Master Storm Water System Maintenance Program Annual Report

City of San Diego

Transportation & Storm Water Department
Storm Water Division

September 2015

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Executive Summary

Under Council Policy 800-04, the City of San Diego (City) is responsible for maintaining adequate drainage facilities for the protection of life and property. Due to the environmental sensitivity of the flood control channels that the City maintains, the Transportation & Storm Water Department's Storm Water Division (SWD) adopted the Master Storm Water System Maintenance Program (MMP) to perform channel maintenance activities for flood control in a manner that minimizes environmental impacts associated with channel maintenance. The MMP includes storm water facilities, specifically open channels, which the Storm Water Division has the responsibility to maintain.

A Programmatic Environmental Impact Report (PEIR) was prepared to study the MMP, and in August 2013 the City approved Site Development Permit (SDP) Number 1134892 for the program. Pursuant to Section 5.5 of the MMP and in accordance with PEIR Mitigation Measure 4.3.8, the Storm Water Division provides this Annual Report to document flood control channel maintenance activities and associated mitigation implemented over the past fiscal year, July 1, 2014 - June 30, 2015 (FY 2015).

The maintenance season for the MMP is typically from September to February/March. Work outside of this time period is restricted due to sensitive bird breeding seasons as identified in the MMP. Some work may occur during the bird breeding season, but typically involves focused minimization measures to avoid impacts to breeding birds.

During FY 2015, the Storm Water Division performed planned maintenance activities in the following channel areas:

- Sorrento Valley Reach[1] 3 (aka Soledad Creek Channel) (MMP Maps 9, 11, 12)
- Murphy Canyon Creek (MMP Map 58)
- Mission Bay High School and Pacific Beach/Olney Street Channels (MMP Maps 36 and 37)

During FY 2015, the Storm Water Division performed emergency maintenance activities in the following channel areas:

- San Carlos Creek Channel (MMP Map 54)
- Reservoir Drive Channel (MMP Map 64a[2])
- Smythe Channel (MMP Map 129)

Wetlands mitigation for the Tijuana River Pilot Channel and Smuggler's Gulch channels (MMP Maps 138 a, b, c, and 139) was continued during FY 2015 within and adjacent to the channel maintenance footprint. Wetlands mitigation for the Murphy Channel has been reserved at a larger City mitigation site

[1] A reach is a section of channel studied during an Individual Hydraulic and Hydrology Assessment (IHHA). The boundaries of a reach are defined most frequently by a change in channel properties, such as construction type (e.g. earthen or concrete), design, width, substrate, or connection to other portions of the larger channel system.
[2] The MMP is currently undergoing an amendment to add this channel as Map 64a.

near Qualcomm Stadium. Wetlands mitigation for Sorrento Valley Reach 3 and Mission Bay High School and Pacific Beach/Olney Street Channels has been designed. The enhancement component is in implementation and the creation component is in the City's contracting process with construction expected during fall of 2015. Uplands mitigation will be in the form of payment into the City's Habitat Acquisition Fund in accordance with Mitigation Measure 4.3.11 of the PEIR. Mitigation for the emergency activities has not yet been identified. The Storm Water Division maintained compliance with all regulatory permits and agreements during the maintenance activities for all channels.

Introduction

The City of San Diego (City) operates and maintains approximately 50 miles of drainage channels to convey storm water and urban runoff for the purpose of reducing flood risk and to provide essential public services. Maintenance of channels primarily involves the removal of vegetation and/or sediment to restore adequate conveyance of storm water.

Under Council Policy 800-04, the City of San Diego is responsible for maintaining adequate drainage facilities to convey storm water runoff in an efficient, economic, environmentally and aesthetically acceptable manner for the protection of property and life. The City's storm water system serves to convey storm water flow in order to protect the life and property of its citizens from potential flooding. The system also serves to convey urban runoff from development such as irrigated landscaped areas, driveways, and streets that flow into drainage facilities and, ultimately, into receiving waters and the ocean. Open facilities, such as channels, can support natural resources including wetland habitat. The long-term performance of the entire system is dependent upon ongoing and proper maintenance of channel sections essential for flood control.

Due to the environmental sensitivity of the natural resources associated with some of the flood control channels, the MMP was developed to ensure that the City complied with various federal, state, and local laws intended to protect and/or minimize impacts to environmental resources (City of San Diego 2011a and b, October 2011). These regulations include, but are not limited to the Clean Water Act (CWA), Endangered Species Act (ESA), California Coastal Act, California Fish and Game Code, California Porter-Cologne Act, California Environmental Quality Act (CEQA), and the San Diego Municipal Code. Additionally, as part of the environmental permitting process, the City works with the public, various stakeholders, non-governmental organizations, and environmental groups, in an effort to avoid, minimize, and/or mitigate impacts.

The goal of the MMP is to provide a comprehensive approach to storm water system maintenance. It is intended to achieve the following major objectives:

1. Fulfill the mandate of Section 26.1 of the San Diego City Charter to provide essential public works and public health services by maintaining the storm water conveyance system for the purpose of reducing flood risk;

2. Develop a comprehensive program that will govern the future maintenance of the City's storm water system in an efficient, economic, environmentally and aesthetically acceptable manner for the protection of property and life, in accordance with Council Policy 800-04;

3. Ensure implementation of Best Management Practices (BMPs) and maintenance protocols during maintenance activities to avoid and/or minimize effects to environmental resources, and incorporate the analysis of the operational and pollution prevention benefits of each proposed project; and

4. Create an integrated comprehensive review process for annual maintenance activities that will facilitate authorizations from local, state and federal regulatory agencies.

With these goals and objectives in mind, the Storm Water Division prioritizes channel maintenance facilities based upon hydrology, potential risk of flooding, and public input; conducts the appropriate technical analyses required by the PEIR to determine scope, scale, justification, and environmental impacts of each channel prioritized for maintenance; permits the channel maintenance activities through up to six environmental regulatory agencies; implements the channel maintenance event; and ensures permit conditions and mitigation measures are met for each project.

The remainder of this report discusses the activities implemented by the Storm Water Division over the past year to meet the goals of the MMP. As required by the MMP and PEIR, this summary includes:

- Tabular summary of the biological resources/sensitive vegetation impacted during maintenance and the mitigation;
- Master table containing the following information for each individual storm water facility or segment which is regularly maintained:
    - Date and type of most recent maintenance;
    - Description of mitigation which has occurred; and
    - Description of the status of mitigation which has been implemented for past maintenance activities.
- Results of water quality tests completed before and/or after maintenance;
- Discussion of vegetation growth and sediment accumulation since last maintenance event;
- Estimate of the conveyance capacity resulting from the past year's maintenance.
- Scaled map of each affected storm water facility illustrating pre- and post-maintenance vegetation;
- Summary of the status of mitigation which has been carried out during the current and previous years to mitigate for impacts to upland and wetland vegetation, and well as sensitive species;
- Two digital date-stamped photographs of each of the areas that were maintained in the current year;
- Description of any remedial actions and the outcome of their implementation for each affected storm water facility;
- A list of all storm water facilities anticipated to be maintained in the coming year; and
- A preliminary estimate of sensitive biological and/or cultural resources to be impacted in the coming year with each maintenance activity and mitigation required for anticipated impacts.

The results of this report will be presented as an informational item to the Environment Committee (formerly the Natural Resources and Culture Committee) of the San Diego City Council and the Community Planners Committee and will be provided to the City of San Diego Development Services Department, California Department of Fish and Wildlife, Regional Water Quality Control Board, US Fish and Wildlife Service, and US Army Corps of Engineers.

Channel Maintenance Activities

Under the MMP, the City's Storm Water Division (SWD) identifies and prioritizes channel maintenance work for the coming year that considers, as a primary objective, each channel segment's ability to meet SWD's flood control objectives. A list of priority channels is prepared that also considers budget constraints, relevant water quality regulations, public input, environmental resources and mitigation opportunities, and pollutant priorities in each watershed in addition to flood risk. Once the priority list has been determined, the City will conduct a number of individual technical assessments that analyze potential impacts to biological, cultural, and water quality resources associated with each facility.

First, an Individual Hydraulic and Hydrology Assessment (IHHA) is completed to assess the current channel conveyance capacity, need for maintenance, determine the minimum amount of sediment and/or vegetation that must be removed to improve flood conveyance, and determine if any structures or actions are required to minimize impacts to water quality and/or provide improved erosion control during or after maintenance. When an IHHA is completed for a channel identifying the need for maintenance, an Individual Maintenance Plan (IMP) is developed to document the maintenance area and methods that will be used. Based upon the IMP, technical assessments for biological resources, historical resources, noise, and water quality are completed to determine potential environmental impacts and determine specific mitigation measures to minimize impacts in accordance with the PEIR.

Once these studies are completed, the individual channel projects are permitted through the City of San Diego Substantial Conformance Review (SCR) process as well as through environmental agencies such as the US Army Corps of Engineers, Regional Water Quality Control Board, California Department of Fish and Wildlife, and California Coastal Commission, as appropriate depending on the type of maintenance conducted and the location of the facility.

Channel maintenance activities may commence after all required permits and authorizations are obtained and pre-project permit conditions are met. Channel maintenance is restricted by the MMP and various regulatory permits to occur from September through February/March to avoid sensitive bird breeding seasons unless additional biological surveys are conducted and demonstrate no adverse impacts to nesting birds. In addition, wet weather and other factors may limit maintenance activities during the rainy season, typically October through April.

Table 1 – MMP Facilities Maintained in Fiscal Year 2015 and Associated Mitigation lists the channels that were maintained during the FY 2015 season and summarizes information regarding vegetation impacts and mitigation information. Figure 1 in Appendix D depicts an overview of the location of these facilities and associated mitigation.

Table 1 – MMP Facilities Maintained in Fiscal Year 2015 and Associated Mitigation

Map No.	Facility	Date	Maintenance Type	Vegetation Impacts (acres)	Vegetation Type	Mitigation
11,12	Sorrento Creek, Reach 3[1]	9/15/2014-10/2/2014 3/11/2015-3/14/2015	Sediment and Vegetation Removal	0.96	Disturbed (Developed/Concrete Lined)	1.91 acres at El Cuervo Del Sur Wetlands Mitigation Site and 5.53 acres at Los Penasquitos Preserve Wetlands Enhancement Site[2]
				0.11	Disturbed (Developed) - Temporary	
				0.04	Disturbed Ruderal - Temporary	
				0.02	Non-Native / Ornamental - Temporary	
				1.13	*Subtotal*	
58, 58a	Murphy Canyon Creek, Reaches 1 & 2	12/22/2014 - 3/14/2015	Sediment and Vegetation Removal	0.70	Freshwater Marsh	4.28 acres of wetlands restoration and enhancement credits at the Stadium Mitigation Site
				0.25	Disturbed Southern Willow Scrub	
				0.21	Southern Riparian Forest	
				0.04	Open Water/Natural Flood Channel	
				0.02	Developed Habitat	
				1.22	*Subtotal*	
36, 37	Mission Bay High School & Pacific Beach Dr/Olney Dr Channels	3/7/2015 - Fall 2015 (Ongoing)	Sediment and Vegetation Removal	0.31	Freshwater Marsh	0.34 acre at El Cuervo Del Sur Wetlands Mitigation Site and 0.96 acre at Los Penasquitos Preserve Wetlands Enhancement Site
				0.3	Non-native Grasslands	
				0.34	Non-Native Vegetation	
				0.22	Disturbed Habitat	
				0.38	Developed Habitat	
				1.55	*Subtotal*	
54	San Carlos Creek Channel Emergency	11/1/2014 - 11/8/2014	Emergency Removal of Debris	0.004	Freshwater Marsh/Concrete Channel	TBD
64a	Reservoir Dr Channel Emergency	11/28/2014	Emergency Removal of Vegetation and Sediment	0.07	Disturbed Freshwater Marsh (on Concrete Channel)	TBD
				0.01	Disturbed Wetland	
				0.07	Developed, Unvegetated Concrete-Lined Channel	
				0.15	*Subtotal*	
129	Smythe Channel Emergency	12/1/2014	Emergency Removal of Vegetation and Sediment	1.30	Developed, Unvegetated Concrete-Lined Channel	None Required.
MMP Total Vegetation Impacts (acres)				5.35		

[1] A reach is a section of channel, the boundaries of which are created during an Individual Hydraulic and Hydrology Assessment (IHHA). The boundaries of a reach are defined most frequently by a change in channel properties, such as construction type (e.g. earthen or concrete), design, width, substrate, or connection to other portions of the larger channel system.

[2] Mitigation listed is for entire channel maintenance project, including Reach 7

Additional details regarding channels that were maintained during the FY 2015 season are provided in subsequent sections of this report. Appendix C includes Figures 1-12, which show the locations of these facilities.

A Master Storm Water Facility and Mitigation List reflecting facilities that have been maintained under the MMP, mitigated, and for which no additional mitigation is required is included in Appendix A.

Sorrento Valley (MMP Maps 9, 11 and 12)

The Sorrento/Soledad/Flintkote Channel Maintenance Project was fully permitted in March 2014 to remove 125 – 175 cubic yards of accumulated vegetation and sediment from the 11000 Roselle Street/11100 Flintkote Avenue Channel (MMP Map 9; also referred to as Reach[3] 7), a concrete lined facility, and 2,000–4,000 cubic yards of accumulated vegetation and sediment from the Soledad Canyon/Sorrento Creek Channel (MMP Maps 11 and 12; also referred to as Reach 3)Prior maintenance occurred under emergency conditions in 2011 in Reach 3. Vegetation and sediment coverage were noted at 40% and 60%, respectively, and, based upon post-maintenance photographs, over 95% of vegetation and 80% of sediment was removed. In the 2013 IHHA for Reach 3, it was observed that sediment deposited along the channel bed varied from approximately 18 inches at its downstream end to a very minimal amount at the upstream end. Some sections contained pebbles and cobbles up to 3 inches in diameter, mixed in with silty sands that were observed to a depth of 12 inches. In general, the downstream end, where the sediment deposition is the deepest, supported the most dense vegetation. Based on pre-maintenance and post-maintenance photos, this accumulation of vegetation and sediment equated to approximately 80% sediment coverage and approximately 10% vegetation coverage.

Maintenance was conducted in Reach 7 in FY2014 and included the removal of 108.10 tons of material from 0.12 acres. More details regarding this maintenance event can be found in the FY2014 MMP Annual Report. Project maintenance activities during FY2015 were completed for a 2,300 linear feet portion of Reach 3 between September 16 and October 2, 2014. During this period, crews removed approximately 3,135 tons of sediment and vegetation from the channel using mechanized equipment. Approximately 770 linear feet of the site was revisited during a second maintenance effort which took place March 11 through March 14, 2015, and included the removal of an additional 343 tons of material, bringing the total amount of vegetation and sediment removed from Reach 3 to 3,478 tons. All BMPs (gravel bags, authorized access routes, etc.) were implemented during maintenance and removed following completion of maintenance. Photographs showing pre- and post- maintenance conditions of the channel are included in Appendix C. Maps displaying pre- and post-maintenance vegetation are included in Appendix D.

Since the completion of maintenance, periodic inspections of the channel have been conducted in Reach 7. As sediment and debris is found, it is swept up by hand and removed from the channel.

No remedial actions were taken with regard to this facility; the project was compliant with all permits.

Wetlands mitigation for this project is being conducted at the Los Peñasquitos Canyon Preserve Wetlands Enhancement Project and the El Cuervo Del Sur Wetlands Mitigation Project. See Mitigation Projects Section for details.

[3] A reach is a section of channel, studied during an Individual Hydraulic and Hydrology Assessment (IHHA). The boundaries of a reach are defined most frequently by a change in channel properties, such as construction type (e.g. earthen or concrete), design, width, substrate, or connection to other portions of the larger channel system.

Conveyance Capacity Resulting from Maintenance

The pre-project IHHA determined that Reach 3 had the capacity to convey a 10-year storm flow in its pre-maintenance condition, and without corrective action, its conveyance capacity would be reduced to a 5-year storm event. However, by maintaining the channel, the projected conveyance capacity increased to the 15- to 20-year storm event.

Water Quality Monitoring Summary

The pre-project IWQA involved assessing water quality and sediment to determine whether the project would impact or benefit water quality. The methodology is documented in the *Standard Operating Procedure (SOP) to Conduct Water Quality Assessment and Quantification Model for Flood Channel Maintenance* found in Appendix A of the *Water Quality Assessment – White Paper* of the PEIR.

The annual existing pollutant removal load capacity over a three year period was calculated during this assessment and compared to the theoretical maintained pollutant load removal capacity over the same time frame. Factors such as pollution uptake by biomass and pollutant removal resulting from sediment excavation were taken into account, and it was determined that the proposed sediment removal during maintenance would eliminate a larger pollutant load than what is theoretically removed during ambient flow by natural treatment system processes. The study showed that sediment excavation in Reach 3 would prevent re-suspension and downstream transport of sediment-bound pollutants during wet weather, and regrowth of fresh water marsh species in Reach 3 within one year would further enhance dry-season pollutant removal from the channel. The IWQA results suggest that there is a benefit to the channel maintenance.

However, in an effort to best combine the as-built channel capacity with improvements to water quality, the City, in accordance with the Coastal Development Permit (CDP) and SDP, is implementing a suite of water quality improvement activities including the distribution of pollution prevention outreach materials; targeted street sweeping; increased inspections of storm drains within the project's drainage area; and several special studies. It is anticipated that application of these activities within the priority channel drainage area will lead to long-term water quality benefits.

Post project water quality monitoring was not required for this project and was not conducted.

Murphy Canyon Creek Channel (MMP Map 58)

The Murphy Canyon Creek Channel Maintenance Project involved the removal of accumulated sediment, trash, and vegetation from Reaches[4] 1 and 2 of Murphy Canyon Creek. The project was fully permitted in November 2014 to remove up to 12,000 cubic yards of material from Reach 1, and up to 3,000 cubic yards of material from Reach 2.

[4] A reach is a section of channel, studied during an Individual Hydraulic and Hydrology Assessment (IHHA). The boundaries of a reach are defined most frequently by a change in channel properties, such as construction type (e.g. earthen or concrete), design, width, substrate, or connection to other portions of the larger channel system.

Prior maintenance occurred approximately 10-12 years ago and pre-dates the current documentation and tracking system for record keeping. Thus records of what occurred during the past maintenance event are not presented in this report.

Project maintenance activities were completed in Reaches 1 and 2 from December 22, 2014 to March 14, 2015 removing approximately 10,324 tons of material. In Reach 1, 0.87 acre (1,554 linear feet) was excavated, 0.02 acre was cleared of vegetation only, and 0.20 acre was not maintained due to inundated conditions. The entire length of Reach 2, which is a concrete-lined segment, was maintained through excavation of approximately 206 linear feet. Where sediment was removed, depths ranged from three to six feet. A portion of an existing bike path in a disturbed, upland location had been undermined prior to the start of work and was repaired at the conclusion of the project. Access points used along the side of the channel were restored to adjacent bank elevations and revegetated with an erosion control seed mix.

BMPs (gravel bags, authorized access routes, etc.) were implemented during maintenance and removed at the end of the current work period on March 14, 2015. Photographs showing pre- and post-maintenance conditions of the channel are included in Appendix C. Maps displaying pre- and post-maintenance vegetation are included in Appendix D.

Wetlands mitigation for this project is planned south of Qualcomm Stadium in accordance with the Stadium Wetland Mitigation Project (Atkins 2015). See Mitigation Projects Section for details. In addition, quarterly inspections of access and staging areas have been scheduled for 25 months after maintenance to check for and remove weeds, including giant reed (*Arundo donax)*.

No remedial actions were taken with regard to this facility; the project was compliant with all permits.

Conveyance Capacity Resulting from Maintenance

The pre-project IHHA results indicated that Murphy Channel could not contain a 2-year storm event in the pre-project condition. With sediment and vegetation removed, the conveyance capacity increased to convey the 5-year storm event in Reach 1 and the 50-year storm event in Reach 2.

Inundated conditions during maintenance precluded sediment removal for approximately 100’ at the south end of the channel.

Water Quality Monitoring Summary

The pre-project IWQA for Murphy Canyon Channel evaluated potential water quality benefits and impacts associated with channel maintenance activities. The methodology for the IWQA is documented in the *Standard Operating Procedure (SOP) to Conduct Water Quality Assessment and Quantification Model for Flood Channel Maintenance* found in Appendix A of the *Water Quality Assessment – White Paper* of the PEIR.

These results of the water quality impact analysis outlined by the SOP suggested that overall the proposed sediment removal during maintenance would remove a larger pollutant load than that which

is theoretically removed under existing conditions during dry weather flow by natural treatment system processes over three years. Therefore, the maintenance was determined to provide an overall water quality benefit and the IWQA did not recommend mitigation requirements as a result of the analysis.

Nevertheless, the City implemented water quality improvement activities in accordance with the SDP. The City elected to restore 100 square feet of wetlands for every 200 linear feet of vegetation removed per fiscal year; an estimated 909 square feet of wetland restoration has been added to the wetlands mitigation planned for the Stadium Mitigation Site for the project to comply with this condition.

During maintenance activities conducted on January 7, 2015, the City crews encountered a section of excavated soil within the Reach 1 earthen channel which was emitting a petroleum-like odor. Work was halted and a hydrologist sampled the area of interest and delivered the soil samples to an approved laboratory for chemical composition testing. The tested sediment was determined to not contain hazardous substances and the material was authorized for disposal at the Miramar Landfill. The project team developed a protocol for air quality monitoring and segregation of potentially contaminated sediment, allowing channel maintenance work to safely continue. At the end of the project, the small stockpile containing potentially contaminated soil was tested to confirm that hazardous materials were not present. ; Test results indicated that the soil did not contain hazardous materials and the soil was disposed at the Miramar Landfill.

Post project water quality monitoring was not required for this project and was not conducted.

Mission Bay High School and Pacific Beach/Olney Street Channels (MMP Maps 36 and 37)

Mission Bay High School (MBHS) and Pacific Beach Drive/Olney Drive (PBO) Channel maintenance began March 7, 2015 and is scheduled to be completed in fall 2015. The maintenance activity includes the clearing of vegetation, sediment, and trash over an 8,600 square foot area of the MBHS concrete-lined channel and a 16,146 square foot area in the PBO earthen channel to restore the conveyance capacity of the channel.

Prior maintenance activities in this channel pre-date the current documentation and tracking system for record keeping. Thus records of what occurred during past maintenance events are not presented in this report. However, the IHHA for the FY 2015 maintenance event describes vegetation and sediment accumulation observed during site visits in August 2012 and September 2013 and the conditions in the MBHS and PBO sections were slightly different. In 2012, sediment mixed with organic material was noted as having a depth of approximately three to four inches and well-established and dense freshwater marsh vegetation and non-native grasslands were observed within the MBHS channel. Additionally, the outlet of the existing 27-inch RCP storm drainpipe that discharges into the channel was significantly obstructed by the vegetation growth within the concrete channel and the side slope west of the MBHS channel, ornamental vegetation, mainly unmaintained ice plant had overgrown to the degree that it had covered the channel's west side in its entirety and, in some instances, had covered the

channel bottom and reached the east side of the channel. Comparatively, the PBO channel had similar vegetation growth, including iceplant growing from one side of the channel to the other, and sediment (also mixed with organic material) was recorded as approximately six to seven inches. In 2013, the sediment accumulation in the entire MBHS/PBO channel was unchanged, but the vegetation was noted as being significantly denser and taller since the previous visit Based upon photos in the IHHA, the pre-maintenance coverage for both vegetation and sediment can be considered approximately 100%.

During the FY2015 maintenance event, 1,972 linear feet of material have been cleared in order to increase the conveyance capacity and reduce the extent of flooding in severe storm events. Approximately 420 tons of material have been removed and legally disposed of thus far in the maintenance period. The channel was accessed through previously disturbed staging areas, and all BMPs were implemented as part of the MMP protocol. The project is ongoing and is anticipated to be completed by fall 2015 and incorporates mitigation measures to protect nesting birds during the general avian nesting season. Photographs showing pre- and post- maintenance conditions of the channel are included in Appendix C. Maps displaying pre- and post-maintenance vegetation are included in Appendix D.

Mitigation for wetland impacts is proposed within the Los Peñasquitos Canyon at the El Cuervo del Sur Wetlands Mitigation Project and the Los Peñasquitos Canyon Wetlands Enhancement Project. Non-native grassland impacts will be mitigated through payment into the City's Habitat Acquisition Fund, acquisition and preservation of specific land, or purchase of mitigation credits. Mitigation project status is discussed below in the Mitigation Projects section.

No remedial actions were taken with regard to this facility; the project was compliant with all permits.

Conveyance Capacity Resulting from Maintenance

The analysis provided in the pre-maintenance IHHA determined that maintenance would serve to significantly control and minimize flooding issues in the area. Maintaining the channels increased the conveyance capacity of the MBHS channel from 30% of a 1-year storm event up to a full 2-year storm event and the PBO from a 2-year storm event to a 5-year storm event.

Water Quality Monitoring Summary

Due to the absence of low flow in the MBHS and PBO Channels, which was determined by site visits on three separate occasions, the pre-maintenance IWQA determined the proposed maintenance would not have an impact on water quality. Further, a dry weather diversion is located at the downstream end of the channel segments which intercepts all dry weather flows and diverts these flows to the sewer system for treatment. However, in an effort to best combine the as-built channel capacity with improvements to water quality, the City, in accordance with the Coastal Development Permit (CDP) and SDP, is implementing a suite of water quality improvement activities including the distribution of pollution prevention outreach materials; targeted street sweeping; increased inspections of storm drains within the project's drainage area; and several special studies. It is anticipated that application of these activities within the priority channel drainage area will lead to long-term water quality benefits.

Post-maintenance water quality monitoring was not required for this project and, therefore, was not conducted.

San Carlos Creek Channel Emergency (MMP Map 54)

In the early morning hours of November 1, 2014, approximately 0.5 inches of rain fell in the San Carlos area, causing vegetation and debris within the San Carlos Channel Map 54 to wash downstream and clog a culvert within a residential area. As the clog occurred, flood water rose and overtopped the banks of the channel. With another storm forecasted later in the afternoon, crews mobilized to remove the clog to avoid additional flooding.

The project involved the removal of approximately 145 tons of vegetation and debris that had dislodged and formed the clog at the 60" culvert. Additional sparse vegetation (collectively 0.002 ac.) and sediment were removed upstream of the culvert by hand along with several large chunks of concrete that had broken free during the rain event. Vegetation (180 sq. ft. or 0.004 ac.) and sediment that was impeding the flow of water through the culvert were also removed at the west end of the culvert. A total of 158 tons of material was removed from the project area.

A notice of exemption and emergency site development permit were issued for the project, and subsequent permitting in accordance with the Environmentally Sensitive Lands Ordinance is in progress. A small portion of the work area occurred just outside of the MMP geographic boundary. This area will be added to the MMP via an addendum to the PEIR. USACE, RWQCB, and CDFW were notified but did not require permits for the emergency work.

PEIR vegetation mapping indicated there were no quantifiable wetlands within the concrete-lined channel. Updated vegetation mapping had not been completed prior to the emergency event and storm that washed vegetation downstream; therefore, it is not known what amount of vegetation and sediment was in the channel prior to the emergency. It is also unknown when the last maintenance event in the channel occurred.

No remedial actions were required for this project.

Mitigation has not yet been designated for this emergency. A search for suitable wetland mitigation opportunities is underway.

Conveyance Capacity Resulting from Maintenance

During the emergency, the San Carlos Channel and associated culvert were plugged and conveyed little to no storm water. Post-emergency maintenance, the channel and culvert are able to function as designed.

Water Quality Monitoring Summary

Due to the emergency nature of the activity, no water quality monitoring was conducted.

Reservoir Drive Channel Emergency (MMP Map 64a- to be added to MMP)

Emergency maintenance including the removal of vegetation, sediment, trash, and debris was conducted in the 12 foot wide, 780 foot long, concrete-lined storm water channel along Reservoir Drive in November 2014 immediately prior to a forecasted rain event of 1-3 inches. Emergency maintenance was conducted to prevent imminent flooding of critical infrastructure located nearby, including Alvarado Hospital. Maintenance included impacts to 0.083 acre of wetlands comprised of 0.071 acres of freshwater marsh (including disturbed) and 0.012 acres of disturbed wetland. The channel also contained 0.065 acres of bare concrete lined channel. A total of 131 tons of material was removed from the channel.

The date of the last maintenance event is unknown. Based on pre-project photos, the channel was covered approximately 75-80% with vegetation (including palm trees) growing in accumulated sediment on top of the concrete-lining of the channel.

A notice of exemption and emergency site development permit were issued for the project, and subsequent permitting in accordance with the Environmentally Sensitive Lands Ordinance is in progress. The channel will be added to the MMP through an addendum to the PEIR. USACE, RWQCB, and CDFW were notified but did not require permits for the emergency work.

No remedial actions were taken with regard to this facility; the project was compliant with all permits.

Mitigation has not yet been designated for this emergency. A search for suitable wetland mitigation opportunities is underway.

Conveyance Capacity Resulting from Maintenance

Before maintenance, the Reservoir Drive Channel and associated culvert were had significant build-up of debris and vegetation growing on the concrete lining of the channel. The potential for this relatively loosely rooted material uprooting and causing flooding downstream was evaluated and resulted in emergency maintenance. . Post-emergency maintenance, the channel and culvert are able to function as designed.

Water Quality Monitoring Summary

Due to the emergency nature of the project, the IWQA pursuant to the Master Storm Water Maintenance Plan was prepared post-project and noted that there was no opportunity to conduct pre-maintenance water quality sampling or conduct the standard usually completed. However, water quality protection measures were implemented during maintenance. A vactor truck was stationed at the downstream end of the channel to vacuum debris so it would not leave the project site.

Downstream impacts from increased sedimentation would not be expected to occur as a result of the maintenance. As a concrete-lined channel, the maintenance did not expose soil. In fact, the

maintenance removed sediment which could have potentially been transported downstream by runoff. Increases in downstream water-borne pollutants would also not be expected. The relatively short length of channel and associated vegetation did not offer substantial capacity to remove pollutants from storm water runoff (Reservoir Drive IWQA 2015).

Smythe Channel Emergency (MMP Map 129)

Emergency maintenance including the removal of non-native vegetation such as giant reed (*Arundo donax)*, sediment, trash, and debris was conducted immediately prior to a forecasted rain event of 1-3 inches in two concrete lined segments of the Smythe Channel in November 2014: 1) a 10-foot wide, 820-foot long section and 2) a 10-foot wide, 1,015-foot long section. A large mass of dirt, cattails, and other plant debris that had washed down to the entrance of the multiple box culvert under West San Ysidro Boulevard was removed. Trash removal was also conducted by hand in an earthen detention basin at the north end of the channel. Impacts to wetlands and significant biological resources were avoided through the retention of small area of southern willow scrub at the north end of the channel. A total of 178 tons of material was removed from the channel.

The date of the last maintenance event is unknown. An estimated 200 tons of vegetation and sediment had accumulated, and much of this had washed downstream as a mass of debris prior to emergency actions commencing.

A notice of exemption and emergency site development permit were issued for the project. Subsequent permitting pursuant to ESL regulations was not required. USACE, RWQCB, and CDFW were notified but did not require permits for the emergency work.

Compensatory mitigation was not required for this emergency which was limited to removing an uprooted mass of vegetation, trash, debris, and non-native vegetation. No remedial actions were taken with regard to this facility; the project was compliant with all permits.

Conveyance Capacity Resulting from Maintenance

Maintenance and a post-maintenance inspection on took place in December 2014. The survey confirmed that all vegetation and accumulated sediment had been removed from the concrete-lined portions of both reaches. As recommended, the southern willow scrub vegetation in earthen-bottom portions of the northern reach was undisturbed, but trash had been removed. The conveyance capacity was restored to the design capacity in the concrete portions.

Water Quality Monitoring Summary

The vegetated swale area downstream of the maintenance area showed no sign of sediment inflow on December 22, 2014, indicating that maintenance activities did not result in discharge of sediment into downstream receiving waters. Water quality monitoring was not required for this emergency project.

Mitigation Projects

In accordance with applicable local, state, and federal regulations as well as the PEIR, one-time mitigation is required for significant biological impacts resulting from implementation of the MMP. To mitigate these impacts, the Storm Water Division is planning and implementing mitigation in various watersheds where past, current, or future impacts have or may occur. This section describes projects in various stages of design and implementation.

Tijuana River Emergency Channel Maintenance Mitigation

The Tijuana River Emergency Channel Maintenance project occurred in the early 1990's and resulted in construction of the Pilot Channel. Mitigation for the Tijuana River Emergency Channel Maintenance occurred in the mid-1990's and consisted of the creation of a 13.21 acre site, 9.43 acres of which was wetlands creation to compensate for the construction of the Pilot Channel. The mitigation was completed in 2001 with sign-off from all applicable environmental regulatory agencies.

On March 19, 2015, Dudek conducted an assessment of the site to verify the mitigation area was still meeting USFWS performance standards. During the site walkthrough, least Bell's vireo (*Vireo belli pusillus*), a federally endangered bird species, were detected vocalizing on site. In addition, a mosaic of native riparian and wetland vegetation communities has been established. While the site exhibits natural changes as dictated by field conditions, the location and composition of vegetation communities is substantially consistent with the project design, and the site remains suitable for supporting the continued utilization by least Bell's vireo (Dudek, April 2015).

Tijuana River Valley Channel Maintenance Mitigation Project

In addition to the creation of wetlands described above, wetland enhancement is being conducted as additional mitigation for the continued maintenance in the Pilot Channel and Smuggler's Gulch, including the 2013-2014 and proposed 2015-2016 channel maintenance activities. The wetland enhancement occurs in two locations per the regulatory permits: 1) Adjacent/Out-of-Channel; and 2) In-Channel. The Out-of-Channel mitigation area is adjacent to the channel maintenance areas. The mitigation site is within the Tijuana River Valley Regional Park on City and County of San Diego property.

The 4.31 acre In-Channel mitigation was initiated in September 2013 with the maintenance event which removed non-native vegetation within the channel. Non-native invasive control was also performed through herbicide application to giant reed (*Arundo donax),* castor bean *(Ricinus communis)* and salt cedar *(Tamarix ramosissima)*. In FY 2015, for channel maintenance areas within the 4.31 acre footprint in which dredging was not completed during year one, nonnative invasive control was performed through herbicide application.

The 4.31 acre Out-of-Channel mitigation was also initiated in September 2013, and involved herbicide treatment and biomass removal of the same three target species. During FY 2015, biomass removal and follow-up herbicide treatment resumed after the end of the 2014 bird breeding season (September 15), and was completed before the start of bird breeding season (March 15). Cleared biomass includes the

minimum required 4.31 acres of out-of-channel mitigation, plus an extra 0.43 acres has been treated as a contingency to ensure the mitigation requirements for minimum acreage is met, totaling 4.74 acres. Trash was also removed from the entire 8.62-acre mitigation area in March 2015. Biomass removal and herbicide treatments will continue in fall 2015 after the conclusion of the bird breeding season.

Los Peñasquitos Canyon Preserve Wetlands Enhancement

The Los Peñasquitos Canyon Preserve Wetland Enhancement Project was designed to remove 8.5 acres of non-native species found within and adjacent to jurisdictional waters in Lopez canyon, as well as support the well-being of native species of plants and animals in order to provide 6.64 acres of mitigation credit. Over the past year, significant progress has been achieved, with the initial removal of a large patch of garland daisy *(Glebionis coronarium)* in the upper reach of Lopez Canyon being completed on April 13, 2015. This area had been targeted due to its large, contiguous growth of garland daisy which posed a threat to state- and federally-listed willowy monardella *(Monardella linioides),* which is also present in this portion of Lopez Canyon. During the process of removing the garland daisy, there were no impacts to the willowy monardella or other biologically sensitive species. Following the removal of invasives, reseeding efforts were successfully conducted in order to revegetate the site with native plant species. The five year maintenance and monitoring period started on June 23, 2015, which marked the completion of the installation phase of the project.

The project provides wetlands enhancement mitigation for the following channel maintenance locations:

- Sorrento Reaches 3 and 7, MMP Maps 9, 11, 12
- Mission Bay High School and Pacific Beach/Olney Streets, MMP Maps 36, 37
- Tripp and Industrial Court, MMP Maps 6, 6a

El Cuervo Del Sur Wetlands Mitigation

This wetlands creation project is designed to establish 2.30 acres of wetlands on a currently non-wetland area within the Los Peñasquitos Canyon Preserve. The site has been designed in two phases, however, only Phase I is being carried forward to implementation at the present time. This mitigation project is adjacent to previous City of San Diego mitigation projects (El Cuervo, El Cuervo Norte) along Los Peñasquitos Creek in the Los Peñasquitos Canyon Preserve. The project will involve creation of a within-floodplain depressional wetland area through grading and excavation; planting with a mix of herbaceous wetland, riparian scrub and riparian transitional species; installation of a temporary irrigation system; and a five year maintenance and monitoring period.

The project provides wetlands creation mitigation for the following channel maintenance locations:

- Sorrento Reaches 3 and 7, MMP Maps 9, 11, 12
- Mission Bay High School and Pacific Beach/Olney Streets, MMP Maps 36, 37
- Tripp and Industrial Court, MMP Maps 6, 6a

The construction contract was awarded in August 2015. The project will be implemented in fall 2015 at the conclusion of the sensitive bird breeding season. Site preparation and grading are projected for late-September through October 2015 and planting and irrigation installation are projected for December 2015.

Stadium (San Diego River) Mitigation Bank Purchase

The Public Utilities Department's Stadium (San Diego River) Mitigation site is located within the floodplain of the San Diego River between I-15 and I-805. The project site is approximately 57 acres and is currently dominated by a high number of non-native species. The project proposes to restore native habitat to the area by removing non-natives, installing native plants, and maintaining and monitoring the site for a minimum of five years. Site construction is anticipated to begin in fall 2016 (City of San Diego, 2015).

The Storm Water Division has reserved 8.528 acres of mitigation credits at this site through a Memorandum of Understanding with the Public Utilities Department. The credits are anticipated to be used for the following channel maintenance locations:

- Murphy Canyon Channel Maintenance (Map 58)
- Alvarado Creek Channel Maintenance (Maps 59, 60, 64)

Rancho Jamul Wetland Mitigation Bank Purchase

The Rancho Jamul Wetland Mitigation Bank, located on CDFW lands in unincorporated county lands near Jamul, is proposed to be expanded by approximately 26 acres (Phase IIB) and involves additional stream and wetland re-establishment and enhancement along Jamul Creek and its tributaries. The final permitting and agreements with all regulatory agencies is in progress. The Storm Water Division has purchased 3.3 acres of pre-released wetlands mitigation credits associated with this expansion from the bank sponsor for future projects that occur within the approved service area, consisting of multiple watersheds.

Otay River Wetland Mitigation Site

The Otay River Wetland Mitigation Site project consists of implementing wetlands creation and enhancement of habitat, involving replacement of eucalyptus woodland and restoration of southern-cottonwood willow riparian forest habitats, located along the Otay River within the Otay watershed. Of the 0.54 acre of mitigation proposed, 0.20 acre will be used to mitigate for the Nestor Creek emergency channel maintenance and 0.34 acre will be proposed as advance permittee-responsible compensatory mitigation for future City projects that occur in the Otay watershed.

The project provides wetlands mitigation for the following channel maintenance locations:

- Nestor Creek Channel Emergency Maintenance, MMP Map 134
- Nestor Creek Channels, MMP Maps 131 and 133

The Habitat Mitigation and Monitoring Plan is anticipated to be finalized by the end of fall 2015 and the project is slated to be implemented in fall 2016 pending the completion of the environmental permitting effort and the City's contracting process.

Conclusions and Future Projects

Over the FY 2015 maintenance period, six channels were maintained and a total of 14,690 tons of trash, sediment, and debris was removed from flood control channels. Over 31 acres of wetlands mitigation is in various stages of progress to compensate for wetlands impacts associated with channel maintenance related to the MMP. Water quality monitoring and assessments indicated no impact to water quality; water quality mitigation is being implemented despite this and as required by the SDP and CDP. The maintenance activities conducted under the MMP maintained compliance with all regulatory permits.

For the FY 2016 season, the Storm Water Division is pursuing permits to maintain the following facilities:

- Alvarado Creek Channel, MMP Maps 59, 60, and 64
- Tijuana River Pilot Channel and Smuggler's Gulch MMP Maps 138 a, b, c and 139

A preliminary assessment of sensitive biological and cultural resources to be impacted as a result of the anticipated FY 2016 channel maintenance projects is included in Appendix B. Storm Water Division will continue to implement the MMP by planning channel maintenance and mitigation activities, pursuing environmental permits, conducting appropriate technical assessments, and conducting channel maintenance.

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URS. 2013b. Individual Hydrologic & Hydraulic Assessment Report for Murphy Canyon Channels. June 14, 2013.

Appendix A

Master Storm Water Facility and Mitigation List

Appendix A. Master Storm Water Facility and Mitigation List

Map No.	Facility	Date of Most Recent Maintenance	Type of Most Recent Maintenance	Mitigation Site	Mitigation Location	Mitigation Type	Mitigation Acreage	Mitigation Status
137a,b,c, 138, 139	Tijuana River Pilot Channel and Smuggler's Gulch	2013-2014	Planned Maintenance; vegetation and sediment removal	Tijuana River Valley	Adjacent to Site	Wetlands Creation	9.43	Complete in 2001
				Tijuana River Valley	Adjacent to Site	Wetlands Enhancement	8.62	Maintenance and Monitoring Year 2
9, 11, and 12	Sorrento Creek Reaches 3 & 7	Reach 7: Spring 2014 Reach 3: 2014-2015	Planned Maintenance; Vegetation and sediment removal	El Cuervo Del Sur	Off Site in Watershed	Wetlands Creation	1.91	Contracting
				LPC Preserve Wetlands Enhancement	Off Site in Watershed	Wetlands Enhancement	5.53	Maintenance and Monitoring Year 1
58 and 58a	Murphy Canyon Creek, Reaches 1 & 2	Reach 1 & 2: 2014-2015	Planned Maintenance; Vegetation and sediment removal	Stadium Wetland Mitigation Project	Adjacent to Site	Wetlands Restoration	4.28	Credits Reserved
36-37	Mission Bay High School & Pacific Beach Dr/Olney Dr Channels	Spring 2015 (ongoing through Fall 2015)	Planned Maintenance; Vegetation and sediment removal	El Cuervo Del Sur	Off Site in Watershed	Wetlands Creation	0.34	Contracting
				LPC Preserve Wetlands Enhancement	Off Site in Watershed	Wetlands Enhancement	0.96	Maintenance and Monitoring Year 1
				Habitat Acquisition Fund	Offsite	Payment into Habitat Acquisition Fund	0.15	In progress*
54	San Carlos Creek Channel Emergency	Fall 2014	Emergency Maintenance; debris removal	TBD	TBD	TBD	TBD	Site suitability search
64a**	Reservoir Drive Channel Emergency	Fall 2014	Emergency Maintenance; vegeation and sediment removal	TBD	TBD	TBD	TBD	Site suitability search
129	Smythe Channel Emergency	Fall 2014	Emergency Maintenance; vegeation and sediment removal	N/A	N/A	N/A	N/A	No mitigation required.

*Will be completed at the end of the project

Total Acres 31.22

**Amendment to add this map to MMP in process

Appendix B

2015-2016 List of Storm Water Facilities Anticipated to be Maintained and Preliminary Estimate of Biological and Cultural Resources to be Impacted

2015-2016 List of Anticipated Biological Resources To Be Impacted

Map No.	Facility	Proposed Maintenance Type	Vegetation Impacts (acres)		Mitigation
138 a, b, c, 138, 139	Tijuana River Pilot Channel and Smuggler's Gulch	Sediment and Vegetation Removal	0.03	Southern Riparian Forest	Mitigated with first maintenance event. 1) 9.43 acres at Tijuana River Emergency Channel Maintenance Wetland Mitigation Project (i.e. mitigation for 1993 Pilot Channel Construction) and 2) 8.62 acres of Enhancement within and adjacent to maintenance footprint. No new mitigation proposed.
			0.01	Mule Fat Scrub	
			1.22	Open Channel	
			3.05	Open Water	
			4.31	*Subtotal**	
59, 60, 64	Alvarado Channel	Sediment and Vegetation Removal	0.63	Freshwater Marsh	3.55 acres of Riparian Rehabilitation and Enhancement as part of the Statdium Mitigation Plan
			0.45	Southern Willow Scrub	
			0.03	Natural Flood Channel	
			0.12	Disturbed Habitat	
			0.01	Non-Native Riparian	
			0.01	Non-native / Ornamental	
			1.25	*Subtotal*	
MMP Total Vegetation Impacts (acres)			5.56		

*Impacts contained wholly within existing channel maintenance footprint. No new impacts.

2015-2016 List of Anticipated Cultural Resources To Be Impacted

Map No.	Facility	Proposed Maintenance Type	Cultural Resources Impacts
138 a, b, c, 138, 139	Tijuana River Pilot Channel and Smuggler's Gulch	Sediment and Vegetation Removal	None
59, 60, 64	Alvarado Channel	Sediment and Vegetation Removal	None

Appendix C

Pre- and Post-Maintenance Photos

Pre- and Post- Maintenance Photographs

Photo 1. Sorrento Creek Reach 3 Pre-Maintenance 9/15/14

Photo 2. Sorrento Creek Reach 3 Post-Maintenance 10/7/14

Photo 3. Murphy Canyon Creek Channel Pre-Maintenance 12/20/14

Photo 4. Murphy Canyon Creek Channel Post-Maintenance 3/20/15

Photo 5. Mission Bay High School and Pacific Beach/Olney Street Channels Pre-Maintenance 10/15/14

Photo 6. Mission Bay High School and Pacific Beach/Olney Street Channels Mid-Maintenance 4/9/15

Photo 7: San Carlos Creek Channel Emergency Pre-Maintenance 11/1/14

Photo 8: San Carlos Creek Channel Emergency Post-Maintenance 11/12/14

Photo 9: Reservoir Drive Channel Emergency Pre-Maintenance 11/14/14

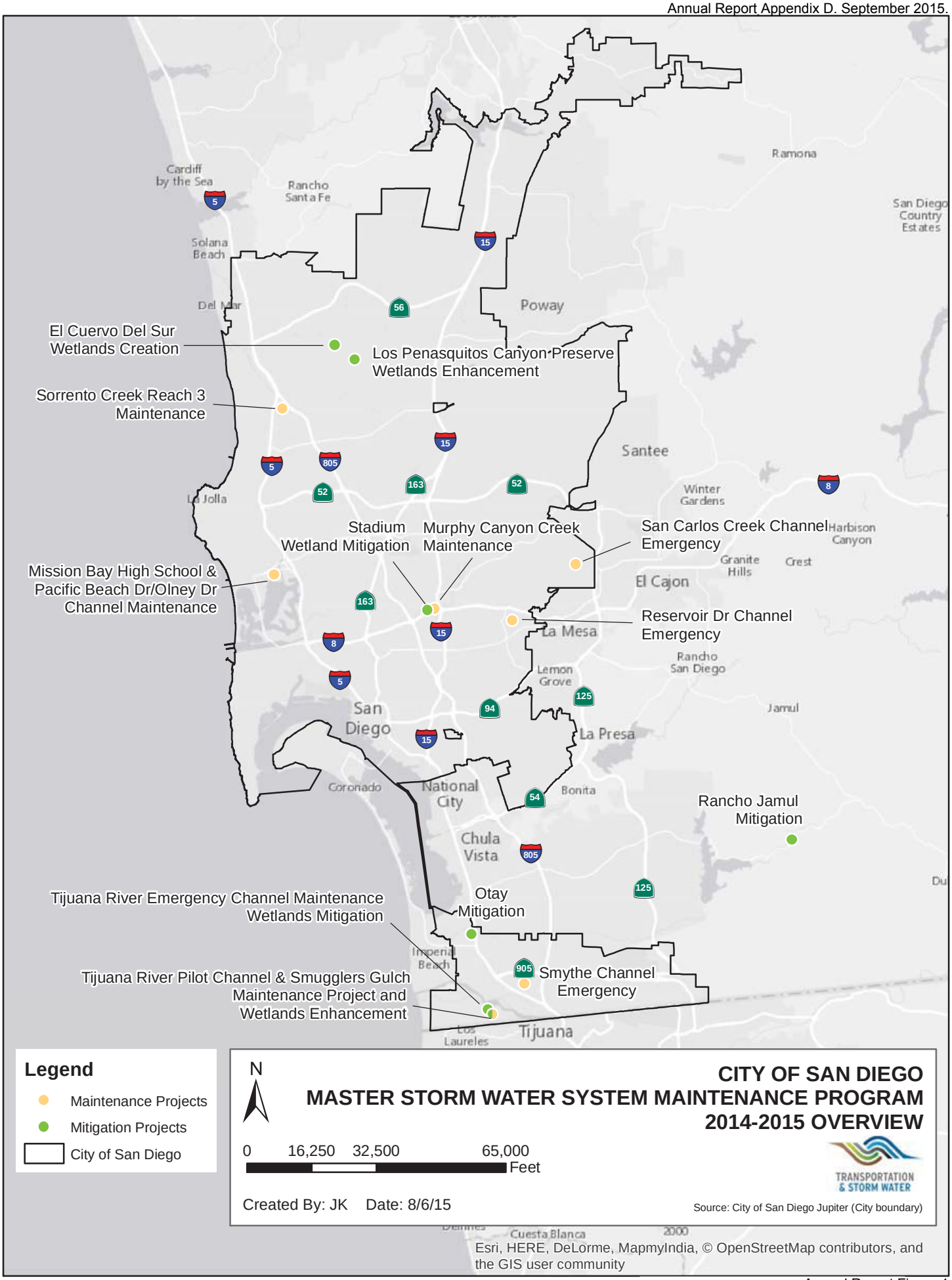
Photo 10: Reservoir Drive Channel Emergency Post-Maintenance 12/3/14

Photo 11: Smythe Channel Emergency Pre-Maintenance 11/16/14

Photo 12: Smythe Channel Emergency Post-Maintenance 12/3/14

Appendix D

Pre- and Post-Maintenance Maps



Annual Report Figure 1

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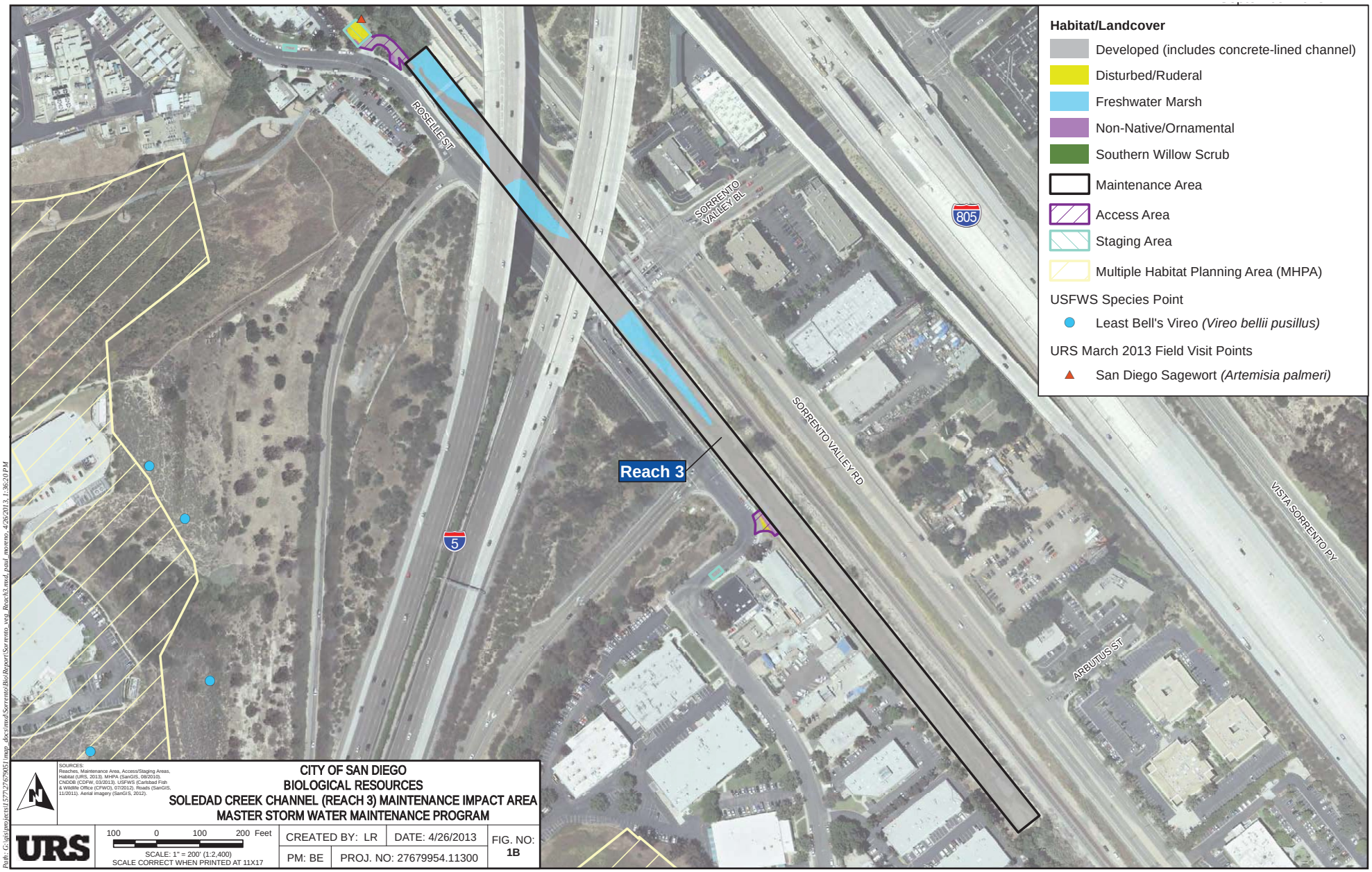
Habitat/Landcover
Developed (includes concrete-lined channel)
Disturbed/Ruderal
Freshwater Marsh
Non-Native/Ornamental
Southern Willow Scrub
Maintenance Area
Access Area
Staging Area
Multiple Habitat Planning Area (MHPA)
USFWS Species Point
Least Bell's Vireo (Vireo bellii pusillus)
URS March 2013 Field Visit Points
San Diego Sagewort (Artemisia palmeri)
ROSELLE ST
SORRENTO VALLEY BL
SORRENTO VALLEY RD
VISTA SORRENTO PY
ARBUTUS ST
805
5
Reach 3
SOURCES:
Reaches, Maintenance Area, Access/Staging Areas, Habitat (URS, 2013). MHPA (SanGIS, 08/2010). CNDDB (CDFW, 03/2013). USFWS (Carlsbad Fish & Wildlife Office (CFWO), 07/2012). Roads (SanGIS, 11/2011). Aerial imagery (SanGIS, 2012).
CITY OF SAN DIEGO
BIOLOGICAL RESOURCES
SOLEDAD CREEK CHANNEL (REACH 3) MAINTENANCE IMPACT AREA
MASTER STORM WATER MAINTENANCE PROGRAM
URS
100 0 100 200 Feet
SCALE: 1" = 200' (1:2,400)
SCALE CORRECT WHEN PRINTED AT 11X17
CREATED BY: LR
DATE: 4/26/2013
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FIG. NO: 1B
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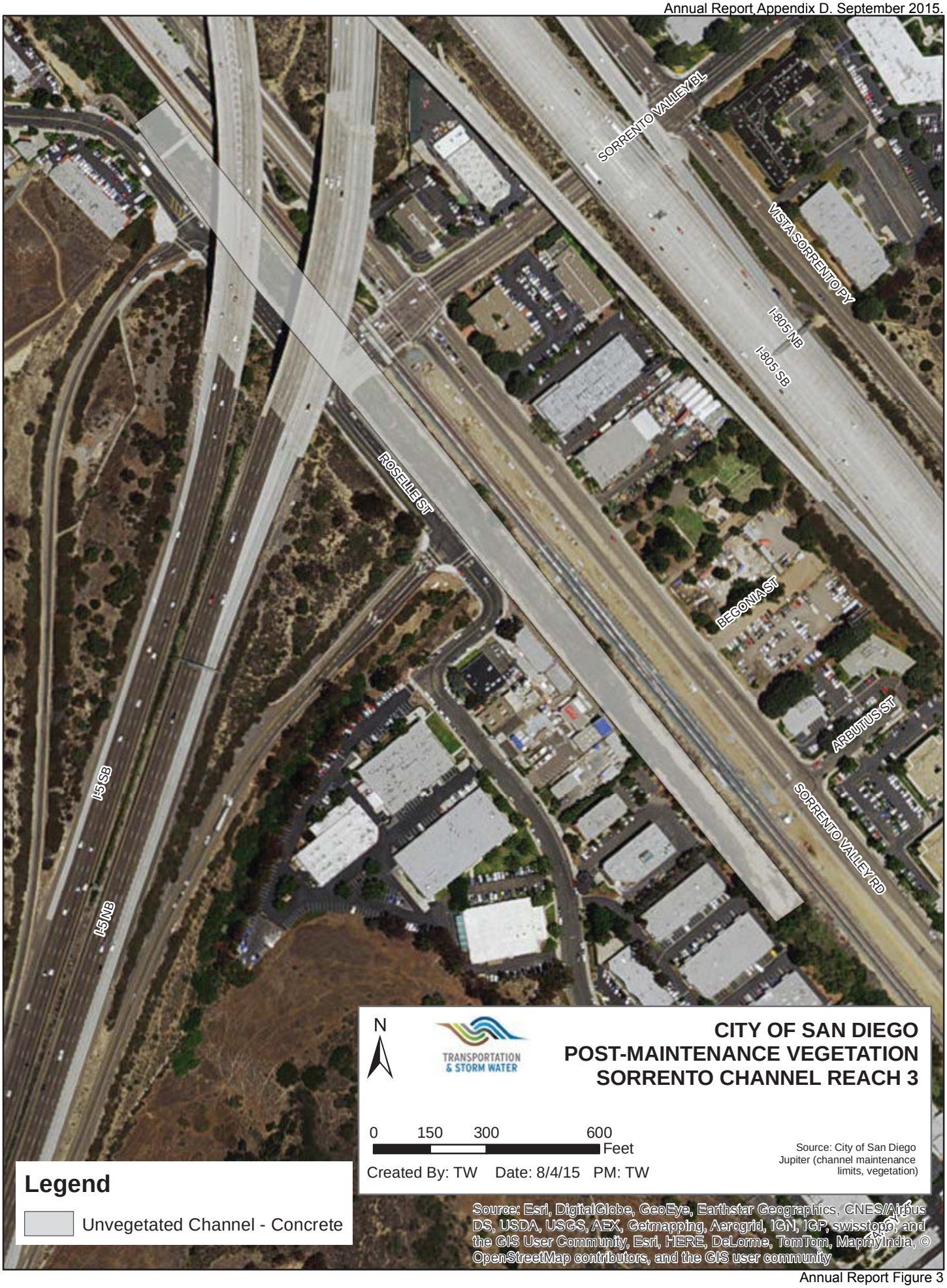

Annual Report Figure 3

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DUDEK

SOURCE: URS 2013; SANDAG; Bing Maps

FIGURE 3A

Biological Resources

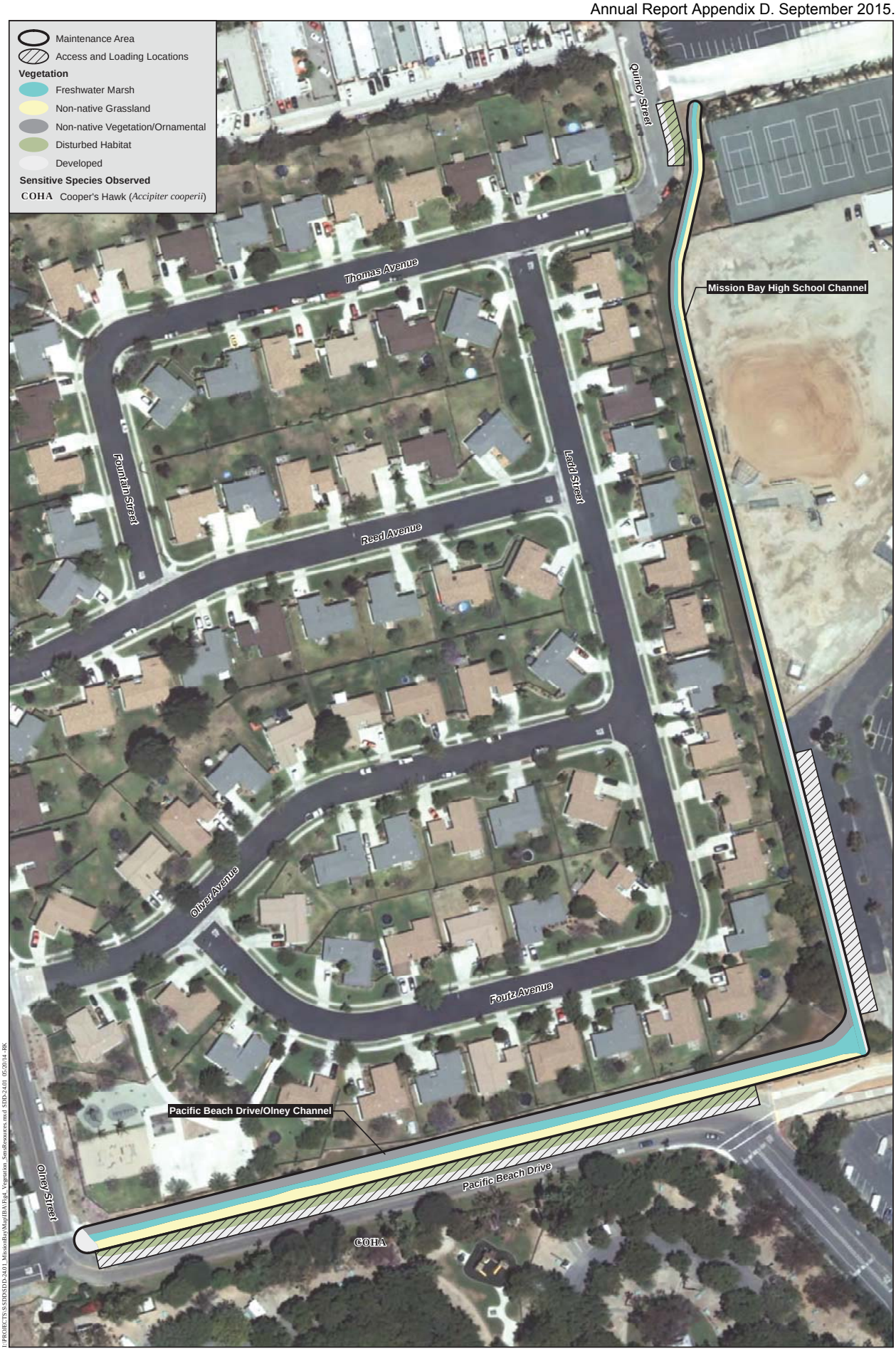
7165

MURPHY INDIVIDUAL BIOLOGICAL ASSESSMENT (IBA)

Annual Report Figure 5

Annual Report Figure 6

Annual Report Figure 7



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Vegetation and Sensitive Biological Resources

STORM WATER FACILITY MAPS 36 AND 37 (MISSION BAY HIGH SCHOOL AND PACIFIC BEACH DRIVE/OLNEY STREET CHANNELS)

HELIX Environmental Planning

Figure 4

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Vegetation and Sensitive Biological Resources

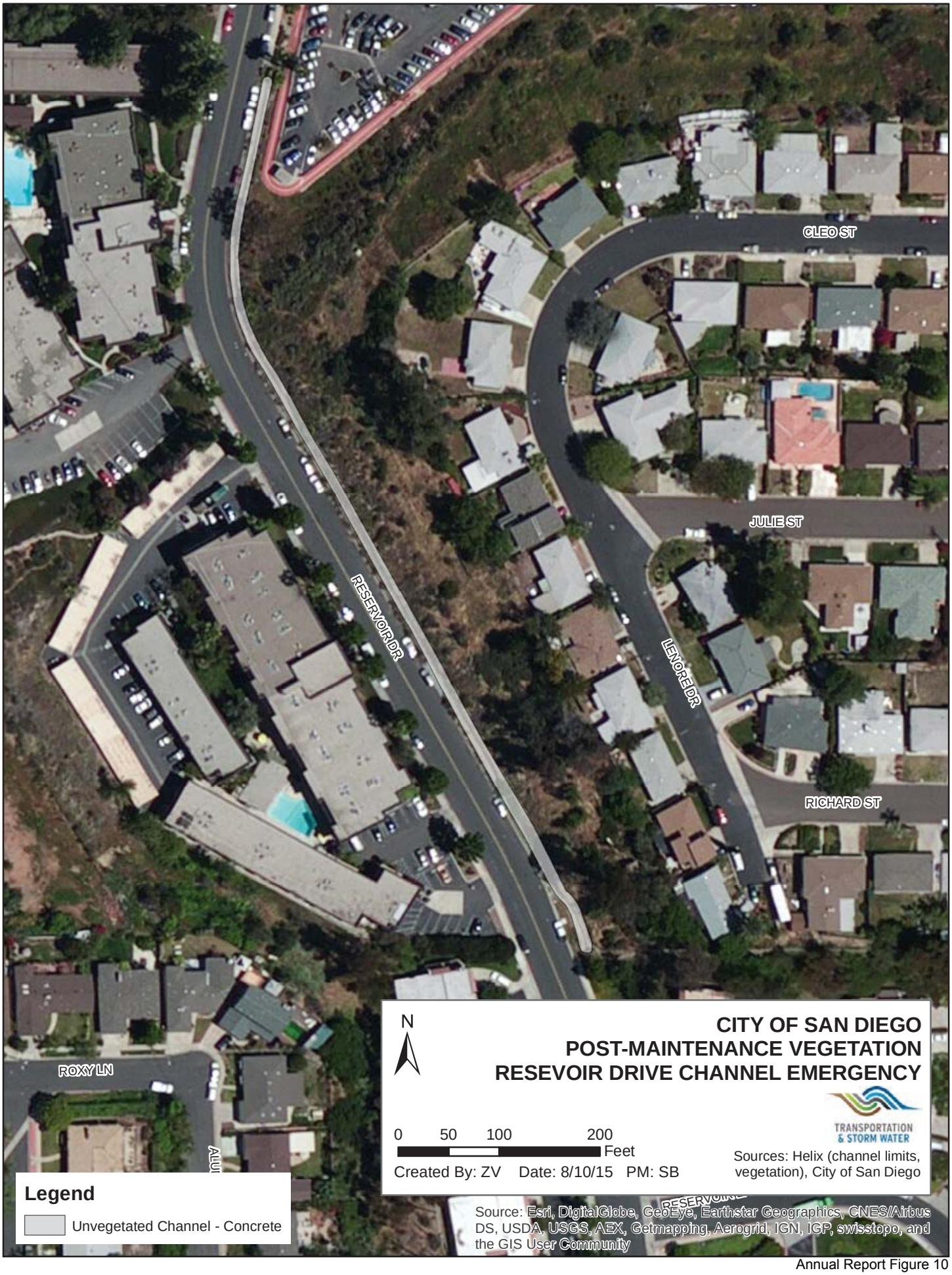
RESERVOIR DRIVE CHANNEL

HELIX Environmental Planning

N 0 150 Feet

Figure 3

Annual Report Figure 9



Annual Report Figure 10

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Vegetation and Sensitive Biological Resources

SMYTHE CHANNEL (MAP 129)

HELIX Environmental Planning

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Figure 3

Annual Report Figure 12