003 and CAS000002 (General Permit)	City is to obtain permit

Source: PES Form prepared by RBF Consulting
ACOE = US Army Corps of Engineers
CCC = California Coastal Commission
City = City of Newport Beach
Department = California Department of Transportation
NPDES = National Pollutant Discharge Elimination System
PS&E = Plans, Specifications, and Estimates
SARWQCB = Santa Ana Regional Water Quality Control Board
SRWCB = State Water Resources Control Board

Section 2 – Affected Environment

2.1 Introduction

The project lies over the Grand Canal in Newport Bay. Newport Bay is mapped as a High Risk Special Flood Hazard Areas (Zone AE Floodplain) that covers the project site. Additionally Balboa Island and Little Balboa Island are also completely within the area of inundation. The project improvements are not within a Regulatory Floodway. See Exhibit 3 for the Revised FIRM for the project location.

2.2 General Setting

2.2.1 Land Use

According to the Circulation Element of the City of Newport Beach General Plan (Figure CE-1, Master Plan of Streets and Highways), the subject site is a residential street within a land use designated "Two-Unit Residential" on the City of Newport General Plan Figure LU4. The area is fully developed with residential housing and existing streets. The existing bridge was constructed in 1930.

2.2.2 Topography

Based on the USGS Newport Beach, California, Quadrangle dated 1965 (photorevised 1981), the subject site consists of developed residential property. Park Avenue is classified as a light-duty road. On-site topography is 6 feet above mean sea level (msl) across Balboa Island. The site is surrounded by Lower Newport Bay and the Grand Canal traverses Balboa Island in a North South orientation.

2.2.3 Regional Hydrology

Detailed hydrology for Lower Newport Bay was not performed as a part of this study. Due to the influence of the Pacific Ocean, hydrologic calculations (i.e. OCPW Modified Rational Method) are irrelevant for this project.

The project is in the 801.11 Primary Hydrologic Unit.

2.2.4 Local Hydrology

2.2.4.1 Precipitation and Climate

The local climate is similar to a Mediterranean climate having warm dry summers and mild wet winters. Annual rainfall is approximately 11 inches, with most of the precipitation occurring in November to May.

2.2.4.2 Surface Streams

There no surface streams within the project limits. The USGS topographical maps show the surrounding water body as Newport Bay.

2.2.4.3 Municipal Water Supply

Newport Bay does not function as a direct Municipal Water Supply.

2.2.5 Ground Water Hydrology

The project is located within the Coastal Plain of Orange County Groundwater Basin, which covers an area of approximately 350 square miles. The Coastal Plain of Orange County Groundwater Basin underlies a coastal alluvial plain in the northwestern portion of Orange County. In general, the groundwater levels in the southern coastal area has declined steadily, but average groundwater levels have risen about 15 feet since 1990 (California Department of Water Resources, 2004). A geotechnical investigation should be conducted prior to final design and construction to confirm groundwater levels. No additional geotechnical borings in the vicinity of the floodplain have been completed in support of this project.

2.2.6 Geology/Soils/Soil Erosion Potential

The Soil Erodibility Factor (K factor) for the site 0.32, according to the State Water Resources Control Board's (SWRCB) Geographic Information System (GIS) K-factor data file. Generally, this equates to a low potential for erosion within the project area characterized by particles resistant to detachment. However, this is a planning-level tool, so a detailed site-specific survey is still required for design-level analysis.

2.3 Watershed Characteristics and Beneficial Uses

Highway Design Manual lists the Natural and Beneficial Floodplain Values including, but not limited to fish, wildlife, plant, open space, natural beauty, scientific study, outdoor recreation, agriculture, and forestry, natural moderation of floods, water quality maintenance, and groundwater recharge.

The Basin Plan Table 3-1 lists the Beneficial Uses for Lower Newport Bay as NAV, REC1, REC2, COMM, WILD, RARE, SPWN, MAR, and SHEL.

Navigation (NAV) waters are used for shipping, travel or other transportation by private, commercial or military vessels.

Water Contact Recreation (REC 1) waters are used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses may include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing and use of natural hot springs.

Non-contact Water Recreation (REC 2) waters are used for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water would be reasonably possible. These uses may include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting sightseeing and aesthetic enjoyment

Commercial and Sportfishing (COMM) waters are used for commercial or recreational collection of fish or other organisms, including those collected for bait. These uses may include, but are not limited to, uses involving organisms intended for human consumption.

Wildlife Habitat (WILD) waters support wildlife habitats that may include, but are not limited to, the preservation and enhancement of vegetation and prey species used by waterfowl and other wildlife.

Rare, Threatened, or Endangered Species (RARE) waters support the habitats necessary for the survival and successful maintenance of plant or animal species designated under state or federal law as rare, threatened or endangered.

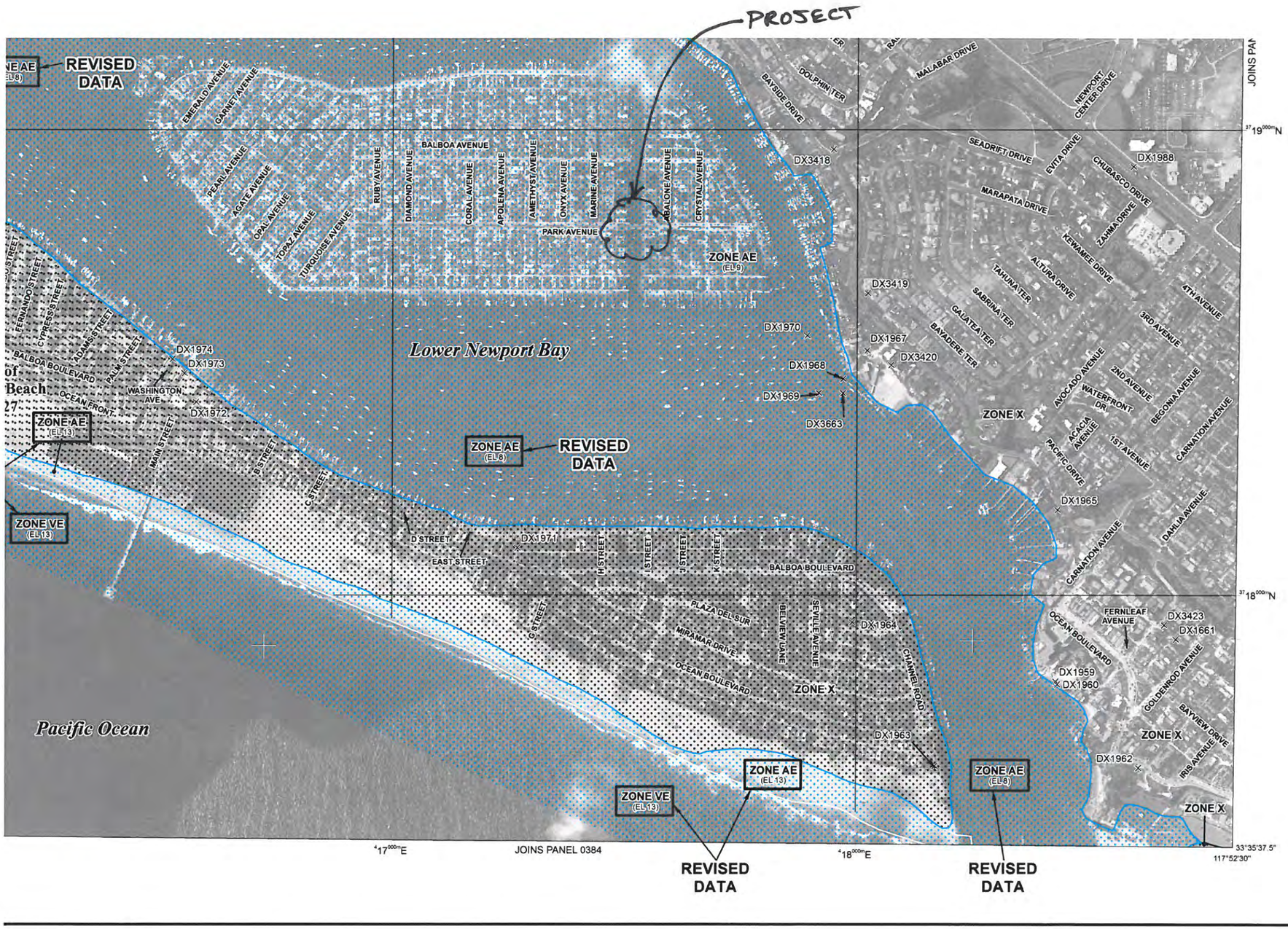
Spawning, Reproduction, and Development (SPWN) waters support high quality aquatic habitats necessary for reproduction and early development of fish and wildlife.

Marine Habitat (MAR) waters support marine ecosystems that include, but are not limited to, preservation and enhancement of marine habitats, vegetation (e.g., kelp), fish and shellfish and wildlife (e.g., marine mammals and shorebirds).

Shellfish Harvesting (SHEL) waters support habitats necessary for shellfish (e.g., clams, oysters, limpets, abalone, shrimp, crab, lobster, sea urchins, and mussels) collected for human consumption, commercial, or sport purposes.

2.4 Support of Incompatible Floodplain Development

The proposed action within Zone AE is limited to reconstruction of an existing bridge within an area that is fully developed. Redevelopment is limited by city ordinances and zoning. Each construction project on the island is subject to City of Newport Beach building permits. Because the City is a participating community in the National Flood Insurance Program, the building department administers the NFIP requirements during the building permit process. The replacement of the existing bridge therefore does not further support incompatible floodplain development.



M1.5 River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 15, 1989

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
February 5, 1992 - November 3, 1993 - January 3, 1997 - February 18, 2004 - December 3, 2009 : for description of revisions, see Notice to Users page in the Flood Insurance Study report.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0382J

FIRM
FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 382 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
NEWPORT BEACH, CITY OF	060227	0382	J

REVISED TO
REFLECT LOMR
EFFECTIVE: **February 19, 2014**

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06059C0382J

MAP REVISED
DECEMBER 3, 2009

Federal Emergency Management Agency

Section 3 – Hydraulic Analysis

3.1 Introduction

The Lower Newport Bay Zone AE Special Flood Hazard Area is a not a result of open-channel flow, typical riverine flooding, or flooding associated with runoff from a storm event. Instead this floodplain is a result of coastal flooding. The FEMA librarian provided the technical studies for Newport Bay and these studies were reviewed to determine the appropriate hydraulic analysis for the Grand Canal.

3.2 Hydraulic Analysis

According to the FEMA provided report "Methodology for computing Coastal Flood Statistics in Southern California" authored by Tetra Tech, Inc. The Zone AE flooding is attributed to one or more of the following mechanisms:

1. Run-up of swell generated by intense offshore winter storms in the North Pacific Ocean
2. Run-up of wind waves generated by landfalling storm systems.
3. Run-up of swell generated by tropical cyclones of Baja California
4. Run-up and surge from landfalling tropical cyclones
5. Tsunamis generated along the Aleutian-Alaskan and Peru-Chili trenches and propagating across the ocean to Southern California.

The Grand Canal does not convey water. The normal water surface within the canal is determined by the tidal elevations within Newport Bay. The effect of the Park Avenue Bridge and the reconstruction of the bridge piers do not displace sufficient volume to influence the water surface of Newport Bay and the Pacific Ocean.

The Zone AE Floodplain shown on the FIRM is a result of off-shore seismic events or severe weather patterns occurring within the Pacific Ocean and the associated coastal flooding. Removal of the existing bridge piers and construction of new bridge piers do not alter the canal's behavior under the influence of these nearby water bodies. There are no foreseeable impacts to the Newport Bay water surface. Therefore, no hydraulic study was performed for the project.

3.3 Results of Hydraulic Analysis

No hydraulic study was performed for the project. The Zone AE Special Flood Hazard Area is a result of Coastal Flooding and is not influenced by the Park Avenue Bridge piers or open-channel flow in Grand Canal.

Section 4 – Risks and Impacts

4.1 Potential Risk from Longitudinal Encroachment

The project is a replacement of an existing bridge within an area that is mapped as fully inundated. The current bridge location is neither a longitudinal or transverse encroachment. The City of Newport Beach is undertaking a separate project that will surround Balboa Island and Little Balboa Island with an elevated sea wall which will remove the islands from the mapped floodplain. At that time, the Park Avenue Bridge will be a transverse crossing of Grand Canal.

4.2 Potential Risk to Life and Property

The Highway Design Manual, Chapter 804, evaluates the potential for risk to life and property by a potential Q100 backwater (Base Flood) for Residences, other buildings, and crops.

The source of the flooding is Newport Bay, and not limited to the Grand Canal. The Potential Risk to Life and Property remains unchanged as a result of these improvements.

The Highway Design Manual, Chapter 804, evaluates the potential for traffic disruptions by a potential Q100 backwater (Base Flood) for:

1. Emergency Supply or Evacuation routes
2. Emergency Vehicle Access
3. Whether a Practicable Detour is available
4. School Bus or Mail Routes

The project includes two staging alternatives to provide for traffic disruptions during construction. Because the project does not alter the existing flooding source (Newport Bay), there are no changes to the existing potential for traffic disruptions.

Therefore, the potential for traffic disruptions due to the influences of the Build Alternatives on the hydraulics is deemed NOMINAL. The duration of traffic interruptions for the base flood event is estimated to be SIX hours. The duration of the disruption is based on the typical semi-diurnal tidal cycle that is recorded at the mouth of Newport Bay, with the ebb tide counteracting the storm run-up.

4.3 Potential Risk to Natural and Beneficial Floodplain Values

The project improvements that occur within Zone AE pose potential risks to Natural and Beneficial Floodplain Values. Each of the Beneficial Uses from the Basin Plan is discussed below. The Park Avenue Bridge Natural Environment Study (RBF Consulting, May 2014) was referenced.

4.3.1 Navigation (NAV)

The risk to the NAV beneficial use in the canal will be minimal, and only occur during construction.

Navigation in the channel will remain possible during construction and will be improved in the proposed condition. The Natural Environment Study (NES) observed small water

vessels (i.e., kayak, canoes, and motor boats) along Grand Canal. The size of the Grand Canal and the available draft and freeboard under the Park Avenue Bridge for navigation does not suggest that Commercial Vessels can transit the canal. North-South passage of the canal might be obstructed during construction of either the Park Avenue Bridge or during construction of the temporary bridge, but detours out the North or South canal entrances are available. No area of the canal will be isolated from access to Newport Bay.

Alternative 1 (Bridge with Staging) will temporarily block the transit of the canal at the Park Avenue Bridge construction site. The obstruction is anticipated to principally be related to warning signage to prevent trespass into construction areas for safety reasons. Alternative 2 (Bridge with Temporary Bridge) will temporarily block the canal during installation of the Temporary Bridge. During installation of the Temporary Bridge, the Park Avenue Bridge will remain open and the area navigable. Once the Temporary Bridge is in place, construction of the Park Avenue Bridge will commence and the navigability of the canal will revert to the Alternative 1 condition.

Once the project is complete, there will be fewer bents in the canal and therefore navigation will be less obstructed in the proposed condition.

4.3.2 Water Contact Recreation (REC 1)

The risk to the REC 1 beneficial use in the canal will be minimal, and only occur during construction.

The impediments to REC 1 activities are similar to the NAV discussion and are not repeated here.

4.3.3 Non-contact Water Recreation (REC 2)

The risk to the REC 2 beneficial use in the canal will be minimal, and only occur during construction.

The impediments to REC 2 activities are similar to the NAV discussion and are not repeated here.

4.3.4 Commercial and Sportfishing (COMM)

The risk to the COMM beneficial use in the canal will be minimal, and only occur during construction.

The size of the Grand Canal and the available draft and freeboard under the Park Avenue Bridge for navigation does not suggest that Commercial Vessels can transit the canal or fish inside of the canal. Sportfishing is possible from small craft or from the channel banks. The temporary impediments to COMM activities are similar to the NAV discussion and are not repeated here.

4.3.5 Wildlife Habitat (WILD)

The risk to the WILD beneficial use in the canal will be minimal, and only occur during construction.

The NES reported that "*No mammal species were observed during the habitat assessment. In particular, no sign of bats or suitable roosting habitat was observed under the existing Park Avenue Bridge during the habitat assessment."*

Further habitat discussion in the NES states:

"Nesting birds are protected pursuant to the Migratory Bird Treaty Act (MBTA) and Fish and Game Code (Sections 3503, 3503.3, 3511, and 3513 of the Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs). In order to protect migratory bird species, nesting bird clearance surveys need to be conducted prior to any vegetation removal or development that may disrupt the birds during the nesting season. Consequently, if avian nesting behaviors are disrupted, such as nest abandonment and/or loss of reproductive effort, it is considered "take" and is potentially punishable by fines and/or imprisonment."

The ornamental trees and shrubs associated with the developed areas within the Biological Study Area (BSA) have the potential to provide limited nesting opportunities for "crevice-dwelling" avian species. No nesting birds, active nests, or birds displaying nesting behaviors were observed during the habitat assessment. The habitat assessment was conducted during the breeding season and no nesting birds were observed. In particular, no remnant or active swallow nests were observed under the existing Park Avenue Bridge during the habitat assessment. Several rock pigeons were observed roosting under the bridge, but no active nests were observed. Rock pigeons are not protected under the MBTA, therefore, if nesting, no avoidance and minimizations measures would need to be implemented."

The lack of observed mammal species or suitable bat roosting habitat indicates that the immediate and long term risks to the WILD beneficial use are minimal. The nesting bird clearance surveys will minimize impacts to nesting avian species as a result of the proposed project. Therefore the temporary risk to the WILD beneficial use remains minimal.

Eel Grass and Essential Fish Habitat (EFH) are discussed below in the SPWN and MAR sections.

4.3.6 Rare, Threatened, or Endangered Species (RARE)

The risk to the RARE beneficial use in the canal will be minimal, and only occur during construction.

From the NES: *"The project site is not located within designated Critical Habitat for any federally listed species (Exhibit 8, Critical Habitat Map); therefore, no consultation with the USFWS will be required for adverse modification or loss of Critical Habitat.*

No sensitive plant species were detected within the BSA during the habitat assessment. Based on habitat requirements for specific species, availability and quality of habitats needed by sensitive plant species, it was determined that the BSA does not provide suitable habitat for sensitive plant species. Therefore, no impacts would occur to sensitive plant species, and no mitigation is required. Thus, implementation of the proposed project is not likely to adversely affect any sensitive plant species.

No sensitive animal species were detected within the BSA during the habitat assessment. Based on habitat requirements for specific species, availability and quality of habitats needed by each sensitive wildlife species, it was determined that the project site does not provide suitable habitat that would support any of these sensitive animal species known to occur in the general area. However, it was determined that Cooper's hawk (Accipiter cooperii), white-tailed kite (Elanus leucurus), and osprey (Pandion haliaetus) have a low potential to occur within the BSA. The BSA does not provide suitable nesting habitat for these avian species, but they can be observed foraging in or around Newport Bay."

The lack of observed critical habitat or sensitive plant species indicates the temporary and permanent risks to the RARE beneficial use are minimal. The foraging activities of the observed avian species might be locally disrupted during the construction phase, but will not be a permanent condition. Thus, the permanent and temporary risk to the RARE beneficial use is minimal.

4.3.7 Spawning, Reproduction, and Development (SPWN)

The risk to the SPWN beneficial use in the canal will be minimal, and only occur if the Temporary Bridge Alternative is employed.

The NES states: *"Eelgrass is found in the middle of the low tide channel for the entire extent of the Grand Canal. However, no eelgrass was observed under the existing Park Avenue Bridge or within the bridge shadow.*

Project Alternative 1 would not have any impacts to EFH and would not require the Corps to consult with the National Marine Fisheries Service (NMFS). EFH is found in the BSA within the Grand Canal, but is not found immediately under the existing Park Avenue Bridge.

EFH extends north up the Grand Canal from Newport Bay approximately 400 feet, and extends south within the Grand Canal from Newport Bay approximately 800 feet. The existing Park Avenue Bridge is not within EFH.

Compensatory mitigation for temporary impacts to eelgrass and EFH will be mitigated through under the conditions of the Corps Letter of Permission (LOP), Section 401 Water Quality Certification, and a California Coastal Commission (CCC) Coastal Development Permit (CDP)."

The risk to SPWN beneficial use has been determined in the NES to be temporary and only associated with the Temporary Bridge Alternative. The NES identifies compensatory mitigation for this case, and compliance will minimize the risk to the SPWN beneficial use.

4.3.8 Marine Habitat (MAR)

The risk to the MAR beneficial use in the canal will be minimal, and only occur during construction.

The nature of the proposed project hazard to the MAR beneficial use is similar to the WILD, RARE, AND MAR discussion. Similar to the WILD, RARE, and MAR uses, the impacts are temporary, and are minimal in character.

4.3.9 Shellfish Harvesting (SHEL)

The risk to the SHEL beneficial use in the canal will be minimal.

The NES stated: *"Several fiddler crabs (Uca spp.) were observed on the un-vegetated mudflat during the habitat assessment. Barnacles (Balanus spp.) were also observed during the habitat assessment on the existing support pillars for Park Avenue Bridge.*

The only mollusks observed during the habitat assessment included mussel (Mytilus californianus), which were observed on the existing support pillars for Park Avenue Bridge. The canal walls and small boat docks provide suitable habitat for mollusks within the BSA."

No impacts are anticipated on the un-vegetated mudflats during construction. Temporary disruption of SHEL habitat on the existing bridge piers will occur during construction from the removal of the existing piles, but the reconstructed piles will provide suitable habitat

for shellfish reattachment. The proposed three-span bridge replaces two canal bents that are within the low water line of the canal, and eliminates two more bents. The project proposes to reduce the overall number of piles in the channel, but the new piles will each have a larger surface area than each of the existing piles. Ultimately, the available attachment area for the noted species will be biologically equivalent.

4.4 Potential Risk for Support of Incompatible Floodplain Development

The adjacent area is fully developed and the project is a replacement of an existing bridge for seismic and functional reasons. Demolition of existing property and reconstruction on Balboa Island is subject to permits from the City of Newport Beach. Because the City is a participating community in the National Flood Insurance Program, the building department administers the NFIP requirements during the building permit process. The replacement of the existing bridge therefore does not further support incompatible floodplain development.

4.5 Measures to Minimize Floodplain Impacts

The project does not add fill, or raise the bridge above the existing profile. The area is mapped as fully inundated. There are no measures available to alter the flooding patterns. The City of Newport Beach is conducting a separate project to construct seawalls to protect Balboa Island during the coastal flooding events. The seawall project is not a part of the Park Avenue Bridge Replacement project.

4.6 Measures to Restore/Preserve Natural and Beneficial Floodplain Values Impacted by the Project

The NES has identified measures to Restore/Preserve the Natural and Beneficial Floodplain values impacted by the project. The following list summarizes the Temporary Avoidance and Minimization Measures recommended in the NES.

- NAV, REC 1, REC 2, COMM, and RARE are not impacted by the project and Temporary Avoidance and Minimization Measures are not required.
- WILD requires nesting bird clearance surveys to be conducted prior to construction, and appropriate measures will be taken if the results of the survey indicate the presence of nesting birds.
- SPWN and MAR will be temporarily impacted if the Temporary Bridge Alternative is employed. If so, the NES has identified that compensatory mitigation for temporary impacts to eelgrass and EFH will be mitigated through under the conditions of the Corps Letter of Permission (LOP), Section 401 Water Quality Certification, and a California Coastal Commission (CCC) Coastal Development Permit (CDP).
- No temporary avoidance or minimization mitigation measure is required for the temporary impacts to the SHEL beneficial use.

4.7 Assessment of Level of Risk

The proposed action is a bridge replacement for seismic and functional reasons. As discussed above: The proposed action does not create a longitudinal encroachment; the project site is fully inundated during the Base Flood Event. Future improvements in the project vicinity will

create a transverse crossing of Grand Canal. The risk to life and property is Nominal; there is no change to the current risk to life and property as a result of the proposed action within the SFHA. The proposed risks to natural and beneficial floodplain values are minimal, the impairments to the beneficial uses are temporary due to construction activities, and mitigation has been identified. There is no support for further incompatible floodplain development. The environs are already fully developed and redevelopment is subject to City of Newport Beach Building Department approvals and City Ordinances. Measures to restore and preserve natural and beneficial floodplain values impacted by the project have been identified and recommended in the NES.

Therefore, the combined Assessed Risk Level is LOW RISK.

Section 5 – Conclusion

The project lies within a Zone AE Floodplain. The source of the flooding is coastal flooding associated with storms, wave run-up, or Tsunamis. The flood hazard and flood depths are unchanged as a result of the proposed Park Avenue Bridge Replacement Project. The proposed action within Zone AE does not include any major roadway alteration, or any cut or fill. The work in these areas is limited to replacing an existing bridge. Engineering assessment of the project condition improvements reveal that the project does not introduce additional risk for traffic disruptions or loss of life and property.

The project does not support incompatible floodplain development; the area is fully developed and participating in the National Flood Insurance Program. The need for measures to minimize floodplain impacts associated with the action has been evaluated and determined to be feasible. The measures to restore and preserve the natural and beneficial floodplain values resulting from construction actions and changes to the bridge footprint have been identified in the Natural Environment Study (RBF, May 2014).

Because the proposed action does not change the water surface elevation or boundaries of the mapped floodplain, the Standard Environmental Reference Chapter 17 criteria is met, and the project constitutes MINIMAL ENCROACHMENT.

The Location Hydraulics Study Forms and Floodplain Evaluation Report Summary Forms are prepared and included with this report as an appendix.

Summary of Preparer's Experience

This Location Hydraulic Study Report has been prepared under the direction of the following registered civil engineer.

Bradley M. Losey is a Registered Civil Engineer in the State of California, license number C65140. Mr. Losey holds a Bachelors' of Science in Civil Engineering from the University of California, Irvine, and has fifteen years of flood control experience related to Roadways, Bridges, Hydrology, and Channel Hydraulics.

This Location Hydraulic Study Report has also been prepared with input and consultation of the following Environmental Specialist.

Alan Ashimine is a Senior Associate with RBF Consulting. Mr. Ashimine holds a Bachelors' of Arts degree in Environmental Analysis and Design from the University of California, Irvine. Mr. Ashimine has over fourteen years of experience preparing environmental and planning studies for public and private sector clients under the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). He has extensive experience in the research, analysis, and writing of environmental documentation for a variety of projects involving infrastructure, redevelopment, residential, and industrial uses.

Technical Appendix

- **Location Hydraulic Study Forms**
- **Floodplain Evaluation Report Summary Forms**

TECHNICAL INFORMATION FOR LOCATION HYDRAULIC STUDY
PARK AVENUE BRIDGE OVER GRAND CANAL

Dist. 12 Co. Orange Rte. N/A
P.M. N/A
EA Federal Project No.: BRLO-5151(026) Bridge No. N/A

Floodplain Description:

The project is within Newport Bay. The project falls within a FEMA mapped Zone AE floodplain. The applicable FEMA map numbers for the project are 06059C0382J and revised by LOMR on February 19, 2014.

1. **Description of Proposal** (include any physical barriers i.e. concrete barriers, soundwalls, etc. and design elements to minimize floodplain impacts)

The proposed project includes the demolition of the existing Park Avenue Bridge and construction of an improved seismically-reinforced bridge over the Grand Canal. The existing five span bridge will be replaced with a three span bridge. The bridge replacement does not alter the existing flooding patterns or change the water surface elevations.

The project falls within a FEMA Zone AE. The source of the flooding is Newport Bay. The flooding type is coastal flooding.

2. **ADT**: Current N/A Projected N/A

3. **Hydraulic Data**: Base Flood Q_{100}= N/A WSE_{100}= 9 ft

The flood of record, if greater than Q_{100}: Q= N/A cfs WSE= N/A ft

Overtopping flood Q= N/A cfs WSE= N/A ft

Are NFIP maps available? YES X NO

Are NFIP studies available? YES X NO

4. Is the highway location alternative within a regulatory floodway?
YES NO X

5. Attach map with flood limits outlined showing all buildings or other improvements within the base floodplain.

Potential Q_{100} backwater damages:

A.	Residences?	NO	YES X
B.	Other Bldgs?	NO	YES X
C.	Crops?	NO X	YES
D.	Natural and beneficial Floodplain values?	NO X	YES

6. **Type of Traffic**:

A. Emergency supply or evacuation route?	NO_____	YES__X__
B. Emergency vehicle access?	NO_____	YES__X__
C. Practicable detour available?	NO__X__	YES_____
D. School bus or mail route?	NO_____	YES__X__

7. Estimated duration of traffic interruption for 100-year event hours:__6__

8. Estimated value of Q_{100} flood damages (if any) – moderate risk level.

A. Roadway	$__N/A__
B. Property	$__N/A__
Total	$__N/A__

Damages to Roadway and Property are not applicable due to the flooding source being Newport Bay, and the proposed Park Avenue Bridge does not alter the source, depth or manner of flooding in the area.

9. **Assessment of Level of Risk** Low__X__
Moderate____
High_____

For High Risk projects, during design phase, additional Design Study Risk Analysis may be necessary to determine design alternative.

Preparer's Signature – Licensed Civil Engineer _____ Date 7/21/14
(Item numbers 3,4,5,7,9)

Is there any longitudinal encroachment, significant encroachment, or any support of incompatible Floodplain development? NO__X__ YES_____

If yes, provide evaluation and discussion of practicability of alternatives in accordance with 23 CFR 650.113

Information developed to comply with the Federal requirement for the Location Hydraulic Study shall be retained in the project files.

Signature – Project Engineer _____ Date 7/21/14
(Item numbers 1, 2, 6, 8)

SUMMARY FLOODPLAIN ENCROACHMENT REPORT
PARK AVENUE BRIDGE OVER GRAND CANAL

Dist. 12 Co. Orange Rte. N/A
P.M. N/A
EA Federal Project No.: BRLO-5151(026) Bridge No. N/A

Limits: Park Avenue Bridge over Grand Canal between Marine Avenue and Abalone Avenue in the City of Newport Beach on Balboa Island.

Floodplain Description:

The project is within Newport Bay. The project falls within a FEMA mapped Zone AE floodplain. The applicable FEMA map number for the project are 06059C0382J and revised by LOMR on February 19, 2014.

		No	Yes
1.	Is the proposed action a longitudinal encroachment of the base floodplain?	X	
2.	Are the risks associated with the implementation of the proposed action significant?	X	
3.	Will the proposed action support probable incompatible floodplain development?	X	
4.	Are there any significant impacts on natural and beneficial floodplain values?	X	
5.	Routine construction procedures are required to minimize impacts on the floodplain. Are there any special mitigation measures necessary to minimize impacts or restore and preserve natural and beneficial floodplain values? If yes, explain.	X	
6.	Does the proposed action constitute a significant floodplain encroachment as defined in 23 CFR, Section 650.105(q).	X	
7.	Are Location Hydraulic Studies that document the above answers on file? If not explain.		X

PREPARED BY:

Preparer's Signature – Licensed Civil Engineer — Date 7/21/14

Signature - Environmental Consultant — Date 7/21/14

Signature - Project Engineer — Date 7/21/14