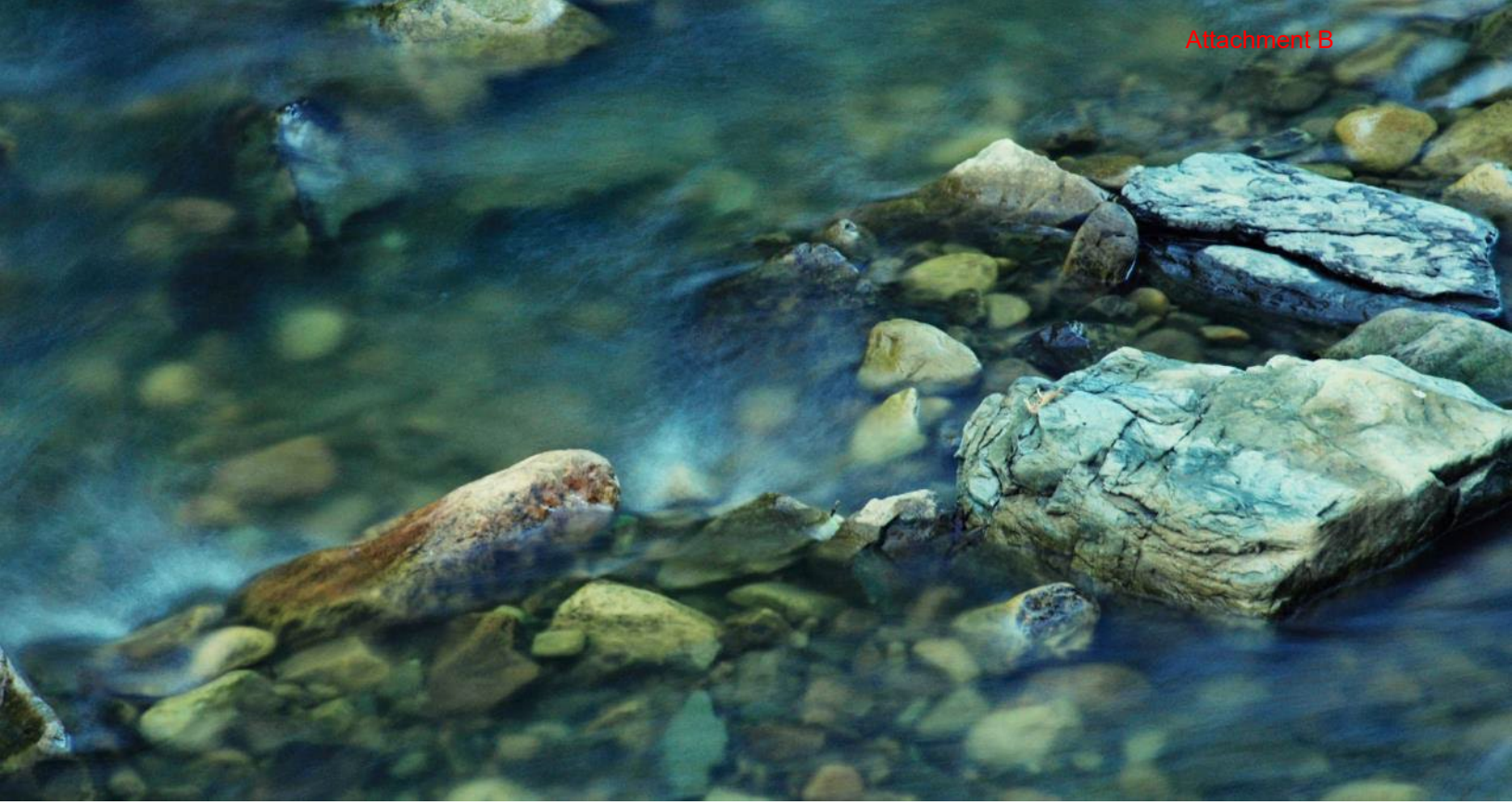

June 2024
South Orange County Regional Coastal Resilience Project

South Orange County Regional Coastal Resilience Strategic Plan

ANCHOR QEA

SUMMIT ENVIRONMENTAL GROUP

OCparks

June 2024
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South Orange County Regional Coastal Resilience Strategic Plan

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ABBREVIATIONS

BCR	benefit-to-cost ratio
BEACON	Beach Erosion Authority for Clean Oceans and Nourishment
Cal OES	California Office of Emergency Services
CAP	Continuing Authorities Program
CCC	California Coastal Commission
CEQA	California Environmental Quality Act
County	County of Orange
CCSMW	California Coastal Sediment Management Workgroup
cy	cubic yard
DBW	Division of Boating and Waterways
FEMA	Federal Emergency Management Agency
GHAD	Geologic Hazards Abatement District
HOA	homeowners association
IIJA	Infrastructure Investment and Jobs Act
JPA	Joint Powers Authority, Joint Powers Agency, or Joint Powers Agreement
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPA	Marine Protected Area
NEPA	National Environmental Policy Act
NGO	nongovernmental organization
NOAA	National Oceanic and Atmospheric Administration
OC CRSMP	*Orange County Coastal Regional Sediment Management Plan*
OC Parks	County of Orange Parks Department
OCMPAC	Orange County Marine Protected Area Council
OCTA	Orange County Transportation Authority
OPC	California Ocean Protection Council
PED	planning, engineering, and design
Proposition 68	California Drought, Water, Parks, Climate, Coastal Protection and Outdoor Access for All Act of 2018
RBSP	Regional Beach Sand Project
SANDAG	San Diego Association of Governments
SCAG	Southern California Association of Governments
SLR	sea level rise
SOCIRWM	South Orange County Integrated Regional Water Management
State Parks	California Department of Parks and Recreation
Strategic Plan	*South Orange County Regional Coastal Resilience Strategic Plan*

TBD	to be determined
TOT	transient occupancy tax
UCI	Geomatics and Flood Risk, Department of Civil and Environmental Engineering, University of California, Irvine
USACE	U.S. Army Corps of Engineers

Executive Summary and Mission of the Plan

This *South Orange County Regional Coastal Resilience Strategic Plan* (Strategic Plan) has been developed to support the formation of a regional, multijurisdictional, multiagency collaborative whose mission and purpose is the implementation of a regional coastal resiliency program focused on public beach restoration through comprehensive and coordinated efforts.

The fundamental goal of this Strategic Plan is to build coastal resiliency in the region by reducing current and future risks from coastal erosion hazards along an approximately 8-mile stretch of shoreline from Dana Point Harbor in the north to San Clemente in the south, as shown in Figure ES-1. This Strategic Plan is intended to provide decisionmakers and other vital stakeholders the blueprint and foundation on which to advance regional coastal resiliency goals in a comprehensive, coordinated, and collaborative manner in South Orange County, California, for the benefit of the people, economy, and environment.

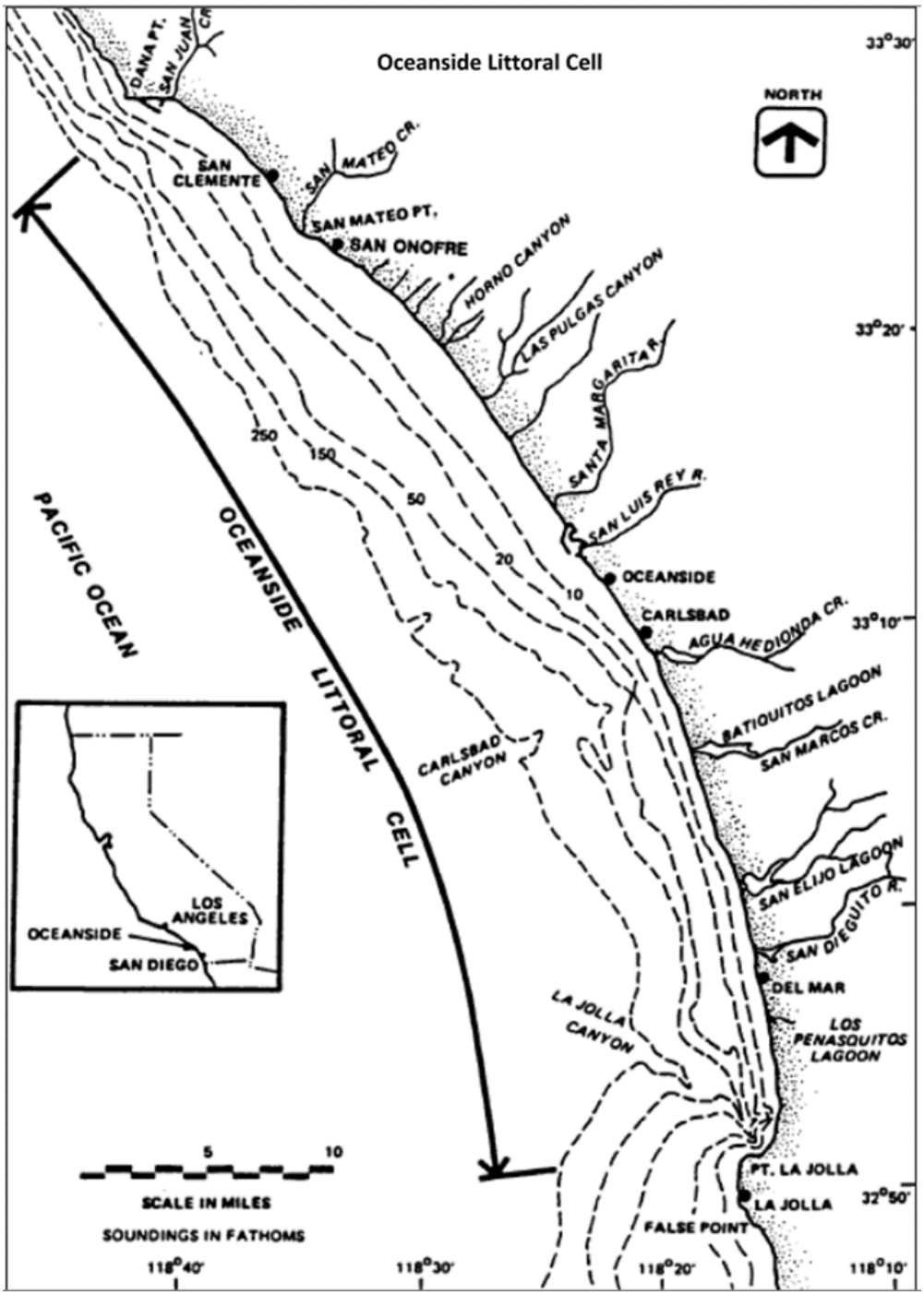
The overarching mission of a regional collaborative would be to serve the residents, visitors, businesses, and greater community interests through consolidated planning, permitting, funding, construction, monitoring, and operations and maintenance for coastal resiliency projects in South Orange County. The vision of the regional collaborative effort would be to actively pursue locally appropriate solutions to produce a more resilient coastline from Dana Point Harbor to San Clemente in an equitable, environmentally, socially, and fiscally responsible manner.

Figure ES-1
South Orange County Coastline

1 Introduction

The South Orange County coastline (the area between Dana Point and the southern county line) geographically falls within the Oceanside Littoral Cell illustrated in Figure 1-1. The littoral cell, bounded by the shoreline headlands at Dana Point Harbor and the La Jolla/Scripps Canyon at the south end, provides a geographical framework for analyzing sediment transport and understanding erosion and accretion processes.

Figure 1-1
Oceanside Littoral Cell



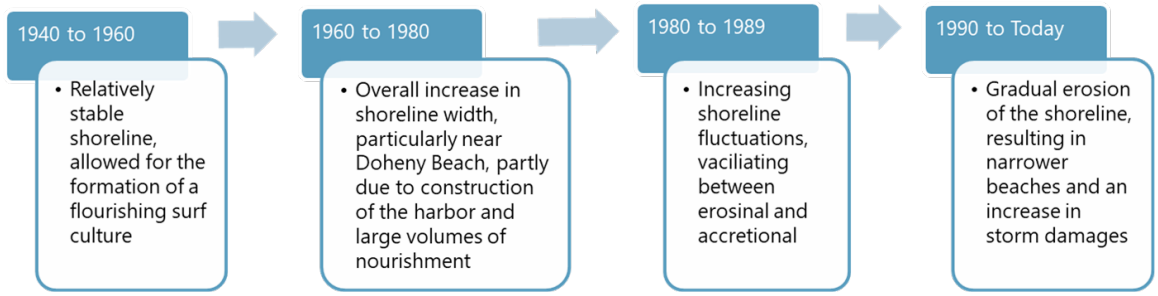
Source: CCSTWS 1991

The South Orange County coastline is experiencing chronic, protracted regionwide beach erosion due to a significant regional sediment deficit largely attributable to lack of sand reaching the beach from the San Juan Creek, which has historically been the main source of sediment nourishing this region's beaches. The result has been the gradual narrowing of the beaches and an increase in storm wave damage to critical public infrastructure and public facilities along the South Orange County coastline.

1.1 Historical Shoreline Trends

A U.S. Army Corps of Engineers (USACE) study of shoreline changes in the Oceanside Littoral Cell suggests that from 1940 to 1960, the shoreline was relatively stable (USACE 1991). Shoreline changes between 1960 and 1980 showed an overall increase in the width of the shoreline, particularly in the area of Doheny State Beach. In the following decade, the shoreline fluctuations increased and vacillated in the alongshore direction between erosional and accretional. Overall, the shoreline changes from 1980 to 1989 indicated an eroding shoreline downcoast of Dana Point Harbor (USACE 1991). Since the 1990s, there has been a gradual erosion of the shoreline, resulting in narrower beaches and an increase in storm damage along the South Orange County coastline. A summary of these beach width trends is summarized in Figure 1-2.

Figure 1-2
Beach Width Trends from 1940 to Today



1.2 Urbanization Caused Sediment Deficit

Significant development in South Orange County and beyond resulted in the channelization of waterways for flood control, which disrupted the natural flow of sediment supply from creeks and rivers and essentially halted delivery of these sediments to the beach. The urbanization of watersheds, flood-control infrastructure (e.g., dams, reservoirs, detention basin, and channelization and hardening of riverbanks), and sand mining has trapped a significant portion of the fluvial (riverine) sediment in the upper watershed, resulting in an overall reduction in the sand supply reaching the South Orange County coastline (USACE 1991; Everest 2013). The now highly reduced sand supply is delivered to the coastline primarily during flood events. During drought conditions,

the overall lack of sand in the littoral system is further exacerbated with almost no fluvial sand supply delivered to the coast to nourish the beaches.

Although the long-term net transport in South Orange County is to the south, variations in the wave climate, particularly from storm events, will move sand upcoast and downcoast, as well as onshore and offshore from beaches. The culmination of these factors has resulted in background levels of mild, long-term beach erosion along the entire South Orange County coastline. This regionwide beach erosion is evidenced by fluctuations in the sandy beach area, ranging from relatively narrow beaches during high wave energy and drought years to relatively wider beach during low wave energy and wet years.

Although several large-scale beach nourishment projects were conducted between 1964 and 1980 to place sand from coastal construction projects and upland sources in the vicinity of Doheny State Beach, the effectiveness has diminished over time in the absence of ongoing maintenance or coastal structures to keep the sand in place.

At first, this sand replenishment kept nearby beaches at a stable width. But over time, this sand supply has languished, particularly in recent decades, and now it is clear that an active beach sand replenishment program is required to restore the public beaches in the region.

1.3 Regionwide Beach Erosion

South Orange County is susceptible to coastal storm wave damage to public facilities, beach amenities, critical public infrastructure and existing structures along the coastline. By the early 2000s, beaches in South Orange County began to suffer major erosion during storms and diminished sediment flow from rivers and creeks due to drought, resulting in losses in beach width. Some recent examples of this ongoing coastal erosion include the following:

- **Capistrano Beach and Doheny State Beach:** Storm wave damage in 2018 undermined and collapsed parking lots, bike paths, and recreational facilities. Storms in 2018 damaged portions of a basketball court, a boardwalk, fire pits, and a restroom building at Capistrano Beach Park, all of which have been removed. In 2020, riprap and sand cubes (geotextile bags filled with sand) were placed.
- **San Clemente Municipal Pier**: Between 2023 and 2024, repeated storm waves have damaged the structure, requiring minor repairs. The west end of the pier was replaced in 1982 following that season's El Niño storm events.
- **Los Angeles to San Diego Railroad:** In 2020, wave damage occurred at several rail locations, particularly in San Clemente, where riprap has been placed in an emergency condition to maintain the important flow of passengers, freight, and security through this area.
- **City of San Clemente:** In 2022 to 2024, activation of ancient landslides has been attributed to the lack of sand supply, which has historically served as ballast on the west side of the railroad

alignment to protect landside structures. Landslides at the Casa Romantica and Mariposa Bridge areas have further placed the rail infrastructure along the coastline in danger from erosion.

- **Oceanfront Residential Communities**: The existing structures within the Capistrano Bay District and Capistrano Shores communities and the railroad tracks are exposed to direct wave attack.

Beach erosion in South Orange County has historically been addressed on an ad hoc, individual, and largely emergency basis with agencies and individuals implementing projects on an as-needed, reactive basis. Factors such as El Niño, coastal erosion, land subsidence, sea level rise (SLR), and storm intensity contribute to this regionwide state of change that has become more readily apparent in the shoreline monitoring data for the South Orange County coastline. Following the ongoing storm damage and coastal erosion noted previously, public agencies are now actively collaborating to reduce risks and advance coastal resiliency in the region.

1.4 Benefits of Beaches

Beaches serve as a natural buffer that protects existing structures along the coastline from direct wave action. Beach erosion adversely affects coastal public access, including a reduction in recreational beach areas available to the public and an increase in the damaging effects of storm waves to coastal communities, existing structures, and public facilities.

Beaches are essential to the culture of southern California, serving as the epicenter of the surf culture that formed in the 1950s and 1960s and as an essential draw for tourism.

Orange County, California, is the fourth-most-visited area in the United States and the most-visited area in California. The region attracted 48.2 million visitors, who generated $11.6 billion, in 2016. Orange County has one of the most diverse and powerful economies in the United States, and one of its three largest employment sectors is tourism. Besides tourism, beaches serve as a primary source of regional recreation and open space for the residents, serving not only coastal cities but also inland residents of cities and counties. Beach visits are a key no-cost and low-cost visitor-serving land use.

In simple terms, an increase in beach width contributes to an increase in the recreational value of a visit to the beach for both visitors and residents and, in turn, contributes to an increase in beach attendance and economic benefits to the community as a whole.

1.5 Efforts Toward Coastal Resiliency

To avoid the need to respond to emergency conditions, public agencies in South Orange County appear ready to proactively address coastal erosion in a coordinated and collaborative manner. With the urbanization of the land, agencies and interested parties become responsible for improving the

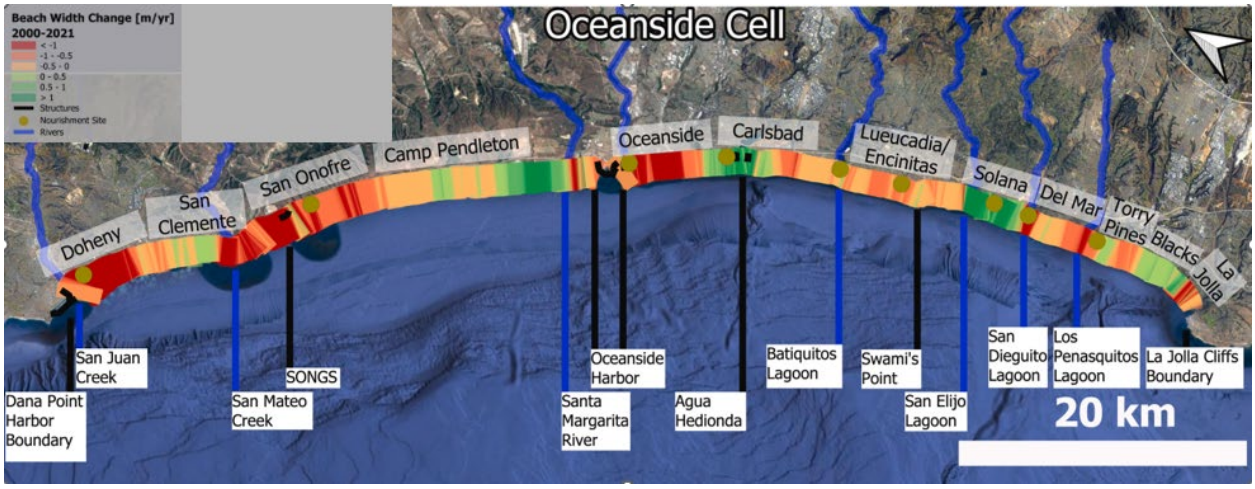
function of our urban systems, rerouting the natural flow of sediment, and planning together for ongoing coastal resiliency. Coastal erosion knows no political or agency boundaries. Thus, ongoing collaboration is essential to working toward the development of regional solutions.

Here are some ways that coastal management agencies have already begun to collaborate in the South Orange County region:

- **Beneficial Sand Reuse:**
  - The County of Orange Parks Department (OC Parks) and California Department of Parks and Recreation (State Parks) placed 45,000 cubic yards (cy) of sand from flood control maintenance activities in the Santa Ana River for the beneficial reuse of sand at Capistrano Beach and Doheny State Beach.
  - USACE is planning to repair the breakwater at Dana Point Harbor and is arranging for the beneficial use of this sediment removed to be placed in the nearshore environment off Doheny State Beach.
- **Sand Nourishment:**
  - The County of Orange, the City of San Clemente, and the City of Dana Point are partnering with the San Diego Association of Governments (SANDAG) Shoreline Preservation Working Group, contribute to feasibility studies for this Regional Beach Sand Project III, benefiting the beach cities within the Oceanside Littoral Cell.
  - USACE and the City of San Clemente are working toward the placement of 250,000 cy of sand in San Clemente in 2024. This is a 50-year project that will repeat every 6 years.
- **Sand Retention and Nature-Based Projects:**
  - OC Parks and State Parks are pursuing grant funding to construct a nature-based shoreline adaptation project (living shoreline) composed of a vegetated sand dune overlying a buried cobble to span the northern reach of Capistrano Beach and southern portions of Doheny State Beach for a total length of 1,150 linear feet.
  - The City of San Clemente is working on draft Nature-Based Sand Retention Concepts Study to address short-term and long-term coastal erosion by bringing sand to the City of San Clemente and developing ways of keeping the sand on its beaches.
- **Research and Monitoring**:
  - Several academic institutions are continuing to study and monitor the flow of sand within the Oceanside Littoral Cell to better understand the more nuanced flows of sediment:
  - The Geomatics and Flood Risk Group, Department of Civil and Environmental Engineering, University of California, Irvine (UCI), is analyzing satellite and drone monitoring and recently published "Characterizing Longshore Transport Potential and Divergence of Drift to Inform Beach Loss Trends" (Kahl et al. 2024). UCI's research uses aerial imagery to measure shoreline changes from CoastSat, a tool that uses satellite

imagery (from 1984 to the present) to determine shoreline positions over time. For example, the data indicate an average shoreline change of 1.8 feet per year between Doheny State Beach to Capistrano Bay District. A simplified graphic showing the beach width changes between 2000 and 2021 is presented as Figure 1-3.

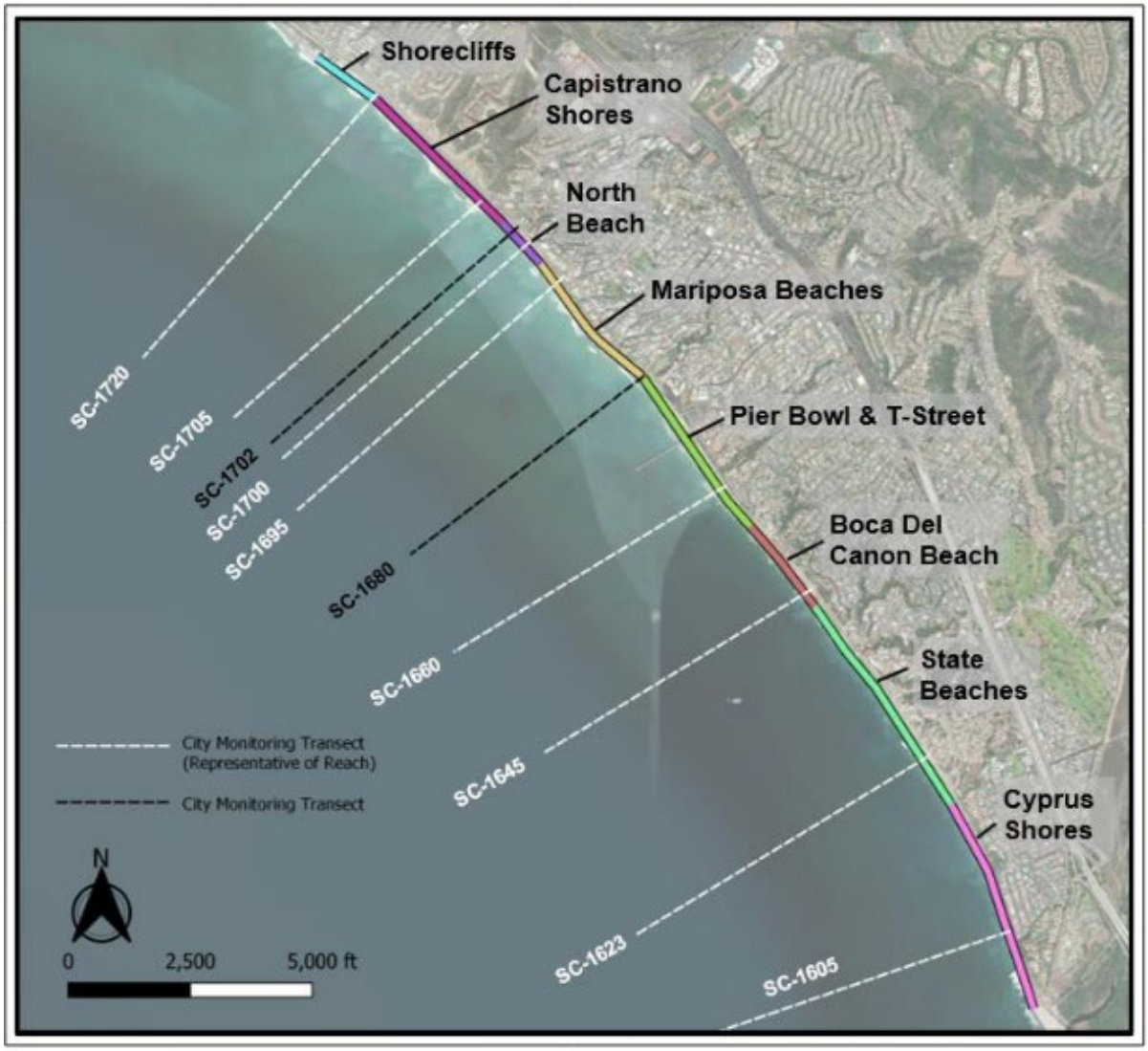
Figure 1-3
Satellite-Derived Beach Width Trends



Satellite-derived beach width trends analyzed by UCI and calculated between 2000-2021 for individual transects in the Oceanside Littoral Cell are colored in shades of green for growing and red for eroding

a. In September 2022, the City of San Clemente formally re-established a local shoreline monitoring program. The primary goal of the program is to build a database of information on shoreline changes in San Clemente and vicinity, thereby providing a basis for evaluating effects of sea level and El Niño conditions as well as beach sand replenishment projects. The data will be used to develop a comprehensive understanding of seasonal, annual, and long-term coastal changes in the region. The City of San Clemente's consultant, Coastal Frontiers, is conducting more traditional transect monitoring (back of the beach to the depth of closure) benefiting the City of San Clemente and adjacent areas. The transects are depicted in Figure 1-4.

Figure 1-4
San Clemente Shoreline Reaches and Transect Locations



Source: Coastal Frontiers Corporation, 2023

b. Partnerships with other academic organizations such as UCSD/Scripps Institution of Oceanography, which has studied San Diego County portions of the Oceanside Littoral Cell extensively, may also help to paint a fuller picture of the movement of sand throughout the littoral cell.

1.6 Formalizing Partnerships

The County of Orange (County) secured grant funding from the California Ocean Protection Council (OPC) to develop this *South Orange County Regional Coastal Resilience Strategic Plan* (Strategic Plan).

The Strategic Plan is intended to guide the formation of a regional collaborative, the mission and purpose of which would be to implement a program focused on beach restoration.

The next step in the effort toward advancing coastal resiliency is to formalize the agency relationships, responsibilities, and partnerships that have been formed through the development of these initial coastal resiliency projects. In creating a collaborative, these agencies can come together to implement projects that will benefit the coast at a regional scale.

1.7 Purpose, Goals, and Objectives

The primary purpose of this Strategic Plan is to establish a new regional collaborative to promote long-term coastal resiliency in South Orange County. The Strategic Plan was developed through a stakeholder-driven process and builds upon existing, localized coastal resiliency projects already being pursued by stakeholders. A key outcome of the Strategic Plan is to help facilitate larger, regional-scaled, sustainable coastal resiliency programs and projects. The Strategic Plan was guided by a focus on the following outcomes:

- Meet the deliverables of the California Drought, Water, Parks, Climate, Coastal Protection and Outdoor Access for All Act of 2018 (Proposition 68) grant work plan of OPC, which is organized under the California Natural Resources Agency.
- Provide a formal platform for agencies to regularly coordinate and discuss coastal resiliency efforts.
- Address chronically eroding shorelines through regional shoreline management planning and project implementation in South Orange County.
- Assess, prioritize, and advance coastal resiliency projects in the region to deliver resources to areas identified as being most in need.

The goals of the Strategic Plan were supported by the following objectives:

- Initiate public outreach to educate/inform stakeholders of the Strategic Plan purpose and objectives.
- Identify existing and planned coastal resiliency projects in South Orange County.
- Engage stakeholders to obtain their input regarding Strategic Plan priorities and outcomes.
- Develop a Strategic Plan.
  - Elements would include a review and analysis of regional projects and programs, collaborative agreements, governance structures, and funding mechanisms.
  - The plan would be specific to, and focused on, South Orange County beaches and shoreline.
  - The plan would be technically, economically, and environmentally feasible.
  - The plan would be beneficial for coastal resources including public access.

  - The plan would advance equity and inclusivity of disadvantaged and severely disadvantaged communities.
  - The plan would consider regulatory requirements, costs, and benefits for the South Orange County regional community.
- Integrate SLR projections into Strategic Plan development.

1.8 Benefits of a Regional Collaborative

A regional collaborative is a multijurisdictional collaborative the mission and purpose of which is the implementation of a regional coastal resiliency program. A regional collaborative approach provides a greater chance of achieving coastal resiliency success in the long term because it would achieve the following important public benefits:

- Close the southern California geographic gap in coastal resiliency collaborative governance structures (i.e., the SANDAG Shoreline Preservation Working Group to the south and the Los Angeles County Department of Beaches and Harbors and the Beach Erosion Authority for Clean Oceans and Nourishment [BEACON] to the north).
- Provide a formal platform for agencies to regularly discuss and coordinate coastal resiliency efforts to strategically deliver resources to areas most in need and where best suited to support the coastal ecosystem.
- Address chronic erosion of beaches through regional planning and management by providing regional leadership with enhanced opportunities and mechanisms for coordination and collaboration to solve mutual problems.
- Coordinate efforts to support natural processes and manage sediment based on resource behavior and functions rather than parcel boundaries.
- Reduce obstacles faced by stakeholders in implementing SLR adaptation measures by providing the leadership and coordination needed for regional solutions.
- Increase opportunities for, and enhance engagement with, private organizations, underserved communities, local Tribes, and other underrepresented communities.
- Take advantage of funding and grant opportunities and avoid having agencies compete for the same scarce public dollars.
- Expedite implementation of resiliency projects in a more efficient and fiscally responsible manner by reducing duplicative and/or redundant efforts.
- Increase cost savings by streamlining environmental review and regulatory compliance efforts for conducting technical studies and obtaining regulatory agency permits/approvals.
- Advance state, regional, and local coastal resilience adaptation objectives planning for rising seas through 2050 and beyond.

2 Overview of Strategic Plan Elements

OC Parks staff helped facilitate regional coordination and collaboration with a wide-ranging and diverse group of stakeholders, managed Strategic Plan development, and served as one of the key stakeholders. The Strategic Plan contains the following elements:

- **Stakeholder Engagement**: A stakeholder engagement process was developed to provide input regarding priorities and preferences on regional solutions for the South Orange County coastline, examples of cooperative agreements, governance structures, and consideration of a wide variety of funding methods. This input was then used to develop this Strategic Plan.
- **Regional Collaborative Structure Analysis:** The regional collaborative could be formed with a new, special-purpose agency or a dedicated working group. The collaborative structure would ideally include a vision statement and work plan that outlines the roles, functions, goals, and outcomes reflecting agreement/concurrence among potential agencies or entities with the appropriate jurisdictional authorities to implement the Strategic Plan.
- **Funding Approaches:** Potential funding sources would be identified for the implementation of Strategic Plan elements, including coastal resiliency project implementation.
- **Regional Collaborative Beach Nourishment Program:** Prioritize coastal resiliency projects to address beach erosion and restore the region's public beaches.
- **Green-Gray Nature-Based Approaches:** Explore longer-term projects to address beach erosion and restore the region's public beaches while co-benefitting the ecosystem.
- **Potential Regulatory Requirements:** Environmental review and regulatory compliance requirements associated with regional coastal resiliency projects or programs would be aimed at addressing beach erosion.
- **Economic Analysis: Costs and Benefits:** A range of costs for implementing a regional beach nourishment program would be based on similar projects that have been completed or are planned to be implemented in 2023 and 2024.
- **Next Steps for Strategic Plan Implementation:** Next steps for regional collaborative and project implementation will be delineated.

2.1 Incorporated by Reference

In developing this Strategic Plan, several technical documents were prepared to support the conclusions derived in this document, or as otherwise required as a component of the OPC grant. This includes the following:

- Appendix A: Information Regarding December 2021 Meeting
- Appendix B: Information Regarding March 2022 Meeting
- Appendix C: Information Regarding July 2022 Meeting
- Appendix D: Information Regarding March 2024 Meeting and Summary of Comments on Draft Strategic Plan

- Appendix E: Regional Coastal Resiliency Options
- Appendix F: Governance Structure Approaches
- Appendix G: Historical Shoreline Data and Trends
- Appendix H: Ongoing and Anticipated Projects
- Appendix I: Sea Level Rise Analysis
- Appendix J: Potential Sand Sources
- Appendix K: Funding Approaches
- Appendix L: Economic Analysis
- Appendix M: Recreational Opportunities

3 Alignment with Other Relevant and Applicable Plans

This Strategic Plan was funded in part by a grant from the OPC Proposition 68 Chapter 10 Grant Program (Grant Agreement No. C0875009), which funds projects for advancing statewide coastal resilience through implementation, planning and design, adaptation planning and coordination, and research. The purpose, goals, and objectives of this Strategic Plan are in alignment with both the OPC's Strategic Plan (OPC 2020) and Proposition 68. The primary goals of OPC's Strategic Plan are to safeguard coastal and marine ecosystems and communities in the face of climate change and to build resiliency to SLR, coastal storms, erosion, and flooding. In alignment with Proposition 68's priorities, the Strategic Plan endeavors to lay a path for the establishment of an organization tasked with minimizing the detrimental effects of climate change by innovatively monitoring and progressively improving the long-term protection and conservation of ocean resources in California.

3.1 Orange County Coastal Regional Sediment Management Plan

Development of this Strategic Plan is also in alignment with the *Orange County Coastal Regional Sediment Management Plan* (OC CRSMP; Everest 2013), which was developed collaboratively by the County and California Coastal Sediment Management Workgroup (CCSMW) to address coastal erosion along the Orange County coastline. USACE and the California Natural Resources Agency co-chair the CCSMW, which includes federal, state, regional, and local agencies as participating members.

In the OC CRSMP, a regional sediment management approach was used to emphasize the importance of pursuing regional-level solutions to sediment management issues because they have implications beyond jurisdictional lines. The OC CRSMP addresses unique physical, environmental, ecological, and socioeconomic conditions in the South Orange County region.

Recommendations identified in the OC CRSMP included the following: 1) initiate outreach and education; 2) develop a governance structure; and 3) continue beach nourishment projects. As a continuation of the OC CRSMP, this Strategic Plan was developed as a stakeholder-driven plan to focus on regional solutions to address beach erosion in South Orange County as first contemplated in the OC CRSMP.

3.2 Local Sea Level Rise Vulnerability Assessments and Adaptation Plans

This Strategic Plan is also consistent with the SLR vulnerability assessments and adaptation plans for the Cities of Dana Point and San Clemente. Both cities' SLR adaptation measures recommend participating in a regional beach nourishment program to increase overall efficiency and cost-effectiveness of implementation. Importantly, the Strategic Plan recommends moving forward with coastal resiliency measures endorsed by the California Coastal Commission (CCC) in their 2021 *"Nature-Based Adaptation Strategies"* memorandum (CCC 2021), which encourage green or soft solutions such as regional beach nourishment programs. The Strategic Plan also refers to both the

OPC's draft State of California 2024 Science and Policy Update and the National Oceanic and Atmospheric Administration (NOAA) SLR technical report to ensure that the best available science is being used (OPC 2024; NOAA 2022).

4 Stakeholder Engagement Overview

Consistent with the OC CRSMP (Everest 2013), the County solicited stakeholder input through printed and interactive surveys online as well as at three in-person meetings held in 2021 and 2022 in developing this Strategic Plan.

The region impacted by widespread coastal erosion rests on the ancestral lands of the Juaneño Band of Mission Indians Acjachemen Nation, Kumeyaay Tribe of Native American Indians, Gabrielino/Tongva Nation, Gabrielino Tongva Indians of California Tribal Council, Gabrieleno Band of Mission Indians – Kizh Nation, Gabrieleno/Tongva San Gabriel Band of Mission Indians, Soboba Band of Luiseno Indians, La Jolla Band of Luiseno Indians, Pauma Band of Luiseno Indians, Rincon Band of Luiseno Indians, Pala Band of Mission Indians, Pechanga Band of Indians, and San Luis Rey Band of Mission Indians. The southern coastal region of Orange County, bounded by Dana Point to the north and by the Orange County border to the south, is located on the ancestral lands of the Juaneño Band of Mission Indians Acjachemen Nation near the Pange and Toovunga village sites. The Acjachemen share territory with relatives and neighbors: Tongva on the northern boundary and Payómkawichum to the east and south. The Acjachemen and their Native relatives are still here and remain as nations with international relationships. The County acknowledges the people that lived on these coastal lands for generations prior to widespread development and that our south coastal operations and gatherings take place on the ancestral territory of the indigenous peoples of Southern California.

The following statement is included as a demonstration of respect for the indigenous peoples and their connection to the land:

Indigenous Californians have had a reciprocal and kinship-based relationship with the coast and ocean since time immemorial. We recognize the deep cultural heritage and enduring presence of these indigenous communities, whose wisdom and resilience have shaped the landscape we inhabit today. Despite centuries of adversity and displacement, they continue to claim their place as stewards of their ancestral lands, a testament to their strength and perseverance.

We pay respect to and honor the original traditional stewards of this land, the Acjachemen Nation past, present, and future. We acknowledge the Acjachemen people as traditional caretakers whose efforts to steward and protect the land and water continue today. We respectfully honor and recognize our responsibility to the original caretakers of this land, water, and air.

As we move forward, let us continue to learn, listen, and engage with the indigenous communities whose stewardship of this land has endured for generations. In addition to continuing our dialogue, the County intends to invite indigenous communities to our public meetings, provide signage in coastal areas to acknowledge the cultural significance of our spaces, utilize native plants, and collaborate on species selection, work toward agreements for appropriate and responsible gathering practices on the lands that we steward, and provide access to coastal areas and gathering spaces where feasible and

safe. As we work in partnership with Tribal members, we hope that our collaborative work will uplift the voices and spirits of everyone dedicated to the protection of our natural and cultural resources. We are grateful for their continued willingness to collaborate in our collective efforts to sustain a healthy coast and ocean for all.

The County continues to seek to work in partnership with Tribal members to create an inclusive platform for everyone dedicated to the protection of our natural cultural resources. To ensure the continued and rightful involvement of these Tribes, the County initiated communication with Tribal representatives and solicited comments on this Strategic Plan. A summary of outreach to Tribal representatives is provided in Appendix C. The comprehensive listing of agencies, entities, and organizations that participated in the stakeholder engagement process is as follows:

- Federal agencies and elected officials
  - U.S. Representative, 49th District – Mike Levin
- Native American Tribes
  - Juaneño Band of Mission Indians – Belardes Group
  - Sacred Places Institute
  - Gabrielino-Shoshone Tribal Council
- State agencies and elected officials
  - CCC
  - California Department of Transportation
  - State Parks
  - California State Lands Commission
  - California Senate, District 36 – Pat Bates[1]
  - California 74th Assembly District – Laurie Davies
- Regional agencies and elected officials
  - County
  - Orange County Transportation Authority (OCTA)
  - Orange County 5th District Supervisors Katrina Foley and Lisa Bartlett[1]
- Local agency representatives
  - City of Dana Point
  - City of Laguna Beach
  - City of San Clemente
- Special districts and public utilities
  - Capistrano Bay Community Services District
  - San Diego Gas & Electric
  - South Coast Water District

[1] Indicates elected officials no longer in office

- Private entities
  - Capistrano Shores Management, LLC
  - Cotton's Point Estates Homeowners Association (HOA)
  - Cyprus Shore Community Association
  - Cyprus Cove HOA
  - Shorecliffs HOA
- Academic institutions and science advisors
  - UCI
- Community advisors and nongovernmental organizations (NGOs)
  - Dana Point Historical Society
  - Surfrider Foundation
  - Save Our Beaches

4.1 Stakeholder Meetings

The stakeholder engagement process was an iterative process that occurred via several meetings as listed as follows:

- December 13, 2021, stakeholder engagement planning meeting at Cyprus Shore Community Club
- March 24, 2022, stakeholder meeting at the Orange County Sailing and Events Center
- July 6, 2022, stakeholder meeting at the Orange County Sailing and Events Center
- March 13, 2024, stakeholder meeting at the Orange County Sailing and Events Center

The first stakeholder meeting was held on December 13, 2021, to introduce the problems facing South Orange County beaches and to introduce the team leading the development of this Strategic Plan. Following the meeting, stakeholders completed a survey that described current and historical threats to each stakeholder's assets, as well as an overview of the remedial actions that are planned or have already been implemented by each stakeholder (Appendix A).

The objective of the second stakeholder engagement meeting (March 24, 2022) was to present the results of the initial survey and provide an overview of the project development process. Additionally, this meeting sought to educate meeting attendees and to solicit their input on causes of beach erosion in the region and the specific issues that each segment faces. The content presented at this meeting and a list of attendees is included as Appendix B.

The third stakeholder engagement meeting, held on July 6, 2022, was designed to solicit more detailed information about stakeholders' preferences on projects and programs, governance methods, and funding mechanisms in consideration for inclusion in the Strategic Plan. In order to garner the best information possible, stakeholders attending the meeting were presented with information on the various proposed elements of the plan and then divided into three groups:

property owners and representatives, NGOs, and resource and regulatory agencies. After information on each section (projects and programs, governance methods, and funding mechanisms) was presented, the stakeholders were then instructed to indicate their support, neutrality, opposition, and endorsement of the various proposed elements. The content presented at this meeting, as well as analysis of the results of the meeting activity and a list of the attendees, are included as Appendix C and summarized in Section 4.2.

The fourth stakeholder engagement meeting, held on March 13, 2024, following release of the draft Strategic Plan, was designed to present the draft Strategic Plan to stakeholders and solicit feedback on its elements. Stakeholders were presented with a summary of the stakeholder feedback at the last meeting, the chapters of the Strategic Plan, summaries of the Strategic Plan's collaborative structure analysis and funding opportunities, and the proposed process for developing and prioritizing projects within the proposed regional collaborative. After the plan was presented, the stakeholders were asked to engage the draft plan and provide comments on its contents via email, comment cards, or a SurveyMonkey survey. The content presented at this meeting, an analysis of the results of the SurveyMonkey survey, and all comments received in response to the draft Strategic Plan are included as Appendix D.

4.2 Stakeholder Input Summary

The Strategic Plan stakeholder meetings were used to obtain stakeholder input and inform the priorities and preferences articulated in this Strategic Plan. The information gained from the printed and interactive surveys was analyzed. This section summarizes stakeholder input on the following: 1) perceived current and historical threats; 2) projects and programs; 3) governance structure; and 4) funding mechanisms.

As stated in Section 4.1, comments on the draft Strategic Plan were solicited and received as part of the fourth stakeholder meeting. Many of these comments provided valuable insight into stakeholder interest in building coastal resiliency in South Orange County but focused more on subsequent phases that will be more applicable once a regional collaborative has been formed and in pursuing individual projects—this group of comments is included in Appendix D.

4.3 Historical, Current, and Future Hazards

Surveys distributed to stakeholders on December 13, 2021, aimed to understand the stakeholders' understanding of the threats to their property or assets and to gain an understanding of the steps that each entity had already taken to address coastal erosion. The surveys were conducted as follows:

1. Stakeholders were asked to select what they believed to be the most pertinent of the following hazards, both current and historically, and in the future:
    a. Bluff stability

b. Beach erosion
c. SLR
d. Lack of sediment delivery to the coast
e. Increased storminess

Beach erosion and lack of sediment delivery to the coast were identified as the top current and historical hazards to the stakeholders' property or assets, whereas increasing storminess and bluff stability were identified as the least.

2. Stakeholders were asked to identify the biggest threats to the coast from among the following options:
   a. Coastal development
   b. SLR
   c. Reduction in sediment delivery to the coast
   d. Changes in wave height, frequency, and direction

   Lack of sediment delivery to the coast from San Juan Creek was identified as the top cause of current and historical hazards to the region, with all respondents choosing that option.

3. Stakeholders were also asked to identify remedial measures and construction projects planned for their area of immediate concern, with the following identified as options and another space left blank for write -in responses:
   a. Bluff stabilization
   b. Placement of riprap on emergency basis
   c. Engineered rock revetment
   d. Seawall
   e. Beach nourishment without sand retention structures
   f. Beach nourishment with sand retention structures
   g. Relocation and realignment (i.e., managed retreat)
   h. Do nothing (i.e., accept/accommodate threats)

   Stakeholders indicated that they had taken a wide range of remedial measures to address these threats, most notably placement of riprap and of relocation and realignment, both of which were identified by approximately half of the respondents.

4. Finally, stakeholders were asked to rank the obstacles to implementing the following SLR adaptation remedial measures from 1 to 6 in order of largest obstacle to smallest obstacle:
   a. Ability to obtain regulatory agency permits
   b. Ability to obtain funding
   c. Lack of leadership, coordination, and political will

d. Availability of technical information
e. Lack of understanding of coastal processes
f. Lack of understanding regarding remedial measures performance

This survey revealed the top obstacles to implementing SLR adaptation measures as ability to obtain regulatory agency permits; ability to obtain funding; and a lack of leadership, coordination, and political will.

The results of this survey showed that stakeholders in the South Orange County region are well-versed on the issues that the region faces as a whole and are willing to advocate to address specific obstacles and challenges to advance regional coastal resiliency goals. They affirmed their high level of education and engagement in coastal resilience in the region by identifying projected SLR and reductions in coastal sediment as the top causes of future threats. The inability to protect structures and beach erosion (due to regulatory constraints and challenges) were identified as the top two future threats to the stakeholders' properties or assets, reaffirming the mission and necessity of this Strategic Plan.

Stakeholders' survey responses demonstrated that their interests firmly align with the goals of this Strategic Plan. The Strategic Plan is intended to address these obstacles and identify opportunities for regional collaboration and leadership to advance a coordinated approach to implementing coastal resiliency goals and projects in the South Orange County region.

4.4 List of Potential Regional Resiliency Projects and Programs

The following stakeholder meeting on March 21, 2022, presented survey results. Based on the stakeholder survey, beach erosion was identified as one of the top current threats to property. A range of technically feasible solutions to minimize beach erosion were presented to stakeholders to gain feedback on their preferences. In the presentation to stakeholders, each potential solution was defined and pros and cons explained. Descriptions of the potential solutions are provided in Appendix E. The following regional coastal resiliency solution options were presented to the stakeholders:

- Beach Nourishment: Placement of sand onto beaches or in nearshore areas to widen beaches
- Beach Nourishment with Retention Structures: Beach nourishment coupled with retention structures that minimize the loss of beach sand (e.g., groins, nearshore breakwaters, and multipurpose reef)
- Sand Dunes (Living Shorelines): Raised sand feature along the back of beaches that provides habitat for wildlife and protects areas behind the feature from wave action
- Cobble Beach: A beach constructed from cobbles instead of sand
- Cobble and Sand Beach: Cobble beach base with sand placement on top
- Shoreline Protection: Structures such as riprap, seawalls, revetments, breakwaters, and groins

Stakeholder input revealed that regional beach nourishment continued to be the most widely supported project type across all groups. Stakeholders also emphasized the importance of retaining recreational benefits in the region. They recognized the importance of protecting the shoreline but did not want to sacrifice sandy beaches and favored natural or natural-looking solutions. Some members of this group were more opposed to hard shoreline protection methods and options that could impact surfing, swimming, and other recreational benefits enjoyed by beachgoers.

Additionally, property owners, their representatives, and NGOs spoke to a need to apply a contextual approach to coastal erosion, applying different solutions to different beaches with different problems. Many stakeholders emphasized that their opposition to a project or program in one context does not mean they are opposed to that project or program throughout the region. For example, stakeholders from Capistrano Bay District, where the homes are located on the sand, opposed living shorelines in that area, given the narrowness/lack of beach, but were in favor of potentially implementing the solution at other places in the region where there was more room on which to build a living shoreline system.

Due to the specificity of needs of each subregion in South Orange County, beach nourishment emerged as the primary solution that could be implemented regionwide with full stakeholder support. Thus, beach nourishment emerged as the preferred regional solution, and the Strategic Plan was developed with a focus on implementing a regional beach nourishment plan.

4.5 Governance Structures and Collaborative Agreements

The next stakeholder meeting on July 6, 2022, explored options for coordinated, regional leadership, including the lack of political will. A wide range of potential governance structures was presented to stakeholders, and a discussion format was used to gain feedback on stakeholder preferences. The following governance structures were presented to stakeholders for consideration:

- **Council of Governments:** A voluntary association of local governments that can be situated in either a metropolitan or rural area designed to promote discussion and intergovernmental cooperation among its members concerning common and regional problems and to engage in planning on a multijurisdictional basis
- **Memorandum of Agreement (MOA)/Memorandum of Understanding (MOU):** Voluntary cooperative arrangements applicable to multiple government agencies of different levels, which can be used by government agencies and private entities
- **Geologic Hazards Abatement District (GHAD):** Enables property owners to collectively mitigate geological hazards that pose a threat to their properties (California Public Resources Code 26500-26601) designed to handle long-term abatement and maintenance of real property potentially threatened by earth movement

- **Joint Powers Authority (JPA):** Entity permitted under California State Code Section 6500 including two or more government agencies that have agreed to combine their powers and resources to work on addressing and resolving common problems
- **Ad Hoc Committee:** A temporary committee established by a board of directors to address a specific issue

The most supported governance structure that emerged was the JPA. The JPA governance structure was supported by property owners and representatives, NGOs, and agencies. All groups continued to emphasize challenges with the Strategic Plan's need to address multiple entities' goals and ensure alignment. The concept of a JPA, as well as other types of governance structures and collaborative agreements, are further described in Appendix F.

Special districts and interagency meetings (similar to a less-formal ad hoc committee) were also mentioned and well-supported in discussion. However, all the indications of support for interagency meetings came from the agencies that also proposed these governance methods. Special districts were also proposed as a viable governance method by a stakeholder in the property owners' and representatives' group. Special districts were described by the group as local governments created by the people of a community to deliver a specialized service essential to that community. While this option was widely supported within the property owners' and representatives' group, upon further discussion, many members of the group decided that many of the benefits of this governance method could also be achieved by a well-organized JPA.

The most opposed governance structure was the GHAD. GHADs were opposed by all stakeholder groups and particularly vehemently by property owners and their representatives. This group was concerned about a GHAD being led by a single engineer, rather than multiple stakeholders collaborating to make decisions for the region. They also expressed concerns about a perceived failure of the Broad Beach GHAD to realize its goals in a timely and cost-efficient manner and did not want a similar outcome for this region. Agencies were also against the implementation of a GHAD and highlighted that this method would place the financial burden on property owners in the region.

4.6 Funding Mechanisms

A wide range of options for funding sources was also presented to stakeholders at the July 6, 2022, stakeholder meeting. The following funding mechanisms were presented to meeting attendees as possibilities for funding projects and programs:

- USACE Hurricane Storm Reduction Damage, Section 103
- Infrastructure Investment and Jobs Act (IIJA)
- NOAA grants and National Fish and Wildlife Foundation grants
- Federal Emergency Management Agency (FEMA)
- California State Coastal Conservancy

- OPC Proposition 68
- State Parks Division of Boating and Waterways (DBW)
- Impact mitigation fees
- Public-private partnership
- Loans
- State revolving funds
- Municipal, environmental impact, or resilience bonds

The Strategic Plan recognizes there are a wide range of funding mechanisms for coastal resilience projects and programs, with some more appropriate than others. The goal of presenting these funding mechanisms to stakeholders was to learn from their experiences with each of them and, in doing so, to learn more about the pros and cons of pursuing each option.

Additional funding mechanisms were also suggested by the stakeholders. Additionally, agencies proposed further investigation into CCC's Local Coastal Program Grants and Department of Transportation's Reconnecting Communities Pilot Program as a potential source of funding.

There was widespread support for pursuing all funding mechanisms by all groups present in this meeting. Due to the differing needs of subgroups in the region, no funding mechanisms were vehemently opposed, apart from public-private partnerships. It was suggested by all groups that all other funding mechanisms remain on the table for future funding needs. It was also emphasized that the search for funding should begin with grants but not rule out the possibility of additional/increased taxes and/or fees. Agencies also suggested using the railroad as a possible nexus for obtaining federal funds, specifically from the IIJA. Overall, stakeholders supported a variety of funding options, prioritizing grants but leaving the door open for other funding opportunities, as discussed in Appendix C.

5 Collaborative Structure Analysis

A fundamental goal of this Strategic Plan is the selection of the preferred governance structure to ensure coordinated, regional, coastal resiliency collaboration. The governance structure will reflect the coordinated implementation approach through which the appropriate jurisdictional authorities can solicit feedback as projects are advanced toward implementation. A governance structure provides the mechanism for the Strategic Plan to be updated as a living document, including recommendations for interpretations, updates, and specific projects and programs.

5.1 Stakeholder Input on Collaborative Structure

Development of this Strategic Plan has been largely driven by stakeholder input and feedback. When presented with potential governance structures for facilitating regional collaboration on coastal resiliency goals, most participating stakeholders preferred a collaborative framework in which the public agencies and other stakeholders in the region coordinate their efforts to promote a unified and comprehensive coastal resiliency program that spans the shoreline from Dana Point Harbor to the southern Orange County line.

The advantages/pros and disadvantages/cons of several types of governance structure originally considered in the stakeholder meeting on July 6, 2022, are outlined in Table 5-1.

Table 5-1
Pros and Cons of Various Governance Structures

Governance Structure	Description	Advantages/Pros	Disadvantages/Cons
Ad hoc committee	A temporary committee established by a board of directors to address a specific issue	• Facilitates focused approach • Easy to organize • Can facilitate standing committee formation • Example: Carteret County, North Carolina, used it to organize four towns to secure federal, state, and county funding	• Temporary so not well-suited for addressing recurring issues and significant long-term issues • Single committee focus • Nothing compelling the group to function or outlining responsibilities • Limited by committee mission, funding, and staff
Council of Governments	Voluntary association of local governments designed to promote discussion and intergovernmental cooperation among its members concerning common and regional problems and to engage in planning on a multijurisdictional basis	• Provides an arena in which elected officials and agency staff can meet and discuss regional issues • Facilitates horizontal cooperation on regional issues • Facilitates vertical cooperation with local, state, and federal government	• SCAG and the Orange County Council of Governments Technical Advisory Committee currently form the Council of Governments for Orange County, so creating another Council of Governments could be perceived as redundant. • Existing agencies are typically focused on housing and traffic topics versus coastal needs, which have a more limited direct impact on the region. • Community involvement is typically restricted to local agencies.

Governance Structure	Description	Advantages/Pros	Disadvantages/Cons
Geologic Hazard Abatement District (GHAD)	State agency formed by local communities to provide prevention, rapid response, and funding to address hazardous geologic conditions. Enables property owners to collectively mitigate geological hazards that pose a threat to their properties. It is designed to handle long-term abatement and maintenance of real property potentially threatened by earth movement.	• Facilitates local approaches • Treated as a new state agency • Can be tailored to specific issues • Can enter contracts • Can issue bonds • May obtain funding • Can levy and collect assessments • May condemn or acquire property • Can construct improvements • Can maintain improvements	• Perceived failure of prior GHAD to realize its goals in a timely and cost-efficient manner • Not easy to dissolve • Only need majority vote to expand • Financed via supplemental tax assessments • Can levy and collect assessments • May condemn or acquire property • Led by a single engineer, rather than multiple collaborating stakeholders • Would place the financial burden on property owners in the region
Joint Powers Authority (JPA)	1. Two or more public agencies contracted to jointly exercise powers common to all members **or** 2. Two or more public agencies to form a separate legal entity; this new entity has independent legal rights, including the ability to enter contracts and hold property	• May be easier to fund and implement projects • Facilitates regional approaches • Can be tailored to specific issues • Can enter contracts • Can hire dedicated staff • Can be renewed continuously • Nonpublic entities can participate in an advisory capacity.	• All members must approve formation. • Can be difficult to fund • Capabilities limited to union of member agencies. • Typically requires majority vote
Memorandum of Agreement/ Memorandum of Understanding (MOA/MOU)	Voluntary cooperative arrangements applicable to multiple government agencies of different levels. They can be used by government agencies and private entities.	• May be easier to fund and implement projects • Long-term history of use • Relatively easy to implement • Can be done administratively • Can be limited by duration	• Contracts run by parties • Funding via participating parties • Staffed by participating parties • Flexibility limited by MOA/MOU.

5.2 Overview of Alternative Approaches to Promote Regional Collaboration and Governance

Any governance structure selected would require consideration and discussion among stakeholders. This Strategic Plan lays out one recommendation and five alternative approaches for regional collaboration and coordination:

- Recommended Action: South Orange County Beach Coalition formed through MOA/MOU Approach
- Alternative 1: JPA Style Approach
- Alternative 2: Local Collaborative (ad hoc or other informal group)
- Alternative 3: USACE-Centered Approach
- Alternative 4: Consultant- or Nonprofit-Led Approach
- Alternative 5: Individual Agency Approach

In the formulation of these alternatives, a GHAD governance structure was not considered because it was opposed by most stakeholders. Council of Governments were also excluded from the list of alternatives because creating another Council of Governments could be perceived as redundant.

5.3 Recommended Action: South Orange County Beach Coalition Formed Through MOA/MOU

The South Orange County Beach Coalition would be a multimember Agency Cooperative Agreement, including, but not limited to, ownership agencies such as the County of Orange, State of California, Cities of Dana Point and San Clemente, OCTA, and other members such as Capistrano Bay District and other special districts, public utilities, Tribal councils, HOAs, and federal and state elected representatives. Additionally, nonvoting members could be included as Community Advisors. To expedite formation and execution of the South Orange County Beach Coalition, subject to the Board of Supervisors' approval, it is envisioned that the County of Orange would serve as the lead agency, offering necessary support including County staff and initial financial resources.

The Executive Committee of the South Orange County Beach Coalition would include public ownership agencies.

The South Orange County Integrated Regional Water Management (SOCIRWM) area is an example of an MOA/MOU that represents a diverse group of stakeholders engaged in integrating water resource planning across multiple sectors, including, but not limited to, jurisdictions; water, wastewater, and groundwater agencies; environmental nonprofits; NGOs; academic institutions; transportation entities; and local residents. The SOCIRWM group has worked collaboratively for more than a decade, representing one of the longest-running recognized Integrated Regional Watershed

Management Group Regions in the state. A 22-member Agency Cooperative Agreement provides the requisite governance structure for the region.

Another example of a MOA/MOU, the Orange County Marine Protected Area Council (OCMPAC) is the state's oldest Marine Protected Area (MPA) Collaborative, started in 1999. OCMPAC is a collaboration of city and county officials, institutional representatives, environmental advocates, academic faculty, and nonprofit organization members. The OCMPAC currently has five dedicated staff members and a membership list of more than 40 participating representatives. OCMPAC seeks to provide beach visitors with consistent MPA-related information throughout the county. For nearly two decades, the organization has accomplished this by developing regional interpretive signage and regional brochures and holding annual docent trainings. OCMPAC's accomplishments also include countywide signage, enforcement trainings, education programs, research and monitoring, and teacher workshops.

This Recommended Action builds on the efforts started in the 2014 OC CRSMP, which recommended further collaborative discussions amongst the many local and regional agencies to consider entering into an MOA/MOU. A draft MOU/MOA is included in Attachment 1 of Appendix F, and is intended to serve as a reference point for developing the relationships, roles and responsibilities to best support Strategic Plan implementation.

5.4 Alternative 1: Joint Power Authority Style Collaborative Approach

Under this alternative, the JPA would act as the lead planning and coordinating agency tasked with receiving funds, completing environmental documentation, acquiring regional permits as appropriate, and planning coastal projects as appropriate. Local land-use decision-making and implementation would remain with the local agencies. The JPA would be defined as the lead planning agency for coastal regional sediment management issues and other erosion control measures.

An example of this style of collaborative approach is BEACON, a California JPA established in 1986 to address coastal erosion, beach nourishment, and clean oceans within the Central California Coast from Point Conception to Point Mugu. The member agencies of BEACON include the Counties of Santa Barbara and Ventura, as well as the coastal cities of Santa Barbara, Goleta, Carpinteria, Ventura, Oxnard, and Port Hueneme. The BEACON board is made up of two supervisors from each county and one councilperson from each coastal city for a total of 10 board members.

5.5 Alternative 2: Local Collaborative Approach (Ad Hoc or Other Informal Group)

Under this alternative, a local collaborative would facilitate regional shoreline management, promote coastal resiliency projects, and obtain funding to implement this Strategic Plan. The collaborative

would have strong support from the cities, OCTA, the County, and State Parks as other public agencies with land-management responsibilities in the South Orange County region. All participating entities would cost share in various efforts according to the shoreline mileage owned/managed by the entity relative to the volume of sand to be placed for a project. This approach could choose to utilize an MOA or MOU to formalize the interagency relationships, roles, expectations, and responsibilities to implement projects. A less-formal approach would provide agencies with a forum to discuss topics, and project funding would be sought through the existing agency framework.

5.6 Alternative 3: USACE-Centered Approach

Under this alternative, the County and cities would formally request the assistance of the USACE, Los Angeles District to reduce coastal storm damage and erosion in the South Orange County region. If USACE determines there is a federal interest in developing a project in South Orange County from Dana Point Harbor south of the county line, USACE would be the federal sponsor, and the County, State Parks, and cities would be the local sponsors.

If USACE agrees to initiate a feasibility study, the preparation of the study would be cost shared with those participants wishing to enter into an agreement. A regional beach nourishment project could be similar in nature to the San Clemente USACE project, which will place sand beginning in late 2023 for a 50-year federal participation period through 2073.

USACE has several Continuing Authorities Programs (CAPs) that may be appropriate to meet the needs of the region, including the following:

- CAP 103 Beach Erosion and Storm Damage Reduction
- CAP 111 Shore Damage Mitigation Caused by Federal Navigation Projects
- CAP 204 Beneficial Uses of Dredged Material

5.7 Alternative 4: Consultant- or Nonprofit-Led Approach

Under this alternative, a consultant or nonprofit organization is retained by the County and the cities (and possibly others) to lead the effort to promote regional dialogue and the development of coastal resiliency projects. The consultant or nonprofit entity would take the leadership role in facilitating communications between the stakeholders, ultimately leading to the implementation of the recommendations and suggested next steps of this Strategic Plan.

5.8 Alternative 5: Individual Agency Approach

This alternative assumes that no regional entity is formed. Under this alternative, the County, cities, OCTA, and others (including private entities) continue to independently plan and construct their own coastal resiliency/shoreline protection projects on an as-needed project-by-project or emergency basis.

Under this alternative, there is no comprehensive SLR adaptation or coastal resiliency strategy implemented for South Orange County. Individual projects continue to be pursued, permitted, funded, and constructed by the individual stakeholders in the South Orange County region.

5.9 Desire for a Regional Collaborative Structure

Development of this Strategic Plan has been largely a stakeholder-driven process. This Strategic Plan builds on the efforts started by the OC CRSMP (Everest 2013) and recommends further collaboration among the local and regional agencies leading to cooperative agreements that facilitate coastal resiliency projects. Based on stakeholder input and recommendations during its multiyear coastal resiliency strategic planning effort, there is agency support to form a special-purpose collaborative to facilitate resource sharing for mutual support on the common problem of coastal erosion and to develop actions and goals.

A collaborative structure provides a framework for the Strategic Plan to be used, including for implementation of projects. This Strategic Plan is intended to serve as the catalyst for coastal resiliency project implementation in South Orange County. A collaborative structure through an existing or new entity provides for input from federal, state, regional, and local entities, as well as from citizens. A collaborative provides a platform to increase opportunities and enhance engagement with a wider range of stakeholders including the following:

- Local Tribes
- Private entities (e.g., HOAs)
- Academic institutions
- NGOs
- Other underserved or underrepresented communities

Formation of a cooperative agreement enables the region to capitalize on the momentum of this Strategic Plan process and numerous funding opportunities available. A comprehensive listing of potential member entities and organizations of the collaborative group is provided in Appendix F. At minimum, member agencies (i.e., voting member) such as the County, City of Dana Point, City of San Clemente, OCTA, and State Parks will need to be a part of the collaborative group because these agencies have primary ownership responsibilities within the study area. Other stakeholders that can provide valuable input generally include Tribes, community groups, HOAs, environmental nonprofit organizations, regulatory agencies, and science advisors.

The regional collaborative could be responsible for some of the following general tasks:

- Facilitating regional coordination and data sharing among the stakeholders
- Enabling public outreach and stakeholder input opportunities
- Applying for and obtaining funding

- Conducting environmental analyses
- Obtaining regulatory permits and approvals
- Conducting pre-construction monitoring
- Coordinating, prioritizing, and implementing one or more regional coastal resiliency projects
- Conducting post-construction monitoring and reporting

Lastly, the preferred, highest-priority community resiliency solution that emerged was a comprehensive, regional beach nourishment program that protects existing infrastructure in place in South Orange County and is implemented in a collaborative and cooperative multiagency effort.

6 Funding Opportunities

The regional collaborative will need to secure funding to implement the projects described in the Strategic Plan. There are also administrative cost considerations for forming a collaborative organization. Anticipated challenges will include acquiring the necessary funding for implementing strategies and gaining commitment and support from federal and state government agencies to collectively address local conditions in a coordinated and collaborative manner.

Identifying and obtaining funding commitments is an essential element of this Strategic Plan. To support its success, the member entities will continue to support the regional focus and encourage ongoing dialogue to identify, fund, and implement the full range of coastal resiliency projects. This Strategic Plan identifies a wide range of potential funding approaches; however, this is not an exhaustive list, as new funding sources periodically become available. A listing with summaries of potential known funding sources that should be considered is provided in Appendix K.

6.1 Regional Collaborative Cost-Sharing Framework

Following the establishment of a regional collaborative, there would likely be various cost-sharing agreements or arrangements utilized depending on whether the costs relate to the following:

- Governance structure and/or operations
- Project type (federal lead agency versus nonfederal lead agency)
- Project phase (planning versus construction)

In general, costs would be allocated among the member agencies (or participating entities) according to the land ownership or maintenance responsibilities and/or benefits derived by each member agency (or participating entity). Each scenario/consideration is described in the following subsections.

6.2 Cost Sharing by Governance Structure

To establish a new coastal resiliency working group composed of the member agencies and other stakeholders, existing agency funding and staff could be utilized, thus building on optimizing organizational efficiency, which would likely serve to reduce costs associated with getting a newly formed South Orange County group-focused coastal resiliency fully operational. This effort would be comparable to existing local agency-led cooperative arrangements, including development of an annual budget and work plan approved by all parties and to which the local agency lead may charge direct labor, materials, equipment, and outside contract services to the program.

Some of the governance structures described in this Strategic Plan rely on a Joint Powers Agreement, MOA, or MOU as the formal guiding agreement, whereas others would involve creating a new entity that is a Joint Powers Agency or JPA. The former examples operate based on a governance structure

framework embedded within an existing agency to take the lead role in coordinating and facilitating the efforts of the multiple entities toward resiliency project implementation. Depending on whether the South Orange County Coastal Resiliency Stakeholders choose to move forward with establishing a new governance structure or rely on an existing agency to coordinate and lead the coastal resiliency efforts, funding will be needed to carry out the mission, and cost-share responsibilities must be equitably allocated.

A new agency would need a new source of money to operate. The two most popular funding methods are either creating a revenue stream or raising capital by issuing bonds. Grant funding may also be an option to fund a startup coastal resiliency organization. An organization such as BEACON has staff, legal counsel, and physical offices and likely has higher costs compared to a new startup agency. A cost sharing agreement will have to be defined and negotiated to ensure the new entity is fully funded and operational and that costs are allocated among the member agencies.

6.3 Cost Sharing by Project Type

Depending on whether a project is jointly developed with USACE as a federal partner or solely developed among the member agencies, there may be cost-sharing/cost-match requirements that have to be satisfied. For example, in the case of the San Clemente and Solana Beach and Encinitas USACE 50-year projects, each of the cities was required to sign a Project Partnership Agreement with USACE for each of the three project phases (i.e., Feasibility Phase; Planning, Engineering, and Design [PED] Phase and Construction Phase).

The general cost-share agreement with USACE and the cities for where the entities function like partners in these projects is 65% federal and 35% nonfederal for all three phases. Importantly, the cities applied for and were successful in obtaining grant funding from State Parks DBW for up to 85% of the required 35% nonfederal share. This supplemental funding from the State of California has been essential to advancing the project to the anticipated Construction Phase later in 2023. More information on funding opportunities (including grant programs) with these agencies can be found in Appendix K.

If the South Orange County coastal resilience group elects not to pursue a partnership with USACE, then additional funding sources would need to be obtained.

6.4 Cost Sharing by Project Phase

Typical coastal resiliency projects include the following general project development phases:

- Phase 1: Preliminary Planning/Plan Formulation
- Phase 2: Environmental Compliance Under California Environmental Quality Act (CEQA)/National Environmental Policy Act (NEPA) and Regulatory Permitting
- Phase 3: Preliminary and Final Project Design

- Phase 4: Pre-Construction Monitoring
- Phase 5: Construction
- Phase 6: Post-Construction Monitoring and Reporting

Cost-sharing frameworks for various project phases are distinguished as follows:

Equally: Project phases that benefit all member agencies equally; therefore, the cost share is the same for all member agencies (e.g., divide cost by the number of member agencies/entities and allocate all members an equal cost share)

  - Typically, this will include the Preliminary Planning/Plan Formulation, Environmental Compliance Under CEQA/NEPA and Regulatory Permitting, and Preliminary and Final Project Design phases and may include the Post-Construction Monitoring and Reporting phase.

- **Cost/Benefit Variations:** Project phases that have jurisdiction-specific cost variations and corresponding varying benefits for various members/entities
  - Typically, this will include the Pre-Construction Monitoring and Construction phases and may include the Post-Construction Monitoring and Reporting phase.
  - Costs may be allocated based on the following:
    - **Relative Length of Shoreline** as a percent of the total regional shoreline
    - **Volume of Sand** to be placed on the beach

A table illustrating the cost-sharing frameworks by project phase is provided in Appendix K. Further refinements to the cost-sharing frameworks would occur once the preferred governance structure is defined and the first regional coastal resiliency project is defined.

6.5 Cost-Sharing Account

Upon formation of a regional collaborative, the group will need to establish a cost-sharing account, which will serve as the primary account where all funds generated pursuant to furthering the efforts of the regional collaborative will be held. The regional collaborative will need to invest the cost-sharing account funds prudently. Responsibilities of the regional collaborative will include applying for and obtaining funding to operate the regional collaborative and implement projects.

6.6 Grant Funding

There are numerous grants funded through federal and state agencies, as detailed in Appendix K. Most grants, whether local, regional, state, or federal, have some cost-share or funding match requirement. The cost share can typically be contributed in the form of direct cash payments and can also often be contributed as a work-in-kind contribution of staff time, technical studies, monitoring data, or other work products needed to support project development and implementation. The

concept of work-in-kind must be negotiated at the outset of discussions of the cost-share requirements so all agencies can plan and budget accordingly.

Federally funded grants, such as those based on the Bipartisan Infrastructure Law, are managed through federal agencies, including the following:

- FEMA via the Building Resilient Infrastructure and Communities Program
- NOAA via the National Coastal Resilience Fund; Climate Resilience Regional Challenge; and science, service, and stewardship funding
- USACE via CAP Section 103 and Section 204 programs

Similarly, state-funded grants, such as those from Proposition 1 or 68, are managed through state agencies including the following:

- State Parks via the Shoreline Erosion Control Program, Public Beach Restoration Program, and Statewide Park Development and Community Revitalization Program
- California Department of Fish and Wildlife via the Restoration Grants Program
- Governor's Office of Planning and Research via the Regional Resilience Planning and Implementation Grant Program
- California Wildlife Conservation Board
- California State Coastal Conservancy

6.7 Local Hazard Mitigation Planning and Pre-Disaster Assistance

The California Office of Emergency Services (Cal OES) Hazard Mitigation Planning Division and FEMA's Hazard Mitigation Assistance grant programs are available to provide opportunities to reduce or eliminate potential losses to public assets through hazard mitigation planning and project grant funding. Currently, Cal OES and FEMA have three grant programs: the Hazard Mitigation Grant Program, Pre-Disaster Mitigation, and Flood Mitigation Assistance. The total value in each grant varies annually based on federal funding authorizations, and each is typically in the tens to hundreds of millions of dollars.

6.8 Impact Mitigation Fees

Impact mitigation, or in lieu fees, are another way to generate funds for coastal resiliency projects. Certain structured fees could be established to generate revenues for 1) covering the necessary planning, technical studies, design, and implementation of coastal resiliency projects; or 2) developing an emergency cleanup fund to be able to respond quickly and opportunistically following disasters. Disasters, through a different lens, are opportunities to implement changes.

There are currently two structured fees CCC uses to address the impacts of coastal structures: a Sand Mitigation Fee and a Public Recreation Fee. The Sand Mitigation Fee is intended to mitigate for the

loss of sand supply and loss of recreational beaches in front of shoreline protection devices. The Public Recreation Fee addresses impacts to the loss of public recreation based upon the loss of beach area physically occupied by a coastal structure. Additional details on these impact mitigation fees are provided in Appendix K.

6.9 Transient Occupancy Tax or Sales Tax

A transient occupancy tax (TOT) is paid by visitors from hotel stays and short-term vacation rentals, and the funds are remitted to the county or city. TOT can provide a source of general fund revenues for the County and cities and requires a public vote for approval. A dedicated increase in TOT (e.g., 2% for coastal resiliency) could be reserved specifically for resiliency approaches that maintain the region's beaches and shoreline. Presently, the TOT rate is 10% in Dana Point, in San Clemente, and for hotels located in unincorporated parts of the County. A potential increase of 2% could yield an additional $530,000 annually. A regionally coordinated increase in TOT could provide regional funding for coastal resiliency improvements, maintenance, or coastal infrastructure repairs as outlined in the Strategic Plan.

The County and cities may consider this approach or coordinate on a countywide approach such as a quality-of-life initiative (as contemplated by SANDAG, for example) to generate local revenues to be used to finance long-term coastal resiliency strategies. For example, the Cities of Solana Beach and Encinitas, both in San Diego County, instituted a dedicated 2% sales tax increase used as a dedicated source of funding for coastal resiliency building for public coastal infrastructure, facilities, and access projects. As with TOT, this would likely require a public vote for approval.

7 Regional Collaborative Priorities

On a regional scale, beach nourishment has the most support among stakeholders, as it has proven to be the most technically feasible and economically beneficial solution to minimize impacts of long-term erosion and reduce storm damage. Beach nourishment is the placement of new sand onto a beach (referred to a receiver beach) to build the beach in elevation and the berm seaward, thus providing wave protection and combating beach erosion, while increasing recreational beach area available to the public and enhancing environmental resources (i.e., shorebird and grunion habitat).

Benefits of a regional beach nourishment program include the following:

- Coordinates efforts to support natural processes that nourish the beaches
- Optimizes beneficial use of material available at offshore borrow sites, harbor maintenance dredging projects, and other opportunistic sources
- Restores natural sediment supply along the coastline in a nonstructural, nature-based manner
- Strategically places sediment to prioritize vulnerable areas and support the coastal ecosystem
- Increases public beach-based recreational opportunities and enhances coastal resources throughout South Orange County
- Provides wave protection and minimizes storm damage to public and private infrastructure and structures
- Supports and enhances ongoing and planned coastal resiliency projects
- Provides an economic approach to coordinating projects across jurisdictions
- Advances the state's target for resiliency of 3.5 feet of SLR by 2050
- Recommended in both the Cities of Dana Point and San Clemente's SLR vulnerability assessments and coastal resiliency plans
- Endorsed by CCC as a nature-based adaptation strategy in the *2021 Nature-Based Adaptation Strategy Memorandum*

Beach nourishment is considered a "soft" or "green" solution and requires an initial (near-term) placement of sand to build up the beaches to establish a foundation. Periodic maintenance (mid-term) is then required to maintain beach width. Supplemental, periodic nourishments would be required to maintain a given level of shore protection. The frequency of supplemental nourishments would vary based on sediment supply, wave climate, and longshore transport conditions in the littoral system, as well as the desired level of shore protection.

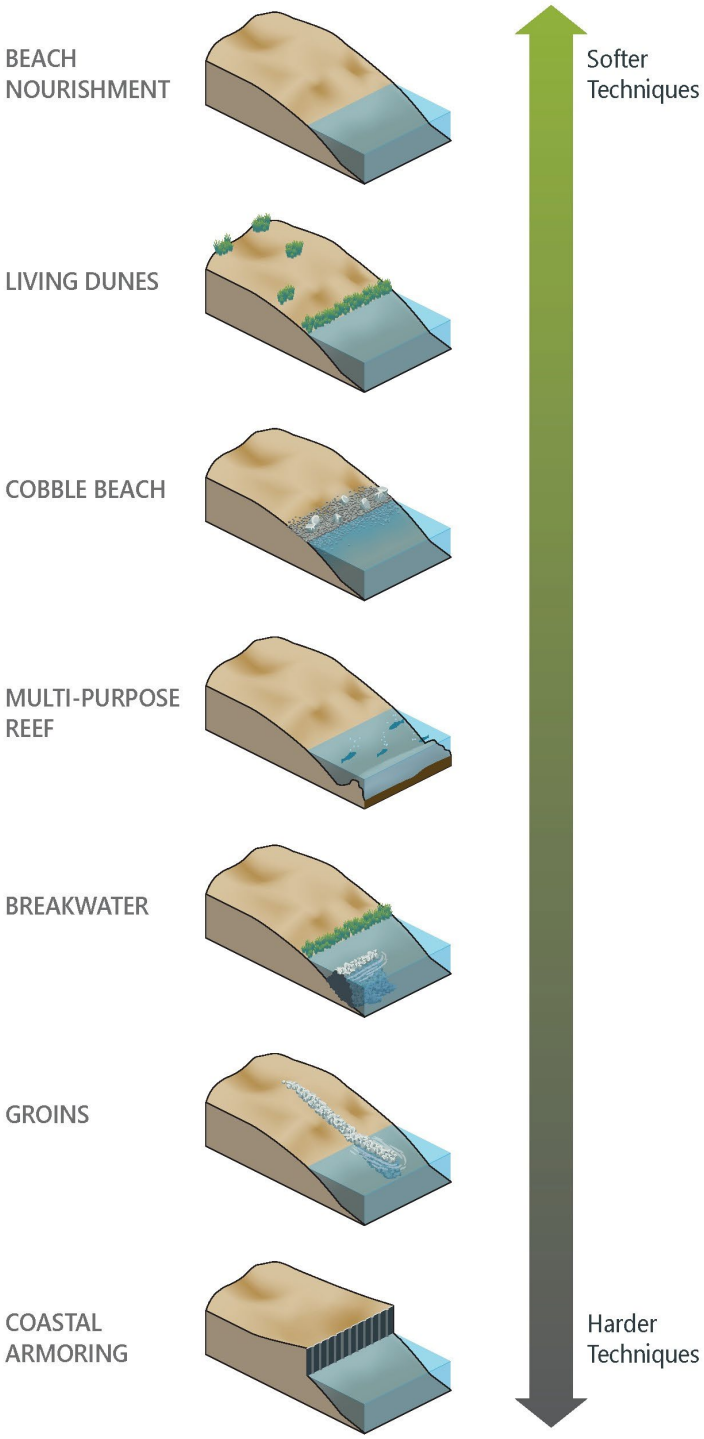
Finally (long term), the effectiveness of beach nourishment would decline with higher rates of SLR; thus, the regional collaborative would need to continue to pursue placing larger volumes of sand on the beach through adaptive management/planning or to pursue other more permanent adaptation measures such as the installation of shoreline protection structures (i.e., green, hybrid, or gray). The green-gray scale ranks shoreline protection structures from green, nature-based solutions such as

beach nourishment and living shoreline/sand dunes up to gray or hard solutions like sand retention devices (groin, jetties, breakwater, or other devices) or shoreline protection devices (revetment, seawall, bulkheads, or other hardening structures). The placement of shoreline protection devices along this continuum was based upon several factors, including effectiveness of the method to increase beach widths, environmental and habitat impacts, existing and available research on the methodologies, and consideration of regional positive impacts. Notably, the continuum rates sand retention devices, such as groins, breakwaters, and multipurpose reefs, as greener, and therefore preferrable, to shoreline protection devices such as revetments, seawalls, bulkheads, and other devices that are presented under the umbrella of coastal armoring under the Coastal Act. Sand retention devices, as defined above, aim to slow the transport of sand along the shore, while the goal of shoreline protection devices is the protection of inshore assets, not maintaining beach widths.

The order in which the adaptation strategies are placed along the continuum can be rearranged depending on the final design, location of the project, and materials and methods used. Real-world conditions and management practices may make one adaptation strategy “greener” or “grayer” than what is presented in the figure.

Refer to Appendix C for further explanation of pros and cons associated with each shoreline protection method and to Figure 7-1 for an exhibit demonstrating structures in the green to gray scale. Based on stakeholder feedback, green solutions would generally be prioritized over more gray, hard solutions for sand retention.

Figure 7-1
Green to Gray Solutions



7.1 Regional Beach Nourishment Program

A near- and mid-term regional beach nourishment program would place new sand along the coastline south of Dana Point Harbor from Doheny State Beach to San Mateo/Cotton's Point in southern San Clemente to provide a relatively uniform increase in beach widths across the shoreline. This would require an initial placement of approximately 4.4 million cy of sand to create a 100-foot-wide beach along the 7.88-mile coastline, assumes the direct placement of sand onto the beach and is based on the beach fill calculation for the San Clemente Beach Nourishment Project.

The approximate beach lengths and percentage of total study area are listed in Table 7-1.

Table 7-1
Summary of Beach Lengths

Beaches	Length (miles)	Percent of Total Length
Baby Beach (Dana Point Harbor)	0.11	1.4%
Doheny State Beach	1.35	16.9%
Capistrano Beach Park	0.21	2.6%
Capistrano Bay District	1.46	18.3%
Poche County and City Beach	0.04	0.5%
Shorecliffs HOA	0.24	3.0%
Capistrano Shores	0.69	8.6%
San Clemente City Beaches	2.13	26.7%
San Clemente State Beach	0.71	8.9%
3800 Block of Vista Blanca to Cotton's Point	1.05	13.1%
Total length:	**7.99**	**100%**

Supplemental renourishment events (i.e., maintenance) would be required every 5 to 10 years to maintain the recreational, environmental, and wave protection benefits of the wide sandy beach. This can be conducted either by placing sand directly on the beach or by placing sand in the nearshore area. (The latter method could be used for suboptimal sands or sediments.) Sand used for beach nourishment requires sediment that is free of chemical contaminants and has comparable grain size and aesthetic characteristics to that of the receiver beach.

7.2 Potential Sand Sources

Potential sand sources for a regional beach nourishment project would include upland or offshore sources. A listing of potential sand sources is provided in Appendix J. Sand mining sources should be considered for use in the South Orange County regional beach nourishment project due to direct access to local beaches from roadways and rail. These sources of sand could be cost competitive with other sand sources, as they do not need to be dredged from offshore but, rather, could be placed

directly on the beach via trucks and/or rail delivery. A listing of sand mining sources is available in the OC CRSMP (Everest 2013).

Upland sources represent the numerous sand sources from the watershed such as rivers, lakes, reservoirs, retention basins, and debris basins. Major rivers have been modified (e.g., channelized with armoring of riverbanks) for flood -control purposes, and, in some cases, sand deposits at the river mouth that are dredged to maintain flood capacity. Historically, sand from rivers has been used opportunistically for beach nourishment. This includes sand from San Juan Creek placed at Doheny State Beach and Capistrano Beach and sand from the Santa Ana River placed at North Beach in San Clemente. Major rivers have also been regulated with dams, reservoirs, and other flood-control infrastructure that have trapped a significant portion of sediment supply in the upper watersheds (Everest 2013). Dams, reservoirs, lakes, retention basins, and debris basins are additional potential sand sources.

Offshore sources are the potential sand sources from harbors, bays, lagoons, and offshore sand deposits referred to as "borrow sites." Sand sources from harbors and bays come from maintenance or access dredging conducted to remove accumulated sediment within navigation channels. Lagoon sand sources are from sediment dredged to maintain tidal inlets or removal of fluvial sediment deposition.

Offshore sources refer to sand sources just offshore of the active littoral zone and may include known borrow sites (Appendix J). An example of using an offshore source for beach nourishment is the large-scale SANDAG Regional Beach Sand Project (RBSP) that used approximately 3.5 million cy of sand from offshore borrow sites located off the San Diego County coastline. The planned San Clemente Beach Nourishment Project also plans to use an offshore borrow site near Oceanside Harbor.

There is a variety of ongoing independent agency projects with opportunities to coordinate sand nourishment on a regional level going forward. For example, the City of San Clemente recently applied for grant funding to identify additional beach-compatible offshore deposits that could be used to support a regional nourishment project. Additional offshore investigations and analyses will be required to identify suitable sand sources for a regional beach nourishment project based on availability of sand and compatibility with receiver beaches.

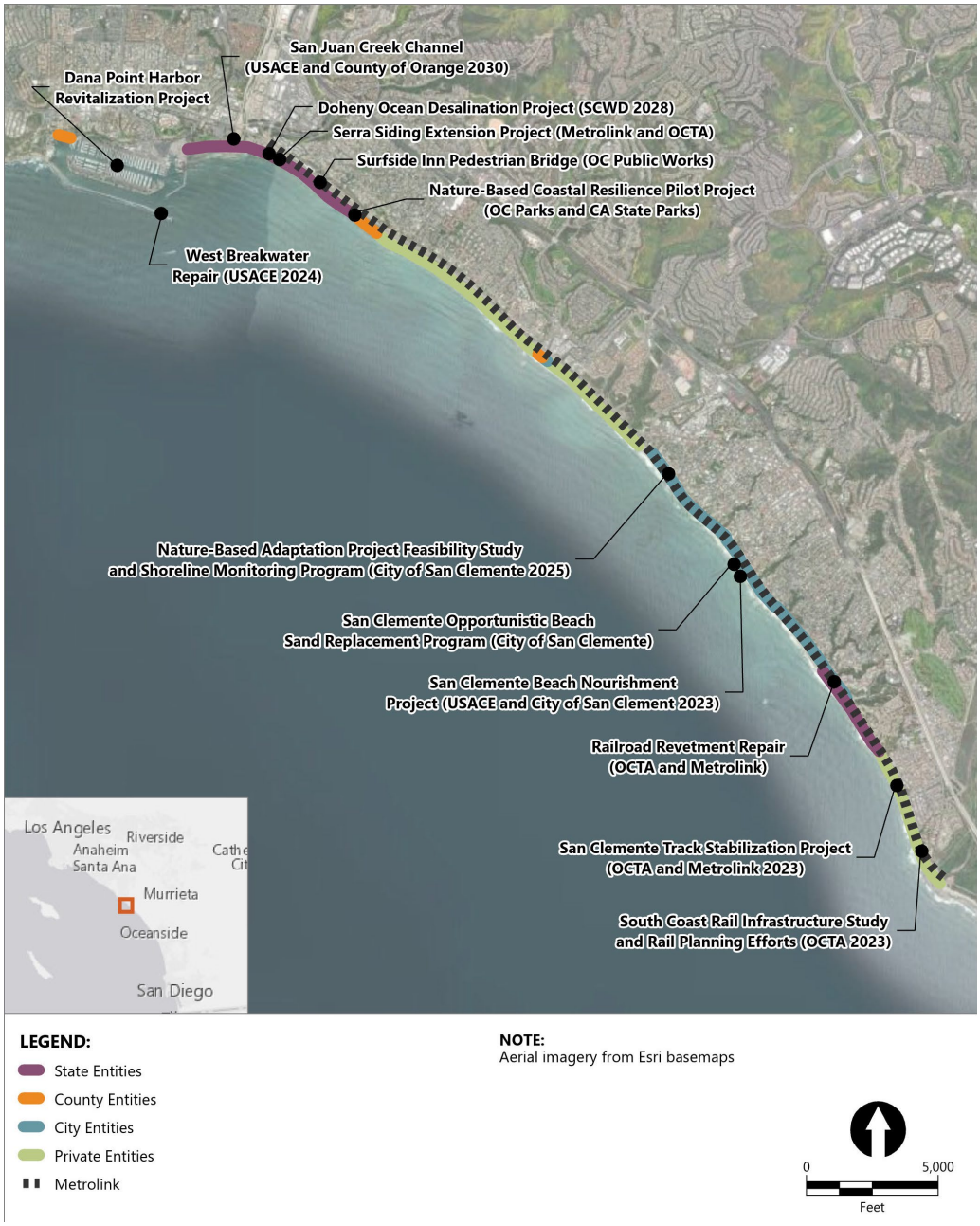
7.3 Prioritization of Future Projects

The intention of a regional beach nourishment program is to place sand along the entire South Orange County coastline, from Dana Point Harbor to San Mateo Point in southern San Clemente. Implementation of beach nourishment projects will be conducted in phases, depending on the availability of sand and timing with other ongoing projects. Further development of a regional beach

nourishment project may require defining individual future projects that complement or integrate existing projects such as the Capistrano Beach and Doheny Beach Nature-Based Coastal Resilience Pilot Project, San Clemente Beach Nourishment Project, and San Clemente Nature-Based Adaptation Project Feasibility Study and Shoreline Monitoring Program.

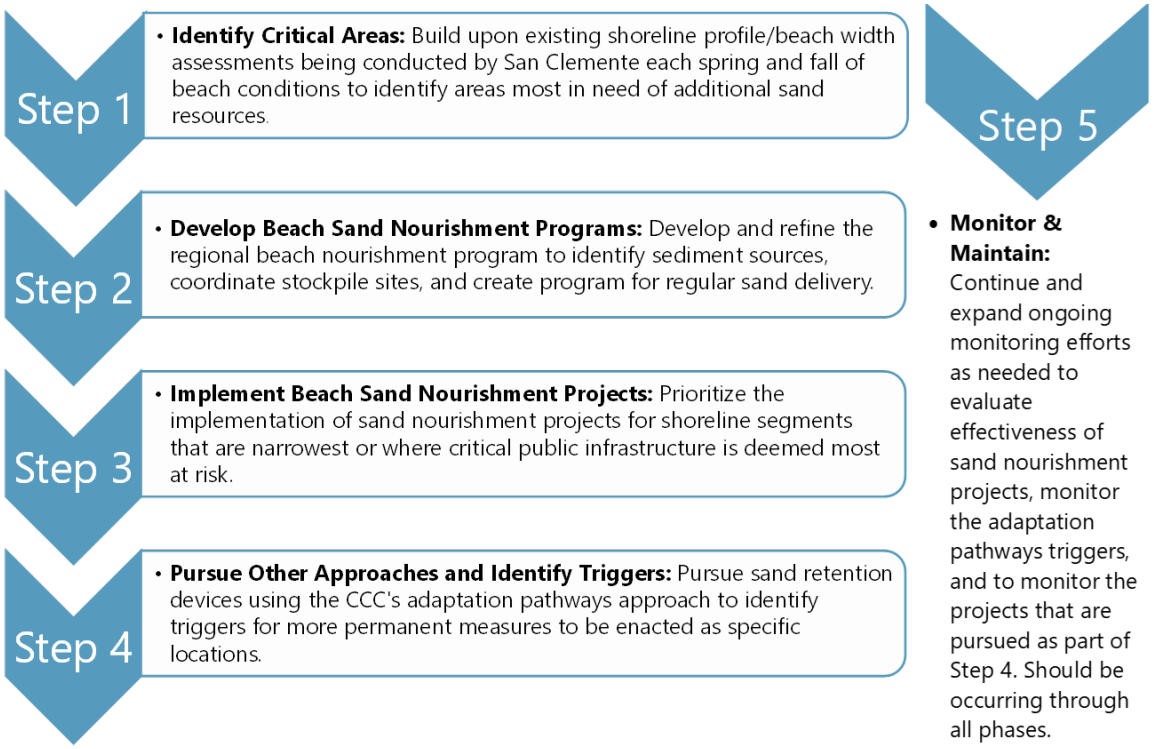
The existing and planned coastal resilience projects were identified by the County and stakeholders and are shown in Figure 7-2. A short description of each project is provided in Appendix H. The extensive list of projects highlights the efforts being made by individual agencies and organization to address beach erosion on a piecemeal and nonintegrated approach throughout the region and supports the need for a regional collaborative to coordinate efforts to achieve the optimal outcomes and reduce costs for all stakeholders.

Figure 7-2
Existing and Anticipated Projects in South Orange County



Establishment of a regional collaborative could incorporate existing projects being planned as part of the regional beach nourishment program (as summarized in Appendix H); consolidate existing projects into a larger project; or develop new projects that support existing projects, as outlined and illustrated in Figure 7-3.

Figure 7-3
Process to Develop Solutions Within the Regional Collaborative



The CCC SLR Policy Guidance, adopted August 12, 2015, and updated on November 7, 2018, to reflect best available science, prescribes adaptation strategies in Chapter 7. This chapter prescribes approaches to protect, accommodate, and retreat, as follows (CCC 2018):

1. "Protection" strategies include "soft" armoring features, such as beaches, dune systems, wetlands, and other systems to buffer coastal areas. This includes strategies like beach nourishment, dune management, or the construction of "living shorelines."
2. "Accommodation" strategies include elevating structures, retrofits, and/or the use of materials meant to increase the strength of development, building structures that can easily be moved and relocated, or using extra setbacks.
3. "Retreat" strategies include removing existing development out of hazard areas, limiting the construction of new development in vulnerable areas, and promoting the preservation and conservation of open space areas.

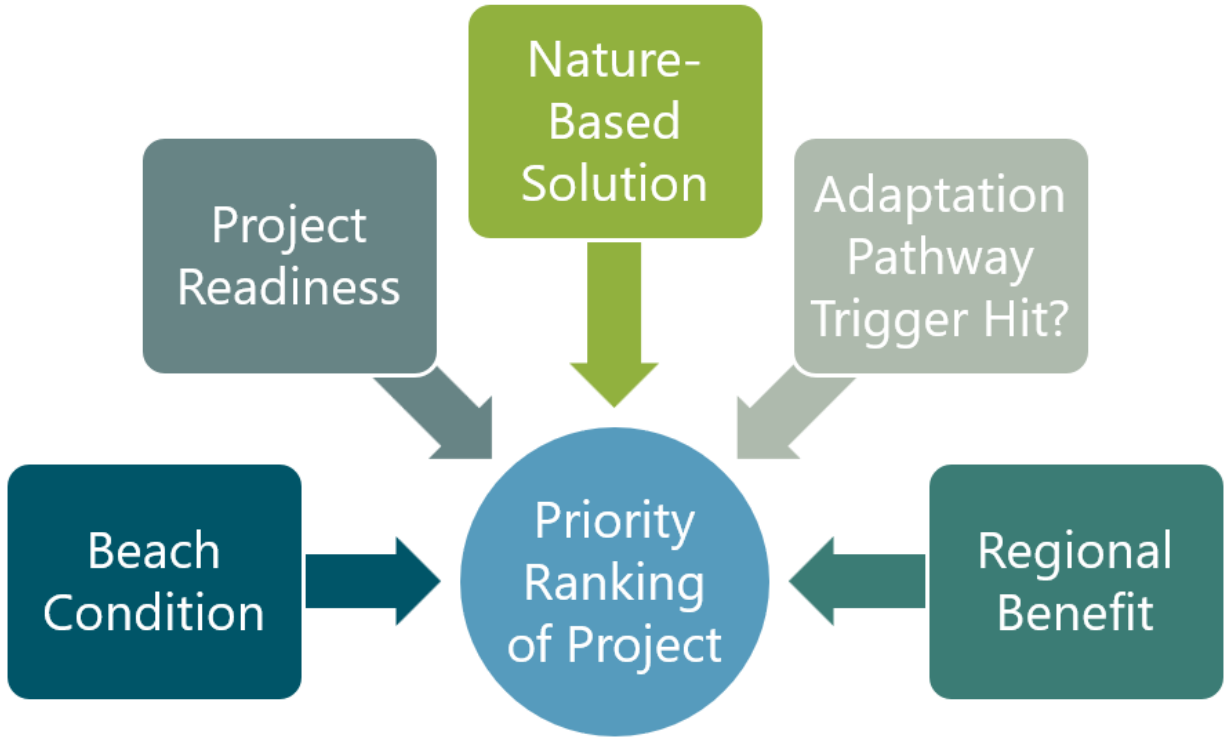
As shown in Figure 7-3, the regional collaborative will incorporate principles of the CCC's adaptation pathways approach, where a range of adaptation strategies are considered after an evaluation of hazards and the assets at risk. Step 4 of the Process To Develop Solutions Within the Regional Collaborative includes the identification of triggers, such as a predetermined beach width reduction,

for adaptation pathways to be enacted at that location. This will allow for a potential phased approach to long-term adaptation while allowing for interim adaptation strategies. As described in this section, nature-based or green solutions would continue to be prioritized with this approach.

The process of selecting appropriate adaptation pathways and triggers for the region would be placed with the regional collaborative, which would be tasked with considering risk, budget, regulatory constraints, and stakeholder input, in addition to other factors. This process should also analyze a range of SLR scenarios and a suite of adaptation strategies to better inform a long-term, phased approach for the region. The SLR scenario selected to analyze potential impacts may also vary depending on the corresponding risk, best available science, and potential impacts to infrastructure and improvements present at each project site identified.

The public outreach process also identified interest in other coastal resiliency projects, such as one or more multipurpose sand retention structures located along the South Orange County shoreline. While this Strategic Plan focuses on implementation of a regional beach nourishment program as the highest-priority coastal resilience project, it is intended that other coastal resiliency projects will be pursued as longer-term, supplemental solutions to beach erosion and SLR. As an example, future and existing projects would continue to be prioritized using a ranking system based on beach conditions, project readiness, whether projects are nature-based solutions, whether the adaptation triggers identified above have been hit, and projects' regional benefit (Figure 7-4).

Figure 7-4
Framework to Prioritize Regional Beach Solutions



The elements of the ranking system would be defined in the following ways:

- Beach conditions: Critical areas based on erosion hot spots
- Project readiness: Status of project based on design phase, regulatory readiness, and funding
- Nature-based solution: Green-gray scale to favor green, nature-based solutions
- Adaptation pathway trigger hit: Use monitoring to determine whether the trigger identified in Step 4 of the Process to Develop Solutions Within the Regional Collaborative was achieved
- Regional benefit: Proportional to length of coastline or volume of sand

The ranking system based on numerical scoring could prioritize individual future and existing projects that favor critical beaches, project readiness for implementation, nature-based solutions, and the benefit that the region stand to gain from implementation. This type of ranking system could be applied to near- and long-term projects, with options to expand with additional criteria such as SLR adaptability or economic cost-to-benefit analysis.

Beach conditions could be determined using ongoing shoreline monitoring. For example, analysis of beach width measurements as part of the San Clemente Nature-Based Adaptation Project Feasibility

Study showed there are variations in the beach stability along the San Clemente coastline. A rating system was developed to identify critical, threatened, and stable beaches using beach width measurements. An example shoreline monitoring program under the County's research partnership with UCI, where ongoing drone and satellite monitoring across the beach width and the movement of sand placed within the littoral cell is being conducted. Development of future projects under a regional beach nourishment program could prioritize sand placement based on the following:

- Critical beaches: Erosional hotspots with a high damage risk to coastal infrastructure, natural resources, and recreation
- Threatened baches: Erosional with a medium damage risk to coastal infrastructure, natural resources, and recreation
- Stable beaches: Stable with a low damage risk to coastal infrastructure, natural resources, and recreation

It should be noted that beach conditions can vary over time and may be influenced by ongoing activities such as other beach nourishment or shoreline stabilization projects. Thus, periodic updates of beach conditions may be required.

Project readiness would be ranked based on readiness for implementation in terms of design phase, status of regulatory permitting, and securing of funding for implementation. Scores for the design phase would be based on the project phase as follows: alternative, conceptual, feasibility, pre-design, final design, or construction. The status of regulatory permitting would be ranked based on completion of environmental studies, submission of permit applications, agency review, or secured permits. Ranking based on funding could indicate if funding has been either not identified, identified, budgeted, or appropriated.

The ranking system would also prioritize green, nature-based solutions such as living shoreline/sand dunes and beach nourishment. Lower-priority projects would be gray or hard solutions like sand retention structures (groin or breakwater) or shoreline protection structures (revetment or seawall) (Figure 7-1).

Regional benefit would account for the scale of the project. A ranking proportional to either the length of coastline or volume of sand could be used to prioritize larger regional projects that benefit more of the coastline.

Additional details on storm wave damage along the South Orange County coastline is provided in Appendix G.

The Strategic Plan identifies the optimal path forward for advancing coastal resilience projects that would provide direct benefits in the form of the following:

- Advances the scientific understanding of coastal processes in South Orange County.

- Supports enhanced public access and coastal resource protection.
- Provides solutions to address shoreline erosion.
- Improves coastal resiliency and SLR adaptability over the long term by building adaptive capacity.
- Regional collaboration would produce cost savings and economic efficiencies by avoiding duplication of efforts and avoiding public agencies in South Orange County from competing with each another for scarce public dollars.

This Strategic Plan was developed to identify a solution to minimize beach erosion and reduce wave storm damage and widen the region's beaches with the goal of project implementation. A range of regional solutions, as described in Appendix E, were presented to stakeholders to select a preferred regional solution, (Section 2.3). Through the stakeholder engagement process, beach nourishment emerged as the preferred regional solution that could be implemented over the next 50 years. While a regional collaborative beach nourishment project would benefit multiple stakeholders by addressing current beach erosion, regional beach nourishment could also be used as a coastal resilience project for adapting to rising sea levels. For beaches in South Orange County, SLR would worsen the already chronic beach erosion and reduce recreational beach areas. The effects of storm waves are projected to increase in magnitude with higher sea levels.

As summarized in Appendix I, key SLR thresholds were identified at 1.6 feet of SLR, which could occur between 2040 and 2060 and at 3.3 feet of SLR, which could occur between 2050 to 2100. Both the Cities of Dana Point and San Clemente's SLR adaptation measures recommend participating in a regional beach nourishment program to increase efficiency and cost-effectiveness (City of Dana Point 2019; City of San Clemente 2019). A regional beach nourishment program could be effective and feasible to offset beach erosion with up to 3.3 feet of SLR. With higher levels of SLR, additional volumes of sand would likely be required and could be accomplished through an adaptive management plan as is contemplated in the San Clemente and USACE 50-Year Coastal Storm Damage Reduction Project that will begin in late 2023. Beach nourishment may be initially prioritized, but other techniques should continue to be considered for mid-and long-term solutions.

8 Potential Regulatory Requirements

Robust technical studies, monitoring data, and biological information are typically required by the regulatory agencies to permit coastal resiliency projects. It is anticipated that there would be significant cost savings if a regional collaborative were to lead the effort to promote regional coastal resiliency project implementation. The establishment of a regional collaborative could streamline environmental compliance efforts for CEQA and NEPA, as well as cost savings related to preparing, submitting, and processing regulatory agency permits.

Cost savings-related regional coordination to develop one or more regional projects is one of the many benefits that can be achieved through regional planning, as opposed to permitting a patchwork of individual beach nourishment projects with redundant and overlapping environmental reviews and agency permits.

While the development of this Strategic Plan is exempt from CEQA and NEPA, conducting environmental review pursuant to CEQA and NEPA will be a required future task once individual projects have been identified.

Implementing projects under this Strategic Plan will require permits from several agencies, including the following:

- USACE (Permits for Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act)
- Coordination with U.S. Fish and Wildlife Service and NOAA/National Marine Fisheries Service for endangered species and Essential Fish Habitat
- CCC (Coastal Development Permit and/or Federal Consistency Determination)
- California State Lands Commission (land lease)
- Regional Water Quality Control Board (Section 401 water quality certification)
- California State Parks (Right of Entry or Encroachment Permit)
- HOA (Right of Entry Authorization)

Further, any projects or planning implemented under this Strategic Plan will be in accordance with the policies, regulations, or statutory standards of the Coastal Act, any relevant certified local coastal programs (City of Dana Point Local Coastal Program, Title 9 [Zoning], and any future local coastal programs adopted for City of San Clemente) and all relevant regulatory agencies. This will be applied to any projects related to shoreline public access and recreation, terrestrial and marine habitat protection, visual resources, landform alteration, water quality, development design, public works and beyond, as is required.

Local agencies (City of Dana Point and/or City of San Clemente) may also require other permits such as grading, haul route, or Coastal Development permits (if authorized in Dana Point). The City of San Clemente does not yet have full authority to issue a Coastal Development Permit.

It is anticipated that compliance with CEQA and NEPA will be required for any/all projects implemented under this Strategic Plan.

Any separately funded projects, such as new or replacement shoreline protective devices, are not a component of this Strategic Plan and would continue to be permitted separately by individual entities.

9 Economic Analysis: Costs and Benefits

This section of the Strategic Plan discusses cost estimates and presents a high-level economic analysis for a range of potential projects and governance structures, focusing on beach nourishment and cooperative agreements, respectively.

The responsible party or parties for the various Strategic Plan components, along with cost-sharing requirements, will vary depending on the following:

- Project phase (e.g., planning and environmental review, permitting and design, construction, and post-construction monitoring and maintenance)
- Location (e.g., county beach, beach-fronting private property, municipal beach, or state beach)
- Amount of sand to be placed

9.1 Cost Estimates

Cost estimates for a South Orange County regional beach nourishment project can be derived from representative and relevant regional project examples (Table 9-1). Information in this table is based on data from the period 2001 through 2023 and provides a range of costs based on a per cubic yard basis from local relevant large-scale public beach restoration effort. The projects below include both federal and nonfederal projects. Additional supporting reference materials are included in Appendix L to this Strategic Plan.

Table 9-1
Cost Comparison for Recent and Relevant Public Beach Restoration Projects

Project Name	Total Project Cost[a]	cy	Average cy Cost[a]	Status
Cardiff Living Shoreline Project	$3,700,000	30,000	$123.33	Project completed in May 2019.
San Clemente and USACE Coastal Storm Damage Reduction Project	$15,019,000	251,000	$59.84	Started in December 2023[b]
Solana Beach and Encinitas USACE Coastal Storm Damage Reduction Project	$43,331,000	1,040,000	$41.66	Completed late April 2024[b]
SANDAG RBSP III[c]	$40,200,000 estimated	TBD	TBD	Phase 1 cost: $200,000 for planning, design, and economic and borrow site analysis to be initiated in fall 2023. San Clemente Cost was $109,000 and Dana Point / County Cost was $126,000
SANDAG RBSP II[d]	$23,817,200	1,500,000	$15.87	Project completed in 2011–2012.
SANDAG RBSP I[e]	$17,500,000	2,102,048	$8.33	Project completed in 2001.

Notes:

a. Costs are consistent with source information and are therefore based on year constructed and not adjusted for inflation.
b. This is a 50-year local-state-federal project with intermittent renourishment cycles planned over 50 years.
c. This project is currently in the planning stages and will likely be a repeat of the prior projects. Phase 1 will be completed in 2023/2024. Phase 2 would be CEQA/NEPA, and permitting would likely be implemented in 2024/2025. Phase 3 (construction) would likely commence in 2026 or beyond. No funding beyond Phase 1 has been secured (Greer 2023).
d. This second project was smaller in scale than the first project and only included five cities in two littoral cells.
e. This initial project included a total of nine cities in three littoral cells.

Upland Sand Sources: It is worth noting that upland sources of sand (including sand mines/quarries) should be further pursued for placement, given the proximity of the South Orange County beaches to major roadways, as well as a railroad, that can provide direct sand placement access to the beach.

Sand material costs from upland sand sources can range from $20 to $25 per cy (material only) based on recent estimates included in Appendix L. Sand truck transport costs are estimated at approximately $22 per cy but can vary widely based on transport distance and the need to load and screen the sand. This comparative cost analysis should be conducted as part of a next step and could provide significant cost reductions, as the single biggest cost of any of the above-listed beach restoration projects is associated with the cost to mobilize and demobilize a dredge.

The following is a brief description of the projects listed in Table 9-1, including project description and cost estimates for the planned/upcoming projects and actual costs for SANDAG RBSP I and II projects, as these two projects have already been completed.

San Clemente and USACE Coastal Storm Damage Reduction Project: The projected construction costs shown in Table 9-1 are current as of 2023 and include all construction costs, including mobilization and demobilization, dredge operations, permit acquisition costs, PED costs, and construction management. This project was initiated in December 2024 but was put on pause in January 2024 due to sediment quality issues, then reinitiated in May of 2024. This is a 50-year federal project and the costs shown in Table 9-1 are for the initial fill and initial construction only. Future renourishment events are anticipated every 6 years on average to maintain the constructed beach berm profile.

Solana Beach and Encinitas USACE Coastal Storm Damage Reduction Project: The projected construction costs shown in Table 9-1 are current as of October 2022 and include all construction costs, including mobilization and demobilization, dredge operations, permit acquisition costs, PED costs, and construction management. This project was completed in April 2024. Final costs will be available later and may be slightly different. This is a 50--year federal project, and the costs shown in Table 9-1 are for the initial fill and initial construction only. Future renourishment events are anticipated every 10 years on average in Solana Beach and every 5 years in Encinitas to maintain the constructed beach berm profile.

SANDAG RBSP III Project: This project is in the early planning stages, and it is not yet known how many member cities will participate. At a conceptual level, RBSP III would be designed to essentially repeat RBSP II and RBSP I, which placed up to 2 million cy of sand within three littoral cells (Oceanside, Mission Bay, and Silver Strand) using similar footprints and borrow sites as the prior SANDAG projects. Costs for Phase 1 (planning) are budgeted at $200,000 (Pesce 2023). Early estimates for Phase 2 (environmental and permitting) are budgeted at $3 million and for Phase 3 (implementation) at $37 million. Additional information will be added here as it becomes available, and these data are current as of the date of publication of this Strategic Plan. The SANDAG Shoreline Preservation Strategy has identified a regional need of approximately 30 million cy of sand to address existing and future public beach restoration needs. Thus, it is likely that there will be a need for many more RBSP projects in the future.

SANDAG RBSP II Project: In 2012, SANDAG implemented a second RBSP (RBSP II), which utilized the same general beach sand placement footprints and borrow sites as a previous project completed in 2001; however, only five coastal cities participated in RBSP II, compared to nine cities in RBSP I. Post-construction monitoring data and lessons learned from RBSP I were used to refine the RBSP II. RBSP II added approximately 1.5 million cy of sand to the region's local beaches.

SANDAG RBSP I Project: In 2001, SANDAG implemented its first RBSP (RBSP I), which placed more than 2 million cy of sand within three littoral cells (Oceanside, Mission Bay, and Silver Strand) in San Diego County. A total of nine coastal cities participated in RBSP I.

9.2 Economic Analysis

A full assessment of the economic benefits of South Orange County beaches is a recommended next step for Strategic Plan implementation. This analysis would evaluate the economic benefits of improving South Orange County beaches compared to the cost, this information, regarding the economic benefits of beach visitation, will be important for policy decisions by the cooperative agreement, as well as state and federal officials.

9.3 Project-Specific Economic Analysis and Developing a Benefit-to-Cost Ratio

Conducting a project-specific economic analysis is an essential component of project development and a required component of Strategic Plan implementation. Once a project has been defined, project costs and project benefits will be quantified such that a benefit-to-cost ratio (BCR) is developed. The purpose of developing a BCR for a project is to demonstrate that a public beach restoration, or shoreline stabilization project generates a net positive return on investment. The BCR will be valuable in enabling a project to obtain grant and other funding. Generally, the higher the BCR, the more competitive a project will be when it comes to securing grant or other funding.

The general types of data, both in terms of the costs and the benefits, that need to be collected to support a quantifiable project-specific economic analysis/BCR analysis follow:

- **Proposed Project Description:** What are the specifics of the proposed project, including sand volumes, offshore borrow site/source site, placement footprints and beach berm design, and total costs?
- **Demographics:** Who visits the beaches in the region, and what are the growth projections?
- **Beach Attendance data:** How many visitors are at the beach on a given day, where do the visitors come from (local or nonlocal), and what percentage of them are overnight versus day-use visitors?
- **Shoreline Profile Data/Story:** What is the existing condition of the beach in terms of beach width, and what is the seasonal shoreline change noting critical erosion hotspots?
- **Existing Beach Infrastructure and Amenities:** Which amenities are available at the beach, including lifeguards, parking facilities, campgrounds, concession stands, showers, restrooms, and similar amenities?
- **Project benefits:** Quantify economic benefits generated from the beach restoration project, including coastal storm damage reduction, property damage avoidance, and public recreation benefits. Additionally, there will be local and regional benefits from valuing the beach as an economic generator from beach visitor spending on lodging, gas, restaurants, sundries, car rental, groceries, and parking.

All of the above inputs could be used to determine the economic impact of the project on the local and regional economy. The quantified benefits would be compared to the project costs to calculate a BCR. As noted, there are multiple methodologies available that can be used to quantify the value of the beach and thus quantify the economic value and benefits of a regional public beach restoration project in South Orange County. By dividing these benefits by the cost of beach nourishment, the BCR can be approximated for each nourished beach. In general, a BCR of greater than one is considered positive (the value of the nourishments being greater than the price paid for them) and thus justify the expenditure, while projects with a BCR of less than one are thus viewed as less economically justifiable (the value of the nourishments being less than the price paid; King and Gilliam 2015) and thus not necessarily a good use of public funds.

Any potential project in the federal interest must demonstrate economic "feasibility" by satisfying BCR requirements that are a minimum of 1:1 (costs to benefits) to allow federal participation in continued study and any project proposal that is to advance. State Parks DBW also requires the calculation of a BCR over a 20-year project lifetime. Thus, it is recommended that once a "proposed project" is identified, a project-specific economic analysis should be conducted as one of the follow-on tasks.

9.4 Economic Benefits from Having a Cohesive Functional Beach Region

South Orange County provides a wide variety of beaches and beach activities ranging from large, highly attended beaches with visible street parking/parking lots accessible from major roadways to smaller cove beaches accessible from within residential communities. Recreational activities available on South Orange County beaches also vary from sunbathing and swimming to surfing. Boardwalk activity is also important at some beaches, particularly at Doheny State Beach and the San Clemente Pier area. Volleyball and other beach activities are provided at some beaches, and scuba diving is popular in some areas. Additional details of the recreational opportunities and amenities along the South Orange County coastline is provided in Appendix M.

Although access to many beaches in South Orange County is free, there is a recreational "value" associated with each beach that measures how much, in dollars, a beach visitor is willing to pay for a visit to the beach. An increase in beach width contributes to an increase in the recreational value of a visit to the beach, which, in turn, contributes to an increase in beach attendance. According to King and Gilliam (2015), beach visitors typically state that an increase in beach width would lead to a corresponding increase in their annual attendance at a given beach. Larger recreational values for a visit to the beach express a greater desire for, and, therefore, a higher frequency of visits to, that beach. Therefore, having a cohesive functional beach region (i.e., an increase in beach width) would not only contribute to an increase in the recreational value of a visit to the beach, it would also be expected to contribute to an increase in the number of visits to that beach and the corresponding economic benefit.

According to King and Gilliam (2015), the SANDAG RBSP II project (2011 to 2012) generated $31.9 million in economic benefits, yielding a BCR of 1.16. In addition, the project generated $32.9 million in total economic impact for San Diego County and $37.3 million in total economic impact for the State of California.

According to King (2023), a new methodology for beach valuation is to use an approach based on the "carrying capacity" or "maximum capacity" of a beach with assumptions about the visitor turnover rate of that area of the beach. King recommends using a turnover of 100 square feet per person, assuming a turnover of 1.6 hours or more for large or wide beaches. For narrow or pocket beaches, such as those in South Orange County, this number would likely need to be modified with a lower turnover rate. Daily attendance in the summer is used as a proxy for overall annual beach attendance.

Having a standard approximation for the value of a beach trip allows city planners and researchers to understand the value of existing patterns of beach recreation and attendance. Applying this

methodology to the future of South Orange County beaches is possible, with additional analysis recommended for the next phase of Strategic Plan implementation.

Estimating the impact of SLR on the recreational value of beaches depends on the impact SLR has on beach attendance. As SLR occurs, beaches will lose area, and this loss in area will likely lead to a loss in attendance. The relationship between lost area and lost attendance can be modeled using the carrying capacity of a given beach. Carrying capacity, in this case, is the number of visitors that can visit a beach at one time—essentially, the maximum occupancy of a beach. Although visitors do not think in terms of explicit carrying capacity, people do make decisions and alter their visiting behavior based on how crowded a beach appears. When a beach becomes too crowded, people choose to go elsewhere or choose not to visit the beach. At this point, carrying capacity would be considered exceeded (King 2023).

Sheehan et al. (2022) uses an assumption that beachgoers generally require approximately 100 square feet of "towel space." However, most beachgoers do not spend an entire day at the beach. Thus, other people can occupy the same area of the beach within a given day, and this is considered the turnover rate (the rate at which visitors leave the beach and are replaced). The turnover rate will vary from beach to beach. The carrying capacity, therefore, is determined by dividing the area by required towel space and multiplying the result by the turnover rate.

Daily attendance is rarely equivalent to carrying capacity, except for at the more popular beaches in high season (such as Huntington Beach or Newport Beach on the Fourth of July). Many beaches are highly seasonal, with more than half of all visits taking place in the summer high season. At some of these seasonal beaches, the beach may be nearly at capacity for much of the summer (high utilization) and nearly empty in the winter (low utilization). Thus, a loss of area would impact the summer attendance far more than low season attendance. Therefore, models of SLR impact need to adjust for the average utilization rate at a given beach or how close daily visitation is to the maximum occupancy (carrying capacity) of the beach.

These economic benefits all underscore the importance of establishing a regional collaborative for South Orange County. The benefits of having a sustained beach are enhanced when it is connected to others in the region. Once the regional collaborative decides upon a regionally beneficial project, the group could move forward with establishing a well-supported BCR for that project using the methods outlined in Section 10.3.

10 Next Steps for Strategic Plan Implementation

Next steps for decisionmakers include the following:

1. **Form a Regional Collaborative:**
    a. Identify required member agencies. At a minimum, this should include ownership agencies such as the County, State of California, Cities of Dana Point and San Clemente, and OCTA but could be expanded as desired.
        i. Expanded organizations could include, but are not limited to, special districts and public utilities, Tribal councils, HOAs, and federal and state representatives.
    b. Refine governance structure and cost-sharing framework with member input.
    c. Execute a cooperative agreement or governing document with member agencies.
2. **Obtain Funding** to establish and support a regional collaborative and to plan, design, and construct priority projects.
    a. If appropriate, establish a cost-sharing account to implement projects.
3. **Develop a Near-Term Regional Beach Nourishment Program:**
    a. Identify critical areas and priority projects.
    b. Develop beach nourishment project design.
        i. Conduct sand source analysis to identify sand sources and potential stockpile locations.
        ii. Conduct an economic BCR analysis using various fill volumes and beach widths to determine the optimal beach width design and identify potential placement envelopes and capacity volumes for placement.
4. **Implement Priority Projects:**
    a. Conduct environmental review under CEQA and NEPA.
    b. Prepare the Sampling and Analysis Plan and Sampling and Analysis Report to ensure compatibility of borrow site sediments with receiver beaches' off-site borrow site data collection and analyses to identify, quantify, and characterize available sand/sediment sources for placement on local beaches.
    c. Obtain regulatory agency approvals and permits.
    d. Conduct pre-construction monitoring.
    e. Implement sand placement and construct projects.
    f. Conduct post-construction monitoring and reporting.
5. **Develop Mid- and Long-Term Goals:**
    a. Identify nature-based solutions and coastal structure solutions within the green-gray techniques scale in the Second Phase Coastal/Community Resiliency Projects/Pilot or Demonstration Projects and Innovative Solutions to be pursued.
    b. Consider development of multipurpose sand retention projects.

10.1 Pursue Future Pilot Studies and Seek Innovative Solutions

As part of the stakeholder input process, multipurpose sand retention projects have been identified for advancement as a second regional priority following beach nourishment. Regional consensus on preferred near-, mid-, and long-term solutions is an appropriate next-phase task and should be developed so the member agencies can begin a parallel process to advance one or more sand retention project(s) to retain the sand placed on South Orange County beaches.

Suggestions made by the stakeholders have included both shore-parallel and shore-perpendicular beach sand retention devices including green, hybrid, and gray solutions including offshore reef systems (scaled up from Wheeler North Reef concepts or reef balls or ECOncrete-type demonstration projects), living shorelines, and other innovative options that can provide multiple benefits for shoreline stabilization, habitat, and recreation.

Retaining the sand placed as part of a comprehensive beach nourishment program will make the beach sand replenishment program more cost-efficient and more effective in attaining regional goals for coastal and community resiliency over the long term.

The member agencies should also re-evaluate and potentially update previous studies conducted for the County and State of California DBW in 2007 and 2009, which evaluated the potential for leasing or acquiring a dredge to be available on an as-needed basis to replenish regional beaches.

10.2 Continue Regional Stakeholder Coordination and Collaboration

It is also recommended that the regional collaborative integrate and coordinate with other ongoing, parallel, and concurrent coastal resiliency planning efforts underway by OCTA, the City of San Clemente, and the City of Oceanside, all of which working on related, concurrent coastal resiliency planning efforts. Once a regional collaborative is formed, it could be expanded to serve as a countywide group, or a second group could be formed to support such coastal resiliency planning endeavors in the northern part of Orange County.

Preliminary discussions have also recently been initiated regarding the development of a southern California superregional collaborative with SANDAG, Los Angeles County, and BEACON encompassing the five counties geographically represented by these entities (i.e., San Diego, Orange, Los Angeles, Ventura, and Santa Barbara counties).

The member agencies should identify opportunities to integrate regional efforts and share and utilize technical data, monitoring data, and other work products generated by others to make the best use of public funds and avoid rework, which can occur when entities work in their own silos. Though each agency has its own responsibilities and objectives, the goal of establishing a formal regional alliance is to advance common and shared goals of promoting regional and local resiliency

in an economically efficient manner and to increase the opportunities for obtaining funding by advocating a cooperative regional resiliency framework.

It is recommended that following the public release of the Final Strategic Plan, regular meetings be convened by the local agencies to advance the regional collaborative goals toward project implementation. Building on the momentum created by the Strategic Plan will be essential to keep all stakeholders actively engaged and collaborating on promoting common regional coastal and community resiliency projects in a timely and effective manner.

10.3 Execute a Cooperative Agreement or Governing Document with Member Agencies

It is recommended that the member agencies execute a cooperative agreement or governing document, which will enable funding to implement a regional beach nourishment program and other sand retention projects.

Two example draft cooperative agreements have been included as Appendix F to this Strategic Plan. As drafted, the example agreements include local, regional, state, and federal agencies and special districts. These draft agreements are examples that have been provided as a starting point for formalizing the desired organizational structure that works best for the member agencies and should not be construed as limiting in any way.

11 Conclusion: Summary of Collaboration Toward Coastal Resiliency

This Strategic Plan represents an effort to close the regional gap in coastal resiliency collaboration. As described in this Strategic Plan, continued stakeholder engagement efforts have revealed the desire of stakeholders in the region to participate in a regional collaborative to address chronic beach erosion and thereby protect their assets and their lifestyles. A regional collaborative would reduce obstacles faced by stakeholders, expedite the execution of resiliency projects, and will establish funding and grant opportunities for projects that may not otherwise be possible. The options for collaborative structures, funding opportunities, and coastal resiliency options laid out in this Strategic Plan are presented and considered to further the goal of facilitating the development and maintenance of a more resilient coastline in this region. By using this toolkit, stakeholders in the region will be more easily and reliably able to pursue solutions to achieve this goal.

As stated in the Executive Summary, the overarching mission of this new regional collaborative would be to serve the residents, visitors, businesses, and greater community interests through consolidated planning, permitting, funding, construction, monitoring, and operations and maintenance of coastal resiliency projects in South Orange County. The foundation established by this Strategic Plan would facilitate advancement of regional coastal resilience adaptation planning objectives benefiting the community, economy, and environment.

12 References

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Pesce, C. (SANDAG Shoreline Preservation Working Group), 2023. Personal communication with Courtney Pesce (SANDAG). March 2023.

Sheehan, L., K. Kunkel, P. King, D. Murray, and N. Garrity, 2022. "We'll Take Manhattan: Preserving an Urban (Southern California) Beach in the 21st Century." *Shore & Beach* 90(3):3–16.

USACE (U. S. Army Corps of Engineers), 1991. *Coast of California Storm and Tidal Waves Study, State of the Coast Report, San Diego Region*. USACE, Los Angeles District. September 1991.

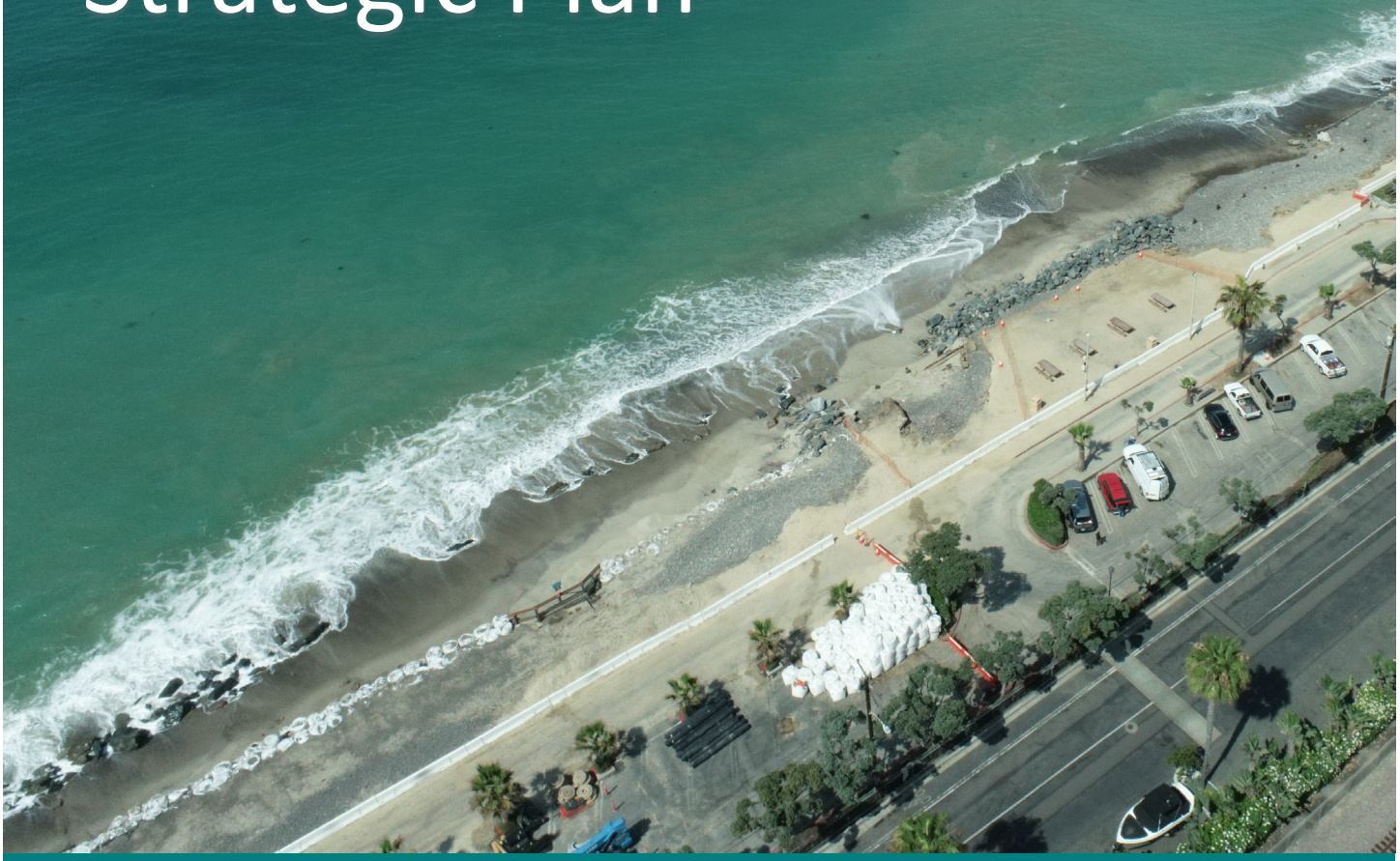
Appendix A
Information Regarding December 2021 Meeting

2021 December Engagement Meeting Attendees

Organization	Name	Email
Anchor QEA	David Cannon	dcannon@anchorqea.com
	Adam Gale	agale@anchorqea.com
Assembly Member Davies's Office	Lauree Davies	--
	Anne Figueroa	--
Caltrans	Chris Lynn	--
	Scott Shelly	scott.shelley@dot.ca.gov
Capo Bay District	Donal S. Russell	drussell@capobay.org
City of Dana Point	Mayor Joe Muller	--
	Mike Killebrew	--
	Matt Sinacori	msinacori@danapoint.org
City of Laguna Beach	Kevin Snow	--
	Garrett Wank	--
City of San Clemente	Mayor Chris Duncan	--
	Erik Sund	--
Congressmen Levine's Office	Terry Van Horne	--
Cyprus Shores Community Association	Bill Bemus	--
	Suzie Whitelaw	suziewhitelaw@gmail.com
	Tim Brown	timbrown@san-clemente.org
OC Parks	Tom Starnes	--
	Susan Brodeur	susan-broduer@ocparks.com
	Joanne Veedor	--
	Natalia Gaerlan	Natalia.Gaerlan@ocparks.com
OC Public Works	Kevin Onuma	--
	Nardy Khan	--
OCTA	Dan Phu	DPhu@octa.net
	Lauren Sato	lsato@octa.net
	Andrea West	--
Senator Bates's Office	Candice Burroughs	--
Shorecliffs Beach Club	Chris Wade	--
California State Parks	Riley Pratt	--
	Scott Kibbey	Scott.Kibbey@parks.ca.gov
Supervisor Bartkett's Office	James Dinwiddie	--
	Yasie Geobel	--
	Nicole Garcia	--

Notes:
Caltrans: California Department of Transportation
OC: Orange County
OCTA: Orange County Transportation Authority

South Orange County Regional Coastal Resilience Strategic Plan



STAKEHOLDER ENGAGEMENT PLANNING MEETING

Monday, December 13, 2021
1:30 PM - 3:00 PM

Cyprus Shore Community Clubhouse

Agenda

South Orange County Regional Coastal Resilience Strategic Plan

Stakeholder Engagement Planning Meeting

Monday, December 13, 2021

1:30 PM - 3:00 PM

Cyprus Shore Community Clubhouse
3922 Calle Ariana
San Clemente, CA 92672

1. Welcome – Lisa Bartlett, Orange County Supervisor, 5th District
2. Guest Introductions – All
3. Background and Project Goals – Natalia Gaerlan, OC Parks Planning and Design Division Manager
4. Regional Strategic Plan, Next Steps, and Action Items – David Cannon, Principal Engineer, Anchor QEA
5. Roundtable – Lisa Bartlett, Orange County Supervisor, 5th District
6. Closing – Lisa Bartlett, Orange County Supervisor, 5th District

SOUTH OC REGIONAL COASTAL RESILIENCE STRATEGIC PLAN

OC Parks was awarded a grant from the CA Natural Resources Agency – Ocean Protections Council for $214,500 to lead a regional planning effort to address coastal concerns. The grant amount covers the consultant fee to organize and manage the planning effort, including research, technical analysis, conceptual designs, and construction cost estimates.

The South Orange County Regional Coastal Resilience Strategic Plan will develop a regional, collaborative strategic plan to facilitate the implementation of regional shoreline management activities to address chronically eroding shorelines in the southern portion of Orange County. The plan will include regional coastal assessments and identify priority projects and potential funding sources. The plan will apply the best available science and incorporate adaptation pathways for projected sea level rise of 3.5 feet by 2050.

The process will begin with stakeholder engagement. A Governance Advisory Team will be created and include relevant public agencies that will provide input on governance issues related to the plan development and implementation. A public stakeholder group will also be created and can include various districts, property owners' associations, institutions, and nongovernmental organizations. Finally, tribal engagement will be conducted outside of the other stakeholder meetings.

Project Goals

- Create a strategic plan to facilitate the implementation of regional shoreline management activities and projects
- Address chronically eroding shorelines along Southern Orange County

Location and Issues

- Southern Orange County coast
- Coastal concerns include bluff instability, beach erosion, sea level rise, lack of sediment delivery to the coast, and increased storminess

Consultant – Anchor QEA

- Anchor QEA to lead the regional strategic plan
    - Review and evaluate existing environmental, economic, physical, and regulatory data

- Lead stakeholder meetings
- Conduct economic analysis of proposed ideas
- Research governance models and funding mechanisms

Stakeholder Involvement

- Governance Advisory Team will be created
- Additional meetings will be held with property owners' associations, nongovernmental organizations, educational institutions, and tribal representatives

Final Report

- The plan is expected to be completed late 2023. Final report will include:
  - Data analysis
  - List of priority projects
  - Schedule for phased implementation
  - Economic analysis memo
  - Summary of governance structure
  - Funding opportunities
  - Operational Tactics

South Orange County Regional Coastal Resilience Strategic Plan

Stakeholder Engagement Planning Meeting Survey

1. Has your organization prepared a Sea Level Rise Vulnerability Assessment?
    a. Yes
    b. No

2. Has your organization prepared a Sea Level Rise Adaptation Plan?
    a. Yes
    b. No

3. What are the top **historical/current** threats to your property or asset?
    a. Bluff stability
    b. Beach erosion
    c. Sea level rise
    d. Lack of sediment delivery to the coast
    e. Increased storminess
    f. Other: _____

4. What are the top causes of **historical/current** threats to your property or asset?
    a. Coastal development
    b. Sea level rise
    c. Reduction in sediment delivery to the coast
    d. Changes in wave height, frequency, & direction
    e. Other: _____

5. What are the top **future** threats to your property or asset?
    a. Bluff stability
    b. Beach erosion
    c. Climate change
    d. Inability to protect
    e. Other: _____

6. What are the top causes of **future** threats to your property or asset?
    a. Coastal development
    b. Projected sea level rise
    c. Reductions in coastal sediment delivery
    d. Changes in wave height, frequency, & direction
    e. Other: _____

7. What remedial measures were identified to address the threats to your property or asset?
    a. Bluff stabilization
    b. Placement of riprap on emergency basis
    c. Engineered rock revetment
    d. Seawall
    e. Beach nourishment without sand retention structures
    f. Beach nourishment with sand retention structures
    g. Relocation/realignment (i.e., “managed retreat”)
    h. Do nothing (i.e., accept/accommodate threats)
    i. Other: _____

8. Do you have any construction projects planned to protect your property or asset?
    a. Yes
    b. No

If yes, please provide a brief description and when you expect to complete construction.

_____

_____

_____

9. Rank obstacles (with ‘1’ being the highest) to implementing sea level rise adaptation remedial measures.
    a. ____ Ability to obtain funding
    b. ____ Ability to obtain permits
    c. ____ Lack of leadership/coordination/political will
    d. ____ Availability of technical information
    e. ____ Lack of understanding of coastal processes
    f. ____ Lack of understanding regarding remedial measures performance
    g. ____ Other (please identify & describe)

10. What other organizations should be considered for participation in this regional stakeholder group? Please provide contact information if you have it.

_____

_____

_____

Comments/Questions:

_____

_____

_____

Comments/Questions:

Survey Respondents

Organization	Survey Resondants	Email Address	Phone Number
OCTA	Dan Phu, Environmental Programs Manager	DPhu@octa.net	714-560-5907
Shorecliffs Beach Club Manager	Tracey Edwards	manager@shorecliffsbeachclub.com	
Capo Shores	Eric Anderson	eanderson@caposhores.com	949-351-9642
City of Dana Point	Matthew Sinacori, PE	msinacori@danapoint.org	949-248-3574
City of Dana Point	Brenda Wisneski	BWisneski@DanaPoint.org	949-248-3560
Capo Bay District	Donal S. Russell, Manager	drussell@capobay.org	949-496-6576
State Parks	Scott Kibbey	Scott.Kibbey@parks.ca.gov	949-243-4175
City of San Clemente	Jennifer Savage	SavageJ@san-clemente.org	949-361-6186
City of Laguna Beach	Jeremy Frimond	jfrimond@lagunabeachcity.net	949-464-6673

Note:
OCTA: Orange County Transportation Authority

Appendix B
Information Regarding March 2022 Meeting

Meeting 2 Invite List

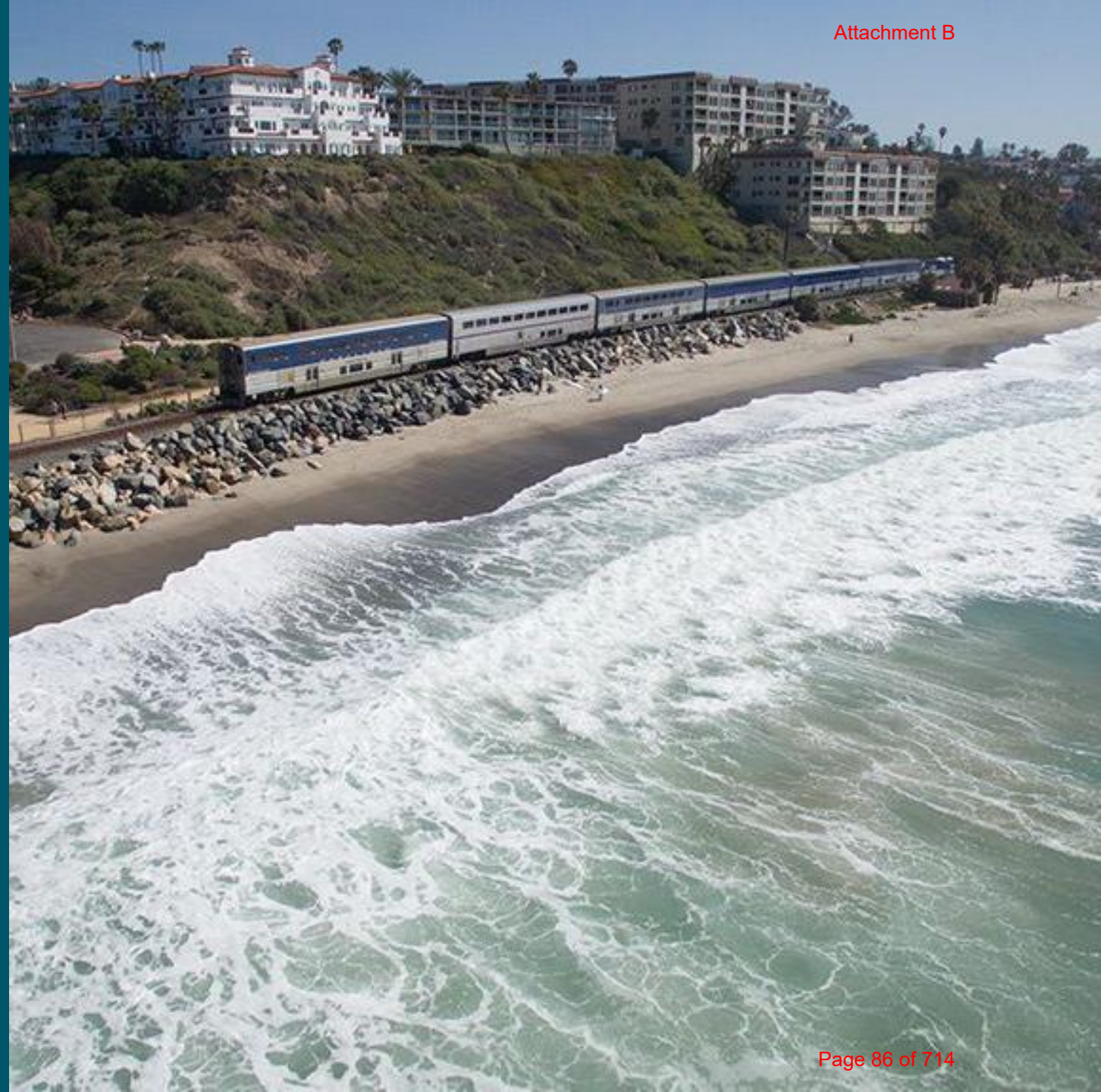
Organization	Name	Email
Anchor QEA	Delaney Inman	dinman@anchorqea.com
	David Cannon	dcannon@anchorqea.com
	Adam Gale	agale@anchorqea.com
Beach Cities Preservation Alliance	Louis Galuppo	lgaluppo@beachcitiespa.org>
California Coastal Commission	Karl Schwing	karl.schwing@coastal.ca.gov
	Shannon Vaughn	shanon.vaughn@coastal.ca.gov
	Dani Ziff	dani.ziff@coastal.ca.gov
	Alex Yee	alexander.yee@coastal.ca.gov
California Coastal Trail Association	Cea Higgins	cea@coastwalk.org
California State Parks	Scott Kibbey	Scott.Kibbey@parks.ca.gov
	Todd Lewis	Todd.Lewis@parks.ca.gov
	Riley Pratt	riley.pratt@parks.ca.gov
Caltrans	Bobi Hettick	bobi.c.hettick@dot.ca.gov
Capistrano Bay District	Don Russell	drussell@capobay.org
	Jack Tarr	jacktarr@jacktarrdc.com
	Saeed Irani	airani1234@gmail.com
Capistrano Shores	Eric Anderson	eanderson@caposhores.com
Capo Cares	Toni Nelson	capocares@gmail.com
City of Dana Point	Mike Killebrew	MKILLEBREW@DanaPoint.org
	Matt Sinacori	msinacori@danapoint.org
	Brenda Wisneski	BWisneski@DanaPoint.org
	Kurth Nelson	knelson@danapoint.org
	John Ciampa	jciampa@danapoint.org
City of Laguna Beach	Jeremy Frimond	jfrimond@lagunabeachcity.net
City of San Clemente	Erik Sund	sunde@san-clemente.org
	Jennifer Savage	SavageJ@san-clemente.org
	Amber Gregg	GreggA@san-clemente.org
	Cecilia Gallardo-Daly	Gallardo-daly@san-clemente.org
Coastal Cities Group - League of California Cities	Antonia Graham, CSM, Env Sp	Antonia.Graham@surfcity-hb.org
Coastal Conservancy	Sam Schuchat	sam.schuchat@scc.ca.gov
	Evyan Sloane	Evyan.sloane@scc.ca.gov
Cyprus Shore Community Association	Steve Lang	sralphlang@gmail.com
	Suzie Whitelaw	suziewhitelaw@gmail.com
	Tim Brown	timthebrown@gmail.com
Dana Point Harbor Partners	Ralph Grippo	rgrippo@bellwetherfinancialgroup.com
	Kelly Rinderknecht	krinderknecht@themarinaatdanapoint.com
Dana Point Historical Society	Barbara Johannes	dphistorical@hotmail.com
	Sandie Iverson / Carl Iverson	sandie6449@gmail.com
Doheny State Beach Interpretive Association	Kathy Wade	kwade@dohenystatebeach.org
OC Bike Coalition	Pete Van Nuys	petevannuys@cox.net
OC Flood	Penny Lew	penny.lew@ocpw.ocgov.com
OC Lifeguards	Jason Young	jyoung@oclg.org
OC Parks	Tom Starnes	tom.starnes@ocparks.com
	Natalia Gaerlan	Natalia.Gaerlan@ocparks.com
	Susan Brodeur	susan-broduer@ocparks.com
OCPW	James Treadaway	james.treadaway@ocpw.ocgov.com
	Nardy Khan	Nardy.Khan@ocpw.ocgov.com
OCTA/Metrolink	Dan Phu	dphu@octa.net
	Jim Beil	jbeil@octa.net
	Jason Lee	jlee1@octa.net
San Clemente Beaches, Park and Recreation Commission	Jorine Campopiano	aspenjorine@msn.com
SCAG	Jonathan Hughes	hughesj@scag.ca.gov
Shorecliffs HOA	Tracey Edwards	manager@shorecliffsbeachclub.com
South Coast Water District	Rick Shintaku	rshintaku@scwd.org
	Marc Serna	mserna@scwd.org
	Chris Newton	--
	Rick Erkeneff	--
State Lands Commission	Jennifer Lucchesi	jennifer.lucchesi@slc.ca.gov
State Parks	Scott Kibbey	Scott.Kibbey@parks.ca.gov
Surfrider Foundation	Rick Erkeneff	rickerk@cox.net
	Denise Erkeneff	derkeneff@southoc.surfrider.org
	Mandy Sackett	msackett@surfrider.org
University of California, Irvine	Brett Sanders	bsanders@uci.edu
U.S. Army Corps of Engineers	Susie Ming	susan.m.ming@usace.army.mil
USGS	Sean Vitousek	svitousek@usgs.gov

Notes:
Caltrans: California Department of Transportation
HOA: homeowner association
OC: Orange County
OCPW: Orange County Public Works
OCTA: Orange County Transportation Authority
SCAG: Southern California Association of Governments
USGS: U.S. Geological Survey

South Orange County Regional Coastal Resilience Strategic Plan

March 21, 2022

ANCHOR QEA



Grant Overview

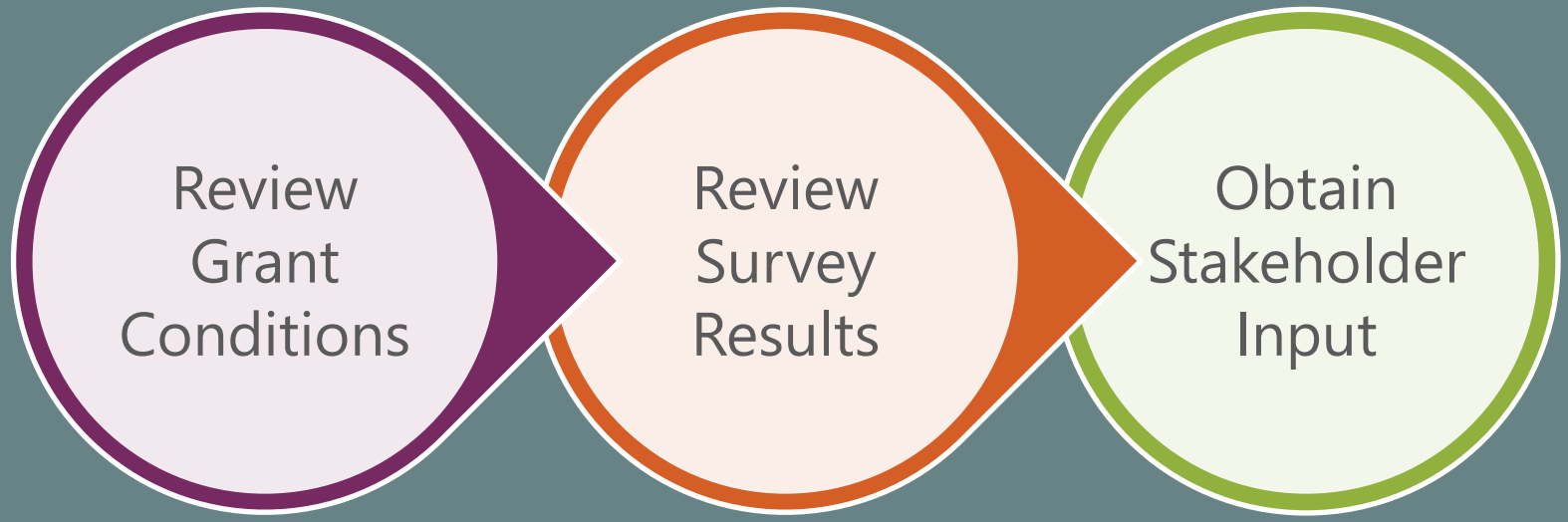
- **Goal:** Develop a regional, collaborative strategic plan to facilitate implementation of regional shoreline management activities to address chronically eroding shorelines in southern Orange County

- **Main objective:** Assess, prioritize, and advance resilience opportunities to reduce the risk to residents and to increase the viability of south Orange County beaches

Scope of Work and Stakeholder Engagement Review

In Progress

- Evaluate Existing Data
- Stakeholder Meetings



Up Next

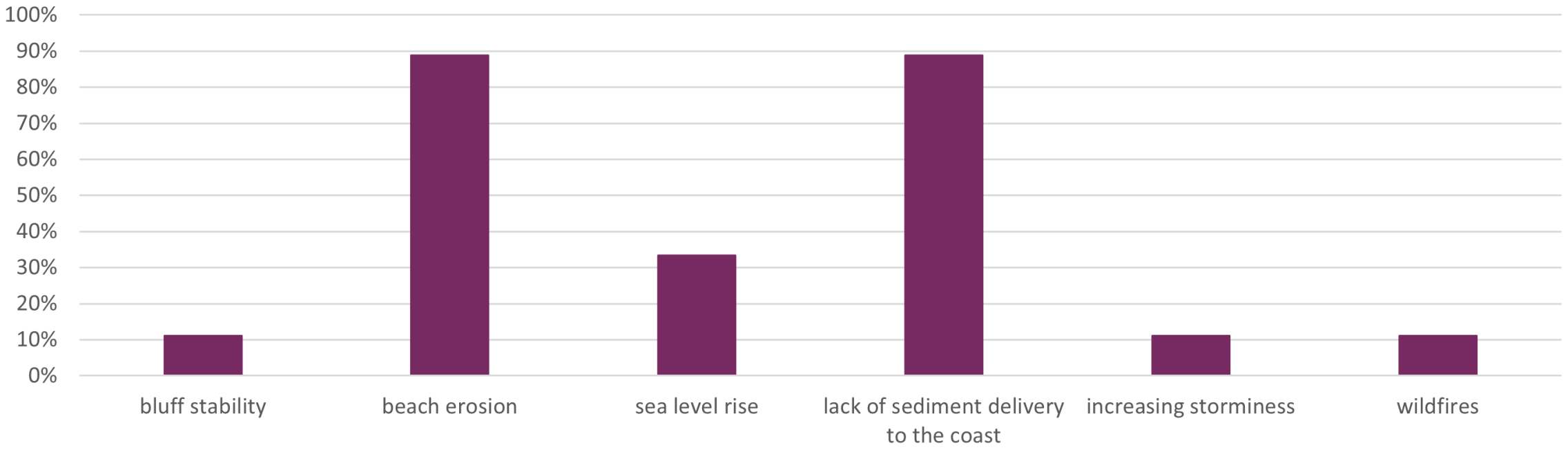
- Cost Estimates, Economic Analysis, Funding, and Prioritization
- Develop Draft Plan
- Final Plan and Draft Cooperative Agreements

Meeting Objectives

- Comply with grant conditions (e.g., Stakeholder engagement meeting)
- Overview of project development process
- Present results of stakeholder engagement surveys
- Solicit stakeholder input on erosion causes, problem area, governance, and additional stakeholders

Survey Results Summary

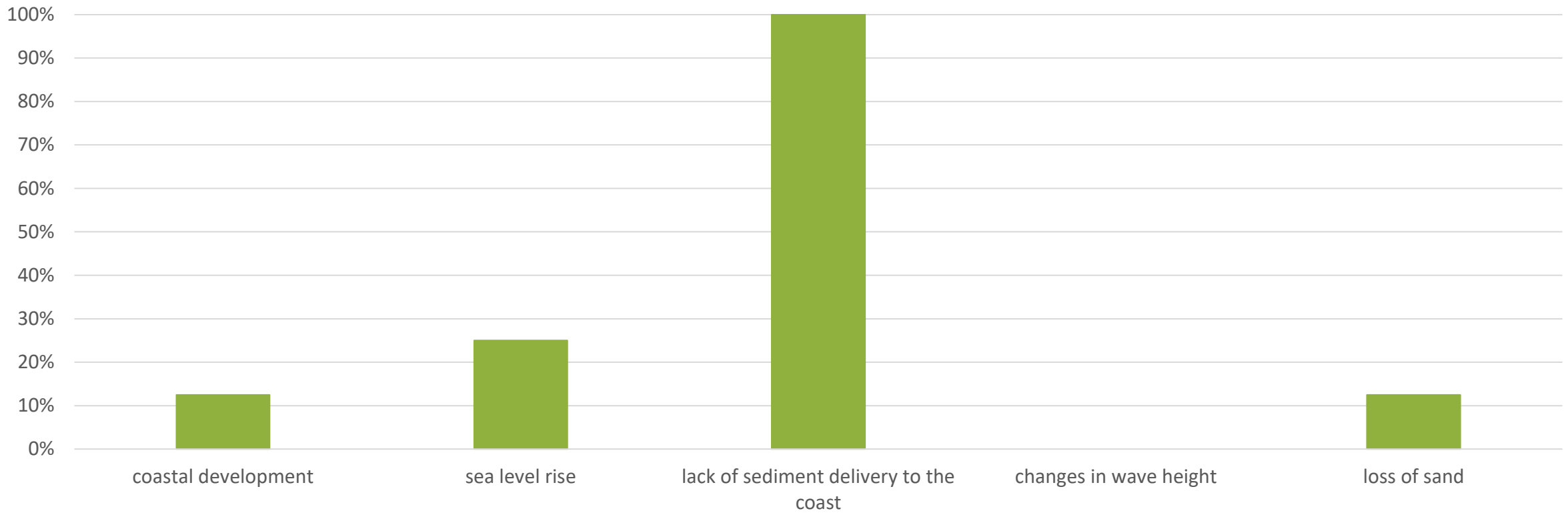
Current and Historical Threats



- Top threats identified by the stakeholders:
  - **Beach erosion** (88.9%)
  - **Lack of sediment delivery to the coast** (88.9%)

* Percentages are based on n=9

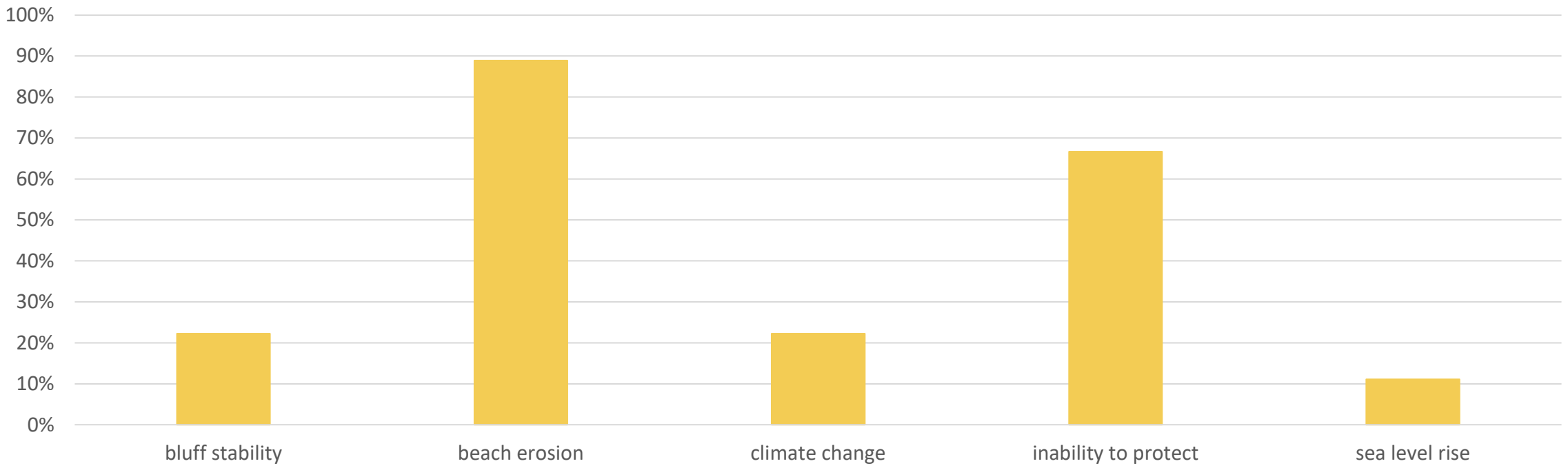
Causes of Current and Historical Threats



- Top cause identified by the stakeholders:
  - **Reduction of sediment delivery to the coast** (100% of stakeholders)

* Percentages are based on n=9

Future Threats

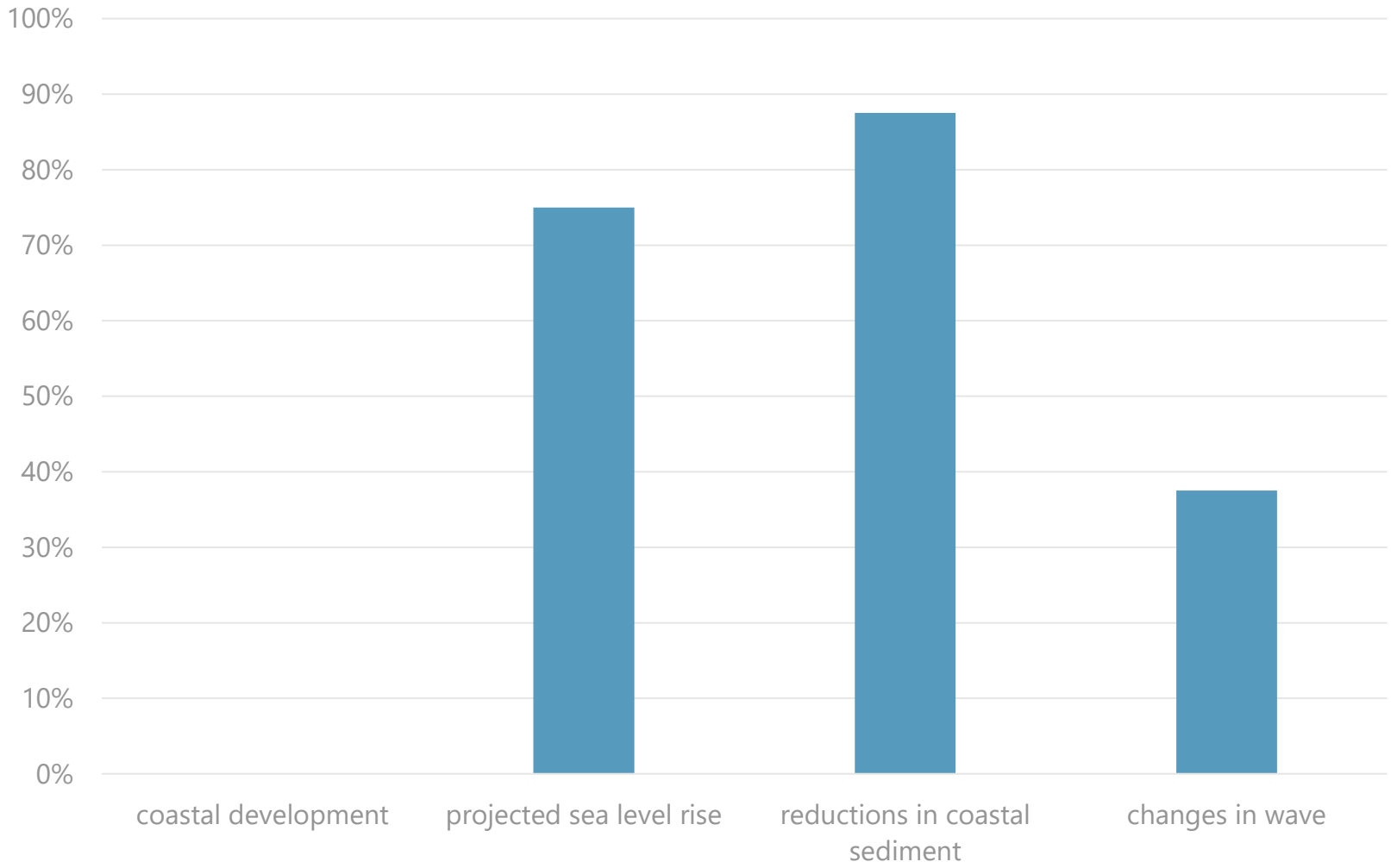


- Top threats identified by the stakeholders:
  - **Beach erosion** (88.9%* of stakeholders)
  - **Inability to protect** (66.7%* of stakeholders)

* Percentages are based on n=9

Causes of Future Threats

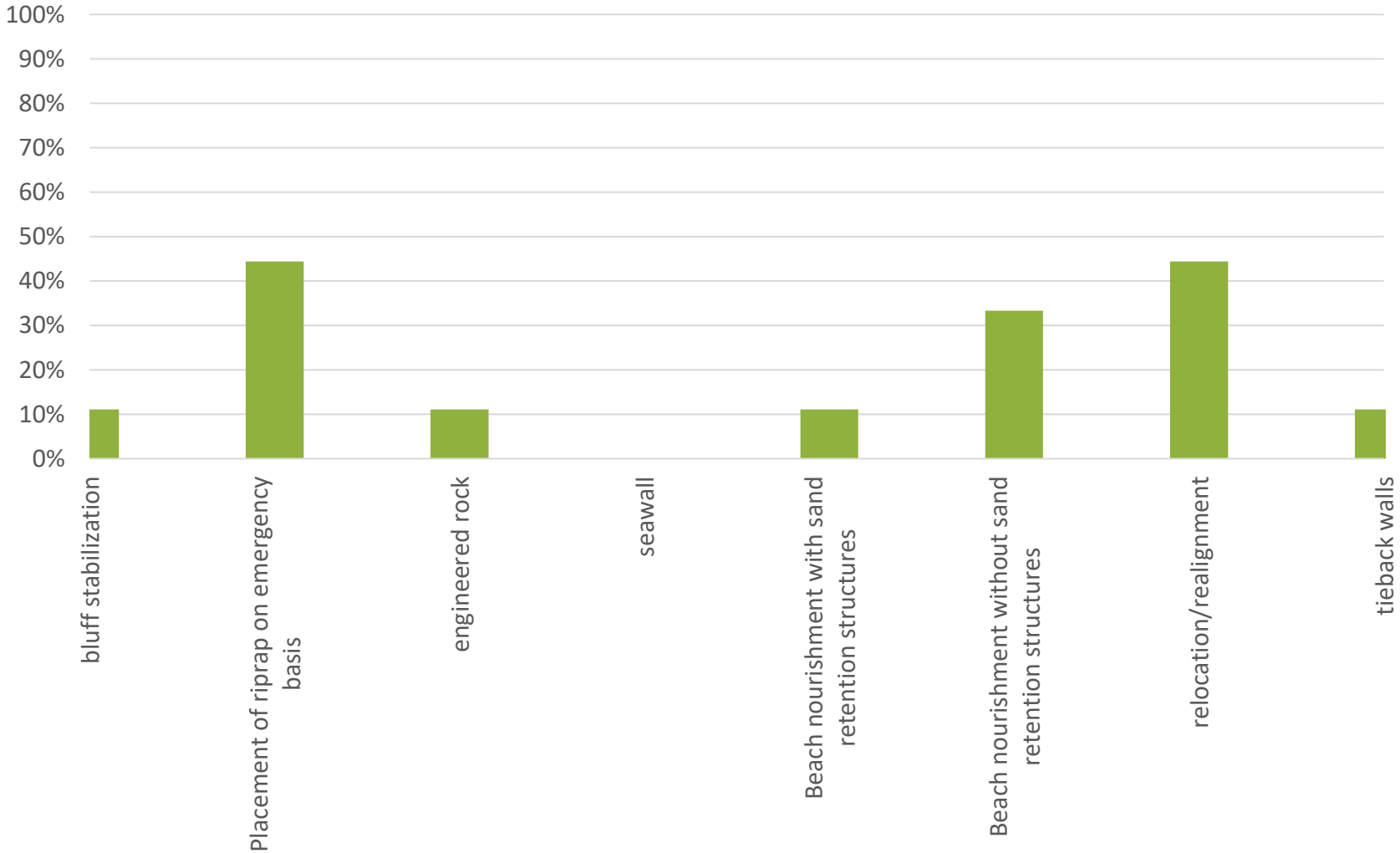
- Top threats identified by the stakeholders:
  - **Projected sea level rise** (77.8%* of stakeholders)
  - **Reductions in coastal sediment** (88.9%* of stakeholders)



* Percentages are based on n=9

Remedial Measures

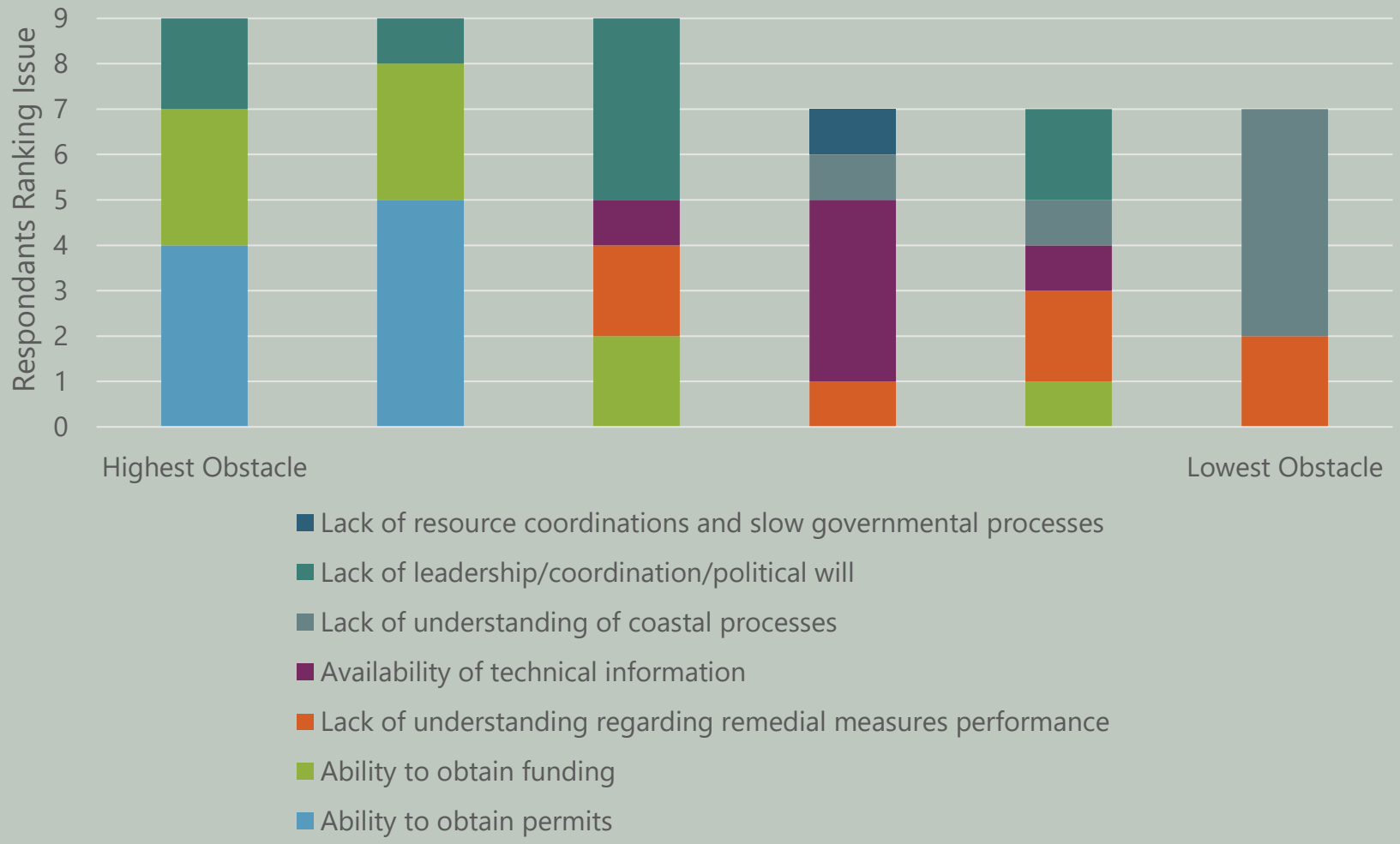
- Top measures identified to address these threats:
  - **Placement of riprap** (44.4% of stakeholders)
  - **Relocation and realignment** (44.4%* of stakeholders)



* Percentages are based on n=9

Obstacles Most Cited by Stakeholders

- Top obstacles to implementing sea level rise adaptation measures:
  1. **Ability to obtain permits**
  2. **Ability to obtain funding**
  3. **Lack of leadership/ coordination/political will**



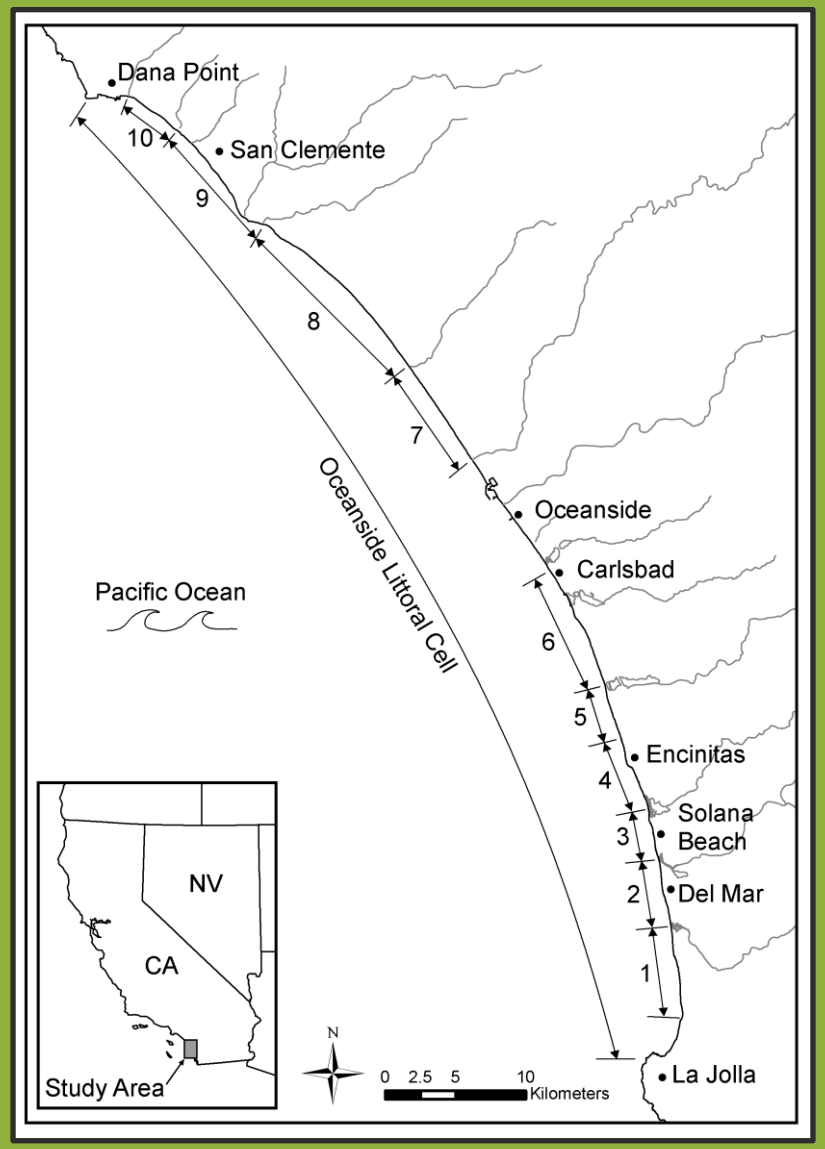
*Percentages are based on n=9
**City of Dana Point and Capo Bay District only ranked top 3 obstacles

Survey Responses with Zero Selections

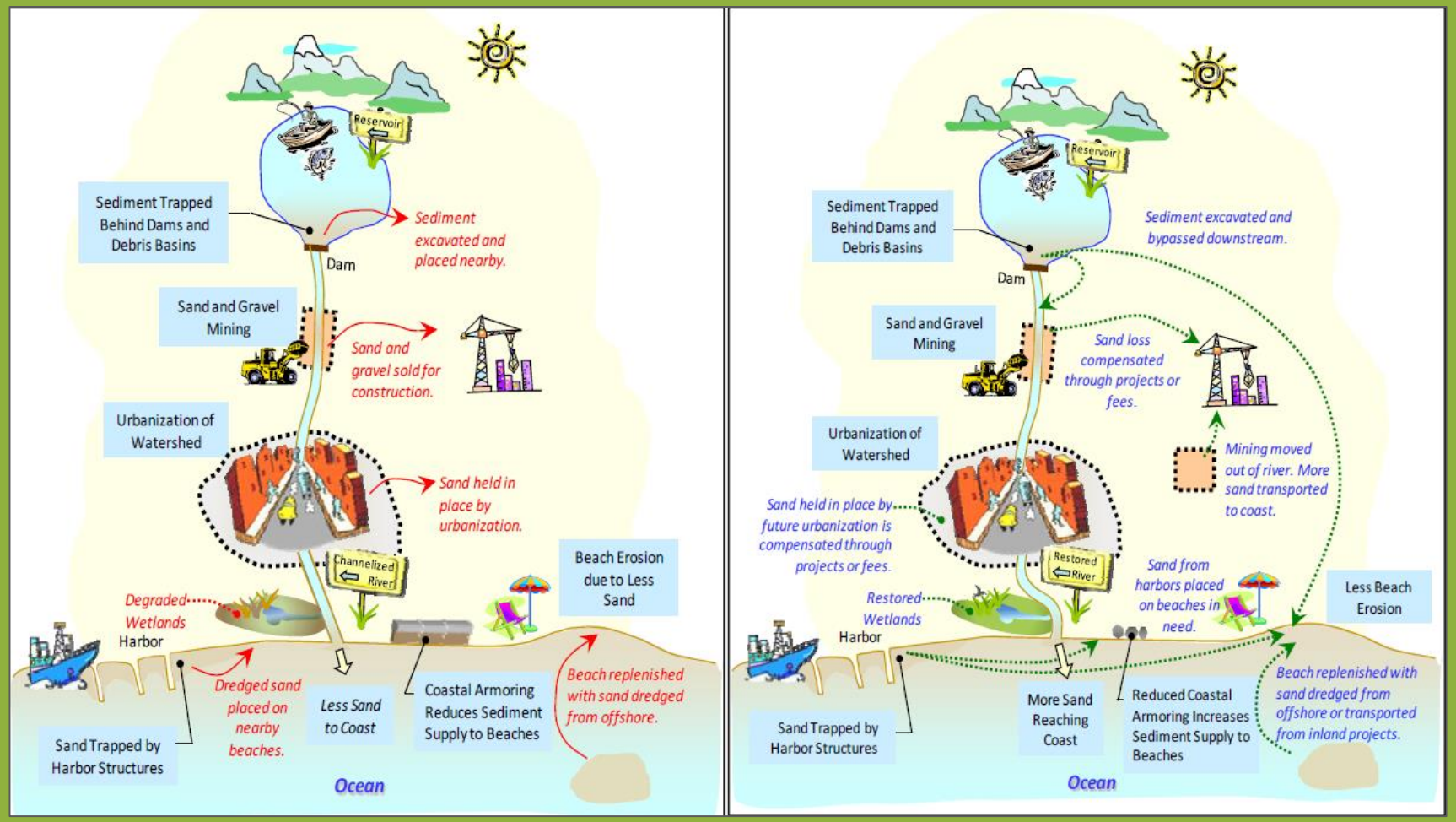
- **No respondents** identified:
  - **Changes in wave height, frequency, and direction** as a top cause of current/historical threats to property or assets
  - **Coastal development** as a top cause of future threats to property or assets
  - **Seawall** as a remedial measure to address the threats to property or asset

Causes of Erosion

- Natural Factors
- Human Factors



Sediment Management



Coastal Area Delineations and Problem Areas

LEGEND:

- State
- County
- City
- Private
- Metrolink

Regional Beach Erosion

- Beach erosion across entire littoral cell
  - Excludes Dana Point Harbor
- Waves reach:
  - Metrolink track
  - Residential development
- System-wide beach narrowing
- Requires system-wide approach to address

Doheny State Beach

- Beach Erosion
  - Loss of beach width
  - Loss of sand increasing exposed cobble
- Damage
  - Parking lots
  - Bike path
  - Palm trees
- Focused protective rock revetment

Capistrano Beach

- Beach erosion
- Infrastructure Damage
  - Boardwalk
  - Ball Court
  - Restroom
  - Parking Lot
  - Coastal Trail
  - Seawall

Capistrano Bay District

- Beach erosion
- Impacts to residential structures
- North extent access provided through Capistrano Beach
  - reliance on County maintaining Capistrano Beach
- Individual home protective structures vary

Shorecliffs Beach Club

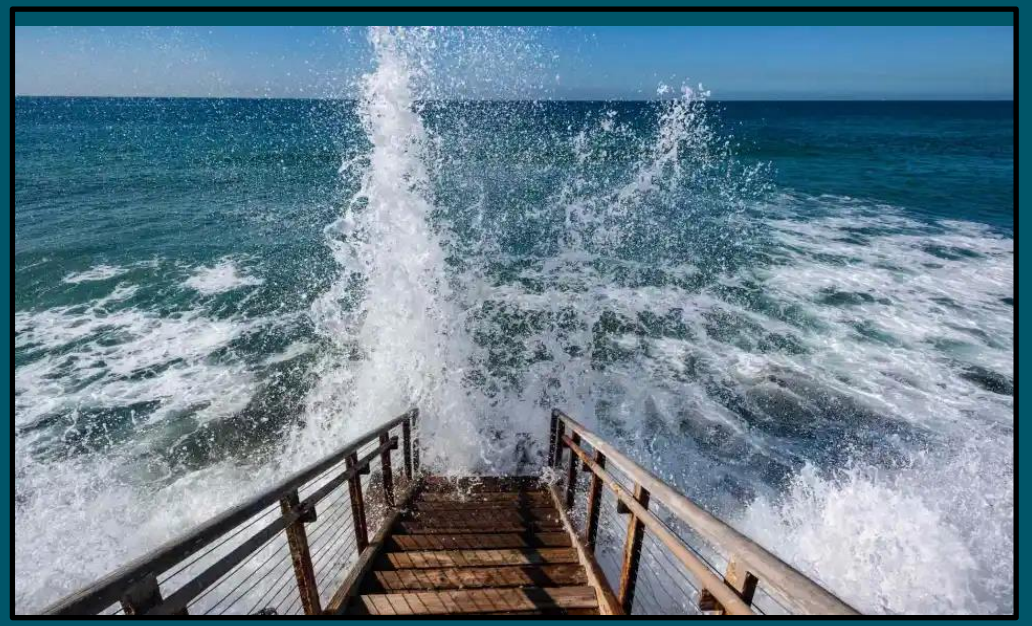
- Impacts to structure
- Impaired Access

Capistrano Shores

- Beach erosion
- Impacts to residential structures

San Clemente Beaches

- Beach erosion up to railroad revetment or seawall
- Access tunnels eroded during high tides
- Metrolink shut-downs due to waves
  - Temporary protection by rock placement
  - Need to relocate or restore sediment
- Parking lot flooding at the San Clemente State Beach
- Pier exposed to high surf

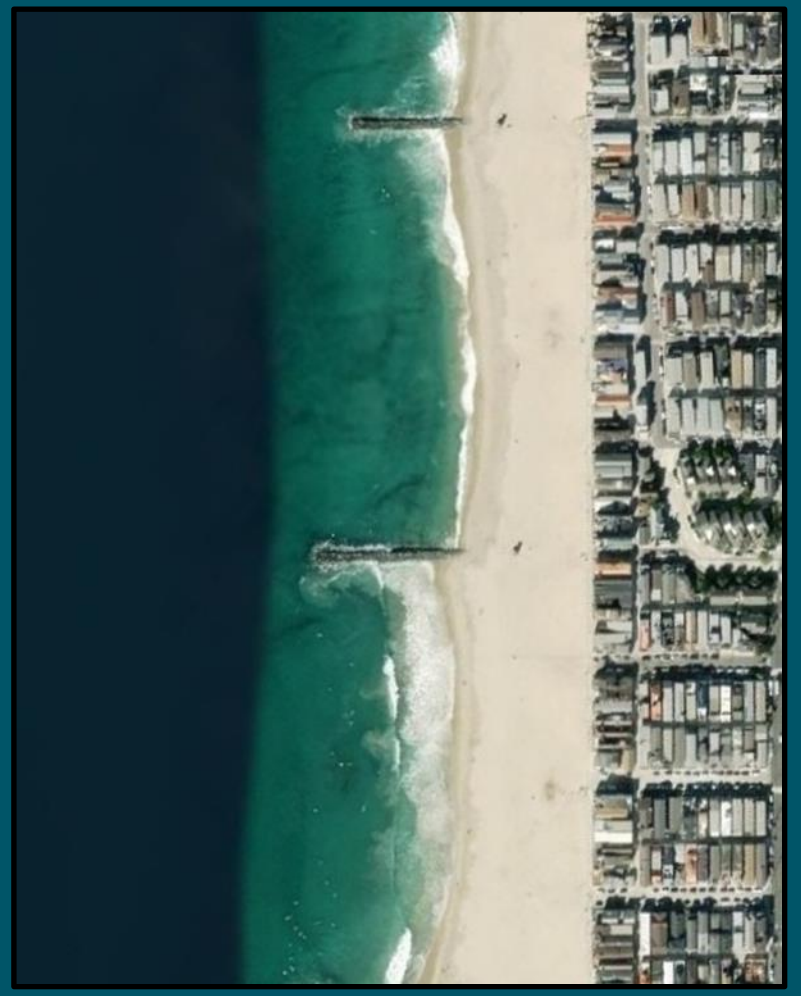


Cyprus Shores and Cotton Point

- Recent movement of the bluff has caused infrastructure damage
  - HOA parking lot
  - Roads
  - Utilities
- Residential property damage
  - Cracking in floors and ceilings
- Cracking and slope failure
  - Result of coastal erosion along tail of the bluff
  - Lack of sand on beach below believed to be the primary cause

Potential Solutions and Funding

- Beach nourishment without retention structures
- Beach nourishment with retention structures
- Offshore multipurpose reef
- Funding Sources
  - Federal
  - State
  - Local
  - Private



Governance Models

- Joint Powers Authority
  - SANDAG
  - BEACON
- GHAD
  - Broad Beach
- Cooperative Agreement
  - Dare County (North Carolina)
- Government Agency Led
  - South Orange County Watershed Management Area

Stakeholder Engagement Process

- Stakeholder group roles and responsibilities
- Big picture stakeholder engagement schedule

Next Steps and Discussion

March 21, 2022

- Stakeholder Meeting

Spring 2022

- Further outreach and engagement
- Analysis and research
- Draft agreement outlines

Summer 2022

- Stakeholder Meeting

Fall 2022 / Early 2023

- Draft plan development
- Further outreach and engagement

Spring 2023

- Final Plan Developed
- Stakeholder Meeting

Appendix C
Information Regarding July 2022 Meeting

Meeting 3 Attendee List

Organization	Name	Email
Anchor QEA	Adam Gale	agale@anchorqea.com
	Delaney Inman	dinman@anchorqea.com
	David Cannon	dcannon@anchorqea.com
	Makenna Brown	mbrown@anchorqea.com
California Coastal Commission	Brittney Cozzolino	brittney.cozzolino@coastal.cc.gov
Caltrans	Scott Shellet	scott.shelley@dot.ca.gov
Capistrano Bay District	Donal S. Russell	drussell@capobay.org
	Leslea Meyerhoff	lealea.meyerhoff@att.net
Capo Shores	Eric Anderson	eanderson@caposhores.com
City of Dana Point	Matthew Kunk	mkunk@danapoint.org
	Jimmy Armenta	jarmenta@danapoint.org
City of Laguna Beach	Marc Wiener	mweiner@lagunabeachcity
City of San Clemente	Kiel Koger	kogerk@san-clemente.org
	Amelia Weinstein	aweinstein40@gmail.com
	Jorine Campopiano	campopianoj@san-clemente.com
	Cecilia Gallavdo-Daly	gallavdo-dalyc@san-clemente.org
	Samantha Wylie	wylies@san-clemente.org
	Chris Duncan	duncanc@san-clemente.com
	Tim Brown	timbrown@san-clemente.org
Coastal Commission	Dani Ziff	dani.ziff@coastal.ca.gov
Cyprus Shores Community Association	Suzie Whitelaw	suziewhitelaw@gmail.com
	Michelle Brochs	michellemariebrochs@gmail.com
Dana Point High School	Keith Johannes	kjohannes1@coz.net
Gabrielino-Shoshone Tribal Council	Gabrielle Crowe	gabrielle@ballonu.org
OC Parks	Dave Hanson	dave@jaxbicycles.com
	Natalia Gaerlan	Natalia.Gaerlan@ocparks.com
	Susan Brodeur	susan-broduer@ocparks.com
	Sheila Cedervall	sheila.cedervall@ocparks.com
OC Public Works	Ashley Tarroja	ashley.tarroja@ocpq.com
OCTA	Alison Army	aarmy@octa.net
	Lauren Sato	lsato@octa.net
South Coast Water District	Rick Erkeneff	--
	Denise Erkeneff	--
State Parks	Riley Pratt	rileypratt@parks.ca.gov
University of California, Irvine	Brett Sanders	bsanders@uci.edu

Notes:

Caltrans: California Department of Transporation

OC: Orange County

OCTA: Orange County Transportation Authority

9700 Research Drive
Irvine, California 92618
949.347.2780

ANCHOR QEA

Memorandum

August 25, 2022

To: Susan M. Brodeur, PE, and Natalia Gaerlan; OC Parks

From: David Cannon, PE, Adam Gale, and Delaney Inman; Anchor QEA, LLC

Re: South Orange County Regional Coastal Resilience Strategic Plan – July 6, 2022, Meeting Summary

Introduction

The purpose of this memorandum is to summarize the South Orange County Regional Coastal Resilience Strategic Plan's stakeholder input received during the July 6, 2022, Stakeholder Meeting at OC Sailing and Events Center. This meeting's objective was to comply with the grant requirement to develop a regional, collaborative strategic plan to facilitate implementation of regional shoreline management activities to address chronically eroding shorelines in the southern portion of Orange County. To achieve this goal, Orange County Parks (OC Parks) and Anchor QEA, LLC, solicited stakeholder input on projects and programs, governance methods, and funding mechanisms that could potentially be included in the final plan.

Meeting Structure and Activity

For the activities designed for this meeting, the stakeholders were divided into the following three groups:

1. Property Owners and Representative
2. Non-Governmental Organizations (NGOs)
3. Resource and Regulatory Agencies (Agencies)

Upon arrival, stakeholders were instructed to sit in the section of room that best describes their relationship to the plan.

In the presentation, included as Attachment A, stakeholders were provided with information on potential projects and programs, governance methods, and funding strategies being considered the framework final plan. The stakeholders were then instructed to indicate their support, neutrality, opposition, and endorsement of the various proposed elements. Anchor QEA collected this information and analyzed the results.

The stakeholder meeting attendee list is included as Attachment B.

Projects and Programs

Across all groups, the most supported plan projects and programs are multipurpose reef, sand and cobble beach, and dunes "living shoreline" (Figure A). However, all the indications of support for multipurpose reefs came from the property owners and representatives (Figure B), and the sand and cobble beach and dunes have support from NGOs as well (Figure C). The most opposed projects and programs are groins, nearshore breakwaters, and cobble beaches (Figure A). All of the indications of opposition came from the property owners (Figure B); groins and nearshore breakwaters were opposed by all groups (Figures B through D). Additionally, property owners and representatives most heavily endorsed beach nourishment without retention structures, with ten endorsements, and multipurpose reefs, with four endorsements.

In addition to indicating their level of support for each project and program element, property owners and representatives emphasized the importance of individual approaches to different problems. For example, a stakeholder from Beach Road made it clear that he is only opposed to a living shoreline at Beach Road because the narrow shoreline would prevent this from being a viable solution. The stakeholder did support a living shoreline and other locations with a wider beach. This group also supported a cobble in some but not all locations; they recognized the importance of protecting the shoreline, but they did not want to sacrifice sandy beaches and their recreational benefits and favored natural or natural-looking solutions. This group was very opposed to armoring for this reason. Additionally, the group suggested looking upstream for sand outside of the watershed to supply sand for beach nourishment projects. One stakeholder emphasized their desire to investigate habitat restoration opportunities as part of this plan.

Like the property owners and representative, NGOs spoke to a need to apply a contextual approach, and to apply different solutions for different beaches with different conditions. The group suggested that we look into implementing a transport and sand bypass project in the plan. NGOs also emphasized the importance of minimal impact to habitat and "letting the waves do the work" by allowing the littoral cell to move sand through the system naturally.

Resource and regulatory agencies highlighted the importance of considering phased retreat and "upzoning," which includes changing the zoning of a property to allow for more dense housing. They suggested that if phased retreat is implemented that roads could be transformed into sandy beaches or bike lanes. Agencies highlighted that phased retreat would be an opportunity to improve infrastructure in the region and that any phased retreat plan would be based on region-specific triggers and thresholds.

They also brought up the importance to the U.S. Army Corps of Engineers that the proposed action is the Least Environmentally Damaging Practicable Alternative and that we analyze the site-specific geologic and biological impacts of each project and program element.

Figure A
Plans and Projects – All Groups

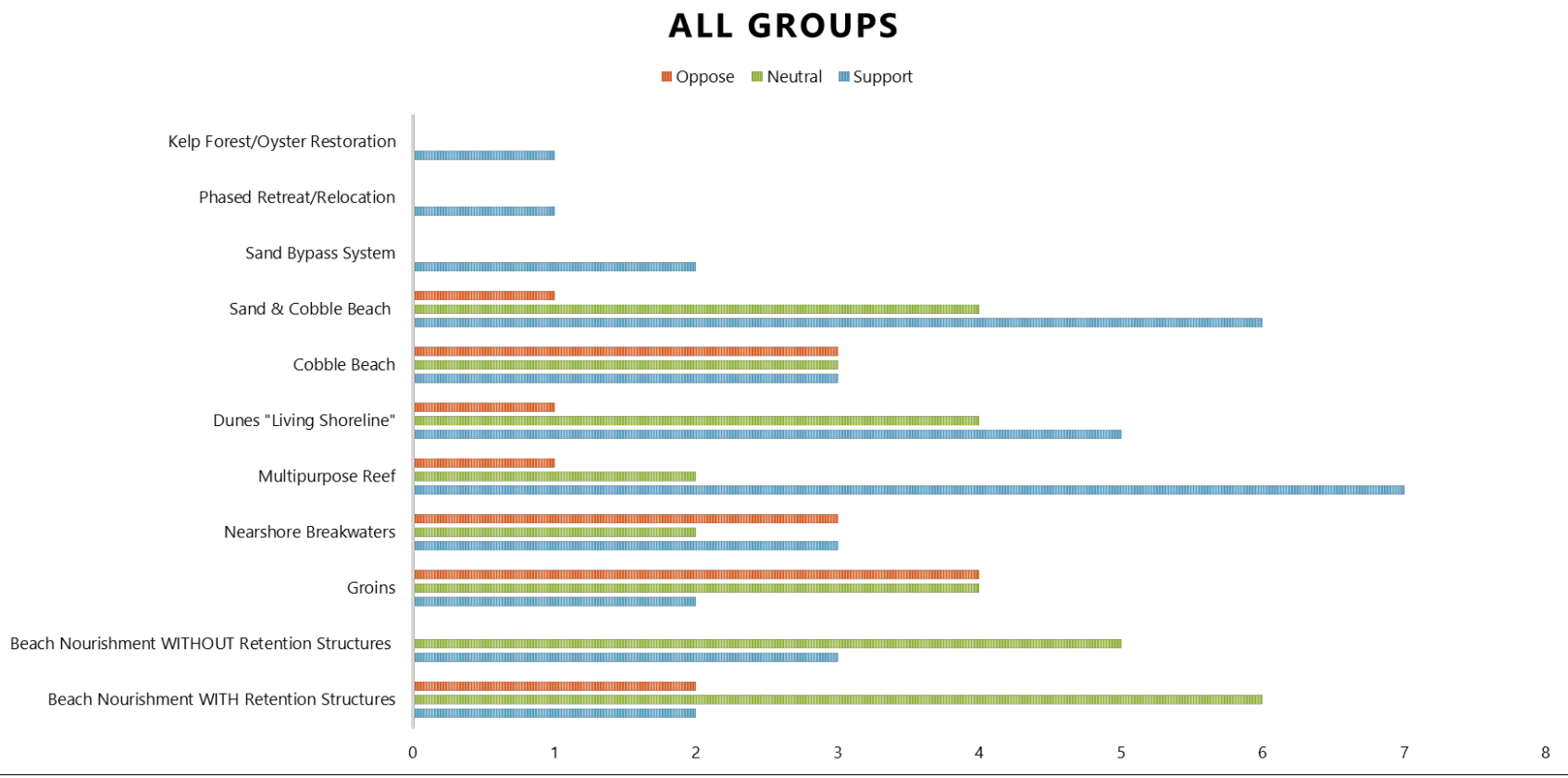


Figure B
Plans and Projects – Property Owners and Representatives

Figure C
Plans and Project – Non-Governmental Organizations

Figure D
Plans and Projects – Resource and Regulatory Agencies

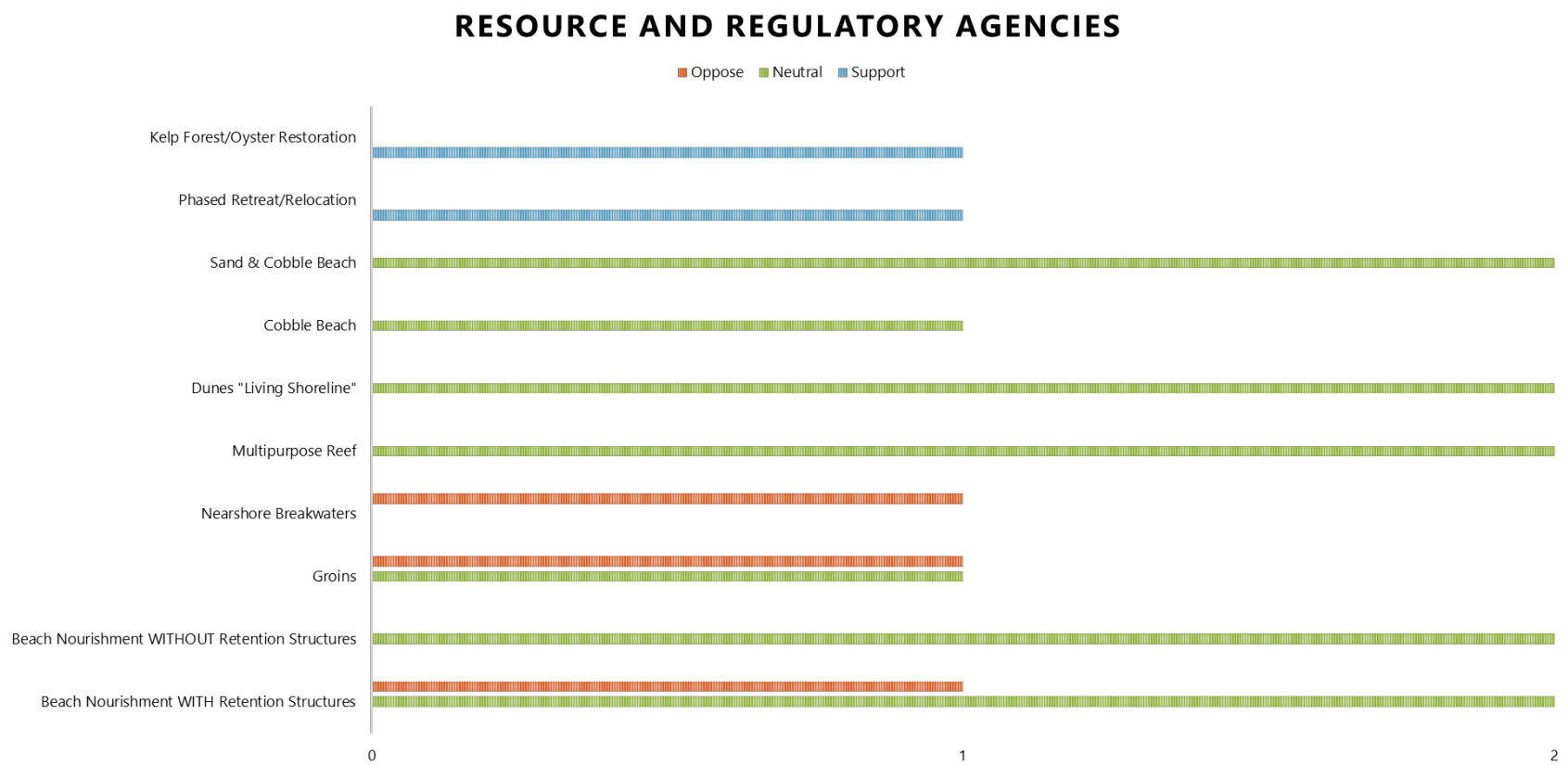
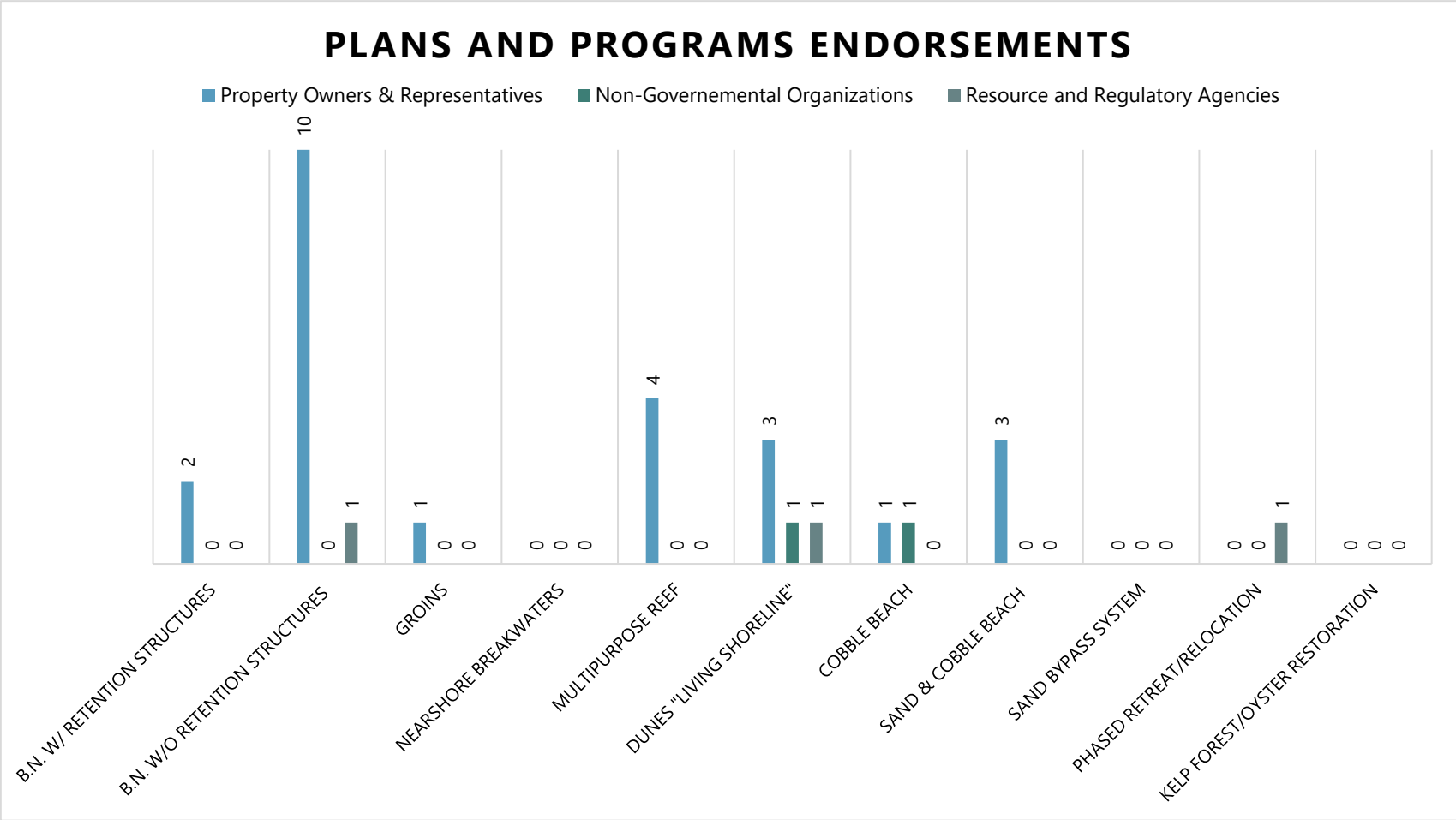


Figure E
Plans and Projects – Endorsements



Notes:
B.N.: beach nourishment
W/: with
W/O: without

Governance Methods

Across all groups, the most supported governance methods are Joint Powers Authority (JPA) and interagency meetings (Figure F). However, all the indications of support for interagency meetings came from the agencies, who also proposed the governance methods (Figure I), and the JPAs have support from NGOs as well (Figures G through I). The most opposed Governance Methods are Geologic Hazard Abatement District (GHAD; Figure F). GHADs were opposed by all stakeholder groups (Figures G through I). Additionally, property owners and representatives most heavily endorsed special districts, a governance method that they proposed, with four endorsements, and JPAs, with two endorsements (Figure J).

One property owner and representative suggested the formation of a special district. The proposed governance method would be based on Ventura County's Watershed Protection District that was founded out of the county's Flood Control District and was instrumental in identifying sand sources similar to what this group may face during subsequent design and implementation phases. The group did concede that this approach may be difficult to apply across multiple districts. The group, particularly one well-engaged stakeholder, was vehemently against a GHAD. They were concerned about the GHAD being led by one engineer and not multiple stakeholders collaborating to make decision for the region. They also were concerned about the perceived failure of Broad Beach's GHAD and did not want a similar thing to happen in this region.

Like the other stakeholder groups, agencies emphasized challenges with this plan's need to address multiple entities with different goals. They were against the implementation of a GHAD and highlighted that this method would place an undue burden on property owners in the region. Stakeholders in this group liked the idea of a Memorandum of Understanding/Memorandum of Agreement (MOU/MOA) and suggested that this group look into the San Juan Creek Watershed MOU/MOA as a good example. They were concerned about who would be the permittee for region-wide projects. They also underscored the importance of including tribal consultation during the development of the plan.

Figure F
Governance Methods – All Groups

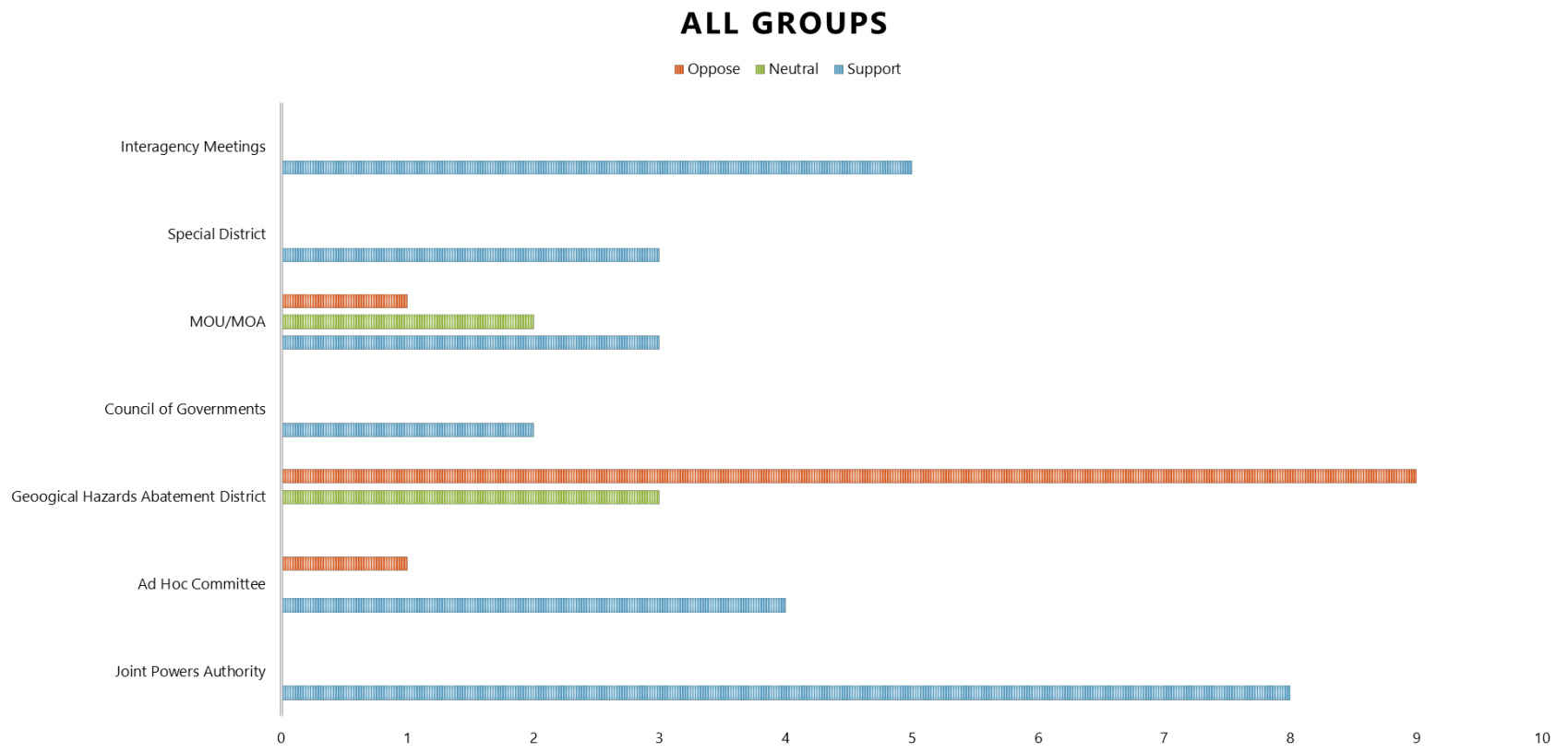


Figure G
Governance Methods – Property Owners and Representatives

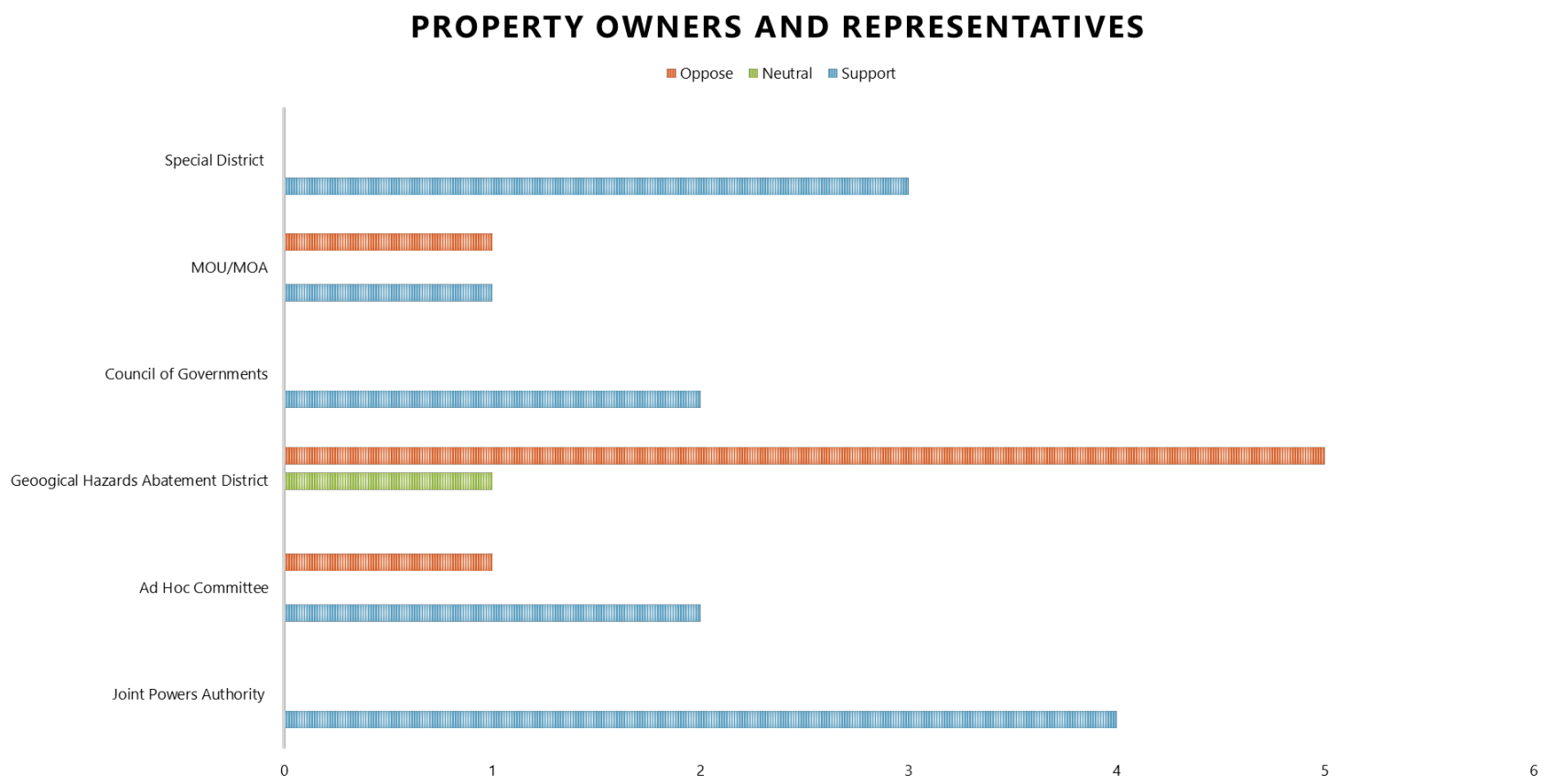


Figure H
Governance Methods – Non-Governmental Organizations

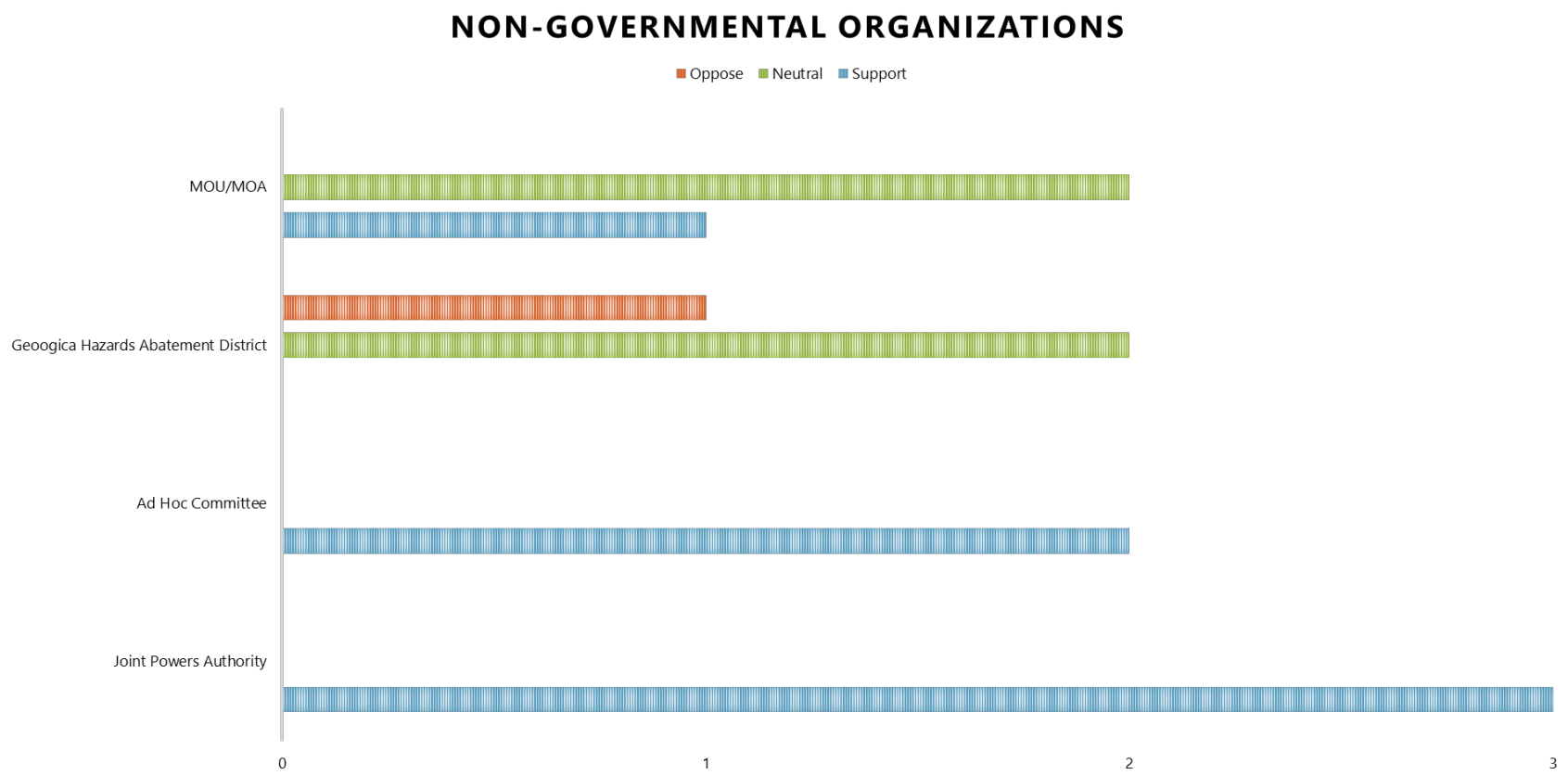


Figure I
Governance Methods – All Groups

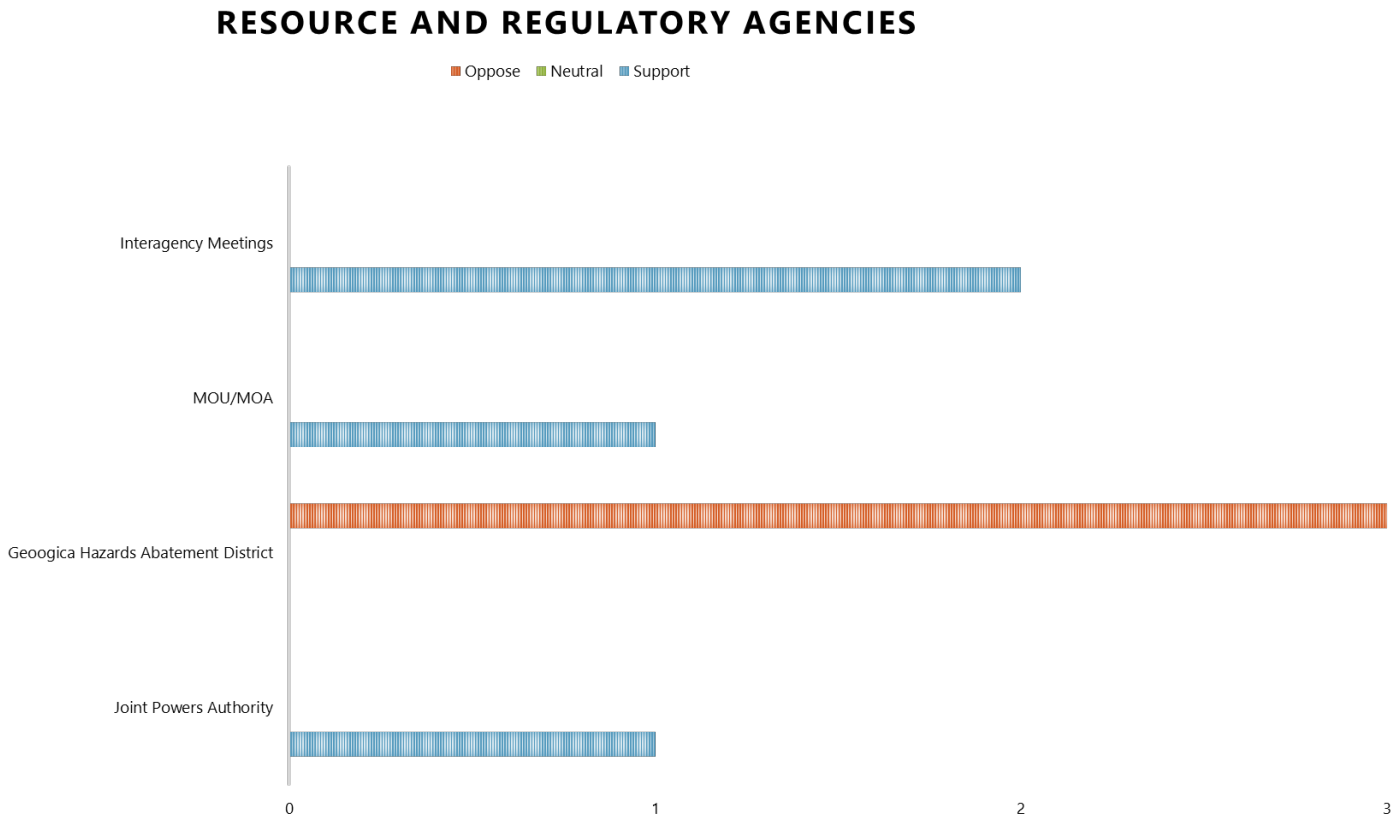
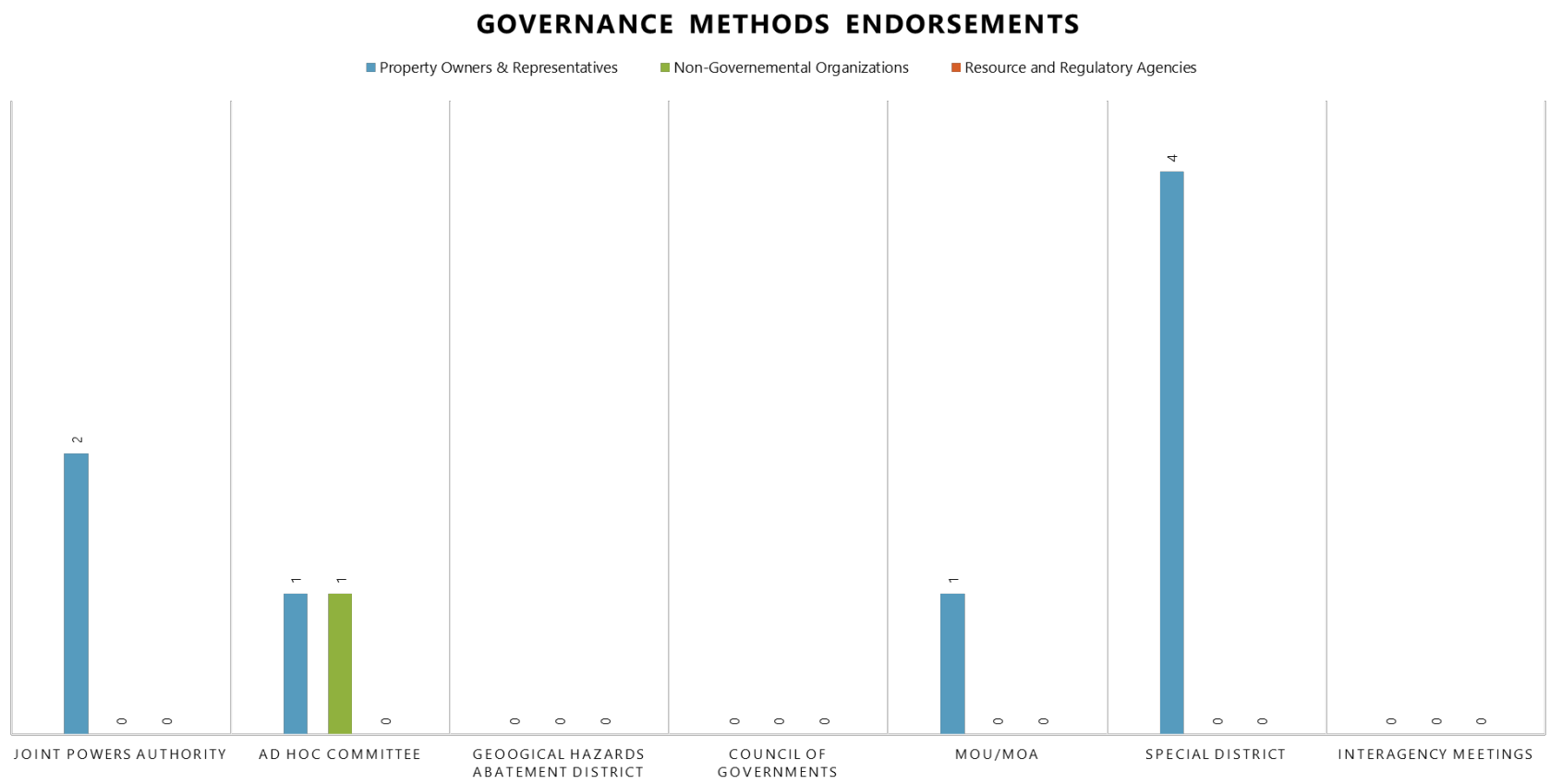


Figure J
Governance Methods – All Groups



Funding Mechanisms

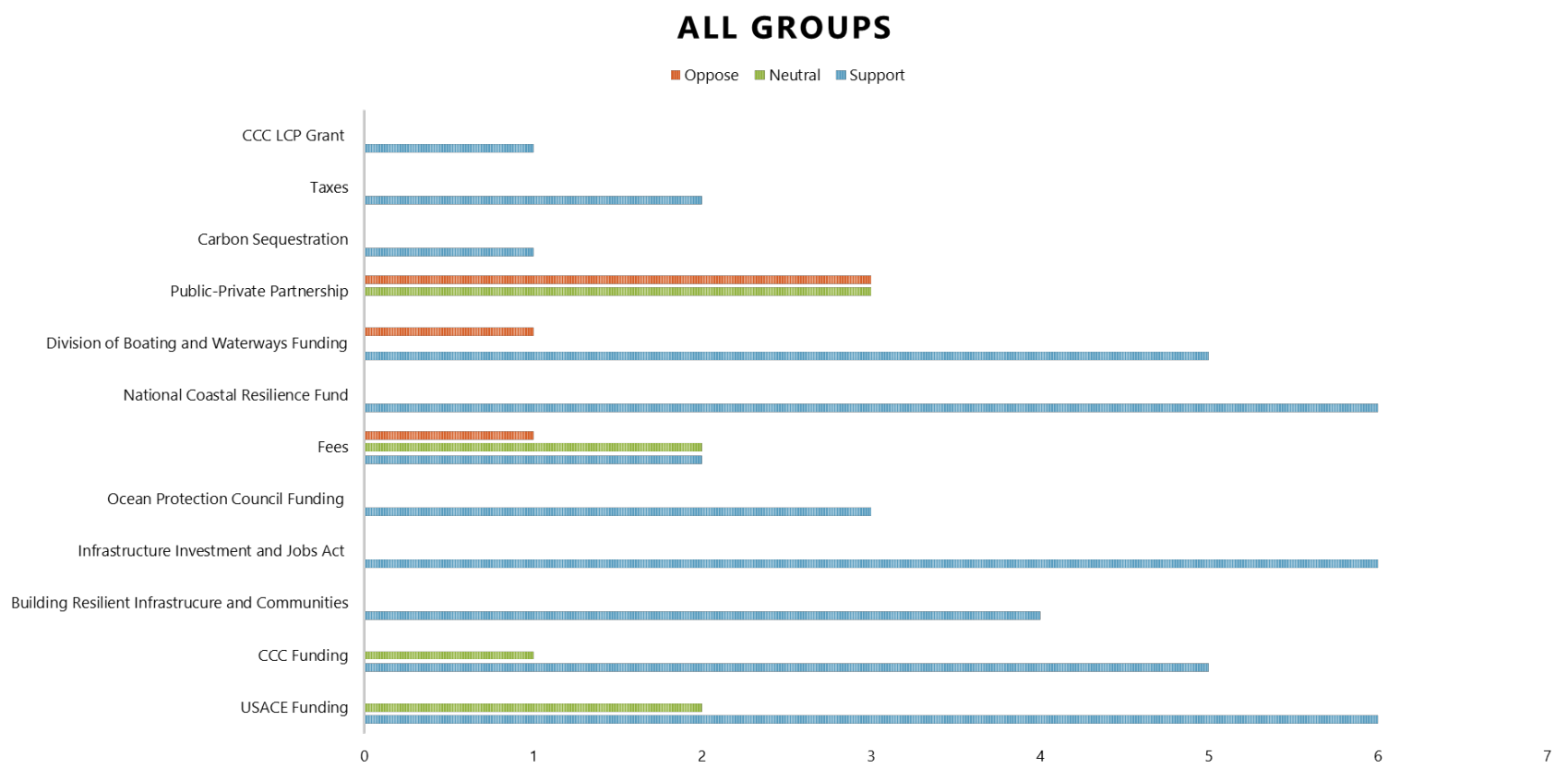
Across all groups, the most supported funding mechanism was U.S. Army Corps of Engineers funding, Infrastructure Investment and Jobs Act funding, and National Coastal Resilience Funding (Figure K). All three of these funding mechanisms are supported across all stakeholder groups (Figures L through N). The most opposed funding mechanism was public-private partnership (Figure K). Public-private partnerships were opposed by all stakeholder groups (Figures L through N). Additionally, there were endorsements for California Coastal Commission funding, Infrastructure Investment and Jobs Act funding, and Ocean Protection Council funding by property owners and representatives and NGOs. Agencies endorsed the California Coastal Commission's Local Coastal Programs Grant, a funding mechanism that they proposed (Figure O).

Property owners and representatives suggested that this group explore taxes and fees generated by others, such as development impact fees, hotel occupancy taxes, increasing bed taxes, and the Clean Ocean Utility Fee (this is a fee to property owners implemented under San Clemente's Urban Runoff Management Plan). This group suggested starting with grants but emphasized a need for a sustained funding source in the form of the aforementioned taxes and fees.

NGOs emphasized the importance of coastal access and recreation for the community and considering this no matter which funding mechanisms are used. They suggested researching the California Department of Transportation's Reconnecting Communities Pilot Program. This group also brought up mitigation funding and legal challenges to obtaining funding.

Agencies suggested using the railroad as the nexus for obtaining federal funding, specifically from the Infrastructure Investment and Jobs Act. They also highlighted the importance of nailing down project objective and the groups that will benefit from the work in order to drive the funding source. They advised looking at San Clemente's recent pilot program that was able to secure grant funding.

Figure K
Funding Mechanisms – All Groups



Notes:
CCC: California Coastal Commission
LCP: Local Coastal Programs
USACE: U.S. Army Corps of Engineers

Figure L
Funding Mechanisms – Property Owners and Representatives

Figure M
Funding Mechanisms – Non-Governmental Organizations

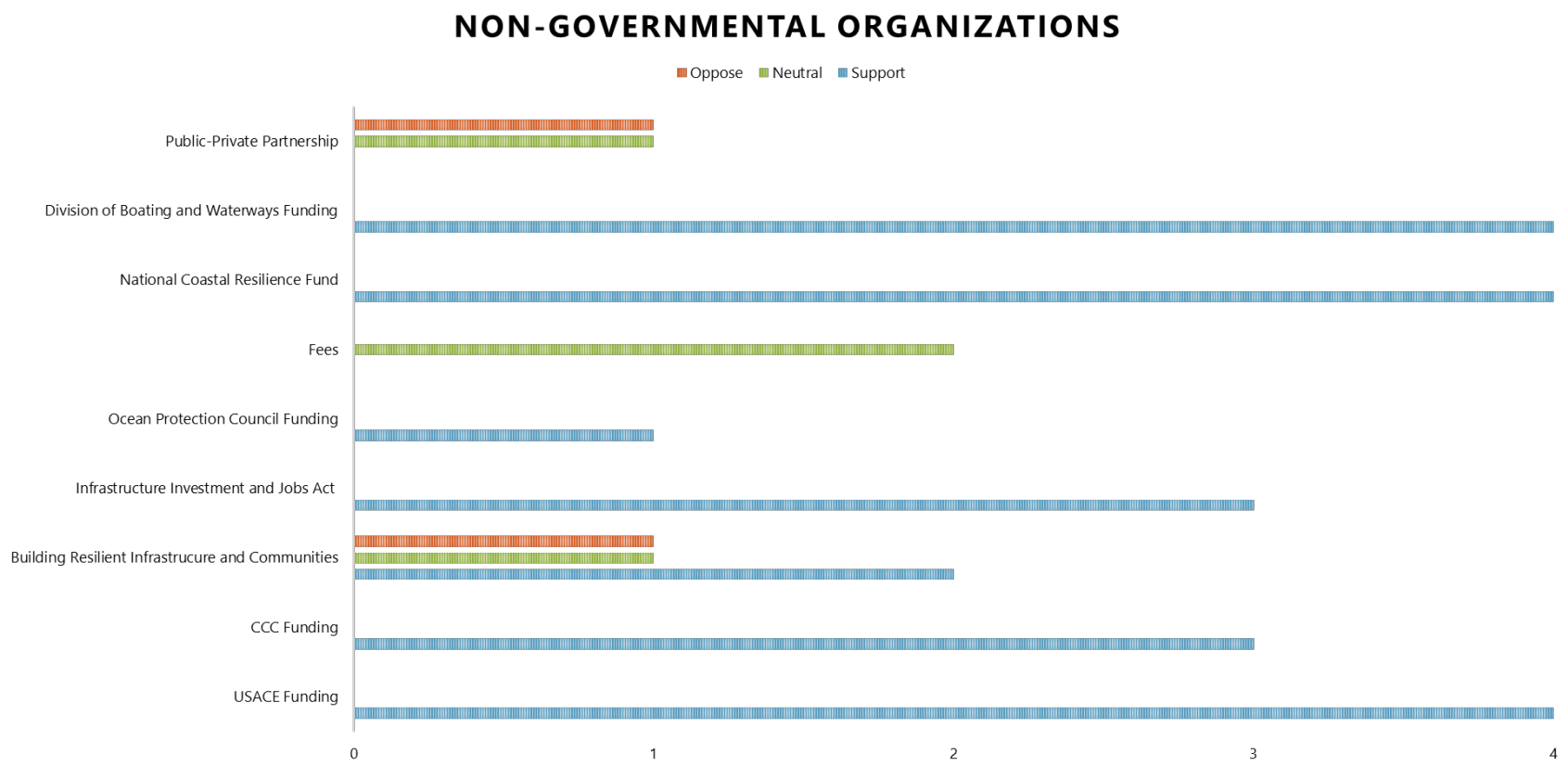


Figure N
Funding Mechanisms – Resource and Regulatory Agencies

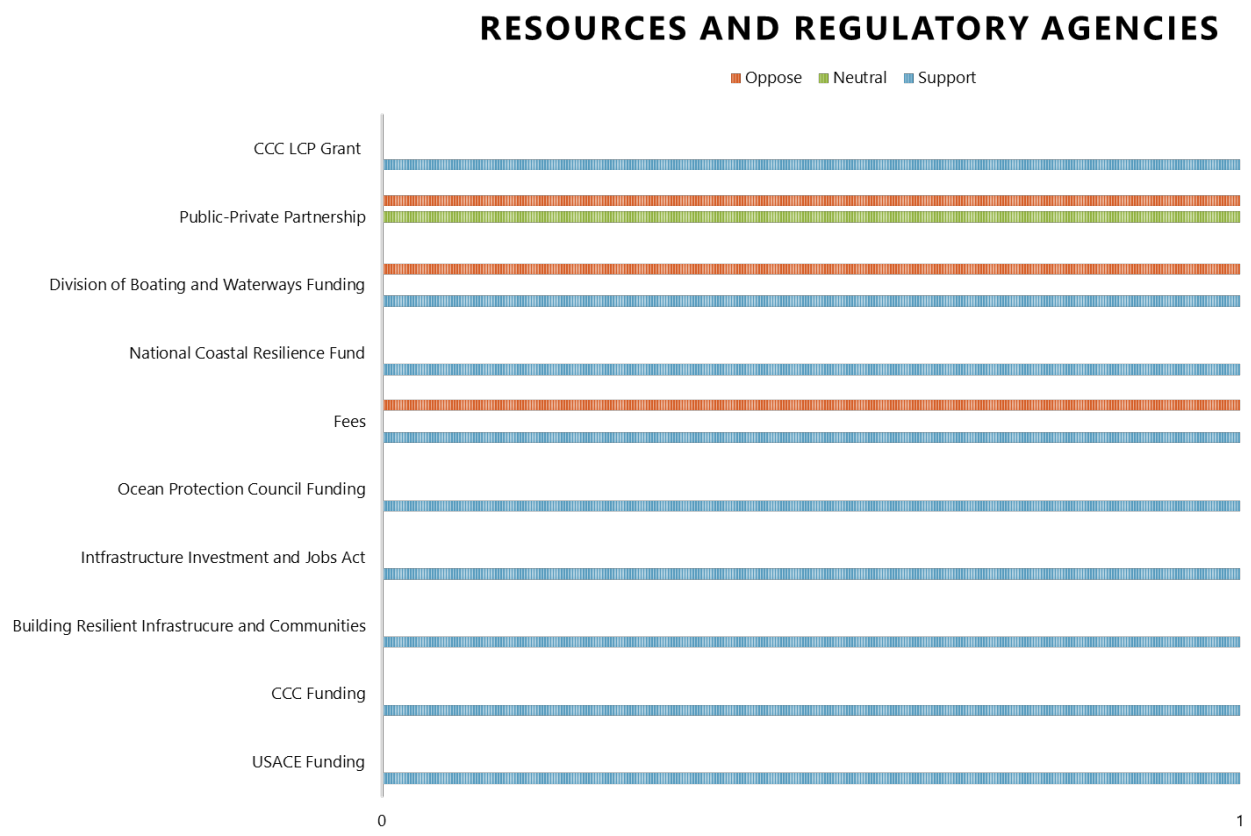
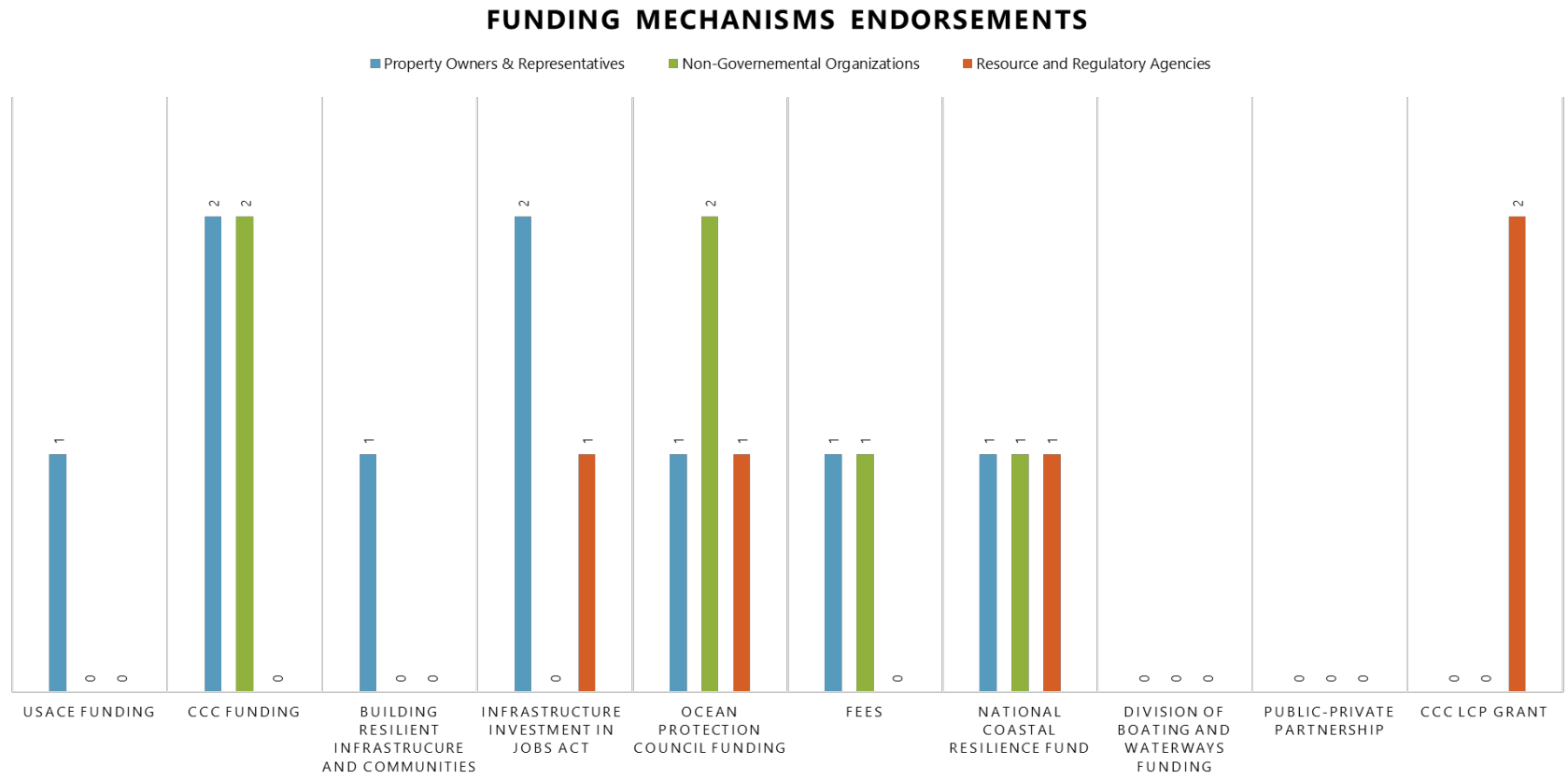


Figure O
Funding Mechanisms – Endorsements



Conclusion

The tables and information outlined in this memorandum provide a high-level outline that identifies the stakeholder preferences for various elements of the South Orange County Regional Coastal Resilience Strategic Plan. The information presented in this memorandum does not indicate the commitment of this group to any of the elements presented; it serves as a way to organize and reference stakeholder priorities in the region.

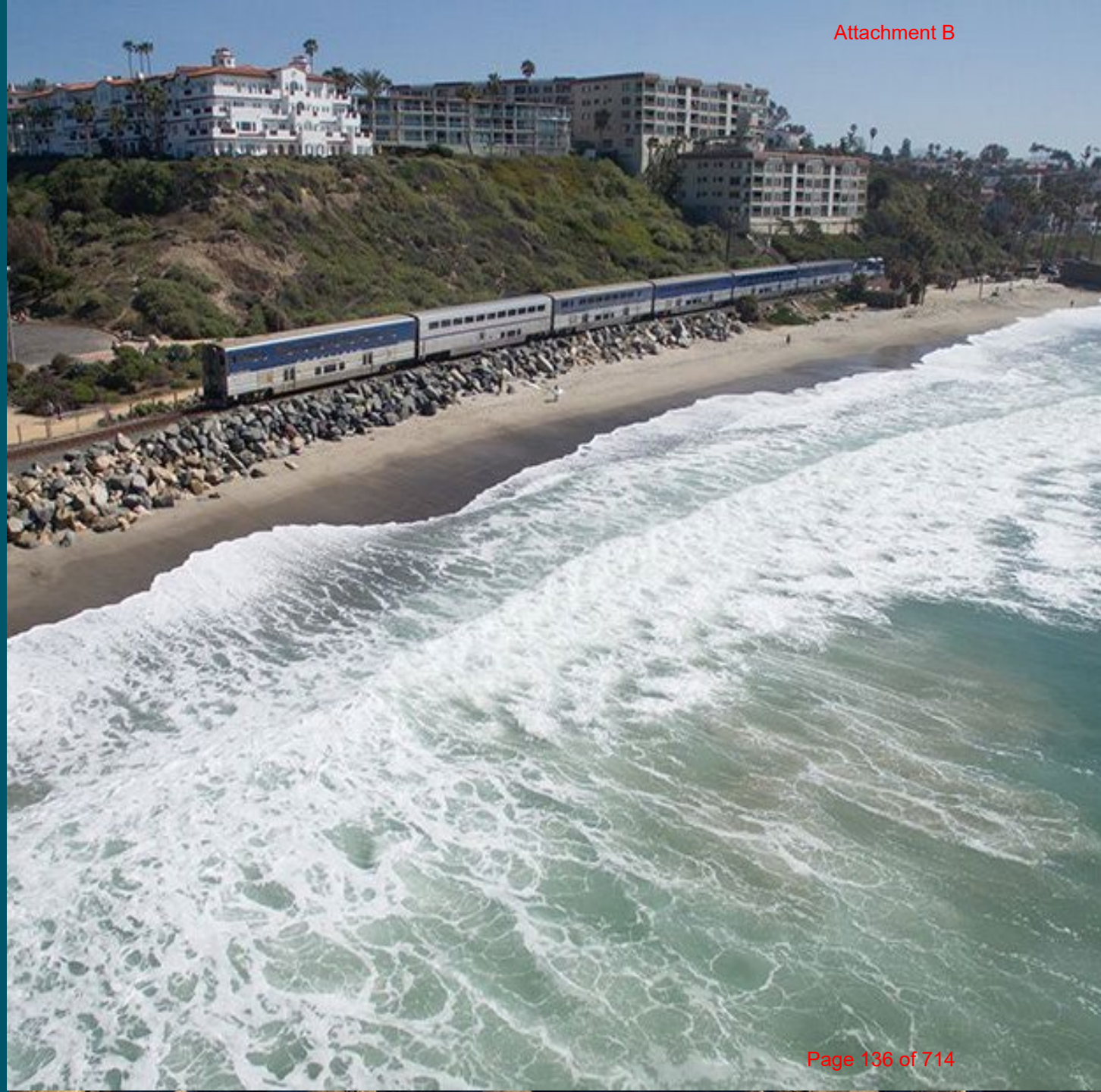
Attachment A
July 6, 2022, Stakeholder Meeting Presentation

South Orange County Regional Coastal Resilience Strategic Plan

Presented by:
David Cannon, PE
Principal Engineer, Anchor QEA

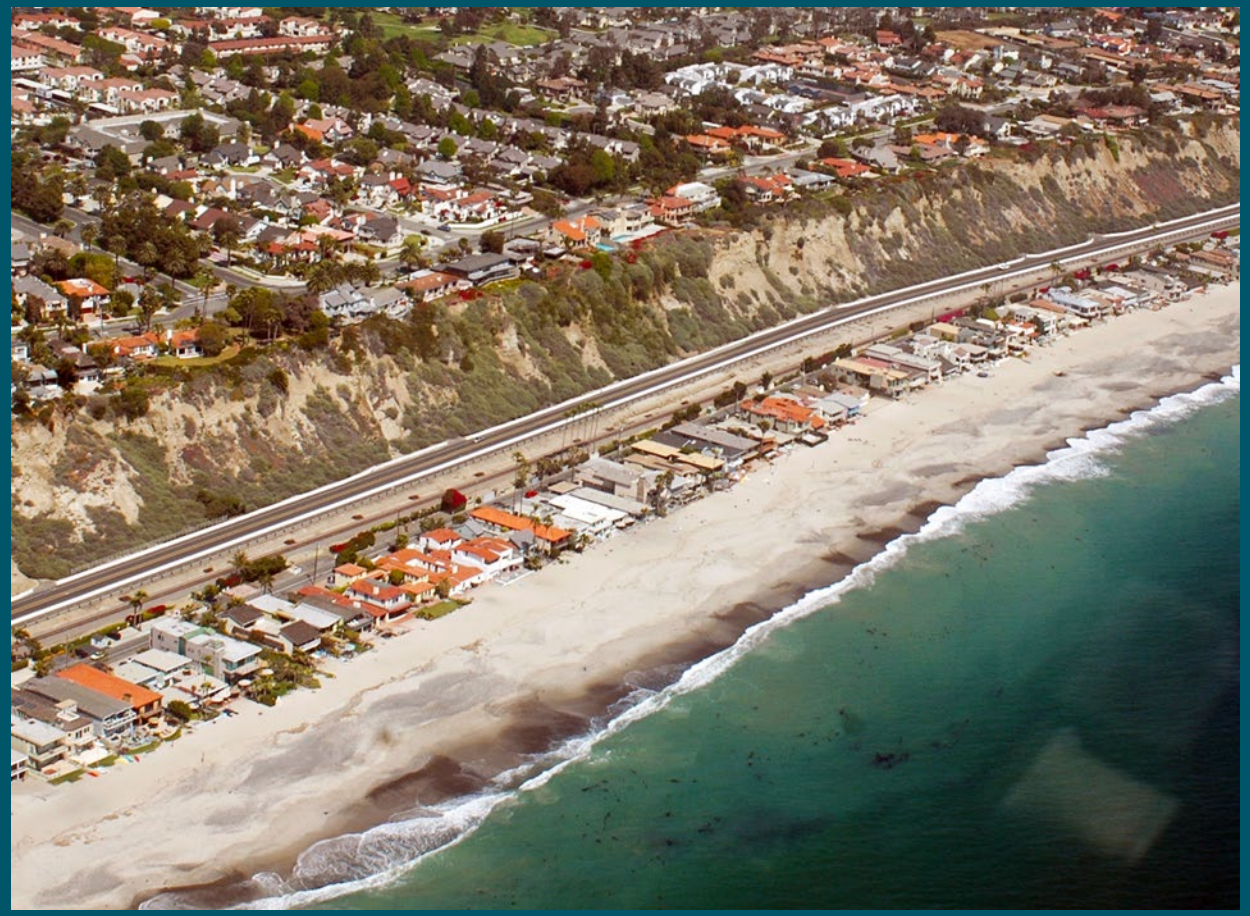
Adam Gale
Senior Manager, Anchor QEA

July 6, 2022



Schedule and Next Steps

Meeting Objectives



- Comply with grant conditions
- Review stakeholder priorities
- Summarize coastal processes
- Obtain stakeholder input
  - Projects & Programs
  - Governance Methods
  - Funding Strategies

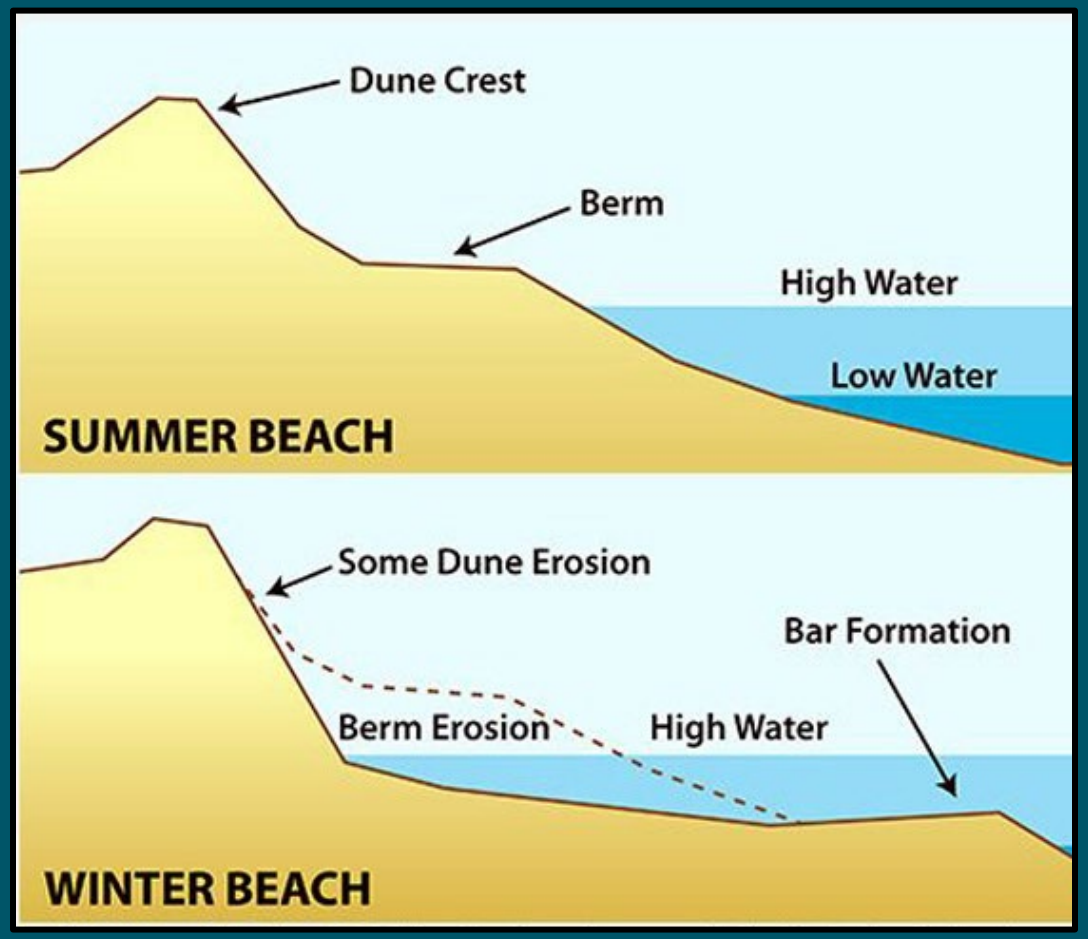
Grant Overview

- **Executed:** May 4, 2021
- **Goal: d**evelop a regional, collaborative strategic plan to facilitate implementation of regional shoreline management activities to address chronically eroding shorelines in the southern portion of Orange County
- **Main Objective:** assess, prioritize, and advance resilience opportunities to reduce the risk to residents and increase the viability of south Orange County beaches

Beach Morphology

- River flow changes impact sediment flow to beaches
- Wave climate changes impact sediment movement along beaches

Cross-shore Transport

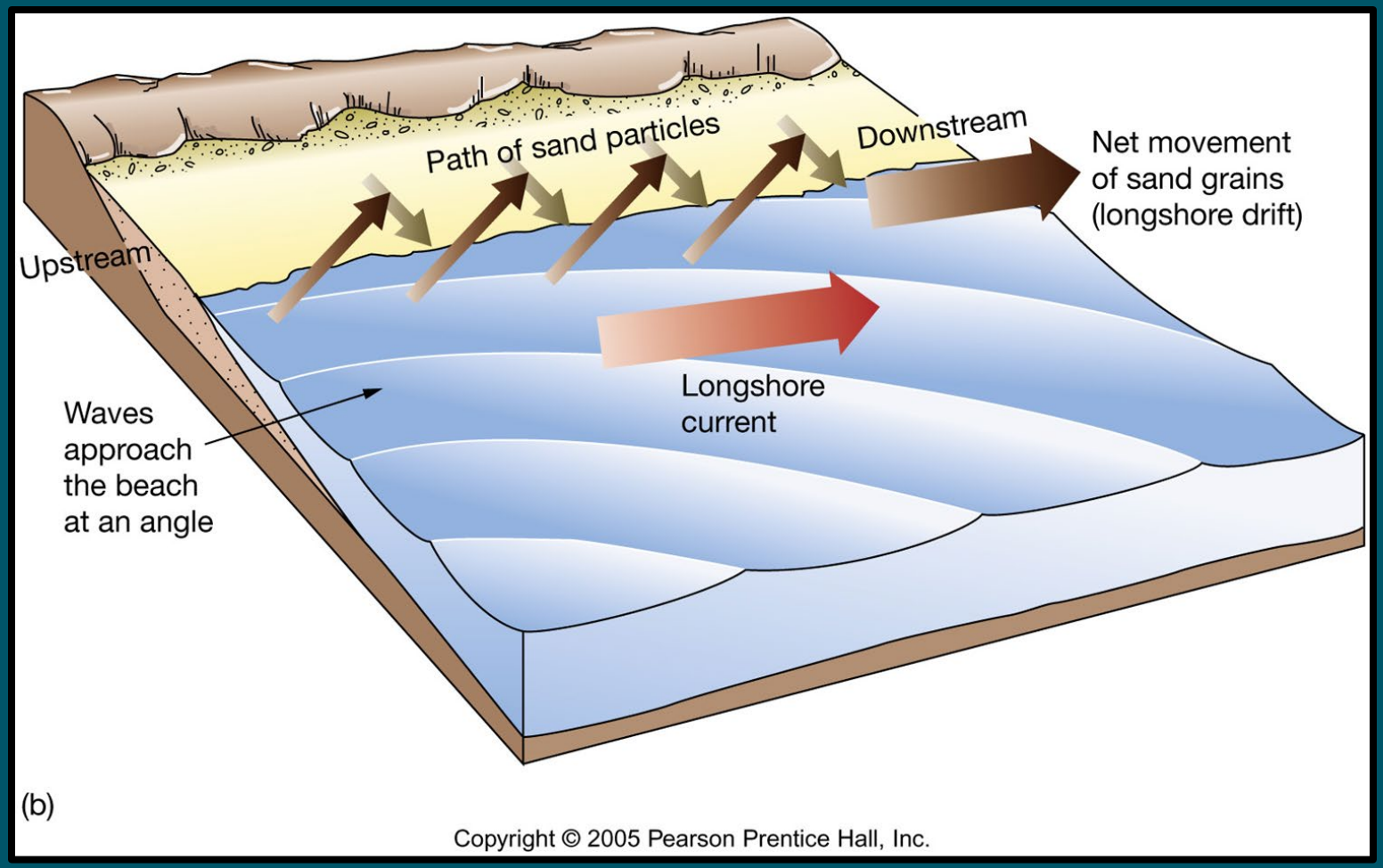


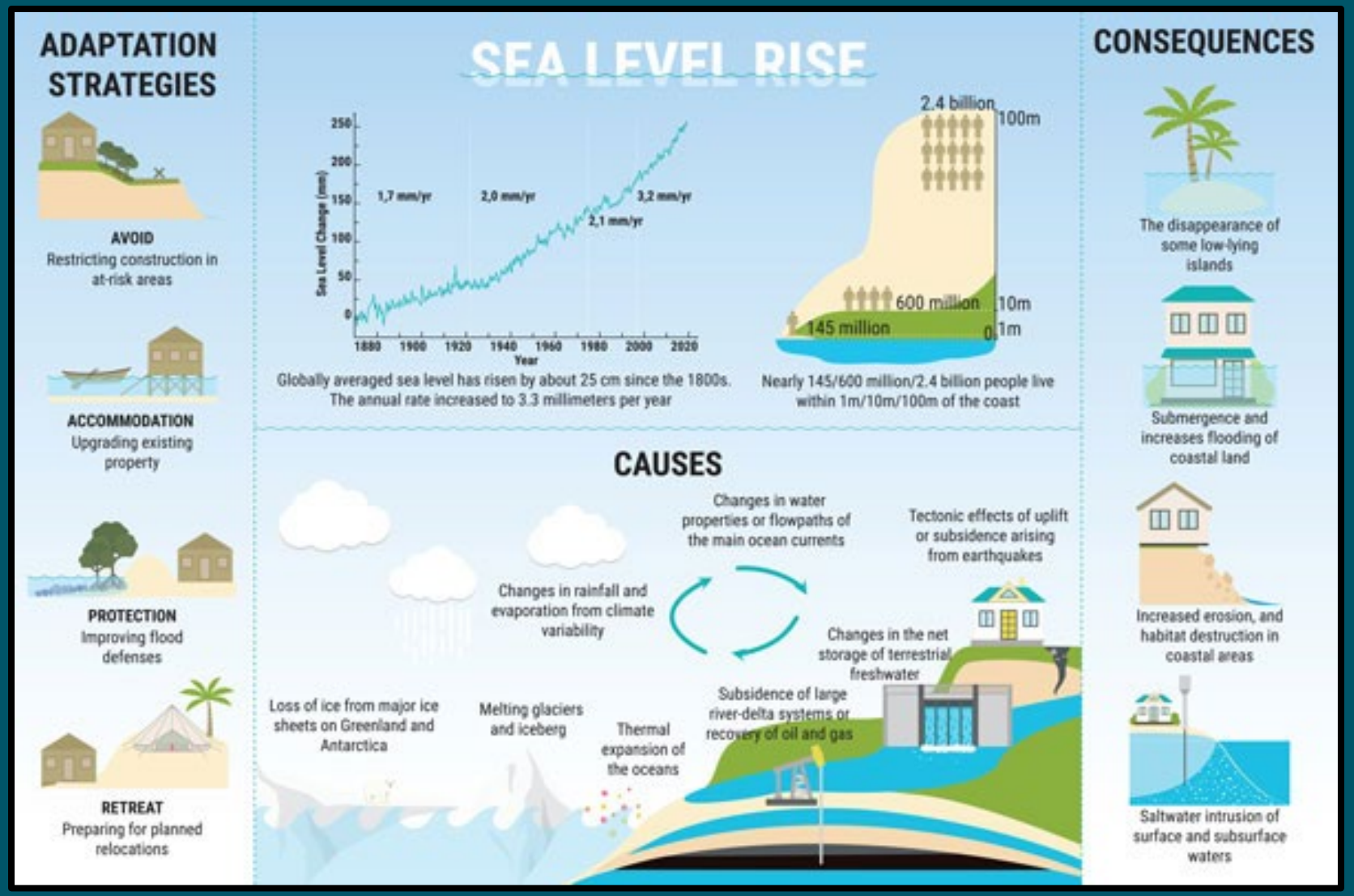
Larger winter waves move sediment offshore narrowing beaches

Sediment pushed offshore forms a sandbar, moving the breaker line farther offshore

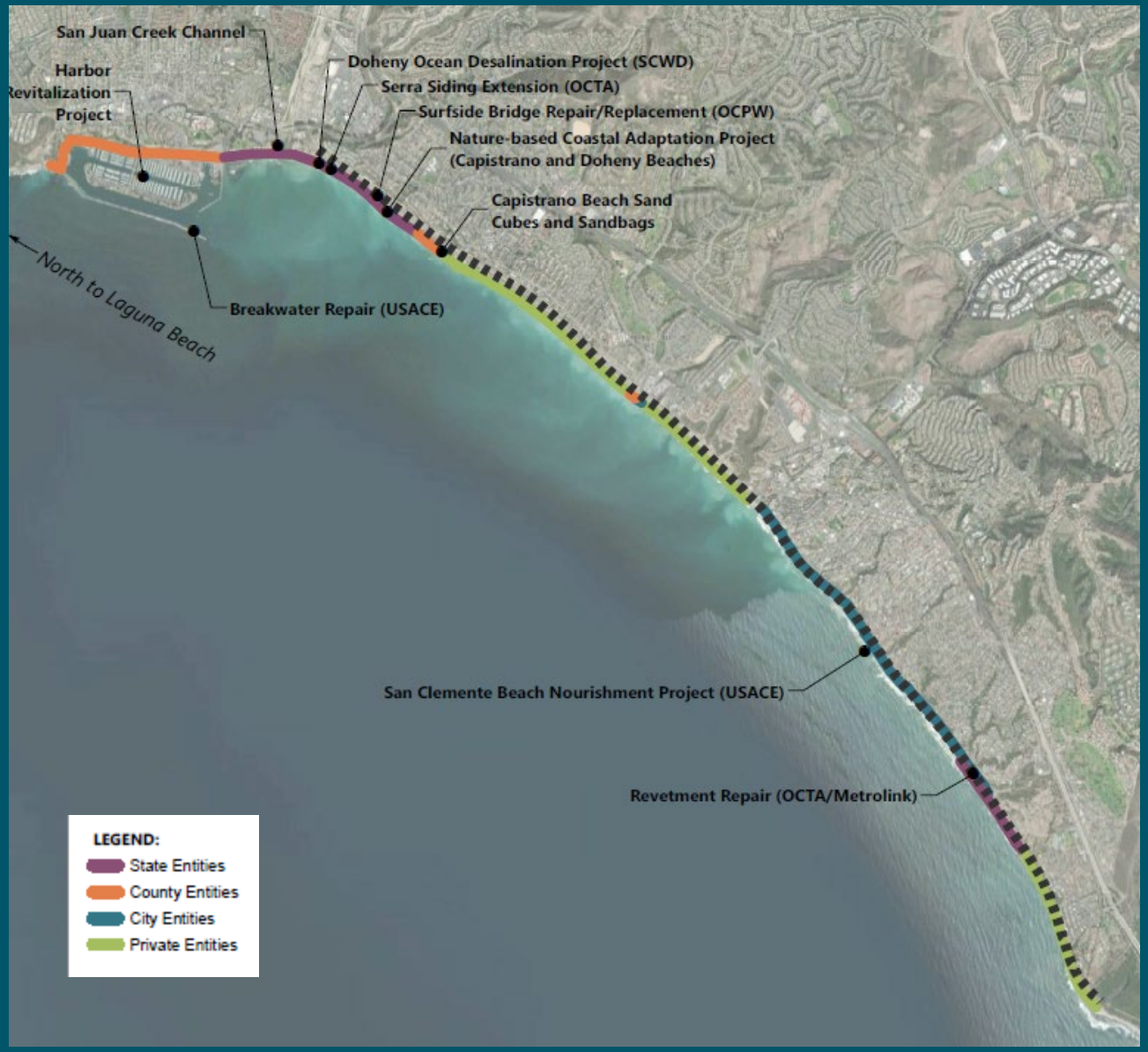
The sandbar dissipates wave energy

Longshore Transport




ADAPTATION STRATEGIES
AVOID
Restricting construction in at-risk areas
ACCOMMODATION
Upgrading existing property
PROTECTION
Improving flood defenses
RETREAT
Preparing for planned relocations
SEA LEVEL RISE
Sea Level Change (mm)
250
200
150
100
50
0
1,7 mm/yr
2,0 mm/yr
3,2 mm/yr
2,1 mm/yr
1880 1900 1920 1940 1960 1980 2000 2020
Year
Globally averaged sea level has risen by about 25 cm since the 1800s. The annual rate increased to 3.3 millimeters per year
2.4 billion
100m
600 million
10m
145 million
1m
0
Nearly 145/600 million/2.4 billion people live within 1m/10m/100m of the coast
CAUSES
Changes in water properties or flowpaths of the main ocean currents
Tectonic effects of uplift or subsidence arising from earthquakes
Changes in rainfall and evaporation from climate variability
Changes in the net storage of terrestrial freshwater
Loss of ice from major ice sheets on Greenland and Antarctica
Melting glaciers and iceberg
Thermal expansion of the oceans
Subsidence of large river-delta systems or recovery of oil and gas
CONSEQUENCES
The disappearance of some low-lying islands
Submergence and increases flooding of coastal land
Increased erosion, and habitat destruction in coastal areas
Saltwater intrusion of surface and subsurface waters

Beach Erosion & Shoreline Retreat Problem Areas



Related Existing and Planned Projects

Projects & Programs

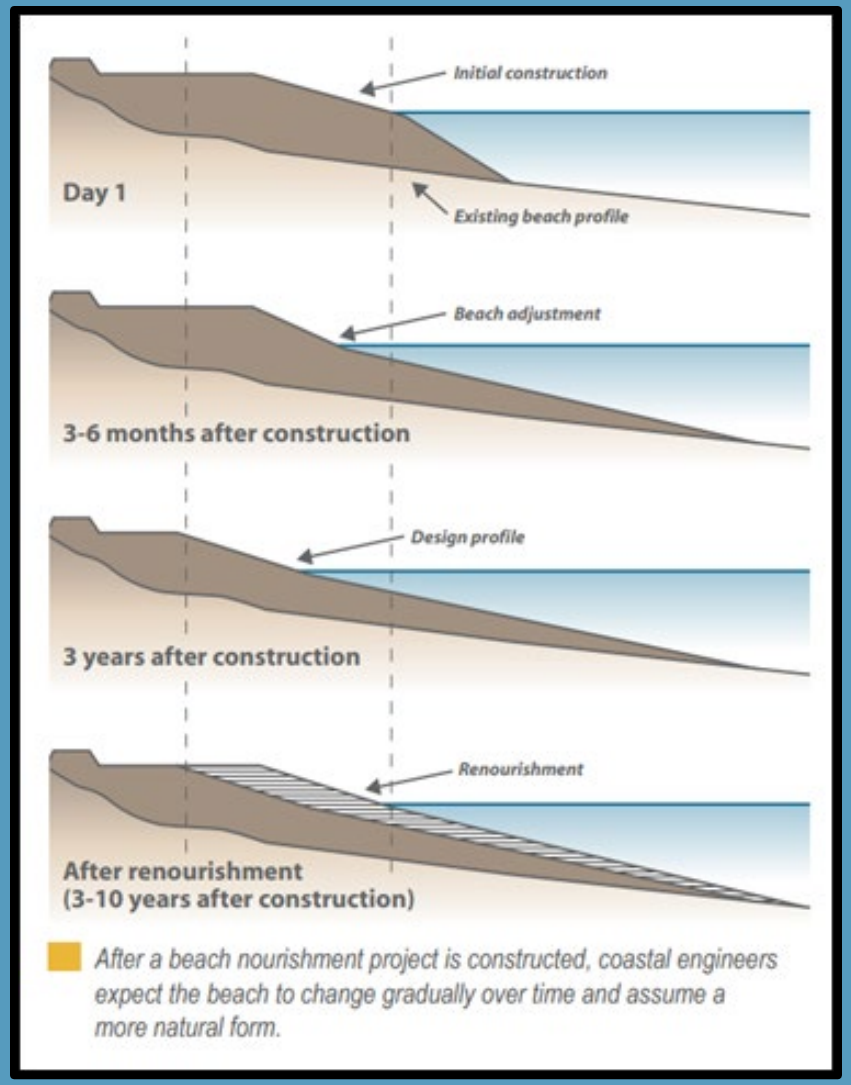
Coastal Armoring

- Coastal armoring includes seawalls, rip-rap, and revetments
- Implementation not covered in Plan because:
  - Don't want to impact armoring efforts underway
  - The plan is regional and armoring is site specific
    - Will be owner's responsibility
  - Would delay implementation of regional efforts

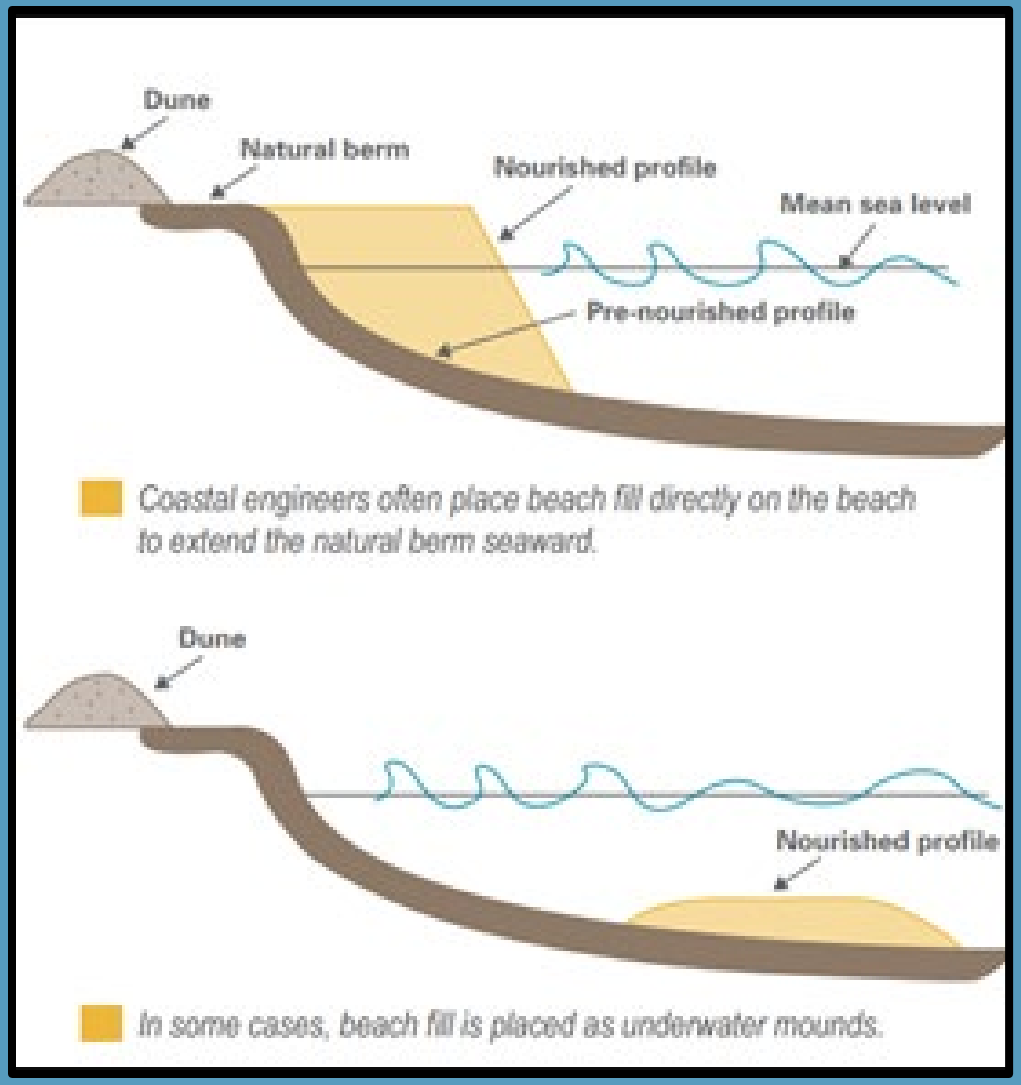
Beach Nourishment

The placement of sandy sediment from outside the littoral cell onto beaches to mitigate erosion via beach width increases

Beach Nourishment - A Primer



After a beach nourishment project is constructed, coastal engineers expect the beach to change gradually over time and assume a more natural form.



Coastal engineers often place beach fill directly on the beach to extend the natural berm seaward.

In some cases, beach fill is placed as underwater mounds.

Beach Nourishment

Pros

- Beneficial reuse of sediment from rivers, bays, nearshore waters, & inland areas
- "Soft" solution
- Provides wildlife habitat (living shoreline)
- Allows recreational beach use

Cons

- Difficult to find long-term sand source
- May require supplemental protective measures
- Expensive due to recurring costs
- Could impact nearshore habitats

Beach Nourishment with Retention Structures

Beach nourishment coupled with structures that minimize the loss of beach sand

Pros

- Improved protective performance
- Increased average beach width
- Decreased recurring costs

Cons

- Increased capital costs due to structures
- New technology with unknown performance
- Difficult & time-consuming to permit
- Ideal location for retention structure may span multiple jurisdictions

Retention Structures: Groins

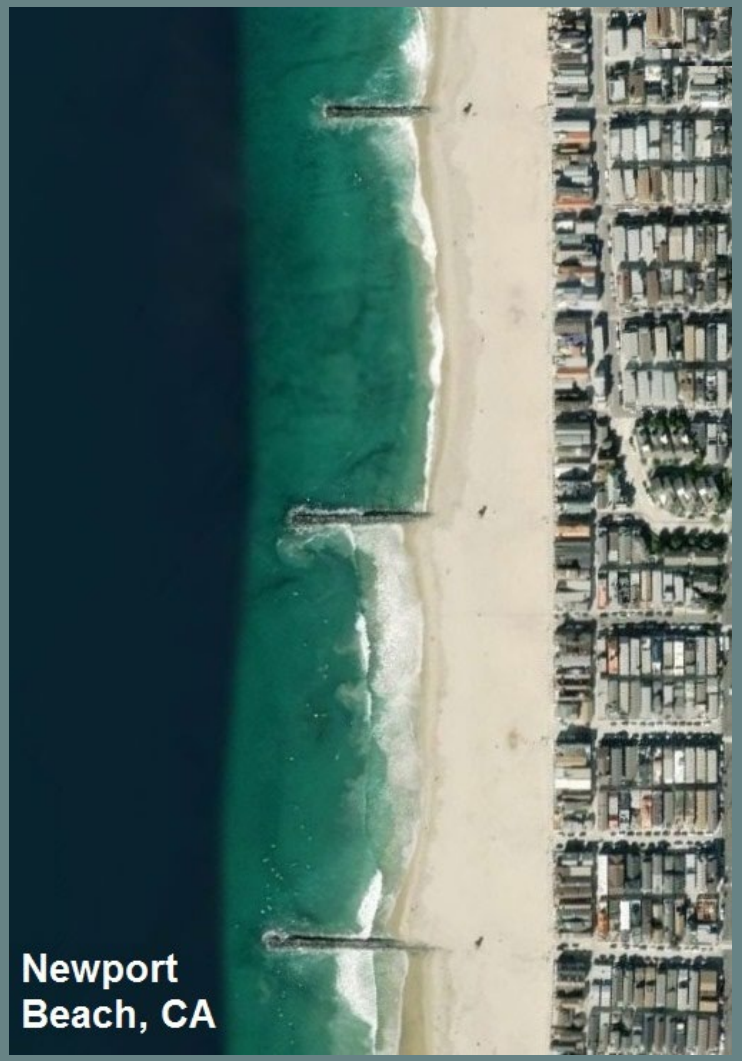
Shore-perpendicular structure that can be made of concrete, steel, boulders, or wood

Pros

- Stabilizes beach location
- Represents “soft” shoreline protection solution
- Provides wide beach for human and/or wildlife use

Cons

- Difficult to permit due to potential impacts to adjacent beaches
- Can produce hazardous rip currents
- Can divert beach sand to offshore sand bars



Retention Structures: Nearshore Breakwaters

Shore-parallel rock and/or concrete structures that provide shore protection by blocking incoming waves resulting in sand accumulation behind the structure

Pros

- Reduces wave heights behind the structure
- Accumulates sand behind the structure resulting in wider beach
- Can reduce hazardous rip currents

Cons

- Increases beach nourishment maintenance costs
- Difficult to permit due to potential impacts to adjacent beaches
- Could impact sensitive nearshore habitats and recreation (e.g., surfing)

Retention Structures: Multipurpose Reef

Offshore, underwater structure designed to provide shore protection, marine habitat, and recreation

Pros

- Reduces wave energy behind structure
- Accumulates sediment behind structure
- Provides habitat for marine wildlife
- Provides recreational benefits (e.g., surfing, diving, fishing)

Cons

- Unproven technology with higher uncertainty of benefits
- Potentially high unquantified mitigation costs
- Difficult to permit due to potential impacts

Dunes (Living Shoreline)

Raised sand depositional feature along back of beaches that provides habitat for wildlife and protects areas behind the feature from wave action

Pros

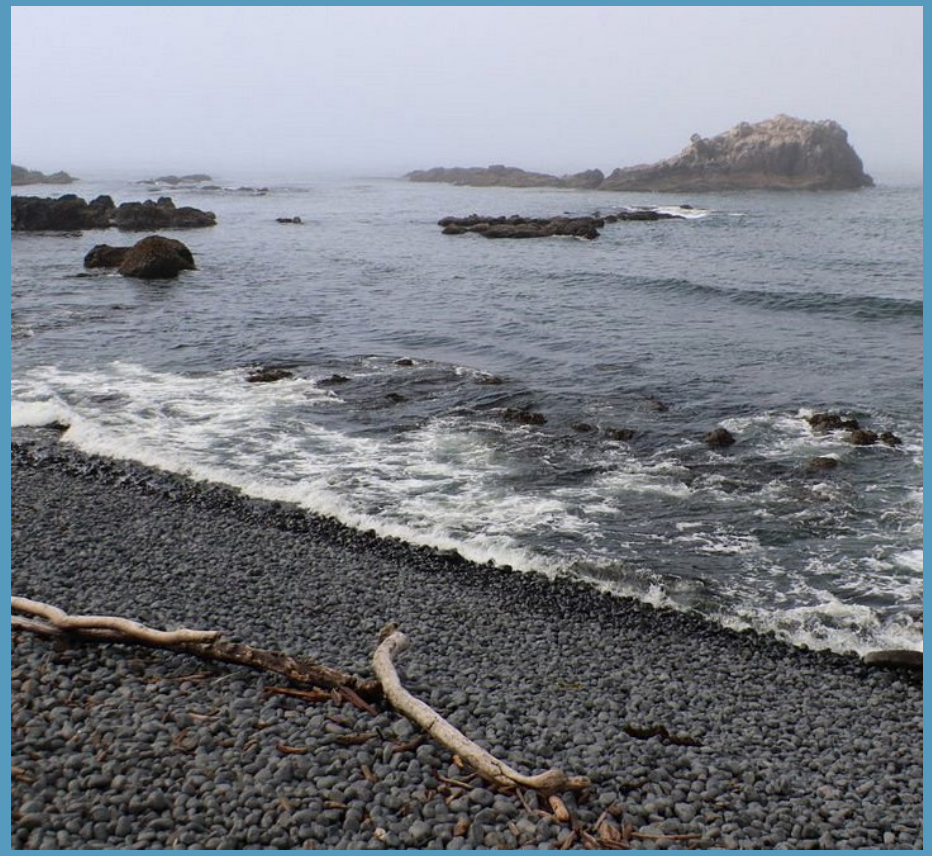
- Natural, “soft” solution to beach erosion
- Relatively easy to permit
- Provides habitat and recreation as well as protection

Cons

- Can have high maintenance costs
- May require supplemental protective measures
- Difficult to find long-term sand source
- Could impact nearshore habitats

Cobble Beach

A beach constructed from cobbles instead of sand



Pros

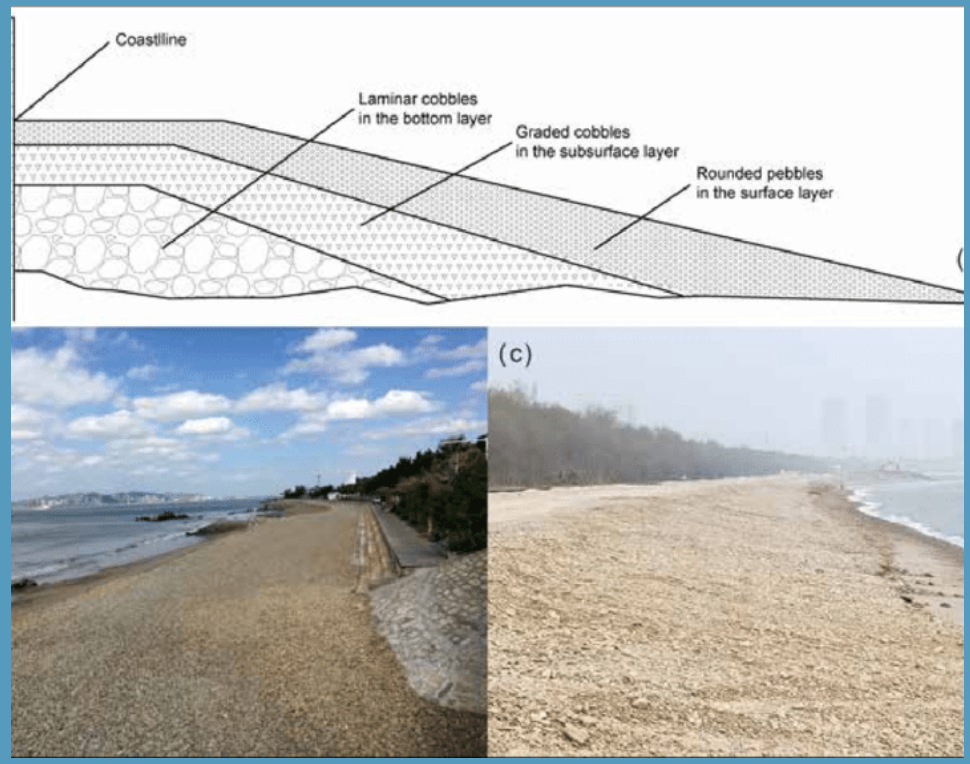
- "Soft" solution so easier to permit
- Minimal impacts to nearshore habitats
- Requires less material to provide similar protection
- Provides wildlife habitat (living shoreline)

Cons

- Limited research on design and performance
- Could support nonnative wildlife
- Public acceptance could be low for recreation
- May require supplemental protective measures

Hybrid Options: Sand & Cobble Beach

A cobble beach base with sand placement on top



Pros

- Cobble could decrease recurring costs by reducing maintenance sand volumes
- Sand cover would facilitate recreation
- Sand cover would support "appropriate" wildlife

Cons

- Limited research on design and performance
- Cobbles could support nonnative wildlife
- Public acceptance could be low for recreation
- May require supplemental protective measures

Projects & Programs Activity

Open Forum

Preferred Projects & Programs

Governance Methods

Joint Powers Authority (JPA)

- Entity permitted under California State Code Section 6500
- There are two kinds of JPA arrangements
  1. Two or more public agencies contract to jointly exercise powers common to all members.
  2. Two or more public agencies to form a separate legal entity. This new entity has independent legal rights, including the ability to enter contracts, and hold property. Forming a separate entity can be beneficial because the debts, liabilities and obligations of the JPA belong to that entity and not the member agencies.

Joint Powers Authority (JPA)

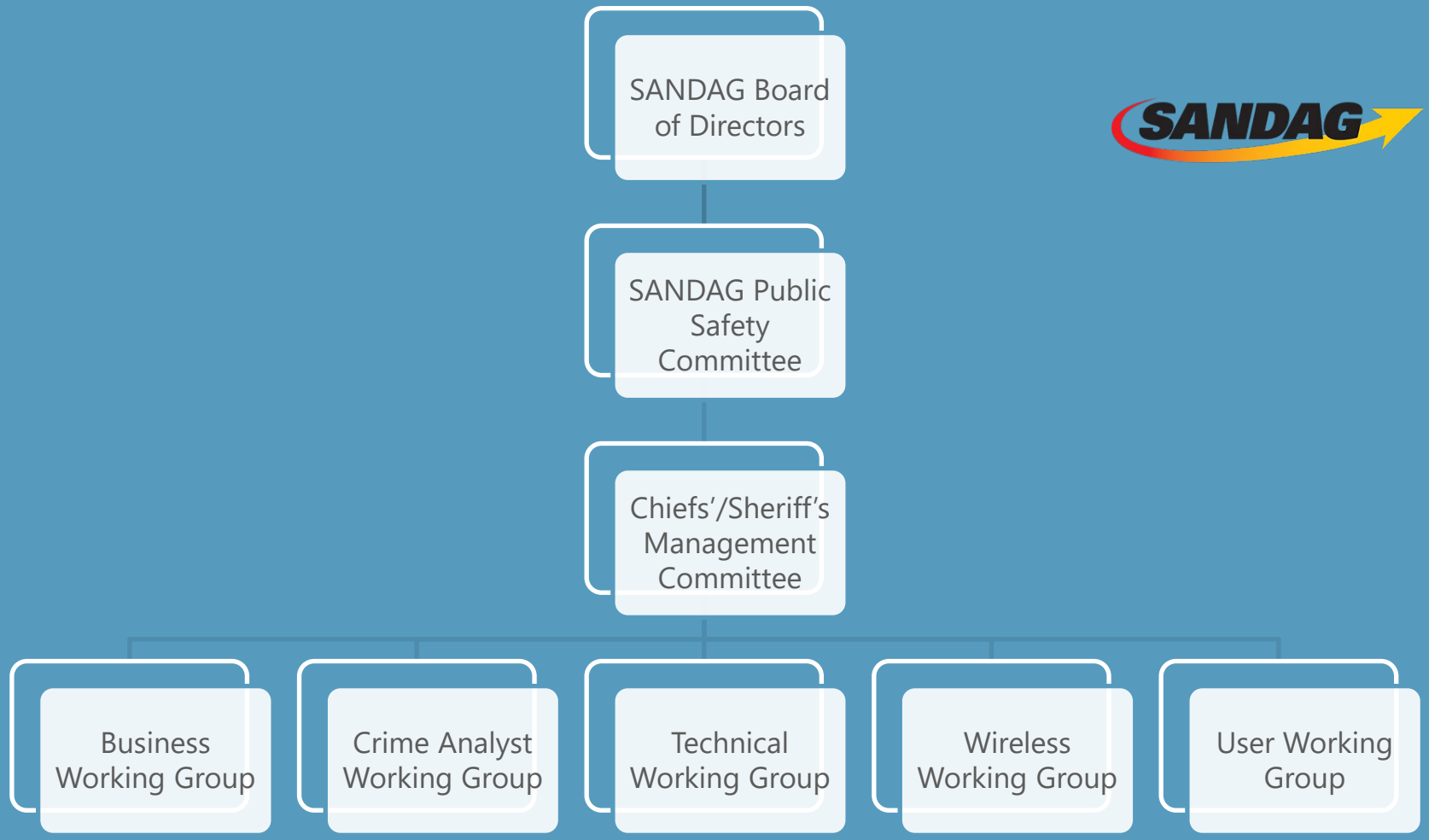
Pros

- Facilitates regional approaches
- Can be tailored to specific issues
- Can enter contracts
- Can hire dedicated staff
- Can be renewed continuously

Cons

- All members must approve formation
- Can be difficult to fund
- Capabilities limited to union of member agencies
- Typically requires majority vote

Example JPA Structure (SANDAG)



Council of Governments

- Voluntary association of local governments
- Can be situated in either a metropolitan or rural area
- Designed to promote discussion and intergovernmental cooperation among its members concerning common and regional problems, and to engage in planning on a multijurisdictional basis

Council of Governments

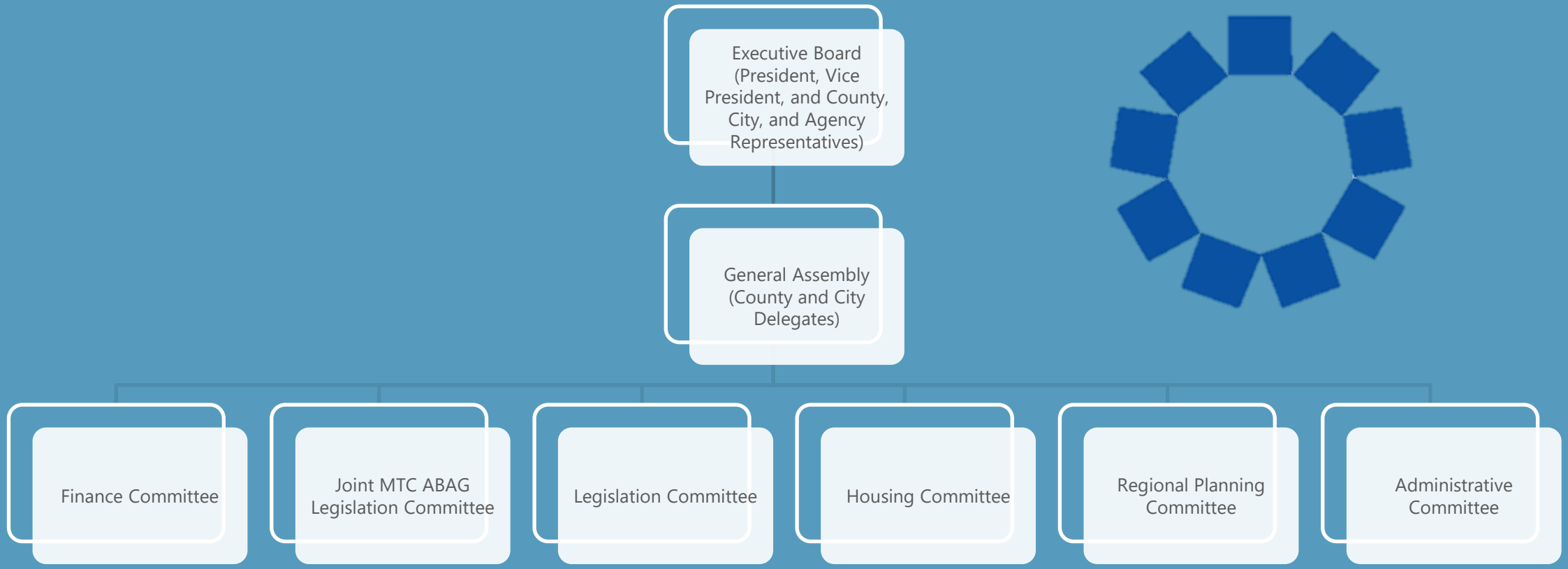
Pros

- Provides an arena where elected officials can meet and discuss regional issues
- Facilitates horizontal cooperation on regional issues
- Facilitates vertical cooperation with local, state, and federal government

Cons

- Organizational need to operate on membership consensus can be difficult to reach decisions
- Low level of community reach results in low engagement across groups with differing interests

Example Council of Governments Structure (Association of Bay Area Governments)



Memorandum of Understanding/Agreement

- Voluntary cooperative arrangements
- Applicable to multiple government agencies of different levels
- Can be used by government agencies & private entities

MOUs and MOAs

Pros

- Long term history of use
- Relatively easy to implement
- Can be done administratively
- Can be duration limited

Cons

- Contracts run by MOU/MOA parties
- Funding via MOU/MOA parties
- Staffed by MOU/MOA parties
- Flexibility limited by MOU/MOA

Example MOU/MOA (Bolsa Chica Lowlands Restoration Project)

Geologic Hazards Abatement Districts (GHAD)

- Enables property owners to collectively mitigate geological hazards which pose a threat to their properties (California Public Resources Code 26500-26601)
- Designed to handle long-term abatement and maintenance of real property potentially threatened by earth movement

Geologic Hazards Abatement Districts (GHAD)

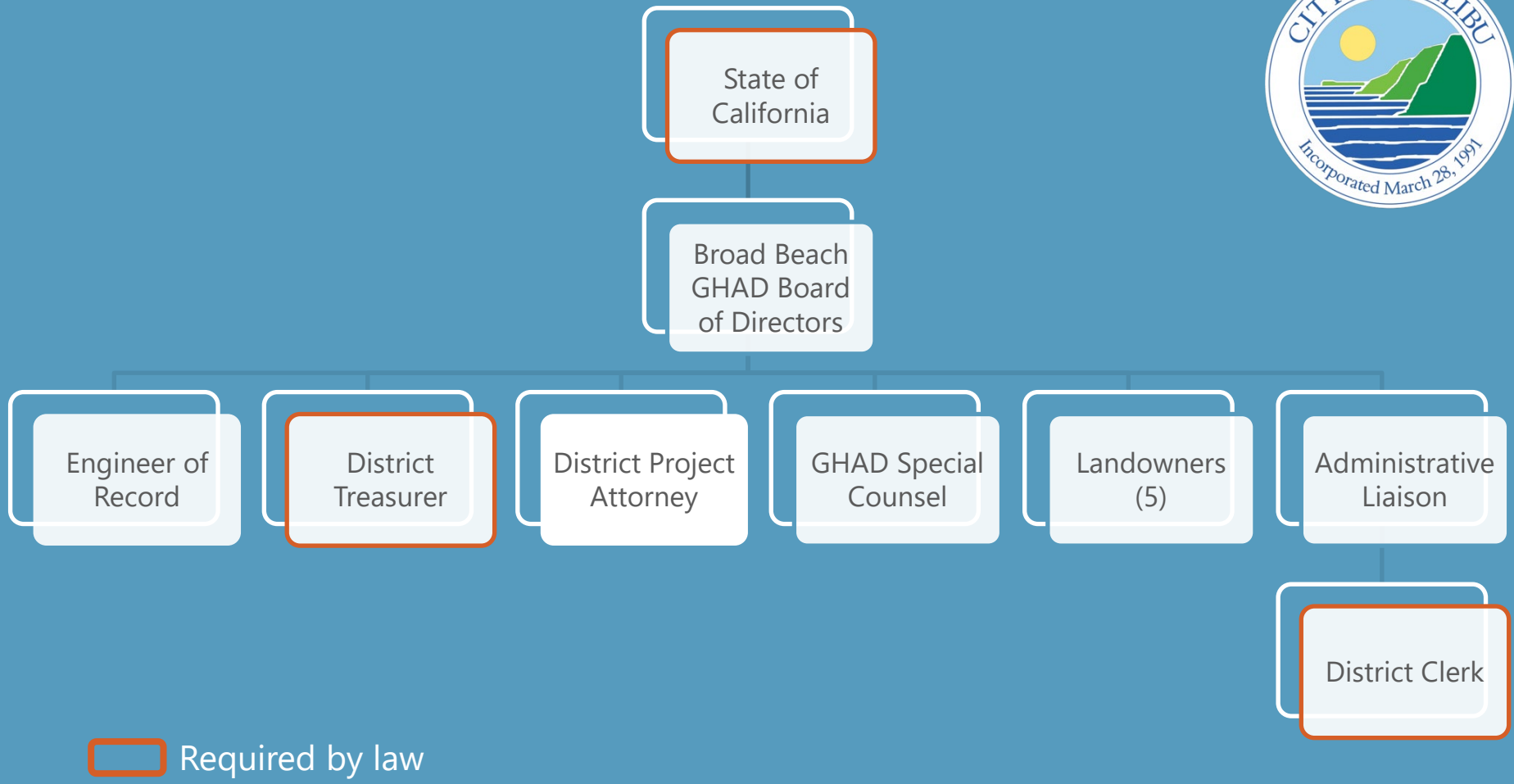
Pros

- Facilitates local approaches
- Can be tailored to specific issues
- Can enter contracts
- Can issue bonds
- May obtain funding
- Can levy & collect assessments
- May condemn/acquire property
- Can construct improvements
- Can maintain improvements

Cons

- Not easy to dissolve
- Only need majority vote to expand
- Financed via supplemental tax assessments
- Can levy & collect assessments
- May condemn/acquire property

Example GHAD Structure (Broad Beach GHAD)



Ad Hoc Committee

- Temporary committee established by a board of directors to address a specific issue

Ad Hoc Committee

Pros

- Facilitates focused approach
- Easy to organize
- Can facilitate standing committee formation
- Carteret County, NC used it to organize four towns to secure federal, state, & county funding

Cons

- Temporary so not suited for addressing recurring issues
- Single committee focus
- Limited by committee mission, funding, & staff

Governance Methods Activity

Open Forum

Preferred Governance Methods

Funding Strategies

Existing Funding Sources

Federal Sources

US Army Corps of Engineers

FEMA

U.S. Army Corps of Engineers (USACE)

Hurricane Storm Reduction Damage-Section 103 allows protection of public infrastructure against erosion and damages caused by natural storm driven waves and currents.

Pros

- If there is federal interest, USACE will fund majority of project costs.
- Feasibility study is funded by USACE up to $100,000.
- USACE funds 65% of design and construction.
- Easier to permit projects using federal-led process instead of state-led process.

Cons

- High study, planning, and design costs due to USACE requirements.
- Local sponsor responsible for operational and maintenance costs once project completed.
- Entire process can take years to decades.
- Most projects do not obtain federal authorization.
- Implementation funding tied to appropriations so difficult to obtain and inconsistent.

Infrastructure Investment and Jobs Act (IIJA)

Bipartisan legislation that provides $1.2 trillion in infrastructure enhancement with $492+ billion dedicated to supporting coastal resilience

Pros

- Provides funding for coastal resiliency
- Existing source of funding
- Reestablishes One Federal Decision, decreasing permitting

Cons

- Coastal resiliency not a top funding priority
- Funding is dispersed annually so might take a long time to get project funding
- Funds allocated through formula apportionments or competitive grants

National Oceanic and Atmospheric Administration (NOAA) & National Fish and Wildlife Foundation (NFWF)

National Coastal Resilience Fund (NCRF) increases and strengthens natural infrastructure to protect coastal communities while also enhancing habitats for fish and wildlife.

Pros

- National program with a regional focus that addresses region specific coastal resilience needs
- Can usually be leveraged to obtain additional funding (but not with compensatory mitigation funds)

Cons

- 2021 grant slate did not include any beach nourishment projects
- Inconsistent funding source
- Might not cover complete project costs

Federal Emergency Management Authority

Building Resilient Infrastructure and Communities (BRIC) and Hazard Mitigation Grant Program (HMGP) are pre-disaster mitigation programs that will support states, local communities, tribes and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards.

FEMA

Pros

- Existing and established source of funding
- Has supported projects that protect against sea level rise-related risks
- Cost-share for the program is 75% federal and 25% non-federal

Cons

- Has not funded any beach nourishment projects in 2020 or 2021
- Homeowners and businesses cannot apply
- Focus on flood control and relocation may not be applicable to the goals of these stakeholders

State Sources

CALIFORNIA OCEAN PROTECTION COUNCIL

CALIFORNIA DEPARTMENT OF BOATING AND WATERWAYS EST. 1957

Coastal Conservancy

State Coastal Conservancy

Ongoing funding opportunities

- Requires cooperation with regional manager

Coastal Stories Program

Pros

- Normally funds projects in concert with restoration efforts
  - Habitat, recreational, and economic benefits included in any project that they fund
- Can usually be leveraged to obtain additional funding (but not with compensatory mitigation funds)

Cons

- Not general fund money
- Not a consistent or reliable source of money - depends on money they have access to distribute

Ocean Protection Council

Coastal Resilience Solicitation's funding possible by Prop 68, Ch 10

- Goal to build resilience on the coast to assist coastal communities in preparing for and adapting to the impacts of sea-level rise

Pros

- Priority issue is currently coastal resiliency and nature-based adaptation strategies to sea-level rise impacts, aligns with stakeholder goals
- Has partially funded BEACON's SLR Adaptation Pilot Program which included beach nourishment

Cons

- Not a dedicated or guaranteed source of money
- OPC provides funds on a reimbursement basis, and withholds 10% of the funds, to be disbursed upon project completion.

Division of Boating and Waterways

Shoreline Erosion Control Program & Beach Restoration Program

Pros

- Existing and established source of funding
- Acknowledges the benefits of beach nourishment as a source of erosion control
  - Partially funded San Clemente's beach restoration project

Cons

- Boaters are protective of the fund and want the money allocated to boating
- Limits on funding related to land ownership
- Cannot fund beach projects aimed at protecting private property

New Funding Sources

Fees

Funds raised by charging fees for services, permits, or in-lieu fees (e.g., mitigation for impacts to sand flow).

Pros

- An established process for funding other activities
- Provides a consistent funding source
- Funds can be dedicated to the intended purpose

Cons

- Requires administrative network to manage
- Funds can be highly variable because some actions (e.g., development) are cyclical or one-time in nature
- Can be difficult to obtain public support

Public-Private Partnership

A cooperation between public-sector agencies and private-sector entities that allow government and private entities to work together to provide a community benefit.

Pros

- Reduces government costs.
- Provides dedicated funding source
- Improves "buy-in" between owners and public agencies

Cons

- Can result in a loss of public control
- Requires strong leadership and good relationships

Financing Opportunities

Loans

Money borrowed from bank or government (state or federal) for a specific purpose

Pros

- Effective way to bridge funding sources & needs
- Can provide advance funds to "lead" revenue sources
- Can be leveraged to accelerate implementation

Cons

- Requires full repayment with interest
- Typically, provides a one-time source of funds
- Federal loan programs require authorization from Congress
- State loan programs require authorization from Legislature

State Revolving Funds

Federal funds allocated annually to state governments to be granted as loans

Pros

- Often dedicated to specific issues, such as water and infrastructure programs
- Can be used by private parties if connected to an eligible public project

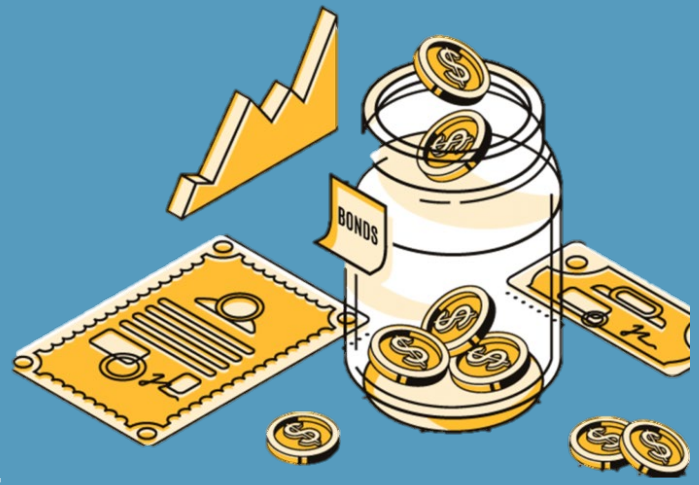
Cons

- Application process can be difficult & time consuming
- Longevity is contingent upon repayment of loans

Municipal Bonds

Issued by local governments to finance capital projects in the form of either revenue bonds secured by future project revenue or general obligation bonds secured by future tax revenue

- Some special purpose entities (e.g., ports, utilities) can issue bonds so possible application for a special purpose entity covering beach erosion



Pros

- Relatively low-cost mechanism to borrow money for capital projects
- Issuer can be either municipal or private entity (e.g., private-public partnerships)
- Relatively low interest rate for payoff

Cons

- Might require a majority or super majority for approval
- Bonds for beach erosion purposes not likely to generate revenue so tax revenue payoff required
- Maintenance "nature" of beach nourishment might limit applicability

Environmental Impact Bonds

Innovative tool that uses a pay-for-success method where investors are paid back at rates that depend upon satisfactory achievement of a specified environmental outcome, such as a predetermined amount of avoided land (beach) erosion

Pros

- Attractive to investors interested in social and environmental benefits of projects
- Provides a concrete way to measure outcomes
- Spreads financial risk across both public and private sectors

Cons

- Can require a lot of time and effort to find an investment group with aligned interests
- Need to identify a repayment revenue source that could be difficult for beach erosion work
- Innovative nature means little prior experience to build from

Resilience Bonds

Bond designed to expand financial protections in the event of a disaster by linking insurance coverage with capital investments in resilient projects that will decrease risk

Pros

- Can link insurance premiums and resilience projects to monetize avoided loss
- Avoided loss can provide funding for projects that reduce risk
- Expands financial protections to vulnerable communities

Cons

- Extensive coordination with local and state government, insurers, and transportation/utility operators
- Designed for catastrophic events, not chronic stress like water scarcity or beach erosion
- There have been no municipal-level resilience bonds issued yet (e.g., new and innovative)
- Requires strong link of beach nourishment to protection instead of recreation and habitat

Funding Activity

Open Forum

Preferred Funding Methods

Schedule and Next Steps

Attachment B
July 6, 2022, Stakeholder Meeting
Attendee List

Coastal Resilience Working Group

July 6, 2022 9:00 - 12:30

	Organization	First Name	Last Name	Email
1	CITY OF SAN CLEMENTE	KIEL	KOGER	Kogerk@san-clemente.org
2	Coastal Commission	dani	ziff	dani.ziff@coastal.ca.gov
3	OC Parks	DAVE	HANSON	dave@jmxbicycles.com
4	Cypress Cove Holt	Suzie	Whitelaw	suziewhitelaw@gmail.com
5	San Clemente	Amelia	weinstein	aweinstein40@gmail.com
6	ANCHOR QEA	ADAM	GALE	Agale@Anchorqea.com
7	SOUTH COAST WATER DISTRICT	RICK	ERKENEFF	
8	SURFRIDER SOUTH OC	DENISE	ERKENEFF	
9	OCPW	Ashley	Tarroja	ashley.tarroja@ocpw.ocgov.com
10	City of SC	Jorine	Campopiano	Campopianoj@san-clemente.org aspenjorine@msn.com
11	CCC	Brittney	Cozzolino	brittney.cozzolino@coastal.ca.gov
12	State Parks	Riley	Pratt	riley.pratt@parks.ca.gov
13	UCI	Brett	Sanders	bsanders@uci.edu
14	SC	Gene	James	
15	City Laguna Beach	Marc	Wiener	Mwiener@lagunabeachcity.net
16	City of D.P.	Matthew	Kunk	mkunk@danapoint.org
17	City of San Clemente	Cecilia	Gallardo-Daly	gallardo-daly@san-clemente.org
18	City of San Clemente	Samantha	Wylie	wylies@san-clemente.org
19	City of SC	Chris	Duncan	duncan@san-clemente.org
20	OC Parks	Susan	Broadeur	susan.broadeur@ocparks.com
21				
22				
23				

Coastal Resilience Working Group

July 6, 2022 9:00 - 12:30

	Organization	First Name	Last Name	Email
1	OC PARKS	SHEILA	CEDERVALL	SHEILA.CEDERVALL@OCPARKS.com
2	OCTA	Alison Army		aarmy@octa.net } FOR DAN PHU
3	OCTA	Lauren	Sato	lsato@octa.net
4	Gabrielino-Shoshone Tribal Council	Gabrielle	Crowe	gabrielle@ballona.org
5	Cabo Bay District	Leslea	Meyerhoff	Leslea.Meyerhoff@
6	Anchor QEA	Delaney	Inman	dinman@anchorqea.com
7	Anchor QEA	Makenna	Brown	mbrown@anchorqea.com
8	Caltrans D12	Scott	Shelley	~~shelley.caguov~~ scott.shelley@Dot.ca.gov
9	Capo Shores	Eric	Anderson	eanderson@capo shores [illegible]
10	DPHS	KEITH	JOHANNES	Kjohannes1@cox.net
11	Capistrano Bay CSD	Don	Russell	drussell@capobay.org
12	Dana Point	Jimmy	Armenta	JArmenta@danapoint.org
13	Sea Clerk	Tim	Brown	timbrown@gmail
14	Cypress Cove	Michelle	Brooks	michellemariebrooks@gmail
15	OC Parks Comm	William	WELLBORN	WELLBORN.WILLIAM@GMAIL
16				
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22				
23				
24				
25				

DYLAN WRIGHT
DIRECTOR
OC COMMUNITY RESOURCES

CYMANTHA ATKINSON
ASSISTANT DIRECTOR
OC COMMUNITY RESOURCES

JULIE LYONS
DIRECTOR
ADMINISTRATIVE SERVICES

MONICA SCHMIDT
INTERIM DIRECTOR
OC ANIMAL CARE

JULIA BIDWELL
DIRECTOR
OC HOUSING &
COMMUNITY DEVELOPMENT

RENEE RAMIREZ
DIRECTOR
OC COMMUNITY SERVICES

PAMELA PASSOW
INTERIM DIRECTOR
OC PARKS

JULIE QUILLMAN
COUNTY LIBRARIAN
OC PUBLIC LIBRARIES

OC Community Resources

M E M O R A N D U M

DATE: March 6, 2024

TO: Ella McDougall, State of California Natural Resources Agency
Justine Kimball, State of California Natural Resources Agency

FROM: Susan Brodeur, Senior Coastal Engineer
Makana Nova, Coastal Planning Manager

SUBJECT: **South Orange County Coastal Resiliency Strategic Plan – Tribal Outreach Efforts**

This deliverable memorandum details the current efforts of Orange County Parks, to-date, to reach out to local tribal contacts for consultation on the South Orange County Coastal Resiliency Strategic Plan. The following list summarizes the outreach efforts, persons contacted, action taken, and responses received:

Correspondence To-Date

- 12-13-2021 Stakeholder Meeting 1
- 03-21-2022 Stakeholder Meeting 2, Gabrielle Crowe, representing the Gabrielino-Shoshone Tribal Council attended.
- 05-11-2022 Native American Heritage Commission (NAHC) request form sent
- 06-13-2022 NAHC Contact List provided
- 06-22-2022 Stakeholder Meeting 3
- 02-21-2023 Letters sent to NAHC contacts list (Refer to attached list with 19 contacts)
- 03-08-2023 Email acknowledging receipt of request letter received from Christina Conley for Gabrielino-Tongva Tribe. Comments were deferred to Acjachemen tribe.
- 04-12-2023 Email request sent to Michael Esgro at California Natural Resources Agency (CNRA)
- 04-17-2023 Email request sent to Michael Esgro at CNRA
- 05-03-2023 Email request sent to Tina at Sacred Places Institute – no response
- 06-15-2023 Email request sent to Michael Esgro at CNRA
- 06-16-2023 Michael Esgro connected to Calla Allisson for statewide MPA Collaborative Network, further coordination planned
- 06-22-2023 Meeting with Calla Allison, Aubrie Fowler, and Jamie Blatter of MPA Collaborative Network to discuss their experiences and potential contacts with tribal outreach

- 11-08-2023 Makana Nova attends “Cultivating Consciousness in Acjachemen & Tongva Homelands” lecture at UC Irvine.
- 12-05-2023 Email request sent to Heidi Lucero, Chairwoman of the Juañeno Band of Mission Indians – Acjachemen Nation
- 12-18-2023 Follow-up email request sent to Heidi Lucero, Chairwoman of the Juañeno Band of Mission Indians – Acjachemen Nation
- 01-09-2024 Virtual meeting with Angela Mooney D’Arcy of Sacred Places Institute.
- 02-09-2024 Virtual meeting with Ciara Belardes, liaison to Acjachemen tribal elders. Ms. Belardes confirms she can attend the upcoming stakeholder meeting on March 13, 2024, and mentions she intends to share this opportunity with several other tribal representatives.

We continue to reach out on a more personal level to the contacts provided for the Acjachemen tribe on the NAHC contact list, since correspondence received suggests, they would be the most knowledgeable of the geographic area south of Dana Point. At this point, we have established a great point of contact with Ms. Ciara Belardes and look forward to continuing to work with her and other tribal elders for the Acjachemen tribe to review the Strategic Plan and identify input opportunities.

As we embark on the final outreach process with the draft Strategic Plan, we remain open to further opportunities to consult with the Native American community prior to release of the final Plan. We also intend to send invitations to the contacts on the NAHC contact list for our upcoming Stakeholder meeting where we will present the draft plan.

Please feel free to reach out to Susan Brodeur, Senior Coastal Engineer, at 949-585-6448 or susan.brodeur@ocparks.com, or Makana Nova, Coastal Planning Manager, at 949-585-6441 or makana.nova@ocparks.com if you have any questions or comments along the way.

Regards,

Coastal Planning Manager

Attachments:
Correspondence to Date
Stakeholder 1 Meeting Minutes 12-13-2021
Stakeholder 2 Meeting Minutes 03-21-2022
Stakeholder 3 Meeting Minutes 06-22-2022

CC:
Jeaniene Casiello, Planning & Design Division Manager
Sheila Cedervall, Senior Landscape Architect
Marisa O’Neil, Grants Manager

Appendix D
Information Regarding March 2024 Meeting and Summary of Comments on Draft Strategic Plan

Comment Letters

1. Michelle Schumacher – San Clemente resident
2. Charlie Fox
3. Toni Nelson – Capo Cares
4. Suzie Whitelaw – Save Our Beaches
5. Orange County Transportation Authority
6. Eric Anderson – Capistrano Shores
7. Ashley Tarroja – Orange County Public Works
8. Shahar Amitay – California Coastal Commission
9. Amanda Quintanilla

List of Attachments

Attachment 1 Summary of Edits for Final Strategic Plan

Attachment 2 Summary of SurveyMonkey Responses

Nova, Makana

From: Michelle Schumacher <schumacherfamily@me.com>
Sent: Wednesday, March 20, 2024 2:19 PM
To: South Coastal Resilience
Subject: Coast

Follow Up Flag: Follow up
Flag Status: Completed

Attention: This email originated from outside the County of Orange. Use caution when opening attachments or links.

Good afternoon

I am sad by the overdevelopment and congestion going on in our county. Our city is spending a fortune on sand - Sadly if rmv is allowed to develop every inch off Ortega our natural sand replenishment processes will be gone forever. Is there anyway the could try and avoid the watersheds? Thank you

Michelle
Sent from my iPhone please disregard autocorrect typos

Nova, Makana

From: Charlie Fox <CFOX@CFOXweather.com>
Sent: Saturday, March 23, 2024 7:10 AM
To: South Coastal Resilience; Katrina.Foley@ocgov.info
Subject: Sand Nourishment

Follow Up Flag: Follow up
Flag Status: Completed

Supervisor Foley,

First off, I want to thank you for your strong position demanding sand replenishment in San Clemente. And specifically, mandating sand emplaced in front of ANY rip-rap reinforced along San Clemente Beaches.

The loss of beach fronting the rip-rap in San Clemente was totally predictable. The fact that OCTA has not ensured a protective beach in front of the rip-rap is just plain mind boggling. Who is advising them? The fact is, when waves reach any hard surface the beach in front of it WILL disappear (not permanently if there is sufficient sand in the system). This is not conjecture. It is empirical fact. We need to ensure that waves don't reach the hard armoring.

As a lifelong resident of San Clemente, avid surfer, and professional marine meteorologist for over 30-years, I want OCTA to shoulder the responsibility of what they have caused; by replenishing, and maintaining a healthy beach fronting their necessary rail line. This is an emergency that their negligence caused.

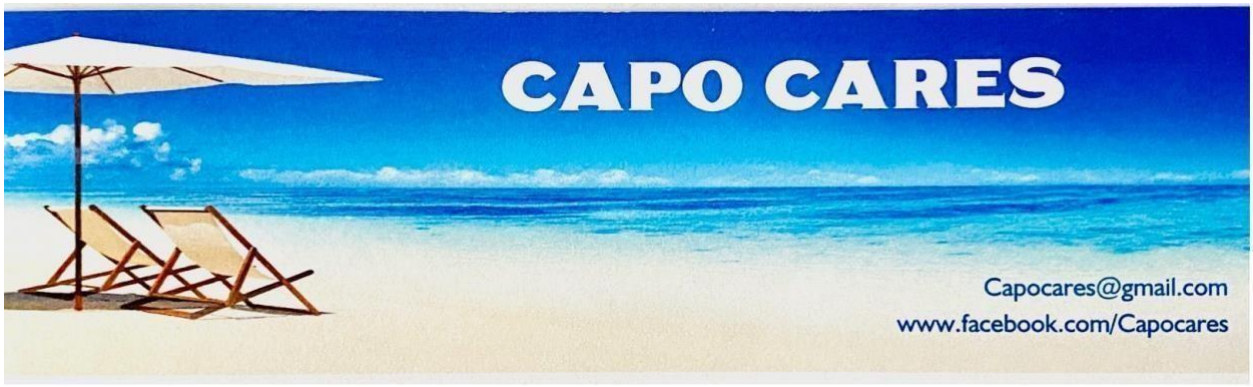
Thank you again for your continuing pressure on the OCTA.

Charlie

C H A R L I E F O X
US NAVY Oceanographer (RET)
NEARSHORE. PREDICTION. EXPLOITATION

808.722.2200

CFOX.surf



April 17, 2024

Comments on Draft South Orange County Coastal Resilience Strategic Plan

Thank you for undertaking this effort to bring coastal stakeholders and advocates together to work toward critical coastal resiliency solutions for South Orange County. The following are our comments on particular areas addressed in the SOCCRS.

Urgency of Sand Replenishment

We agree with Save Our Beaches that every effort should be made to expedite identification, permitting and delivery of sand to our beaches on an urgent basis. The Prado Dam and Santa Ana River sources look very promising. We should also be coordinating with SANDAG's efforts while researching potential sand sources off our own shoreline which might offer opportunities for a more economic dredged source.

We know that approximately 2 million cubic yards of sand excavated during the Dana Point Harbor construction was dumped by the Army Corps of Engineers near San Juan Creek in the early 70s. Unfortunately, we did not have the foresight to replenish that sand when it became clear that inland development and droughts created an annual sand deficit on our beaches. The Harbor sand lasted almost 40 years, but by 2010 it became clear that our coastline was suffering from acute sand starvation. We need to make up for those losses and feed our beaches --NOW. We do not have time to wait for 20-year projects by the Army Corps of Engineers. We need effective, proactive leadership supported by a strong citizen and NGO-based support group to make this happen.

Working Group Structure

The Working Group should not become a JPA. This is a problem that requires nimble, collaborative and decisive actions. A joint powers bureaucracy is exactly where fast effective solutions go to die. Funding and other decisions requiring government action can be coordinated at the City and County levels, ideally led by our very capable 5th District Supervisor.

Regional Focus

All beaches should be included in the working group. Dr. Brett Sanders' recent study made it clear that our littoral cell from Cotton's Point to Dana Point is a wide bay within which sand will freely flow north and south, but that most sand replenishment will stay in the cell. We observe this at Capistrano Beach every day, where part of the recent sand deposits (for which we are extremely grateful) has moved south, but we still have more sand than cobble and sufficient sand is and was intact to protect the coastal trail throughout a rough winter. It is vital that every beach in the cell be included and considered for mitigation.

Sand Prioritization

In terms of priority for sand mitigation, it's pretty obvious that beaches with the most erosion or critical need, and locations with the most potential for regional benefit should be addressed first. In the case of private beaches, owners should be given the opportunity to participate in funding direct replenishment at cost. Coastal engineers can determine what areas and what quantities make sense based on the unique characteristics of each site.

Natural Solutions = Sand

We agree with Save Our Beaches on the need to promote natural solutions and sandy beaches for public recreation and the survival of indigenous marine species. Cobble beaches are not a good solution.

Funding

If we were able to go back 40 years and recognize what would slowly happen to our beaches, I believe public agencies would have sought funding to mitigate sand loss each year instead of waiting for our current crisis conditions. Unfortunately, beach loss was ignored at every level and because it didn't clearly fall under the umbrella of a particular agency or government entity, it remained an unfunded orphan. Today, the orphan can no longer be ignored. The threats to public and private infrastructure, our vibrant tourist economy and public health and welfare are now significant, and sand starvation is an imminent threat to Orange County's welfare.

This is a county-wide problem that needs a county-wide funding solution. Whether we seek federal and state funding or seek a sales or property tax increase, the funding solution must recognize that the burden should not solely rest on south county cities. The entire county uses our beaches and benefits from the property taxes and tourism dollars that are intrinsically tied to the existence of and access to our beautiful coast. Since the problem is linked to inland development, one solution might be to institute a development impact fee similar to that imposed on new development to help fund the Transportation Corridor Agencies. Thankfully

the good news is that sand is much cheaper than riprap boulders or sea walls, and there is a huge public constituency in favor of retaining our beaches for this and future generations.

Coastal Bluff Concerns

Although the primary purpose of this effort is to address coastal erosion, I believe the coastal bluffs that line our beaches should also be considered as an area of concern to perhaps be addressed in a subcommittee. Recurrent landslides and moisture issues affect not only bluff homeowners, but the railroad corridor and our iconic bluffs themselves. Both San Clemente and Dana Point bluffs contain water pipes, including fragile clay pipes from the 1920s and 1930s. Many homes that were built prior to current building codes actually drain rain and irrigation run off to the slopes. There are canyons within the bluffs in San Clemente that run water 24/7. Proper drainage and storm drains and appropriate bluff landscaping with deep routed native species are essential parts of protecting both private and public infrastructure. This group may be able to serve as a catalyst to urge cities to address moisture concerns, mitigate damage and save taxpayer funds to repair slide damage, perhaps redirecting them to sand funding.

Thank you for considering our comments. We look forward to future workshops.

COMMENTS ON DRAFT SOCCRC STRAGEIC PLAN
Suzie Whitelaw, President
Save Our Beaches San Clemente

I would like to begin by highly commending the staff of OC Parks, in particular Susan Brodeur and Makana Nova, for initiating and leading this effort, and for Supervisor Foley for supporting this highly valuable project. Their vision and dedication to a scope of work that was likely not within their usual job description is remarkable. We also commend all of the stakeholders who diligently attended meetings, communicated openly, and advanced the cause of our beautiful coastline, and to the consultants (Adam Gale and Leslea Meyerhoff) who did an excellent job of compiling all of our input. All parties involved have done south Orange County a considerable service and the effort thus far represents collaboration at its finest.

Purpose: Facilitate Delivery of Sand from Inland Sources to our Beaches

The stated purpose of the collaborative: "establish a new regional collaborative to promote long-term coastal resiliency in South Orange County" should be more narrowly defined – coastal resiliency projects could incorporate a lot of different programs, from the Dana Point Harbor renovations to San Clemente landslides, these issues are better dealt with by the individual entities. This collaborative should focus on our most urgent need: getting sand on our beaches.

There are only two sources of sand: offshore and onshore. All of South Orange County has already signed onto SANDAG's RBSPIII Program which is by far the most likely mechanism for bringing offshore sand onto our beaches. There would be no obvious advantage to be gained for the cities of San Clemente or Dana Point to withdraw from SANDAG or for this collaborative to try to replicate it: joining forces with the massive influence of the entire San Diego coastline, and an agency with decades of experience with offshore beach replenishment and funding, is just too powerful to dismiss.

This would leave the Working Group to focus on facilitating the delivery of inland sources of sand to our coastlines. There seem to be two main sources of inland sand: private sand quarries and County-managed facilities such as the Santa Ana River channel, Prado Dam, and other flood control structures.

Scope: Develop and Permit Plan to Deliver Sand from Prado Dam

The County owns and operates many of the flood-control and groundwater-recharge facilities containing the sand that should have been naturally delivered to our beaches. The Santa Ana river channel is one important source, and in 2023 County staff very efficiently developed an expedited process for excavating and transporting sand from the river channel to our beaches. However, the SAR does not hold an infinite amount of sand, and we understand that the City of Newport Beach may have priority, so additional sources need to be developed.

Prado Dam holds more than enough sand to support all of our beaches for the foreseeable future, and a significant portion is of the medium-coarse grain size necessary. We understand that OCWD

will be required to excavate several hundred thousand tons of this sand over the next five years. All that remains is to delineate the details of logistics, among the most important:

- Exactly where will the sand be excavated, and can that excavation be located in order to generate the best-quality sand for our beaches?
- Have environmental impacts from excavation been addressed or do they need to be quantified?
- How can that sand be moved efficiently onto railcars? Prado Dam is adjacent to the major east-west rail line, is there a nearby rail spur or does one need to be constructed for the purpose of loading rail cars?
- Which carrier (for example, BNSF or Coast Rail Services) could provide the most efficient delivery services?
- Are there other permitting or logistical issues related to transport, and could OCTA assist with defining and resolving those issues?
- Can the OCTA-owned siding in San Onofre be used for offloading sand onto trucks for delivery to the beaches in San Clemente?
- Environmental permitting for all of these activities will require a SCOUP permit; County staff have been working on this, on a part-time basis, additional resources should be dedicated.

All of these issues are resolvable. All of them require collaboration. Most of the tasks and work will need to be undertaken by the County at their facilities.

Funding: Mitigation for Sand Deficit Activities

As outlined in the document, the cause of our beach erosion is urbanization throughout Orange County. Therefore, shouldn't all of Orange County help to rectify the damage? Making the coastal communities responsible for remedying the damage to our shared environmental resources would be equivalent to allowing upstream communities to release pollution into our streams, and requiring the coastal communities to deal with that pollution.

A county-wide funding mechanism would address this inequity and should be pursued. If a County-wide funding mechanism is not achievable, then it seems that, at a minimum, the County government could do a more robust job of mobilizing its existing infrastructure and staffing to create an efficient method of getting sand out of its flood-control structures and onto our beaches. The above-mentioned County staff members are working largely outside of their job descriptions, and part time efforts are not enough – a full-time effort should be devoted to this undertaking if it is to be successful.

Structure: Collaborative Working Group

With respect to the type of organization proposed, there is no clear need for a formal Joint Powers Authority (JPA) entity, with offices and staff. A JPA would add another level of bureaucracy that could actually end up delaying projects or siphoning off funding that could be better served actually putting sand on the beaches. Save Our Beaches recommends that the collaborative undertake the

Working Group approach – that could be advanced into a JPA if that model doesn't work (while the reverse would be much more difficult).

My photos of the voting results during the workshops suggest that the "Resource and Regulatory Agencies" indicated a preference for the Working Group model, citing the San Juan Creek Water MOU as a good example, and highlighting challenges with multiple entities having different goals. The group "Property Owners and Representatives" did show a clear preference for a JPA such as SANDAG, but now that both San Clemente and Dana Point have joined the SANDAG project, that preference may have changed.

Our beaches would be better served if the structure of this Working Group remains collaborative and not reorganized into a hierarchical bureaucracy with a lead agency. The city of San Clemente is already advancing options for increasing funds available for beach restoration and they should maintain control over how those funds are allocated, and the same would apply to any entity engaged with the Working Group.

Public Beaches or All Beaches?

Which entities and beaches should be included in the Working Group? The document indicates in several locations that this collaborative will only focus on "public beaches" even as it acknowledges that sand movement does not recognize parcel boundaries and that "coastal erosion knows no political or agency boundaries." About half of the coastline under the collaborative is privately owned, and most of those private entities have been a part of this collaboration since the beginning. If public and private beaches will have different prioritizations, then this should be clearly stated in the final document.

Funding and Prioritization of Projects

The issue of how individual projects are developed, funded and implemented needs to be clearly delineated. Specifically, the question of whether or not the Collaborative (Working Group or JPA), through the guidance of a Lead Agency, should have authority over the individual entities to prioritize projects (beaches) for sand delivery.

Both the document and the presentation suggest that the collaborative would decide which projects within south Orange County would get funding ("*avoid having agencies compete for the same scarce public dollars*") and which beaches would receive sand ("*Strategically deliver resources to areas most in need and where best suited to support the coastal ecosystem") ("assess, prioritize, and advance coastal resiliency projects in the region to deliver resources to areas identified as being most in need.")* and on Slide #16 entitled "Priorities for Developing Projects, those priorities include "*Project Readiness*" *"Regional Benefit" "Nature based Solution"* or *"Critical areas?"*

Is it envisioned that these entities would each allocate an equivalent amount of funding into a shared account, and then vote to determine which beach would get the priority to utilize that funding for sand placement? It seems that the entity providing or obtaining the funding should be able to use that funding to develop and implement projects according to their own priorities.

The SANDAG model of funding illustrates a different approach. SANDAG works towards developing a regional dredging project and then asks each entity whether they want to participate, and then their proportional cost sharing is based upon a formula that is the same for each entity.

This model works because SANDAG will be undertaking one single large project to deliver the sand via dredging. However, for the delivery of inland sources of sand to the beach, there will not be one large project where many beneficiaries can easily do cost sharing. There will not be one dredger servicing many beaches. There will necessarily be many smaller projects to individual beaches.

However, there may be some projects that could benefit from cost-sharing. These projects and opportunities should be more better-defined, through the Working Group collaboration.

Using "Green to Grey Solutions" to Prioritize Projects

I agree with the broad generalization that ecological restoration should attempt to be as ecologically harmless as possible through replication of pre-existing natural conditions. However, I strongly disagree with the oversimplified rating presented on Slide #13 presented at the March 13th meeting. For example, replacing a sandy beach with a cobble beach is not an ecologically sound model as the living organisms typical of a sandy beach cannot survive on a cobble beach – its basically an annihilation of the ecosystem. Alternatively, a multi-purpose Living Reef could, in many iterations, create enhanced habitats while protecting or restoring the natural sandy ecosystem. The sandy beach environment is rapidly becoming an endangered ecosystem in southern California and all efforts should be made to replicate the specific conditions that were originally present. This graphic is oversimplified and should not be used for prioritization of actual projects. Specific environmental conditions at specific sites, along with local stakeholder input, should guide project development, not a rigid oversimplified model.

Sea Level Rise Guidance

The State's (California Ocean Protection Council, 2024) current guidance on SLR for 2050 is now 9 inches, not 3.5 feet, and the document should reflect the latest science.

Conclusion

I applaud this entire effort and Save Our Beaches commits to continuing as a member of the Working Group.

Suzie Whitelaw
President
Save Our Beaches San Clemente

AFFILIATED AGENCIES

Orange County Transit District

Local Transportation Authority

Service Authority for Freeway Emergencies

Consolidated Transportation Service Agency

Congestion Management Agency

April 15, 2024

Ms. Makana Nova
Costal Planning Manager
Orange County Parks
13042 Old Myford Road
Irvine, CA 92602

Via email: SouthCoastalResilience@ocparks.com

Subject: Draft South Orange County Regional Coastal Resilience Strategic Plan

Dear Ms. Nova:

Thank you for the opportunity to review and comment on the draft of the South Orange County Regional Coastal Resilience Strategic Plan (Plan). The Orange County Transportation Authority (OCTA) appreciates the County's effort to develop a formal regional approach to promote long-term coastal resilience. Please see below for our comments:

- As a regional approach to coastal resilience, there are many different agencies and property owners involved in the vicinity of the vulnerable areas identified in the Plan. The continued partnership with the community, local agencies, state, and federal regulatory agencies is integral to the Plan's success. OCTA urges OC Parks to be proactive in conducting all aspects of outreach and ensure that all stakeholders are engaged in a commitment to this effort.
    - In multiple areas in the Plan, there is an assumption that there will be strong support from all stakeholders. Although this may be the case, there should be a vetting process with potential partners that ensures a formal commitment before such assertions are made. It is important to note the potential member agencies were not afforded an opportunity to weigh in on the specifics of the concept during the development of the Plan. It is crucial for member agencies to understand the anticipated roles, responsibilities, funding needs, limitations, and scopes within the purview of each member agency.
- The Plan focuses on sediment deficit caused by development. However, the Plan does not address how sediment would be transported to the beaches. The focus of the Plan appears to be treating a symptom (beach erosion) which would not solve the overarching problem of continual beach recession. We encourage the County to explore opportunities within flood control channels to facilitate natural beach nourishment as well as sand retention structures.

- It is important to note that the Plan cited storm wave damage was the main cause of beach erosion, and not the railroad or the protective structures, as had been cited by some comments received to date on the OCTA Coastal Railroad Resiliency Study.
- In Section 9.1 “Cost Estimates,” there is discussion of the proximity of sand sources and there is mention of OCTA’s involvement and participation in sand transport discussions. It should be noted that there are challenges for OCTA to coordinate railroad transport of sand due to limited work windows since freight and passenger rail; Southern California Regional Rail Authority’s Metrolink and The National Railroad Passenger Corporation all share a single rail line.
    - Upland sources of sand transported using the railroad must be carefully evaluated by the railroad operators to determine feasibility.

Throughout the development of this Plan, we encourage open communication with OCTA on any matters discussed herein. We look forward to continued collaboration as we all strive to better understand ongoing coastal rail infrastructure challenges as well as the County’s plan to protect the recreational resource. If you have any comments or questions, please contact me at (714) 560-5907 or at dphu@octa.net.

Sincerely,

Dan Phu
Manager, Environmental Programs

DP:tc

From: Delaney Inman
To: Delaney Inman
Subject: FW: Capistrano Shores Community - Comments / Questions South Orange County Coastal Resilience Strategic Plan Stakeholder Meeting March 13th
Date: Tuesday, April 23, 2024 10:10:49 AM

Good afternoon,

I wanted to take a few moments and provide some comments and thoughts following the recent South Orange County Coastal Resilience Strategic Plan stakeholder meeting on March 13th. But before I provide my two cents, I wanted to say thank you! This effort and collaboration is so needed. I loved something that Katrina said, "my principal role the last few years has been coordination". I just think that is exactly what this large problem will need to find a viable solution, I know Mrs. Foley has done much more that coordinate and has also been extremely successful in cutting through a lot of the red tape and getting action items done and projects underway. This is also a much-needed component as the red tape is often times the hardest part of bringing solutions to fruition, especially when it comes to the Coastal Commission and our beaches. So, I just want to again say thank you and voice our community's appreciation with this massive effort and undertaking.

1. I would like to request that the Capistrano Shores Community be updated to reflect or check the box "Funding Partner" in Table 1, Appendix E.
2. I was curious if there was any study available or if it would be worth the effort to substantiate the lack of sand supply to this specific littoral cell section i.e., Danap Point Headlands to Cotton's Point and that effect vs sea level rise. I believe for messaging purposes to the general citizens in the area this is an important marketing piece. Having specific language which substantiates this is not a climate change issue that is causing these results on our shores, this is 100% man made. This is upstream development consequences being placed on the shoulders of coastal communities. Greatly affecting tourism, quality of life, threatening infrastructure etc.

Below and attached are a couple of thoughts I had for consideration related to what I believe would be the ideal dump site for San Clemente via rail line. Attached are two aerial images for ease of reference. I think the north end of Capistrano Shores would be well suited for a very large quantity of sand vs a smaller scale. Which could be easily pushed north covering Shorecliffs Beach Club area, Beach Road and of course to the south the Capistrano Shores Community and North Beach.

1. The Poche drop site is potentially 359 yards in continuous length for off-loading via rail. Could get an additional football field length if the fence was removed and included the use of the sand dump section directly across from the Palm Mobile Home Park.
2. Whereas the NB (North Beach) potential drop site is only approximately 119 yards in length.
3. There is large rip rap between the rail and the sand at the NB drop site, which could

further complicate moving the material once unloaded off the rail.

4. Conversely there is no rip rap at the poche dump site.
5. At NB In addition to the rip rap, there is also a constructed fence between the sandy beach and tracks. Which creates a roughly 30’ gap between rail and sand.
6. At the poche site there is no fence on the ocean side of the tracks and can easily dump and place sand directly off the rail within a tight swing. This would be especially convenient and efficient if the rail cars were being off loaded via an excavator.
7. I am only guessing but given the NB dump site is located across or near a train station I would imagine there could possibly be additional requirements to maintain safety given commuters are standing on the platform and may need to have additional safety measures throughout the process.
8. Storing heavy equipment would be challenging for the long term or duration of the project at the NB site given the narrow beach and lack of high ground.
9. Ample dry space for storage of heavy equipment for the project at the poche dump site.
10. Ample high, dry ground for storing sand.
11. Given that there is no fence in place presently on the ocean side of the rail line at the proposed dump site, this would I imagine ease the safety requirements placed on the permit from the RR.

Just a few thoughts I wanted to share. I am sure you have already looked at this but never hurts to put all thoughts on the table.

Thank you,

Eric Anderson
General Manager
Capistrano Shores Inc.
eanderson@caposhores.com
949-351-9642

Review of Draft South OC Regional Coastal Resilience Strategic Plan

Comment Response

Prepared by Ashley Tarroja

4/15/2024

Several comments relate to how the Strategic Plan re-iterates alternatives or solutions that were described with similar detail in the OC Coastal Regional Sediment Management Plan (OC CRSMP). The Strategic Plan should build upon the information already provided by the OC RSMP and have more details specific to implementation for a South OC collaboration. The technical solutions described lack supporting details for evaluating technical feasibility.

- The Strategic Plan proposes alternatives for governance structures and alternatives for addressing beach erosion. The alternative analysis presented for beach erosion do not provide any substantiating, technical evidence to support the recommended alternative of only providing beach nourishment in the near term. Rather, it is presented as the solution that had the most support from the stakeholder meetings; however, the majority of stakeholders did not consist of individuals with relevant technical backgrounds. The calculation for the total estimated sediment volume for beach nourishment is not shown and is stated to be based on the San Clemente Beach Nourishment project (beach slopes for various beaches were not identified). A volume of 4.4 cy of sand required for a 100 ft wide beach along the entire coastline is stated. Historical and existing beach widths are not stated and there was no identification of whether 100 ft width is reasonable for all the beaches (no baseline or historical comparison shown). Beach width of restoration should be based on historical beach width trends as well as estimates of what is sustainable with reduced sediment delivery. It was not identified if specific beaches would be exempt from the required sediment volume if beaches already have a nourishment project, such as the San Clemente city beaches. Sand volumes from appropriate sources were not identified, even though preliminary data is provided in the OC CRSMP. Sediment transport downcoast was not discussed in the beach nourishment alternative. These details are important to evaluate the technical feasibility as well as to evaluate the potential environmental impacts. Beach nourishment does have environmental impacts and requires proper planning and implementation to minimize impacts. It must also be evaluated and determined appropriate for each project site.
- The Strategic Plan only describes the recommended beach erosion alternative which is beach nourishment. The decision to only recommend beach nourishment appears to be premature, based on the following reasoning from Section 4.4 (pages 17 & 18):

  > *Additionally, property owners, their representatives, and NGOs spoke to a need to apply a contextual approach to coastal erosion, applying different solutions to different beaches with different problems. Many stakeholders emphasized that their opposition to a project or program in one context does not mean they are opposed to that project or program throughout the region.*

Due to the specificity of needs of each subregion in South Orange County, beach nourishment emerged as the sole solution that could be implemented regionwide with full stakeholder support. Thus, beach nourishment emerged as the preferred regional solution, and the Strategic Plan was developed with a focus on implementing a regional beach nourishment plan.

A regional plan should not eliminate solutions solely because they may only apply to a portion of the region.

- The greatest benefits of sand placement can be obtained when placing sand upcoast since sediment will be transported downcoast within the littoral cell (refer to "Development of Sand Budgets for California's Major Littoral Cells by Patsch and Griggs, 2007). It is unknown whether transport of sediment was considered in the estimated sediment volume for beach nourishment.
- There is an emphasis on sand mining as a source of sediment for beach nourishment. Reduced cost is explained as a benefit of sand mining; however, increased environmental impacts are not discussed.
- Figure 1-1 requires a citation. Figure 1-3 has low resolution and requires a citation.
- In addition to development of a governance structure, a pilot Sand Compatibility Opportunistic Use Program (SCOUP) for Orange County was identified in the OC RSMP as a high priority activity. OCPW is currently drafting an OC SCOUP; while the SCOUP is intended to create a framework for regulatory permitting and to facilitate the development of sand placement projects, beach managers will be responsible for projects and compliance.
- In Section 1.5, verify participation of the County of Orange for the "Sand Nourishment" bullet. Specify with department of the County is involved.
- In Chapter 2 "Green-Gray Nature-Based Approaches" is bulleted. Is this term referring to hybrid armoring per the 2021 CCC memo?
- Chapter 4 needs to revise the names of the tribes and bands listed. The Luiseño tribe has several bands that are listed without showing the full name. The names shown on the band websites should be used.
- The comprehensive listing of agencies, entities, and organizations that participated in the stakeholder engagement process is as follows lists "County" and "UCI" as stakeholders engaged in development of this document. More specificity is required as to which County agencies and UCI departments were involved.
- Section 4.4 shows "Sand Dunes (Living Shorelines)" in the bullet list. Living shorelines are not always sand dunes. Modify this bullet if it is applicable to more than 1 type of living shoreline or briefly explain that beach dunes are the only applicable living shoreline option. The Strategic Plan does not describe options for living shorelines along the South OC beaches.
- Section 4.5 describes a concern of the GHAD governance being "led by a single engineer". The term engineer should not be used like this. Change to "entity". This phrase is also used within

the disadvantage column for GHAD in Table 5-1. It should be removed from the table since it is not a true statement, rather it is a false perception by HOAs.

- In Chapter 5, the recommended governance structure alternative should have a number associated with it. Additionally, the name of alternative 1 would be clearer if it does not refer to BEACON and the name of alternative 2 would be clearer if it stated, "Ad Hoc or Other Informal Group". Alternative 3 is not a governance structure, rather it is a project specific relationship between USACE and a local sponsor.

- The Strategic Plan does not define which department of the County would be a member of the MOA. Does the Strategic Plan intend to have a specific department within the County be the member of the MOA? OC Parks is the direct stakeholder, but they only own a small percentage of the Orange County coastline. Reference to the County should be replaced with the specific department or participation by the County needs to be described.

- How will the beaches with adjacent private property participate in the recommended governance structure and cost sharing? The Strategic Plan currently identifies HOAs to participate as advisors to the collaboration per Appendix E. A majority (43%) of the beaches in South OC are not city, county, or state beaches. The private properties would still benefit from sand placement projects as the sand will migrate. The details of participation must be addressed, particularly since some of the properties have placed riprap in front of homes which can increase erosion to adjacent beaches.

- Chapter 6 describes the option for a 2% increase in transient occupancy tax or a sales tax (with no percentage recommended) without any duration for the increased taxes described. Durations for the tax increases should be discussed. It also requires showing a budget for the collaboration as justification for the estimated revenue.

- Chapter 7, paragraph 1 erroneously describes beach nourishment as "reducing beach erosion". Beach nourishment does not reduce erosion. It provides additional sediment to be eroded which dissipates wave energy (which is correctly stated in the prior sentence). Modify this sentence to refer to the impacts of beach erosion or remove this part of the sentence.

- Chapter 7 lists benefits of a sediment program; however, a sediment program is not described in the Strategic Plan. Is this referring to a beach nourishment program? It also states that it is endorsed by the CCC in a 2012 memo. The CCC memo does not provide endorsements. The memo supports nature-based adaptation strategies (NBAS) over traditional shoreline protection devices. The NBAS must be appropriate for the project site.

- Chapter 7 mentions the County has a "research partnership" with UC Irvine for shoreline monitoring. The term "research partnership" is not explained. State the researcher and their department and spell out the university name. Explain if the partnership is via funding and if so, verify if the County is funding the researcher's project with a grant or as a consultant. Professor Sander's website states the beach monitoring project is funded by State Parks. It does not mention the County.

- In Figure 7-1, living shorelines should be higher on the scale than beach nourishment for "green" solutions.

- Revise statement in Section 9.2 that states “beach tourism is fundamentally ecotourism”. It is not ecotourism. Beach tourism has environmental impacts resulting from large amounts of people concurrently utilizing the beach and from increased traffic. Ecotourism intends to support conservation and to minimize ecological impacts of tourism. There is no mention of conservation or minimizing impacts from tourism in the Strategic Plan.
- In Table 9-1, have the dollar amounts been adjusted for inflation?
- The Strategic Plan refers to the proposed governance structure as regional collaborative throughout the document. Grammatically, it should be “regional collaboration”. Collaborative is an adjective.
- References are not properly listed. Some references show an agency in place of the author such as the Orange County Coastal Regional Sediment Management Plan that was authored by Everest Consultants and prepared for the County of Orange, USACE, and California Coastal Sediment Management Workgroup. Everest Consultants must be shown as the author, not USACE.
- Appendix C contains a duplicate set of the slides from the meeting presentation. It also contains various documents within the appendix. It requires an introductory statement to summarize the contents and a table of contents.
- Appendix E is difficult to follow due to way it attempts to explain California Government Code for a joint powers agreement. It mixes terms and tries to combine the MOA governance structure with the joint powers agreement structure. It uses the JPA abbreviation for 3 terms (joint powers agreement, joint powers agency, joint powers authority) that it then tries to separate and distinguish. This results in contradictions in the appendix. by trying to separate a. Much of this confusion could be clarified if the JPA abbreviation was used more consistently and with the same terminology used in CA GOV Code Section 6500. The language in this appendix needs to be clarified and better aligned with section 4.5 of the report.
- Appendix F, page 2, mentions shoreline changes via CoastSat. This method should be used with caution and cross referenced with transects. The horizontal accuracy described in Vos et.al. 2019 was 10 meters. It is more applicable for large erosion events.
- Verify creeks listed in paragraph 4, page 8 of Appendix F. San Clemente Creek is listed but location is unknown. Prima Deshecha and Segunda Deshecha are not listed. This paragraph should also discuss how development of the watershed is a major contributor to reduced sediment transport to fluvial sources.

STATE OF CALIFORNIA - NATURAL RESOURCES AGENCY GAVIN NEWSOM, *Governor*

CALIFORNIA COASTAL COMMISSION
South Coast Area Office
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Long Beach, CA 90802-4302
(562) 590-5071

April 18, 2024

Katrina Foley
Orange County Supervisor, District 5
400 W. Civic Center Drive
Santa Ana, CA 92701

Delivered via electronic email: Katrina.Foley@OCGov.com

Re: South Orange County Regional Coastal Resilience Strategic Plan
Coastal Commission Staff Comments on March 2024 Draft

Dear Supervisor Foley:

California Coastal Commission (Commission) staff appreciates the opportunity to review and provide comment on the Orange County Parks (OC Parks) March 2024 Draft of the South Orange County Regional Coastal Resilience Strategic Plan (Strategic Plan). We also would like to acknowledge the significant collaboration that has already taken place to date between interested stakeholders, and several local, regional, and state agency representatives, in the development of this significant plan. Given the inherent challenges of short- and long-term climate change risk factors in Orange County, as well as immediate issues of improving coastal resiliency and increasing public access to and along the coast, there is a need for proactive, risk-based planning that builds coastal resiliency capacity in the region and protects environmental resources along the coast. Moving forward, Commission staff is interested in collaborating on issues of mutual concern such as protecting and restoring sandy beaches and in offering comments and suggestions on the Strategic Plan's outlined approach to implement beach restoration programs and coastal resiliency projects on a regional scale. Commission staff may provide further feedback as the Strategic Plan is finalized and as additional assessments and implementation efforts are undertaken; please consider the below to be initial comments.

Commission Staff Comments

I) Governance Structure and Approach

A) Member Entities and Organizations

The Strategic Plan identifies the importance of creating a multimember agency cooperative agreement and weighs options for how to structure the cooperative agreement. Commission staff generally agrees that there is a strong need for a regional collaborative governance structure for developing and implementing coastal resiliency in South Orange County. Whether the collaborative structure will be pursued through an existing or new entity, it is crucial to engage a wide range of stakeholders

to ensure that there is ample input, data sharing, environmental review, funding opportunities, and monitoring as part of building community resiliency and adaptive capacity. To that end, Commission staff would like to highlight the importance of outreach and engagement with potential non-voting members of the regional coalition (e.g., Capistrano Bay District, Capistrano Shores, Cyprus Shores Community Association, Juaneño (Acjachemen) Tribal Bands, Luiseño Tribal entities, Dana Point Harbors LLC, and various community organizations) and recommends that the Strategic Plan elaborate further on what outreach and engagement with such entities might entail.

In addition to serving as a key permitting authority for coastal resiliency projects, Appendix E of the Strategic Plan also identifies the Commission as a funding partner and scientific/technical advisor. Indeed, Commission staff would like to support this effort by providing advisement and technical assistance, as well as in identifying funding sources and opportunities.

B) Regional Collaborative Approaches

Generally, Commission staff supports whichever regional collaborative approach is ultimately pursued, including the County's preferred approach to create the South Orange County Beach Coalition with an underlying MOA/MOU, so long as the selected structure will allow for ample coordination among multiple entities and will prioritize public and tribal participation. Regardless of the final form, stakeholders will need to identify the main entity (or entities) that would act as applicant(s) for grants and permits, as well as who has the legal authority to propose projects on public/private lands within the study area.

C) Consistency with Applicable Coastal Act/LCP Policies

The Coastal Act includes specific policies that address issues including but not limited to shoreline public access and recreation, terrestrial and marine habitat protection, visual resources, landform alteration, water quality, development design, and public works. The policies of the Coastal Act (and any relevant certified LCPs) constitute the statutory standards applied to planning and regulatory decisions made by the Commission and by certified local governments. Where applicable, the Strategic Plan should make note of this regulatory framework (e.g., on Page 45), as well as acknowledge the laws and regulations of other relevant regulatory agencies.

II) Content Analysis of the Strategic Plan

A) Sea Level Rise

The Strategic Plan's sea level rise analysis is generally consistent with the Commission's approach. The Commission's 2018 Sea Level Rise Policy Guidance discusses sea level rise projections under three scenarios: low risk aversion, medium-

high risk aversion, and extreme risk aversion (H++) as presented in the Ocean Protection Council's (OPC) 2018 Sea Level Rise Guidance Update. However, OPC is currently in the process of updating the State Sea Level Rise Guidance based on evolving science, including the recently released NOAA SLR projections, with adoption anticipated in June 2024. Among other details, the new NOAA report changes how the extreme (H++) sea level rise scenario is discussed. Since Appendix H currently references OPC's 2017/2018 numbers and uses the approach therein, Commission staff recommends referring to the draft OPC update where possible. Also, please reference the 2022 (instead of 2017) NOAA Sea Level Rise Technical Report on Page 5 of Appendix H to reflect the latest available science.

B) Minimizing impacts to Local Sand Supply

For large sections of South Orange County's coastline, there is development (including homes, public facilities, roads, and rail) between the shoreline and the toe of the coastal bluffs. In addition to the erosion of the beach, the coastal bluffs in this area are also extremely erodible and prone to landslides. Section 30253(b) of the Coastal Act is especially focused on shoreline sand supplies and the continued natural movement or delivery of sediment and nutrients in the littoral zone. The Strategic Plan should consider examining opportunities to facilitate the transport of natural bluff material to appropriate locations in the littoral zone. Commission staff have already had preliminary conversations with partners such as OCTA and State Parks on this topic and would be happy to continue providing guidance and technical assistance on appropriate permitting approaches.

C) Coastal Resiliency Program

The Strategic Plan generally identifies the preferred, highest-priority community resiliency solution as a comprehensive, regional beach nourishment program that protects existing infrastructure in place within the study area. The Plan acknowledges that the effectiveness of beach nourishment would decline with higher rates of sea level rise, and therefore the regional collaborative would need to continue to pursue placing larger and larger volumes of sand on the beach in the absence of implementing other adaptation measures. Pages 34-35 of the Strategic Plan explain that in the longer-term timeframe, permanent adaptation measures like the installation of sand retention and shoreline protection structures may need to be implemented. Additional regional coastal resiliency solutions spanning from "green" (soft) to "gray" (hard) are explored in Figure 7-1 on Page 36 and in Appendix D of the Strategic Plan.

Commission staff first and foremost encourage the use of "greener" solutions that prioritize nature-based adaptation planning and restoring natural coastal processes, such as dune creation and restoration of historic sand delivery wherever possible. In addition, Commission staff expresses concerns that the analysis in the Strategic Plan does not differentiate enough between various "gray" protection approaches in terms of their potential for adverse impacts on the environment. If the overall goal of the

Strategic Plan is to ensure community resiliency through the building of adaptive capacity of existing coastal resources such as beaches, then *shoreline protective* devices, as opposed to *sand retention* devices, would not accomplish this goal. Shoreline protection devices (e.g., revetments, seawalls, bulkheads, and other devices that are harden the backshore) do not provide a long-term solution to beach erosion as stated in Figure 7-1; rather, they frequently exacerbate beach erosion and lead to loss of beach area as sea levels rise. This is because their main goal is not to help maintain beach widths, but rather to protect assets inland of the beach. Since shoreline protective devices typically do not lend to helping maintain beaches, they do not conform with Sections 30212 and 30253 of the Coastal Act and equivalent LCP policies (unless they meet the specific circumstances outlined in Coastal Act Section 30235). On the other hand, sand retention devices (e.g., groins, jetties, breakwaters, offshore reefs, and other devices that aim to slow the transport of sand along the shore) could be found consistent with the Coastal Act by serving to retain beach widths and promoting their recreational and economic values.

Given this context, the Strategic Plan should more clearly distinguish and prioritize between the various "gray" protection approaches that are appropriate for maintaining beach width, minimizing adverse impacts on the environment, and maximizing protection of coastal resources and coastal access and recreation. This should at least include incorporating the above context on pages 34-35.

In addition, Commission staff has several concerns about the content and legibility of the text on the right-hand side of Figure 7-1, including some mischaracterizations of various green and gray approaches and their potential benefits and impacts. Commission staff recommends deleting this text from this figure.

D) Adaptation Pathways

Commission staff encourages the regional effort to consider an "Adaptation Pathways" approach as was discussed in previous stakeholder meetings. Such an approach is helpful because analyzing a range of sea level rise scenarios along with a suite of adaptation strategies will better inform a long-term, phased adaptation strategy, which may then allow for interim adaptation strategies to maintain certain beaches and assets while future accommodation, retreat, or relocation plans are evaluated and potentially pursued. This could be addressed in Section 7 of the Strategic Plan within the context of project prioritization with an emphasis on nature-based adaptation solutions. Specifically, the Strategic Plan should acknowledge the importance of adaptation pathway planning; briefly describe how the regional collaborative would identify triggers for adaptation pathways (e.g., what additional information or next steps would be needed); note that Step 4 in Figure 7-3 should be based on an adaptation pathway approach; and include adaptation pathways triggers in the Figure 7-4 framework for prioritizing regional beach solutions. Step 5 in Figure 7-3 (and elsewhere as suitable) should also be expanded to apply the need for on-going

monitoring to projects that are identified and pursued as part of Step 4, as well as to monitoring of identified adaptation pathway triggers.

E) Sand Supply Sourcing

Commission staff underscores the finite scarce nature of beach-compatible sand. Since it will likely become increasingly expensive to maintain a long-term beach nourishment program, especially in the face of beach erosion and flooding exacerbated by sea level rise, then other approaches that focus on sand retention in addition to sand nourishment may be more successful. The Strategic Plan should acknowledge this and note that the selection of adaptation strategies will need to be based on site-specific conditions and adaptation pathway triggers, and will be reviewed for consistency with the Coastal Act (or certified LCP where applicable).

F) Integration with Other Plans

In Section 3 of the Strategic Plan, Commission staff suggests acknowledging the importance of aligning with other state and local planning efforts underway to address climate change impacts from sea level rise and other hazards. These efforts may include but not be limited to the Cities of Dana Point and San Clemente's LCP updates to account for climate change impacts, Caltrans' Vulnerability Assessment and Adaptation Prioritization for its infrastructure in Orange County, OCTA's Orange County Coastal Rail Resiliency Study.

III) Funding Opportunities

The Strategic Plan contemplates various funding sources and opportunities. First, Commission staff expresses support for using sand mitigation fees as a funding source and would be happy to have additional discussions on this topic. In addition, the Commission can further support the Strategic Plan through its Local Assistance Grant Program, which is designed to assist local governments in assessing impacts and planning for coastal resiliency, including adapting to the impacts of climate change and sea level rise, and which contain an LCP planning component. The grant funding could be used to conduct technical studies, economic analyses, public outreach and engagement, monitoring assessments, or other components of the Strategic Plan.

The Commission's grants can be made available to the City of Dana Point and City of San Clemente on a non-competitive, rolling basis. The Commission's staff grant coordinator for the Orange County region will be happy to discuss the grant program details and opportunities with you further.

As a regional entity, the County is also eligible to directly apply to the OPC SB 1 Sea-Level Rise Adaptation Planning Grant Program for additional funding. Two funding tracks will be available for grant applicants: 1) funding for sea level rise adaptation planning (proposals in the pre-planning, data collection, and planning phases) which will be

accepted on a non-competitive, rolling basis, and 2) funding for sea level rise implementation projects that will be accepted on a competitive process starting in mid-late 2024.

Together, these grant programs could provide direct and meaningful funding streams to finalize and carry out the Strategic Plan. The grant programs also focus on ensuring adequate equitable funding for sea level rise adaptation plans and projects that benefit tribal and environmental justice communities in accordance with the Commission's Tribal Consultation Policy and Environmental Justice Policy.

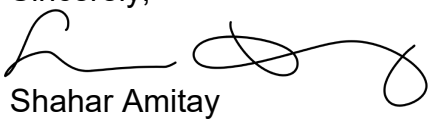
IV) Conclusion

Given the importance of building community resiliency in the face of increasing climate change and sea level rise impacts to South Orange County, Commission staff is keen to engage in ongoing discussions with the County and other interested stakeholders to best support this planning effort. Please keep us apprised as the Strategic Plan is finalized and implemented.

Please note that the comments provided herein are preliminary in nature. More specific comments may be appropriate as the Strategic Plan is finalized. Additionally, the comments contained herein are those of Commission staff only and should not be construed as representing the opinion of the Commissioners themselves.

Thank you again for the opportunity to comment on the Strategic Plan, and we look forward to future collaboration on preservation of coastal resources within Orange County. If you have any questions or concerns, please do not hesitate to contact our South Coast District Office or Statewide Planning Unit.

Sincerely,



Shahar Amitay
Coastal Program Analyst
Statewide Planning Unit

cc: Karl Schwing, South Coast and San Diego Coast District Director, CCC
Shannon Vaughn, South Coast District Manager, CCC
Brittney Cozzolino, Statewide Planning Supervisor, CCC
Liliana Roman, South Coast Resiliency Coordinator, CCC
Mike Killebrew, City Manager, City of Dana Point
Andy Hall, City Manager, City of San Clemente
Makana Nova, Coastal Planning Manager, OC Parks
Susan Brodeur, Senior Coastal Engineer, OC Parks
April Winecki, Winecki Consulting, Inc.

As a San Clemente resident for over half a century, please accept my public comments for the South Orange County Regional Coastal Resiliency Strategic Plan.

I am in support in the efforts of the OC Parks to "proactively address coastal erosion in a coordinated and collaborative manner," but I have some **concerns.** In the draft, under section, 1.5 Efforts Toward Coastal Resiliency, this section captures the reality of the urbanization of the land in Orange County. This is especially important upon the building over of creeks, watersheds, and tributaries for decades. These riparian systems once sustained and replenished sand to our local beaches. However, this natural flow has stopped and/or rerouted the natural flow of sand and sediment.

As a longtime resident of San Clemente of over half a century, I remember the sand dunes that were prevalent at Salt Creek Beach where the Niguel Beach region is located. Sand dunes were also located at Niguel Shores Community and where the Ritz Carlton currently exists. I would like to see the OC Parks webpage document those sand dunes using USGS documentation for that location. Please see the attached photo that depicts the Dunes at Salt Creek circa 1975.

(Photo shared by Chris Mauro on Facebook.)

Salt Creek & Niguel Shores

To further elaborate upon this drastic change, I quoted the U.S. Geological Survey,

> "According to U.S. Geological Survey (USGS) topographic maps, Salt Creek historically began in the southern San Joaquin Hills near what is now the intersection of Golden Lantern and Marina Hills Drive in Laguna Niguel. The upper half of the creek, now filled in and graded over with suburban residential development, ran southwest through a small valley along present-day Marina Hills Drive then south along Niguel Road.[6] It emerges from an underground culvert at the intersection of Niguel Road and Club House Drive and is joined from the east by a tributary from San Juan Canyon. Crossing under Niguel Road, it flows south through a natural channel in the Salt Corridor Regional Park. The Salt Creek Trail parallels the creek from here until the mouth." https://en.wikipedia.org/wiki/Salt_Creek_(Orange_County)

The OC Parks webpage sure mentions the outcome of a 1965 Grand Jury Report regarding Salt Creek, "which stressed the "overcrowding of our parks, beaches and harbors," the County of Orange has continuously sought to acquire more public/recreational areas." [sic] The "land on the island side of Salt Creek was purchased by the Laguna Niguel Corporation, then later AVCO Community Developers. Final acquisition of beach front property was completed in 1968. This land was set aside for private community development, including single family dwellings, condominiums, and apartment complexes." That Grand Jury report was from 1965, but for the past 59 years efforts to minimize development of Orange County and set aside significant mitigated land to protect our open spaces was not done. Conservation measures for land and the planting of diverse shrubs, grasses, and trees should have been done decades ago in all cities. These natural buffers were all removed/destroyed for the sake of development.

According to the OC Parks webpage, the Niguel Shores Revetment Restoration Project has been ongoing for years. The current plans include "the maintenance of the existing rock slope protection along Strands Beach below the Niguel Shores Community. The construction crew will operate from a staging area located within the HOA parking area. The public stairs and ramp will also be repaired at the north end of the revetment area." Only now after decades of neglect are communities remediating the errors and harms of the past.

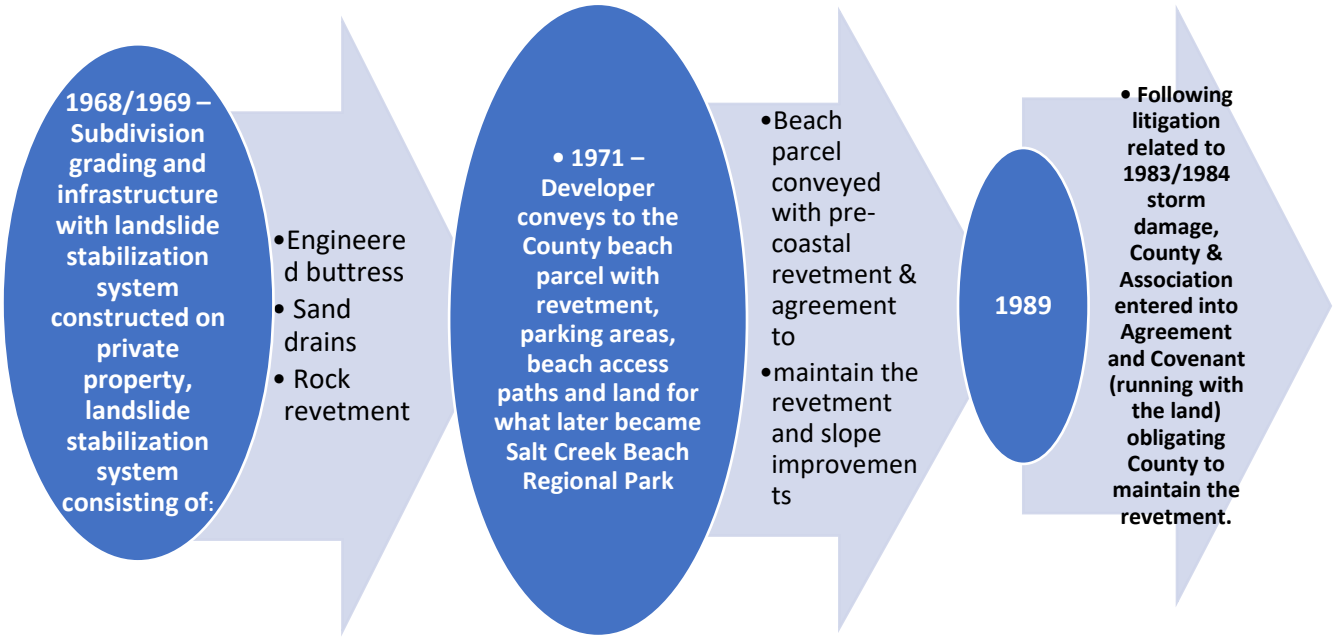
The plan will be from February 26 to late May 2024 as follows:

> "Retrieve and re-stack displaced stone in 100-foot sections
> Import of up to 1,000 tons of rock

Repair the existing northerly access ramps
Repair the existing public, concrete beach stairs”

The "Niguel Shores Rock Revetment Repair and Maintenance Project" of 2021 show that "OC Parks is working to maintain an existing rock shore protection device in Niguel Shores. The Niguel Shores rock revetment protects approximately 1,250 feet of coastal frontage supporting residential bluff-top homes along Breakers Isle within the gated community of Niguel Shores. The project is located in the west-central portion of the City of Dana Point within a pocket shoreline reach bounded by Monarch Point on the northwest and Dana Point Headlands to the southeast." However, this plan only focuses upon shore support structures which does not address the underlying issue of sand replenishment.

To further demonstrate this problem with “The Niguel Shores Revetment Restoration Project of 2021” you only need to review the history of the project broken down in the following timeline:



Coastal Development Permit Review Summary
• 1977-1998 – Coastal Commission takes various permit actions to address landslide damage and County requests to maintain and repair revetment (EME-134, P-80-7056, 5-86-109, 1998 Exemption)
• 2011/2012 – County applies to reconstruct the revetment and Coastal Commission denies permit 5-11-053, finding:
• Revetment must be located as far landward as feasible
• Revetment must be designed sufficiently high to avoid overtopping

• Revetment design must incorporate a public walkway to mitigate adverse impacts to public access
• 2020 – County applies to reconstruct the revetment with Coastal Commission required public walkway; Coastal Commission denies permit 5-19-0288 due primarily to loss of beach area from larger reconstructed revetment footprint."

These plans show a willingness to maintain the area and it address the challenges as a result of litigation. More importantly, it should emphasize that the importance of the Coastal Commission's approval and support in the plan that OC Park or the County introduce. The Coastal Commission denied permits throughout the years. Focus should be done to avoid further denials by the Coastal Commission. Please the attached documents for the presentations.

Dana Point Harbor

The massive construction of Dana Point Harbor has contributed to substantial damage to our regional beaches for over 60 years and it has changed the shoreline and surf. This single structure has had a significant impact upon regional shores, water movement, and sand flow.

It is stated in your draft that "The fundamental goal of this Strategic Plan is to build coastal resiliency capacity in the region by reducing current and future risks from coastal erosion hazards along a 10-mile stretch of shoreline from Dana Point Harbor in the north to San Clemente in the south…" From the beginning of your study, you have identified a hot zone of Coastal shoreline problems, but not creating the correlation between the location and the changes to this region in the last 6 decades. Namely that alteration of the natural San Juan River Creek and adjacent Harbor.

The OC Parks draft report included the section of Urbanization Caused Sediment Deficit, which includes the USACE report of 1991 and 2013 information of the impact of significant development. It states the following:

> Significant development in South Orange County and beyond resulted in the channelization of waterways for flood control, which disrupted the natural flow of sediment supply from creeks and rivers and essentially halted delivery of these sediments to the beach. The urbanization of watersheds, flood-control infrastructure (e.g., dams, reservoirs, detention basin, and channelization and hardening of riverbanks) and sand mining has trapped a significant portion of the fluvial (riverine) sediment in the upper watershed, resulting in an

> overall reduction in the sand supply reaching the South Orange County coastline (USACE 1991, 2013). The now highly reduced sand supply is delivered to the coastline primarily during flood events. During drought conditions, the overall lack of sand in the littoral system is further exacerbated with almost no fluvial sand supply delivered to the coast to nourish the beaches."

As a historical perspective, it is important to have noted that "several large-scale beach nourishment projects were conducted between 1964 and 1980 to place sand from coastal construction projects and upland sources in the vicinity of Doheny State Beach, the effectiveness has diminished over time in the absence of ongoing maintenance or coastal structures to keep the sand in place." This is an admission that there was an absence of ongoing maintenance, but it does not mention which government agency or City had a duty to maintain sand replenishment? Who had a duty to oversee these projects? When errors like this take place, it is usually a result of a systemic error from several stakeholders. Are they at fault for any damages caused by this dereliction of duty?

I am including two photos of Doheny State Beach and the adjacent San Juan Creek. These photos of Dana Point were taken circa 1960's around the time of the construction of the Harbor. The first picture depicts an aerial view taken just south of the harbor construction showing the wide Doheny beach with high quality of white sand. Then second photo is even more important as you can see from the below image is that the San Juan Creek is still in its natural state without concrete fortifications. There is copious sand and beaches along this creek bed and outflow area. Furthermore, you can see the amount of sand in the ocean water.

(Photos by Paul Butler shared on Facebook)

San Juan Creek is the closest creek north of the City of San Clemente. Urban development has had a significant devastation to the natural flow of

sediment. As storm waters would flow down the river, sediment and other detritus would be ground down and become the beautiful white sand that would build up and then be carried down the currents to San Clemente. This was the natural source of our much-needed sand from Dana Point to San Clemente.

This current re-development and modifications to the Dana Point Harbor zone should be questioned and analyzed, to determine what measures OC Parks have done to inspect and analyze the current plans for Dana Point Harbor revitalization project? If nothing was done to stop negative affects from those efforts, that in itself gives rise to a claim that the County of Orange or OC Parks have not been good stewards.

Doheny State Beach includes the jetty or groin called Thor's Hammer was this done to prevent coastal erosion? What was the impact of this groin throughout the years? It would be a good thing to mention the effectiveness as an example of what works. It is my understanding that the City of Newport Beach is on their 13th Cycle of sand replenishment and replenish their groin areas.

The main problem is an accountability from the County of to establish uniform set of standards to have addressed urban development that encompasses every city. For instance, there has been permitting of development without water permits in certain places such as for the development of Tesoro High School. There is limited water in California, but development is not encumbered by that fact. Could it be that Cities are pushing through development projects without water permits and the County does nothing to properly monitor this issue? What about other developments in Orange County that have been approved without water permits? There are plans for development in Rancho Mission Viejo, which they are using old and outdated Environmental Impact Reports, EIR's. They are using EIR 584 and 589, which were done over 20 years ago. The major problem with that is that using outdated EIR's were agreed upon by cooperative agreements that were done by the County, City of San Clemente, Rancho Mission Viejo, and OCTA.

The majority of the residents of San Clemente were not aware of the impact of the cooperative agreement. The city council members agreed not to challenge the County's addendum to the Environmental Impact Report, EIR 584 and EIR 589. A question arises who benefited from this agreement? Was it was Rancho Mission Viejo since they did not have to do new EIR's?

This cooperative agreement included a false narrative that it needed to meet expediated timelines to submit the Los Patrones Parkway Extension, LPPE, for the inclusion of the Master Plan of Arterial Highways, MPAH and to allow the County to apply for funding to advance the design and environmental review of the LPPE, but that is not entirely true. The County stated at the City Council meeting that the County had three (3) years to apply for funding and it was a certain council member who stated that they needed to agree to it right now. Efforts to undue this cooperative agreement and placing the Los Patrones Parkway Extension, LPPE, on the Master Plan of Arterial Highways, MPAH, and the General Plan Amendment. There was only support from one councilwoman to rescind support of the LPPE to be removed from the MPAH and the General Plan Amendment.

These issues highlight a systemic problem in regional design and development that have not conducted systematic and wide-ranging analysis to determine overlapping issues. Many times, individuals may raise concerns or problems, but for the sake of development and keeping to governmental timetables plans have been approved with glaring flaws and omissions.

For example, Senator Pat Bates had proposed two bills, SB 760 and SB 761, and this cooperative agreement basically killed these two bills that would have protected our open spaces, land easements, and mitigated lands from Toll Roads and etc. Rather than seeking a long-term solution, an inadequate agreement was made. At the result of this cooperative agreement, Senator Bates withdrew her Senate bills since this matter was solved at the local level. However, the cooperative agreement was not effective in protecting our open spaces.

It seemed that the County basically favored development by Rancho Mission Viejo rather than the conservation measures. The County favored future development on incorporated lands versus protecting established cities and our open spaces. Perhaps OC Parks should look into legislation to stop building on incorporated lands that does not accurately have the proper permitting such as water permits, current EIR’s, and the infrastructure in place.

As a San Clemente resident of over 50 years, I certainly would not want the annexation of any protected space for this new development. There are open space requirements in place, but land conservation should be a top priority and requirement should be amended to expand in conserving land. Perhaps the open space requirement should require developers in setting aside 50% of land as mitigated land for open space. A key problem that I heard from a Dana Point Coffee chat last summer, where Supervisor Katrina Foley stated that there are thousands of acres at Casper’s Wilderness Park and all it is

doing is sitting there and doing **nothing**. A perspective that views undeveloped land as wasted spaced, undermines to critical role that natural ecosystems have upon adjoining human habituated areas. What is Supervisor Foley expecting it should be doing when this land is a wilderness park and some of the land was set aside under open space requirements?

According to the OC Parks webpage there is documentation of Casper's Wilderness Park. It states the following:

> "Orange County Board of Supervisors, under the direction of Chairman Ronald W. Caspers voted to purchase the southern 5,500 acres of the ranch for use as a public recreation facility. On April 12, 1974 the Starr Viejo Regional Park was opened as a primitive, wilderness day use and camping facility. In June of 1974, Ronald W. Caspers, members of his family and friends were lost at sea in rough waters off the coast of Baja, California. On August 20, 1974 the Orange County Board of Supervisors changed the name of the park to Ronald W. Caspers Wilderness Park in honor and recognition of his foresight in acquiring and preserving this area of quality wilderness. In 1984 an additional 2,100 acres was acquired from the O'Neill Ranch bringing the park's total acreage to 7,600. This 2,100 acre addition was achieved in lieu of open space requirements for development occurring around the Arroyo." [sic]

Each city has its own set of problems that the public has to contend with and that seems to be the result of party politics. Another problem that the public has seen relates to unsubstantiated complaints that permitting for development projects is somehow being slowed down as it was the fault of the Planning Department. Complaints have been about that it is a slow process and this process should be expedited.

San Clemente Issues

The OC Park draft mentions the "vision of the regional collaborative effort would be to actively pursue locally appropriate solutions to produce a more resilient coastline from Dana Point Harbor to San Clemente in an equitable, environmentally, socially, and fiscally responsible manner. That is promising, but the major stakeholder is having the Coastal Commission assisting with permitting of sand replenishment either from Prado Dam, the Santa Ana River, and other places. The problem is also with the United States Army Corp of Engineers, USACE, for sand replenishment and that is a lengthy process and recently the City of San Clemente received cobble instead of sand. It has taken the City of San Clemente to work with our representatives

such as Congressman Mike Levin, Senator Janet Nguyen, and Assemblymember Laurie Davies to help with that matter.

The draft includes the section, Historical Shoreline Trends that mentions a USACE study of the shoreline changes in the Oceanside Littoral Cell. They determined the area to be stable from 1940 to 1960. It also addressed an overall increase in width of the shoreline in the area of Doheny State Beach from 1960 to 1980. The problem began within the following decade and your reported that the "shoreline fluctuations increased and vacillated in the alongshore direction between erosional and accretional. Overall, the shoreline changes from 1980 to 1989 indicated an eroding shoreline downcoast of Dana Point Harbor. (USACE 1991)." The summary of the USACE 1991 report does not include the main cause for this erosion and accretion. Perhaps it was the development of Dana Point Harbor caused this erosion and it was just a matter of time to develop.

The draft summarizes the storm damage along the South County coastline and does not emphasize the damage to drainage systems such as the Prima Desecha drain that runs down parallel to Avenida Pico in 1993. The City's has had its share of problems with storm drains as a result of storms, ancient landslides, and ancient fault lines. We have had problems with landslides throughout San Clemente for decades going back to the 1920's as a result of Capistrano formation and Monterey land formation.

Please see the following link that depicts the storm of 1993, the video is dated January 16, 1993. It depicts storm damage to several parts of San Clemente and damage to storm drains and beach access.

There was damage to the following drains: Mariposa, Palizada, Arlena, Boca De Cannon, and Cazador storm drains. The Mariposa new storm drain failed, along with the "abandoned storm drain." The sewer pipes were intact. There was damage to the Palizada Storm drain and a buried storm drain due to slope failure. Arlena Storm drain damage to the pipes was caused by slope failure. Boca De Cannon drainage was damaged by slope failure and there were multiple of landslides. The water pressure at Cazador storm drain undermined the structure of a building

The high-volume of water caused slope failure at Colony Cove exposing the footings of home foundations. Three homes were unsafe at the location at Camino San Clemente on the bluffs. On East Avenida Pico there was slope failure between McDonalds and San Clemente High School that undermined the sidewalk or land slippage. More high-volume damage caused Coastal canyon failure of slope or headwalls on private property to the bottom of the canyon. This caused debris dams and it blocked canyons. One example was

of a blocked canyon between Lobos Marinos and San Antonio, south-end of town. The storm carved out a ravine on San Antonio causing a shear wall.

There were sink hole formations on Buena Suerte and the approximate size was approximately from 8 to 10 ft deep and 12 ft. across. There was formation of four (4) sink holes at Casa Romantica. One sink hole was at least 6 feet.

There was other damage such as water damage to Califia beach to the gutter, curb, and it undercut the road. As a result of a previous storm, the city had replaced the curb and gutter.

There were mud slides of mud and debris throughout the city in cul-de-sacs and streets covering cul-de-sacs and streets. It was hauled to a to the end of Los Mares and the number of debris and mud was up to 8 ft tall. This was temporary since the water content was too high to take to the landfill.

The following video titled, "Storm San Clemente Storm Damage 1993 (part 2") will show storm damage to several areas. The video was provided to the City by San Clemente Police and Fire Departments and Rick Stevens with R.S.V.P Video Productions. Here is the following link:
https://www.youtube.com/watch?app=desktop&v=8k-2wzqJbNg

Please see the following video titled, "Storm San Clemente Storm Damage 1993 (part 1) and it will show significant storm damage to Avenida Pico and El Camino Real. The video was not shot at the height of the storm as stated by the narrator. Meaning that conditions were even worse.
https://www.youtube.com/watch?v=lyAXMnSI96

I am concerned about Section 1.3 Regionwide Beach Erosion where it states inaccurate comment about activation of ancient landslides that allege that this was a result of a lack of sand supply. Ancient landslides are active in our city for years throughout the city.

> **City of San Clemente:** In 2022 to 2024, activation of ancient landslides has been attributed to the lack of sand supply, which has historically served as ballast on the west side of the railroad alignment to protect landside structures. Landslides at the Casa Romantica and Mariposa Bridge areas have further placed the rail infrastructure along the coastline in danger from erosion

If the draft is referring to the ancient landslide in South San Clemente that was a result of land movement. Pease look at the following SC Times article:

> There was continued "underground movement since the reactivation of an ancient landslide in September 2021 that heightened the cracking underneath four homes within the Cyprus Shore community..." Sand may be "a buffer between the ocean and the bluffs, or the hillsides.," but ultimately when there is cracking underneath from an ancient landslide takes place there is nothing to hold back land from shifting. There is also an ancient fault line that runs parallel to the I-5 in the South end of town. There is groundwater in the south end of town, which also contributed to the problems. There were also problems with storm drains and on April 5, 2022, the "City Council approved appropriations that went toward a Pump Station Relocation project estimated to be more than $2.6 million and a Storm Drain Emergency Relocation of $411,000. The council then approved funding for emergency wastewater operations and storm drain relocation costs that totaled more than $450,000" at its July 19", 2022 meeting.

They do not mention the groundwater in Cyprus Shores that contributed to the problem. According to the Public Works Director in an email to Andy Hall, San Clemente City Manager, he stated that, "In general, west of the I-5 has more permeable soil which can capture water from rain and over irrigation. The captured water can be contained in lenses and eventually finds its way to a low point where it seeps outs, such as, Cyprus Shore, Pier Bowl, coastal bluff, etc." The subject matter of the emails was about ground water at these areas. The draft does not mention the layer of sand, clay, and groundwater that caused the landslide at Casa Romantica.

The City of San Clemente has a history of landslides throughout the town and not just in the Coastal zones and these landslides go back to the 1920's, 1930's, and throughout the decades. For instance, your draft does not mention anything about the storm of 1993. In the article, Storm causes new damage to San Clemente homes by Terri Vermeulen on February 23, 1993 it stated the following:

> "San Clemente City Engineer Bill Cameron said weeks of torrential rain caused parts of three homes on La Ventana to tumble down onto PCH after the steep bluff collapsed. Cameron said about half of one of the homes slid down the bluff late Monday, just hours after a contractor helped to literally cut the house in half in order to try to save at least part of it."
>
> https://www.upi.com/Archives/1993/02/23/Storm-causes-new-damage-to-San-Clemente-homes/2155730443600/

The impact of the storm caused a steep bluff to collapse and this on ocean front property.

Another article, Mud slides, evacuations remain after storm leaves on January 19, 1993, stated the following:

> "In San Clemente, 18 homes and businesses had been declared uninhabitable because of mud slides since Monday night. 'There are a couple we expect to go,' San Clemente Fire Department spokesman Jack Stubbs said. 'It's just a matter of when.' City officials were getting more reports as residents noticed signs of slippage and expected the situation to continue for at least a week. Stubbs said some buildings would require new foundations. 'It's not something you can just dump a load of dirt on,' Stubbs said."
>
> https://www.upi.com/Archives/1993/01/19/Mud-slides-evacuations-remain-after-storm-leaves/9914727419600/

One Los Angeles Times article, On Edge of Destruction : Aftermath: San Clemente city officials and residents assess damage to the homes sliding down hills, businesses destroyed by heavy rains. And the danger may not be over. [sic] by Frank Messina on January 23, 1993 is about a home in another part of town on Calle De Soto https://www.latimes.com/archives/la-xpm-1993-01-23-me-1526-story.html

The article states the following:

> "She has a million-dollar view of the Pacific Ocean through her picture windows, but these days, Tamara Dill keeps the shutters closed tight.
>
> She doesn't want to see what's no longer there--namely, about 6 feet of back yard that has disappeared down a rain-soaked hill. But inside her house on Calle De Soto, gaping cracks appear every day to remind her that the ground is still moving.
>
> And Dill is one of the lucky ones. Four days after torrential rains finished pounding San Clemente, city officials began to assess the damage."
>
> From January 6 to February 28, 1993, a series of storms produced 20 to 40 inches of rain over much of the southern California coastal and mountain areas and more than 52 inches at some stations in the San Bernardino `

The following video titled, "Storm San Clemente Storm Damage 1993 (part 2") will show storm damage to several areas. The video was provided to the City by San Clemente Police and Fire Departments and Rick Stevens with R.S.V.P Video Productions. Here is the following link: https://www.youtube.com/watch?app=desktop&v=8k-2wzqJbNg

Please see the following video titled, "Storm San Clemente Storm Damage 1993 (part 1) and it will show significant storm damage to Avenida Pico and

El Camino Real. The video was not shot at the height of the storm as stated by the narrator. Meaning that conditions were even worse.
https://www.youtube.com/watch?v=lyAXMnSI96

The water was approximately 6 to 10 ft over the top of the culver that passes underneath Avenida Pico.

The picture shows four trapped people above the real estate business.

The following screenshot picture taken shows North Beach flooded west side of the railroad tracks due to all the water coming above the Prima Deshecha drain.

There was significant structural damage to Ernesto's Restaurant and the Holiday Motel, which they had to be torn down. There was a lot of mud and debris that had to be removed on El Camino Real and at North Beach. The Amtrack had to be shut down because of storm damage from the flooding. The railroad had to be shut down and lost revenue was about $400,000. There was additional damage to the Trailer Park as the result of the flooding. The flood took out a lot of the sand and footings underneath of the trailers. There was debris underneath the trailer park from debris that came out of the storm drain.

The following picture is of the Pico Drain that caused damage to the retaining wall which knocked out about 300 to 400 ft of retaining wall. The retaining wall is approximately 30 ft. tall.

There was also damage to a drain at North Avenida De La Estrella. There were bluffs failures to the City of San Clemente and Dana Point. Pacific Coast

Highway was closed from Camino Capistrano to Palisades Drive. There were about 100 to 1000 slope failures that were throughout San Clemente. Also, there were slope failures to the City Hall at 100 Avenida Presidio. Two homes on Calle Sonora had some landslide or slippage.

There are prevalent landslides in the City of San Clemente. One recent study done by LGC Geotechnical, Inc. "performed a limited geotechnical evaluation of the suspected ancient landslide at the former location of City of San Clemente City Hall, 100 Avenida Presidio, San Clemente, California. The purpose of our study was to perform a limited geotechnical evaluation of the site to determine the subsurface, geologic conditions and assess the stability of the site with regard to potential landslide slope stability issues."

The geotechnical report stated the following:

"We understand that earthwork grading was performed shortly before the building was constructed between approximately 1959 and 1960. Grading and construction of the community to the northeast appears to have occurred in the 1960's, shortly after construction of the City Hall structure.

The regional geologic map for the area (USGS, 1999) depicts a large, queried, ancient landslide underlying the former City Hall site and much of the surrounding community (Figure 2). The few geotechnical evaluations performed within this area also suggest the presence of a large landslide."

Sand reuse: Support

I am in support of the County of Orange Parks Department (OC Parks) to implement sand reuse measures as stated "OC Parks and the California Department of Parks and Recreation (State Parks) placed 45,000 cubic yards (cy) of sand from flood control maintenance activities in the Santa Ana River for the beneficial reuse of sand at Capistrano Beach and Doheny State Beach." That was greatly appreciated among several cities. It was a great sign in a positive different and gave hope to the residents of San Clemente.

Thank you for including information that the "USACE is planning to repair the breakwater at Dana Point Harbor and is arranging for the beneficial use of this sediment removed to be placed in the nearshore environment off Doheny State Beach."

Sand nourishment/replenishment: Support

I am in support of the measures that are in place of the USACE and the City of San Clemente continuing a partnership for the placement of 250,000 cubic yard, with the condition that city receives high quality sand. More importantly, that the City of San Clemente does not receive cobble.

However, I am concerned about SANDAG since they have been in support of Toll Road, which the City has fought for years against.

Sand Retention and Nature-Based Projects:

I support that OC Parks and State Parks are pursuing grant funding to construct a nature-based shoreline adaptation project (living shoreline) composed of a vegetated sand dune overlying buried cobble to span the northern reach of Capistrano Beach and southern portions of Doheny State Beach for a total length of 1,150 linear feet.

I strongly oppose any retention structures such as groins, nearshore breakwaters, specifically emergent breakwaters, and multipurpose reefs.

The City of SanClemente is in the second phase of the "Nature-Based Coastal Project" and concluded accepting public comments for the second phase of the study on April 19, 2024. I strongly oppose any plans that would include the use of boulders/cobble to be placed at offshore at North Beach, Mariposa Beach, and Cyprus Shores or any beach in San Clemente. This plan would endanger, threaten, and harm the marine eco-system, the Whale migration, negatively impact the Dolphin and Porpoise population since it would destroy the fish population. It would also hurt the fishing industry.

I strongly oppose the placement of any groins and reefs that would endanger and destroy the marine eco-system. I strongly oppose any plan that is experimental and that is not supported by evidenced based data. I do not support any plans that have been tested in a laboratory setting. The only plan to support in the first phase was to support a living shoreline on the sand.

I support of sand placement or re-use of sand that was done at Capistrano Beach. I also support the re-use of sand through the Sand Compatibility and Opportunistic Use Program, SCOUP, permit for the City of San Clemente. The members of the city council voted to approve the funding for the SCOUP permitting process.

I support Sand Dunes (Living Shorelines) with an exception. I oppose sand dunes with raised sand features. The raised sand features should be identified. I do support habitat for wildlife.

I strongly oppose a Cobble Beach: A beach constructed from cobbles instead of sand.

Sand Nourishment: Support with specification

I support sand nourishment and/or Sand replenishment that the City of San Clemente has partnered with USACE for the placement of 250,000 cy of high quality of sand for this year and will be repeated every 6 years.

Research/Monitoring-support.

I support research that includes evidence-based data. I also support that the flow of sand should be monitored that is within the Oceanside Littoral Cell.

Special districts-oppose

I oppose any special districts since this is a divisive to the city. There is a concern regarding representative to these special groups.

Governance Structures and Collaborative Agreements

I do not support the formation of a Joint Power Authority, JPA, that is "permitted under California State Code Section 6500, which includes two or more government agencies that have agreed to combine their powers and resources to work on addressing and resolving common problems."

The City of San Clemente and thousands of residents fought against the Transportation Corridor Agencies, TCA, against Toll Roads, Managed lanes/ Toll Lanes on the I-5, which would have destroyed established communities, businesses, churches, schools, parks and recreation centers, and open space and mitigated lands in San Clemente for over four years. Residents continued to oppose the Los Patrones Parkway Extension, LPPE, and fought for more years.

There were representatives such as Assemblymember Rocky Chavez who introduced AB 382, Assemblymember Bill Brough who introduced AB 331 and AB 1273, and Senator Pat Bates who introduced SB 1373, SB 760, an SB 761 to protect South Orange County from Toll Roads and the practices of the TCA. The TCA always opposed legislation that would help San Clemente.

As the result of TCA's practices, there were two Grand Jury reports as the result of their massive bond debt.

‘The grand jury recommends the TCA develop and implement a written plan to pay off all debt by 2040, the original maturity date of the initial debt offering." The Grand Jury recommended that the TCA eliminate development impact fees paid by developers once the debt was paid off. The grand jury also recommended merging the Foothill / Eastern Transportation Corridor Agency and San Joaquin Hills Transportation Corridor Agency. By merging the two JPA’s they would save money.

I oppose partnering with San Diego Association of Governments, SANDAG, since they are supportive of Toll Roads. The residents of San Clemente do not trust SANDAG to adequately advocate for the residents of San Clemente.

I am concerned that there has been discussion between SANDAG, Los Angeles County, and BEACON that encompasses five counties. I oppose a Southern California superregional collaborative with these agencies. A larger agency will create a larger bureaucracy and less local control for the City of San Clemente. Being at the end of Orange County causes agencies to not listen to our concerns and not have the best interests for our city.

As San Clemente resident of half a century, I support nature-based solutions that do not hurt, destroy, and negatively impact the oceans. Not only in terms of human activities but the natural ecosystem as well. A key part of this is whale migration namely whale mothers and their calves who swim close to shore, dolphins, sharks, and other protected marine life. All of which can be affected by changes to the ecosystem by breakwaters. The disruption to the natural flow of water and currents can have long-term and possibly irreversible consequences.

I do not support measures that will hurt the Fishing industries and people who depend on this industry for making a living.

I have seen first-hand how development has devastated our creeks, watershed, our tributaries for decades. I hope that a working group that only includes ownership agencies, such as the County, State of California, Cities of Dana Point and San Clemente, and the OCTA. This includes only those who have a vested interest.

Thank you for your time.

Sincerely,

Amanda Quintanilla

Attachment 1
Summary of Edits for Final Strategic Plan

Table D-1
Summary of Edits for Final Strategic Plan

Chapter	Comment Number	Commenter	Comment(s)	Key	Page No. Addressed/Notes
General Comments	1	Ashley Tarroja (OCPW)	Specify County department responsible, OC Parks owns a small percentage of the coastline. Response: The County Department was specifically not identified in the Strategic Plan so this could be determined and identified at a later date when a formalized regional collaborative is formed with an MOA/MOU.	Comment noted; edit is not recommended	N/A
	2	Ashley Tarroja (OCPW)	Specify UCI department involved. Response: edit to (Geomatics and Flood Risk, Department of Civil and Environmental Engineering, University of California, Irvine	Edit recommended	Refer to pp. vi and 7
	3	Ashley Tarroja (OCPW)	"Collaborative" is an adjective, use the term "Regional collaboration" instead. Response: More recently, collaborative has come to be used as a noun referring to an organized group effort, especially one involving a community. Synonyms include collective, joint, and cooperative. (Source: dictionary.com)	Comment noted; edit is not recommended	N/A
Chapter 1	4	Leslea Meyerhoff	The plan should include a mission statement or some general regional coastal resiliency policies? Response: add to final plan or rather MOU/MOA	Edit recommended	Refer to p. ES-1 and Appendix F
	5	Leslea Meyerhoff	Approx. 10 miles, revise to, "Approx. 8 miles" of coastline.	Edit recommended	Refer to p. ES-1
	6	Ashley Tarroja (OCPW)	Figure 1-1 (citation needed)	Edit recommended	Figure replaced; refer to p.1
	7	Ashley Tarroja (OCPW)	Figure 1-3 low resolution	Edit recommended	Refer to p.7
Chapter 3	8	California Coastal Commission	Section 3.2, refer to updated draft OPC Guidelines and NOAA Sea Level Rise Technical Report (2022) for SLR best available scienc	Edit recommended	Refer to edits in p.14 and Appendix I
Chapter 4	9	Makana Nova	Land acknowledgement. Gather additional Acjachemen input	Edit recommended	Refer to pp. 15–16
	10	Ashley Tarroja (OCPW)	Revise tribal bands listed, use names from band website	Edit recommended	Refer to p. 15
	11	Ashley Tarroja (OCPW)	Section 4.5 GHAD – improper use of term "engineer", refer to entity instead, remove disadvantage listed (noted as false perception by HOA's)	Comment noted; edit is not recommended	N/A
Chapter 5	12	Ashley Tarroja (OCPW)	Remove BEACON from Alternative 1 list	Edit recommended	Refer to p. 29
	13	Supervisor Katrina Foley, Orange County Supervisor District 5	Section 5.3 - "South OC Beach Coalition" name in recommendation section of the Plan.	Comment noted; edit is not recommended	N/A
	14	Katrina Foley, Orange County Supervisor District 5	Section 5.3 Name the regional collaborative "South County Beach Coalition (SCBC)". No one says South OC unless you aren't from South OC	Comment noted, edit is not recommended	N/A
Chapter 6	15	Ashley Tarroja (OCPW)	Specify duration of a proposed TOT	Comment noted; edit is not recommended	N/A
Chapter 7	16	Ashley Tarroja (OCPW)	Beach nourishment does not "reduce beach erosion"	Edit recommended	Changed to "combating beach erosion"; refer to p.39
	17	Ashley Tarroja (OCPW)	Terms for sediment management are used interchangeably with beach nourishment program. Use consistent terminology	Edit recommended	Refer to p. 39; terms changed to "beach nourishment program" for consistency
	18	Ashley Tarroja (OCPW)	Figure 7-1 – living shorelines should be higher on the scale than beach nourishment for "green solutions". Explain figure is a scale of green to gray from soft to hard structures	Comment noted; edit is not recommended	N/A
	19	California Coastal Commission	Figure 7-1 – improve content and legibility of this exhibit including some "mischaracterizations" of various green and gray approaches and benefits/impacts, delete text from the figure, Additional correspondence with CCC recommended removing text and adding a footnote.	Questions to ask/discuss	Refer to p. 41 and attached correspondence.

Table D-1
Summary of Edits for Final Strategic Plan

Chapter	Comment Number	Commenter	Comment(s)	Key	Page No. Addressed/Notes
Chapter 7 (cont.)	20	California Coastal Commission	20.Pg. 34-35, distinguish and prioritize "gray protection" approaches that support "sand retention devices" versus "Shoreline protection devices" (revetments, seawalls, bulkheads, and other devices that harden the backshore) are different from "Sand retention devices" (groins, jetties, breakwaters, offshore reefs, and other devices that aim to slow the transport of sand along the shore)	Edit recommended	Redline edits added for consistency of terminology; refer to p. 40.
	21	California Coastal Commission	Emphasis on nature-based adaptation solutions, discuss "Adaptation Pathways" approach with a suite of adaptation strategies to address a range of SLR scenarios	Edit recommended	pp. 34–35; additional edits recommended by Makana Nova; refer to pp. 47–49
	22	California Coastal Commission	Figure 7-3 = Step 4 should be based on an adaptation pathway approach – CCC, create a sub-step edit,	Edit recommended	Add "pursue sand retention devices using…" Makana Nova; refer to p. 47
	23	Ashley Tarroja (OCPW)	Figure 7-3 – Step 5 (and elsewhere as suitable) should be expanded to apply the need for on-going monitoring to projects and pursued as part of Step 4, as well as monitoring of adaptation pathway triggers.	Comment noted; edit is not recommended	Step 5 applies to Steps 1–4; see organizational format of Figure 7-3, p. 47.
Chapter 8	24	California Coastal Commission	Pg. 45 - make note of regulatory framework of Coastal Act and any relevant certified LCP's, acknowledge laws and other relevant regulatory agencies	Edit recommended	Refer to p. 49
	25	Ashley Tarroja (OCPW)	Table 8-1, adjust dollar amounts for inflation, or state that it is not adjusted. Response: add footnote, "Costs are based on year constructed and are not adjusted for inflation."	Edit recommended	p. 54, refer to footnote added to Table 8-1
Chapter 9	26	Ashley Tarroja (OCPW)	Section 9.2 – "beach tourism is fundamentally ecotourism", incorrect statement. Response: remove statement	Edit recommended	p. 61; removed text
	27	Ashley Tarroja (OCPW)	References are not property listed. Example: Everest Consultants must be shown as the author, not USACE.	Edit recommended	Reference updated; see also p. 4
Appendix C	28	Ashley Tarroja (OCPW)	Duplicate slides in attachment, provide an introductory statement to summarize contents	Edit recommended	Appendix C
Appendix E	29	Ashley Tarroja (OCPW)	Mixes MOA and JPA terms, language needs to be clarified and better aligned with Section 4.5	Edit recommended	Appendix E
	30	Eric Anderson / Capistrano Shores Community , General Manager	Reflect Capistrano Shores as a funding partner in Table 1	Edit recommended	Appendix E
Appendix F	31	Ashley Tarroja (OCPW)	CoastSat should be used and cross referenced with transects. It is more applicable for large erosion events.	Comment noted; edit is not recommended	Appendix F
	32	Ashley Tarroja (OCPW)	Paragraph 4, Pg. 8, San Clemente Creek is listed but location unknown. Prima Deschecha and Segunda Deschecha are not listed. Discuss how development of watershed is a major contributor to reduced sediment transport to fluvial sources.	Edit recommended	Appendix F
Appendix G	33	Ashley Tarroja (OCPW)	Address redline comments	Edit recommended	Appendix G
Appendix H	34	California Coastal Commission	Pg. 5, refer to updated draft OPC Guidelines and NOAA Sea Level Rise Technical Report (2022) for SLR best available science	Edit recommended	Appendix H
Appendix K	35	Makana Nova	Provide updated RBSP III estimate	Edit recommended	Dana Point estimate added to Appendix K
	36	Ocean Protection Council	Cost-benefit analysis in Appendix K?	Edit recommended	Email sent April 9, 2024; Ocean Protection Council confirmed acceptance of Chapter 8 and Appendix K on May 1, 2024

Notes:
N/A: not applicable
OCPW: Orange County Public Works
Strategic Plan: *South Orange County Regional Coastal Resilience Strategic Plan*

Attachment 2
Summary of SurveyMonkey Responses

9700 Research Drive
Irvine, California 92618
949.347.2780

ANCHOR QEA

Summary of Survey Monkey Responses

May 22, 2024

Question 1

Survey Participants: 11 total

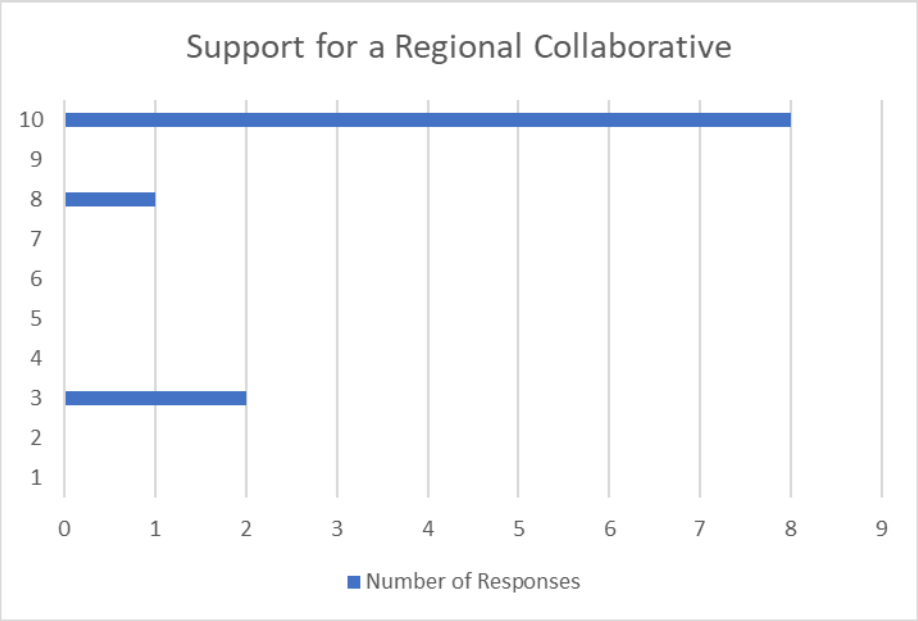
1. **Name:** Toni Nelson
   Agency/Affiliation: Capo Cares
   Position Within Agency/Organization: President/Founder
2. **Name:** Eric Anderson
   Agency/Affiliation: Capistrano Shores Community
   Position Within Agency/Organization: General Manager
3. **Name:** Ciara Belardes
   Agency/Affiliation: Sacred Places Institute
   Position Within Agency/Organization: Education and Community Outreach Coordinator
4. **Name:** Mark Enmeier
   Agency/Affiliation: City of San Clemente
   Position Within Agency/Organization: Mayor Pro Tempore
5. **Name:** Suzie Whitelaw
   Agency/Affiliation: Save Our Beaches San Clemente
   Position Within Agency/Organization: President
6. **Name:** John Ciampa
   Agency/Affiliation: City of Dana Point
   Position Within Agency/Organization: Principal Planner
7. **Name:** Matias Belardes
   Agency/Affiliation: Juaneno Band of Mission Indians – Belardes Group
   Position Within Agency/Organization: Tribal Chairman
8. **Name:** Amanda Quintanilla
   Agency/Affiliation: Not applicable (N/A)
   Position Within Agency/Organization: n/a
9. **Name:** Shahar Amitay
   Agency/Affiliation: California Coastal Commission
   Position Within Agency/Organization: Statewide Planning Analyst
10. **Name:** Karen Morris
    Agency/Affiliation: Capistrano Bay District
    Position Within Agency/Organization: Administrative Assistant
11. **Name:** Joe Wilson
    Agency/Affiliation: N/A
    Position Within Agency/Organization: N/A

Question 2

On a scale of 1 to 10, how supportive is your organization of a formalized regional collaborative for purposes of coastal resiliency planning and project development?

Average level of support: 8.55

Figure D-1
Support Level for a Regional Collaborative

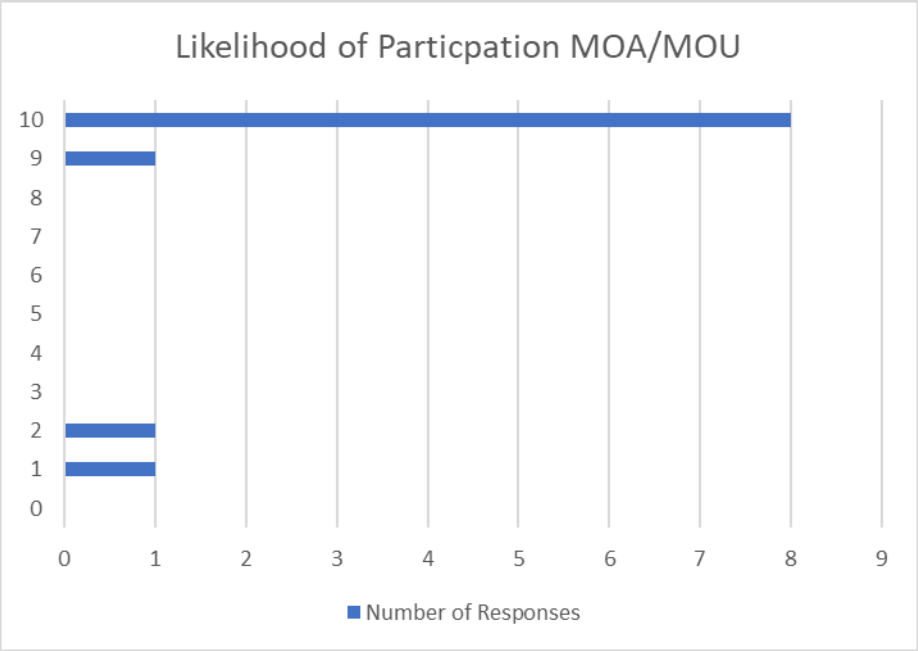


Question 3

On a scale of 1 to 10, how likely is your agency to participate in a regional collaborative, implemented through a MOA/MOU, for purposes of coastal resiliency planning and project development?

Average level of support: 8.36

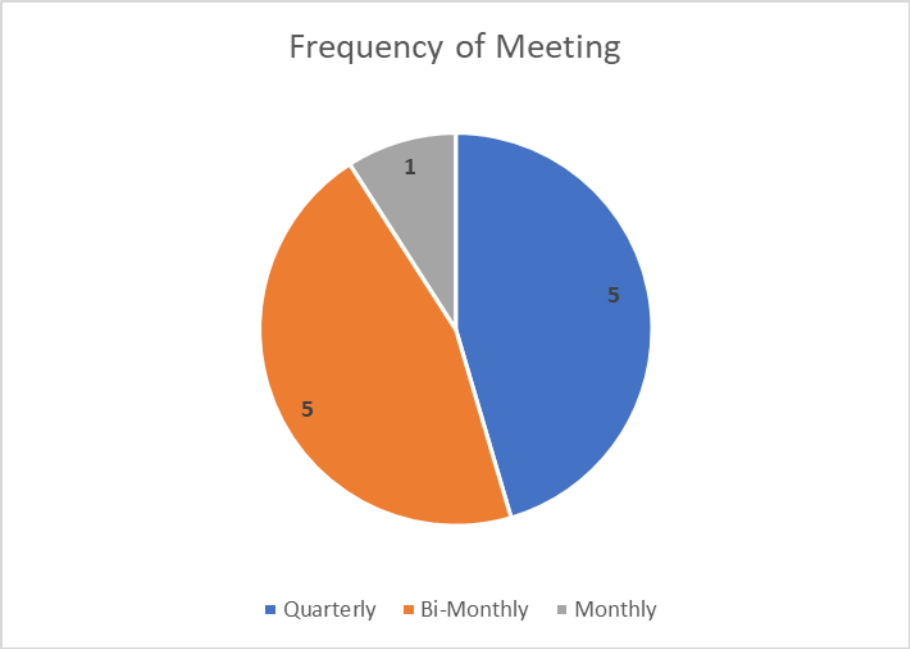
Figure D-2
Likelihood of Agency Participation in MOA/MOU



Question 4

What would be your preferred frequency of the collaborative's meeting?

Figure D-3
Respondents Preferred Meeting Frequency Pie Chart

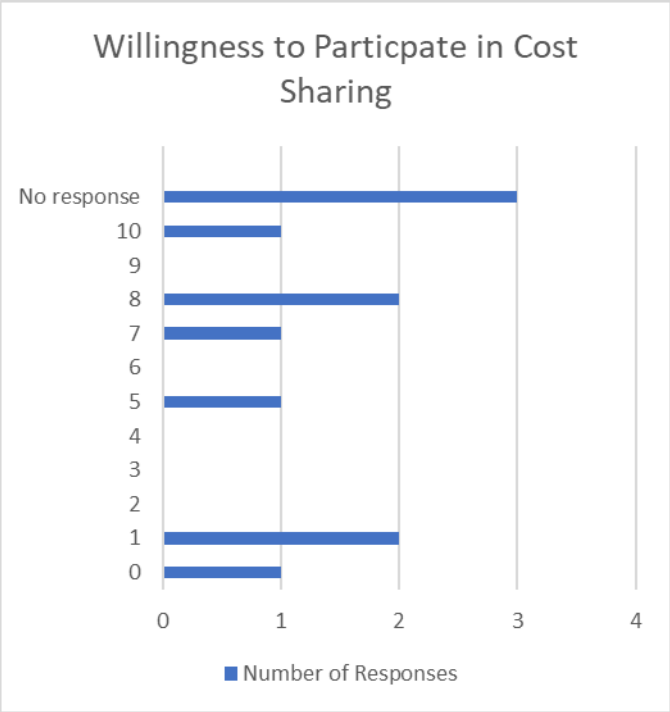


Question 5

On a scale of 1 to 10, would your agency or group be willing to participate in cost sharing contributions for coastal resiliency projects?

Average Level of Support (from 8 responses): 5.13

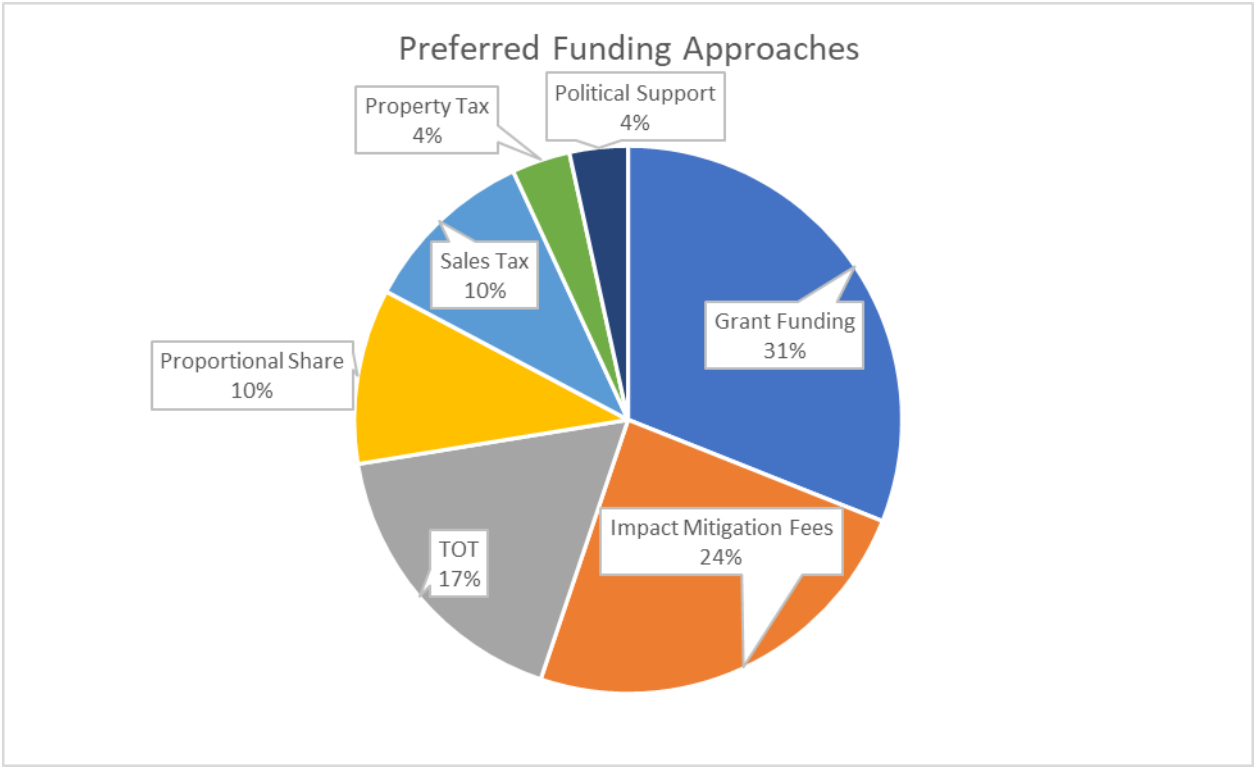
Figure D-4
Group or Agency's Willingness to Participate in Cost-Sharing



Question 6

What are your preferred funding approaches to support a regional collaborative? (Pick 3)

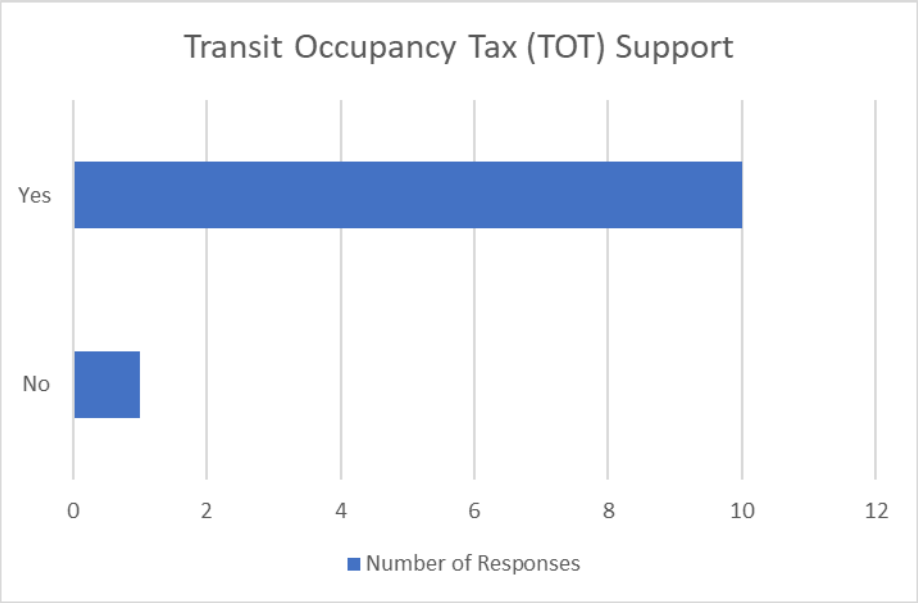
Figure D-5
Group or Agency's Preferred Funding Approaches Pie Chart



Question 7

Do you (as an individual) support a Transit Occupant Tax (TOT) to support coastal resiliency projects?

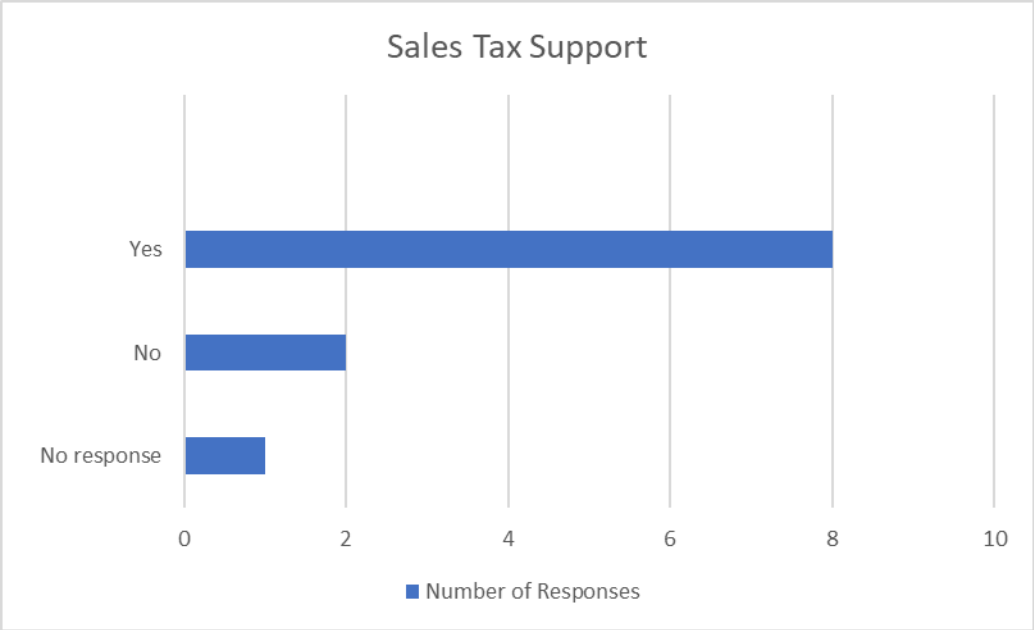
Figure D-6
Individual's Support for a Transit Occupant Tax



Question 8

Do you (as an individual) support a sales tax increase to support coastal resiliency projects?

Figure D-7
Individual's Support for a Sales Tax



Question 9

What are the strengths of the draft South Orange County Regional Coastal Resilience Strategic Plan (What did we get right)?

- Collaborative approach (3)
- Establish a regional effort to address coastal resiliency
- Identifying and rating areas according to beach width/coastal endangerment
- Including public and non-profit coastal advocacy groups in discussions
- Provides an opportunity for private properties to gain permitting through CCC
- Joint permits as the cheapest option to protect vital infrastructure and avoid decades of eminent domain legislation
- Incorporating indigenous perspectives, traditional ecological knowledge, and collaboration with tribal nations (commitment to honoring indigenous voices and fostering meaningful partnerships).
- Public input, stakeholder inclusion
- Understanding the negative impact of urban development to our watersheds, creeks, and tributaries

- Willingness to come up with solutions and study the problems Cities are facing
- Inclusion of several agencies who have a vested interested in solving and protecting our eroding beaches
- Save our beaches, protect property, and keep the railroad functioning
- Focus on sand replenishment, period

Question 10

What constructive criticism can you offer on the South Orange County Regional Coastal Resilience Strategic Plan (What did we get wrong or what should we include in the final version of the Strategic Plan)?

- OCTA's plan and impact of hard armoring, opportunity to insist on environmental studies and assessments for OCTA's proposal, hold OCTA accountable for their role in beach erosion in San Clemente, prevent more hard armoring (2)
- Need to emphasize messaging for public support as a lack of sand supply rather than a climate change/SLR problem
- Need to pull in additional public support (Laurie Davies, Mike Levin, etc.)
- Bring in a PR firm for messaging
- Ensuring ongoing engagement with tribal communities
- Consider unique needs and vulnerabilities of tribal communities to further enhance resilience-building efforts
- More focused on governance and not on coastal resilience (focus more on the required solutions and necessary efforts)
- Incorporate the use of native plants in coastal areas
- Incorporate interpretive signage to address indigenous tribes such as the Juaneño Band of Mission Indians.
- Formation of JPA – possibility of bad actors, lack of accountability & proper management, and fiscal responsibility of creating a separate organization (Example: TCA)
- All bases covered (at least for now)

Question 11

What other comments or questions do you have as the South Orange County Regional Coastal Resilience Strategic Plan is finalized?

- Include non-profits in the coalition
- Including OCTA invites the "fox into the hen house." Need to focus on stopping use of "emergency" strategy to avoid vetting environmental impacts of hard armoring, stalling/ignoring sand replenishment as a better rail protection method
- Shape the messaging

- No tribal acknowledgement was made during the stakeholder meeting on March 13, 2024. Convene meetings aimed at addressing acknowledgement and ensure indigenous voices and concerns are respectfully recognized and integrated into the planning process.
- No public outreach
- A survey limits public comments. Survey should provide the ability to review answers before submitting
- Survey scale from 1 to 10 is not appropriate and should provide for a scale from 0–10 instead.
- Thank you for the hard work toward a collaborative group to tackle coastal resilience! (2)
- We are glad to be part of the solution!

Appendix E
Regional Coastal Resiliency Options

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Regional Coastal Resiliency Options

May 22, 2024

Introduction

Currently, existing and anticipated coastal resilience projects are being implemented by individual agencies or organizations rather than as a regional coastal resiliency option. This *South Orange County Regional Coastal Resilience Strategic Plan* (Strategic Plan) was developed to formulate strategies to minimize beach erosion and reduce wave storm damage and widen the regions beaches, with the ultimate goal of project implementation. A range of regional solutions, as described in the following sections, were presented to stakeholders to select a preferred regional solution. The options included a range of soft (i.e., green), hard (i.e., gray), and hybrid (green and gray) solutions that could increase beach width and provide recreational and environmental (e.g., wildlife habitat or living shoreline) resources and provide shoreline protection for the region's beaches. Both traditional solutions and innovative and/or experimental solutions were presented to the stakeholders for their consideration and feedback.

Soft solutions (i.e., green strategies) are methods using more natural elements (i.e., are nature based) and are considered more temporary and therefore may be more ephemeral. Hard solutions refer to methods that are intended to be in place for a longer period of time or may be permanent, such as structures constructed out of rocks or concrete. For the Strategic Plan, the preferred regional solution is intended to be implemented over the next 10 to 50 years; however, the entire range of solutions will be considered in the future because beach nourishment emerged as a top priority near-term solution and could be the foundation or a first-phase coastal resiliency project.

Shoreline Protection

Shoreline protection structures such as seawalls, riprap, and revetments are installed to prevent further erosion. Examples of shoreline protection structures include the intermittent sections of rock riprap along the seaward slope of the Los Angeles-San Diego-San Luis Obispo Rail Corridor and seawalls or rock revetments along oceanfront homes. Another example is the temporary armor rock and sand cubes that have been used at Capistrano Beach Park, which are anticipated to be replaced with a living shoreline. These shoreline protection structures—which are considered gray, or hard, solutions made from concrete or rock—fix the shoreline position and prevent further erosion. Coastal shoreline protection was not considered for the first phase of the Strategic Plan because it is a site-specific solution that would be best implemented by individual organizations that can tailor the design according to their specific needs. It should be noted that this Strategic Plan is not intended to hinder or otherwise delay the efforts of others in the planning, design, and implementation of current or future projects involving the use of shoreline protection structures.

Beach Nourishment

Beach nourishment is the placement of new sand onto a beach (referred to a receiver beach) to build the beach in elevation and the berm seaward, thus providing wave protection and reducing beach erosion while increasing recreational beach area available to the public and enhancing environmental resources (i.e., shorebird and grunion habitat). Beach nourishment is considered a green, or soft, solution and requires periodic maintenance to maintain beach fill design width. Supplemental, periodic nourishments would be required to maintain a given level of shore protection. The frequency of supplemental nourishments would vary based on sediment supply, wave climate, and longshore transport conditions in the littoral system, as well as the desired level of shore protection. Typically, beach nourishment is constructed by placing sand directly on the beach using hydraulic pumping of sand slurry from a pipeline if the borrow site/source is located offshore (as in the upcoming San Clemente Beach Nourishment Project) or, if sand is from upland sources, using trucks to dump sand (as in previous San Clemente Opportunistic Beach Sand Replacement Program) that is then reworked by dozers.

Beach nourishment can also be constructed by nearshore placement with new sand placed just offshore of the receiver beach that relies on wave action to move the new sand onto the beach. This method of beach nourishment is recommended for use where borrow site sediments are not within the grain size envelope, color, or other constituents of the receiving beaches. Nearshore placement may also be preferred when using a hopper dredge for sediment dredging to reduce overall construction costs.

Beach Nourishment with Sand Retention Structures

Beach nourishment on narrow and erosive beaches would require maintenance as noted previously. Sand retention structures that are green, hybrid, or gray can be used to stabilize the beach and extend the effectiveness of each beach nourishment event by keeping the sand in place longer and optimizing the period of time between each renourishment cycle. This method is currently used in North Orange County at Seal Beach and West Newport Beach, where constructed groins have been successful in maintaining wide beaches. This method is also under study by San Diego Association of Governments (SANDAG) for implementation within the San Diego region pursuant to the SANDAG 2001 Sand Retention Strategy.

By minimizing the loss of beach sand with retention structures, beach nourishment with retention structures improves the protective performance, increases the average beach width over time, and decreases costs from reducing the frequency of supplemental nourishments. On a regional scale, multiple retention structures would likely be needed with construction across multiple jurisdictions. Examples of retention structures are described in the following sections.

The City of Oceanside (located in San Diego County and south of the project study area) has recently initiated efforts to develop "innovative shoreline solutions" for their shoreline to combat shoreline erosion challenges. An international design competition is underway to provide the City of Oceanside with various designs that would provide both beach nourishment options, as well as structural solutions to retain the sand in place.

Groins

A groin is a shore-perpendicular structure that blocks the alongshore transport of sand to stabilize a beach. The structure is typically made of rock, but could also be made of concrete, steel, or wood. An example application of groins is the Newport Groin Field, which contains eight groins spaced approximately 300 feet apart along the West Newport Beach coastline that maintains a wide sandy beach fronting oceanfront homes. The groins inhibit sediment migration, creating reliable sandbars that cause waves to break hollow, which is favored for surfing (USACE 2013). Another example is at Seal Beach; a groin near the Seal Beach Municipal Pier divides the beach into West Beach and East Beach. West Beach tends to be wide and mildly sloping, and East Beach is narrow and steep. Despite the groin, East Beach has chronic erosion problems that are addressed by intermittent beach nourishment and semiannual sand backpassing from West Beach to East Beach (USACE 2013). In South Orange County, Thor's Hammer stabilizes the Dana Point Harbor entrance and functions as a groin, enabling the west area of Doheny State Beach to be relatively wide, stable beach. Groins help to retain sand and maintain wide beaches for recreational and environmental resources and can be constructed with rock and can also be constructed as natural infrastructure, such as living shoreline or living levee.

Nearshore Breakwaters

A nearshore breakwater is a shore-parallel structure made of rock or concrete that blocks incoming waves, allowing sand to accumulate behind the structure and widen the beach. It is constructed just offshore of the beach to reduce direct wave action and sand transport from the beach. In concept, this is similar to the West Breakwater that protects Dana Point Harbor by reducing wave heights in the interior of the harbor. Nearshore breakwaters help to retain sand by reducing wave exposure and maintain wide beaches for recreational and environmental resources. However, nearshore breakwaters could impact adjacent beaches, sensitive nearshore habitats, and recreation, such as surfing.

Multipurpose Offshore Reef

A multipurpose reef is an offshore, underwater structure that provides shore protection, marine habitat, and recreational benefits. A good local example is the 375-acre Wheeler Reef complex designed as a mitigation project for the San Onofre Nuclear Generating Station, although this reef was designed solely to create marine habitat. The Wheeler Reef is generally located offshore of

San Clemente, though the reef complex extends north into the area offshore of Dana Point and south offshore of Trestles.

A multipurpose reef could be designed to cause waves to break farther offshore, dissipating and reducing the direct wave exposure and partially sheltering the beach. The reduced wave climate allows sand accumulation behind (i.e., in the leeside) the reef similar to, but to a lesser degree than, the nearshore breakwater. A multipurpose reef also has the additional benefits of providing habitat for marine wildlife, as well as recreational opportunities for surfing, diving, and fishing. The implementation of a multipurpose reef is still considered to be experimental and lacks proof as a feasible solution and proven design method. Attempts to evaluate the effectiveness of a multipurpose reef for sand retention were being pursued for a site offshore of Fletcher Cove in Solana Beach and at Oil Piers in Ventura County by the City of Solana Beach and U.S. Army Corps of Engineers (USACE; 2007 to 2011) and USACE and the Beach Erosion Authority for Clean Oceans and Nourishment, respectively.

Sand Dunes/Living Shorelines

A coastal sand dune is a raised, alongshore feature along the back of beaches that can naturally occur landward of the beach berm where sand from aeolian transport accumulates (i.e., winds blowing onshore move sand from beach to dune). There are remnant sand dune examples in northern San Clemente, as well as at Cotton's Point/Trestles, for reference. Sand dunes can also be integrated with riprap and cobbles and geotextile fabric to create a living shoreline (hybrid green and gray solution) that could be shore-parallel (such as Cardiff Living Shoreline) or like a living levee concept currently being explored by the City of Del Mar (San Diego County).

Sand dunes protect landward areas by blocking direct wave action and provide recreational and environmental resources. Although sand dunes are typically considered a soft solution as an alternative to shoreline protection, sand dunes can be considered a nature-based or hybrid solution when constructed with a rock revetment or cobble berm core (hard) overlain with sand and vegetation cover. The effectiveness of a sand dune is heavily dependent on the amount of sand fronting the dune and site-specific conditions because the sand movement needs to be balanced between the existing beach and dune. For South Orange County, combinations of sand dunes with beach nourishment and hard solutions (e.g., rock revetment) would likely be needed.

Sand dunes are currently under consideration in Dana Point at Doheny State Beach and Capistrano Beach and in San Clemente as part of the Nature-Based Adaptation Project Feasibility Study.

Cobble Beach

A cobble beach is composed mostly of cobble stone—a larger-grain-size sediment. The larger-sized cobbles make it more resistant to erosion and more stable compared to sand in the same wave

conditions. A cobble beach, which is a soft solution, provides recreational and environmental resources but may be less desirable for recreation compared to a sandy beach and may not be suitable for native wildlife. An example of a cobble beach can be found locally at Trestles.

A cobble berm is currently under consideration in San Clemente as part of the Nature-Based Adaptation Project Feasibility Study.

Sand-and-Cobble Beach

A sand-and-cobble beach is a hybrid beach with a cobble base (cobble mattress) that is covered with sand. Doheny State Beach and Capistrano Beach Park have a mixture of sand with varying amounts of gravel and cobbles from alluvial sediments from San Juan Creek. A sand-covered cobble beach would still provide benefits for recreational and environmental resources but may be less desirable for recreation compared to an all-sand beach and may not be suitable for native wildlife. A sand-and-cobble beach could be used in a beach nourishment program to reduce the costs of supplemental sand nourishments. The feasibility of a sand-and-cobble beach is unclear because of limited research on the design and performance; therefore, additional research (e.g., pilot project) is needed to evaluate this potential solution, as well as many other innovative solutions described previously. The Nature-Based Coastal Resilience Pilot Project at Capistrano Beach Park and Doheny State Beach approved by the California Coastal Commission will help inform this research for the future.

Reference

USACE (U.S. Army Corps of Engineers), 2013. *Orange County Coastal Regional Sediment Management Plan*. Prepared for U.S. Army Corps of Engineers, County of Orange, and California Coastal Sediment Management Workgroup. Prepared by Everest International Consultants, Inc., in association with Science Applications International Corporation and Dr. Philip King. June 2013.

Appendix F
Governance Structure Approaches

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Governance Structure Approaches

May 22, 2024

Introduction, Background, and History

The *South Orange County Coastal Resilience Strategic Plan* (Strategic Plan) was first envisioned in the *Orange County Coastal Regional Sediment Management Plan* (OC CRSMP; USACE 2013). Section 4 of the OC CRSMP contains the core activities targeted for implementation. Activities were ranked as high, medium, and low priority based on a combination of stakeholder interests, perceived needs, recreational benefits, shore protection benefits, funding availability, costs, impacts, regulatory requirements, and ability to be permitted. OC CRSMP activities were designed to ensure implementation of the OC CRSMP.

One of the key recommended activities was the development of a governance structure to facilitate OC CRSMP implementation. The OC CRSMP outlined various types of governance structures that could be used to promote regional collaboration and coastal resiliency project implementation. A governance structure provides a framework for the Strategic Plan to be used, including interpretations, updates, and implementation of particular activities. The governance structure represents a coordinated implementation approach that provides a framework for input from citizens, as well as federal, state, regional, and local entities. Any governance structure to be adopted would require extensive consideration and discussion among coastal public agencies.

This Strategic Plan builds on the efforts started in the OC CRSMP and recommends further collaborative discussions among the many local and regional agencies to consider entering into an Memorandum of Agreement (MOA)/Memorandum of Understanding (MOU) or starting a new Joint Powers Authority (JPA). Draft/example cooperative agreements are included in Attachment 1 of this appendix and are intended to serve as a reference point for formalizing the relationships, roles, and responsibilities to best support Strategic Plan implementation.

The OC CRSMP recommended developing a new JPA following the model laid out by Beach Erosion Authority for Clean Oceans and Nourishment (BEACON). Using the Southern California Association of Governments (SCAG) as the governance structure was not recommended because the SCAG region covers all of Southern California, whereas the focus was on a much smaller geographic subregion.

It was recommended that the JPA would act as the lead planning and coordinating agency that, if adopted, seeks funds, administers grants and studies, assists with implementation activities as deemed necessary by the local implementing agencies, facilitates collaboration on coastal issues, works to fill data gaps, and maintains and updates the OC CRSMP.

Examples of other erosion control measures include seawalls, sand retention reefs, perched beaches, groins, revetments, breakwaters, and headland enhancement.

The OC CRSMP recommended that the JPA hire a dedicated staff member to assist the executive director to specifically manage coastal RSM issues and coordinate with other staff. The executive director would be advised and guided on RSM issues by a committee comprising representatives from regional and local governments, academic institutions, industry, and nonprofit organizations. The executive director would then report to a board of directors.

A governance structure provides a framework for the Strategic Plan to be used, including interpretations, updates, and implementation of particular activities. The governance structure represents a coordinated implementation approach through an entity with appropriate jurisdictional authorities that provides for input from citizens, as well as federal, state, regional, and local entities.

Thus, a fundamental goal of this Strategic Plan is the formulation of the preferred governance infrastructure and cost-sharing framework to ensure coordinated regional coastal resiliency collaboration that will be required for successful coastal resiliency project implementation. To support this outcome, several examples are provided as alternatives for reference and to lay out the types of collaborative arrangements that can be forged among the stakeholders to support the regional goals of coastal resiliency project implementation.

Potential Member Entities and Organizations

The comprehensive listing of agencies, entities, and organizations presented in Table 1 have been identified as the key participants whose involvement is essential to the establishment, function, and success of a regional coastal resiliency alliance regardless of the method of organization or collaborative framework ultimately selected.

Table 1
Matrix of Potential Member Agencies and Other Stakeholders

Agency/ Organization	Potential Roles					Notes
	Member Agency	Scientific or Technical Advisor	Permitting Authority	Funding Partner	Community Advisor	
Federal Agencies						
USACE			X	X		USACE maintains both a Civil Works Branch that directly develops projects in the public interest, as well as a Regulatory Branch that provides permits (Section 10 and Section 404) for project applicants.
USGS		X				Modeling data and science contributions
NOAA, NMFS		X	X	X		Essential Fish Habitat evaluation once a project is identified
USFWS			X			Implements the federal Endangered Species Act in coordination with USACE and other federal agencies once a project is identified
FRA		X	X			FRA's Office of Railroad Safety promotes and regulates safety throughout the nation's railroad industry.
Native American Tribes						
Juaneño (Acjachemen) Tribe of Native American Indians		X				Sovereign Nation/land stewardship, AB 52 consultation once a project is identified
Luiseño Tribe of Native American Indians		X				Sovereign Nation/land stewardship, AB 52 consultation once a project is identified

Agency/ Organization	Potential Roles					Notes
	Member Agency	Scientific or Technical Advisor	Permitting Authority	Funding Partner	Community Advisor	
Kumeyaay Tribe of Native American Indians		X				Sovereign Nation/land stewardship, AB 52 consultation once a project is identified
Tongva Tribe of Native American Indians		X				Sovereign Nation/land stewardship, AB 52 consultation once a project is identified
State Agencies						
CCC		X	X	X		Key permitting agency (Coastal Development Permit) for any coastal resiliency project unless USACE involved, then potentially a federal Consistency Determination instead of a Coastal Development Permit
Santa Ana Regional Water Quality Control Board			X			Key permitting agency for any coastal resiliency project, Clean Water Act 401 Water Quality Certification
State Parks	X		X	X		There are several state parks and beaches located in South Orange County, including Doheny State Beach, San Clemente State Beach, Calafia State Park, and San Onofre State Beach. A right of entry permit may be needed for project construction.
Caltrans			X			This agency maintains El Camino Real, located east of the railroad tracks in the north part of the project area and west of the bluffs/along the beach in the southern part of the City of San Clemente.
California State Lands Commission			X			Key permitting agency (lease of state lands) for any coastal resiliency project

Agency/ Organization	Potential Roles					Notes
	Member Agency	Scientific or Technical Advisor	Permitting Authority	Funding Partner	Community Advisor	
California Department of Fish and Wildlife		X	X			Key regulatory coordination agency for any coastal resiliency project, implements the California Endangered Species Act in conjunction with the USFWS and NOAA/NMFS
California State Coastal Conservancy				X		State agency actively supporting projects along the coast; potential funding partner
California State Association of Counties		X			X	Membership of California Counties
League of California Cities, Coastal Cities Group		X			X	Membership of California Cities
Regional Agencies						
County of Orange	X					County of Orange Parks Department owns and operates beaches and public facilities along the shoreline in South Orange County (Poche Beach, Capistrano Beach, and Dana Point Harbor). Orange County Public Works maintains roads, bridges and flood control channels.
OCTA	X			X		OCTA owns and operates the railroad corridor (including revetment and ROW) in South Orange County along with Metrolink and Amtrak. Metrolink operates railroad operations in South Orange County along with OCTA and Amtrak.

Agency/ Organization	Potential Roles					Notes
	Member Agency	Scientific or Technical Advisor	Permitting Authority	Funding Partner	Community Advisor	
Local Agencies						
City of Dana Point	X		X	X		Local city government responsible for managing public works, zoning, and building regulations under a Local Coastal Program
City of San Clemente	X		X	X		Local city government responsible for managing public beach, recreational amenities and public safety under a Local Coastal Program. The city council, staff and the Beaches, Parks, and Recreation Commission will continue to be involved with the development of the Strategic Plan.
Special Districts and Public Utilities						
SCAG					X	MPO for the greater Los Angeles Region and includes Orange County
Orange County Council of Governments					X	Subregional MPO for Orange County
Capistrano Bay District				X	X	Special district that owns/manages a beach front residential community in Dana Point
Santa Margarita Water District		X				Special district that provides water supply and related infrastructure in the coastal zone
South Coast Water District		X				Special district that provides water supply and related infrastructure in the coastal zone
San Diego Gas & Electric		X				Responsible for delivering electricity and natural gas services in South Orange County

Agency/ Organization	Potential Roles					Notes
	Member Agency	Scientific or Technical Advisor	Permitting Authority	Funding Partner	Community Advisor	
Southern California Edison		X		X		Owns and operates San Onofre Nuclear Generating Station and 375-acre Wheeler North Reef (offshore mitigation reef network)
Private Entities						
Capistrano Shores				X	X	Manufactured home residential community located on the shoreline in San Clemente
Dana Point Harbor Partners, LLC					X	Operates Dana Point Harbor
Cyprus Shores Community Association/HOA					X	Private coastal residential HOA and has formed Save Our Beaches. Located along the shoreline, east of the railroad, in southern San Clemente
Shorecliffs HOA					X	Blufftop private residential community in San Clemente east of the railroad and Pacific Coast Highway; private beachfront property with clubhouse
Cotton's Point HOA					X	Private bluff top residential community in southern San Clemente
Academic Institutions						
Scripps Institution of Oceanography, University of California, San Diego		X				Science advisors in various disciplines, including coastal processes, sea level rise, and shoreline monitoring
University of California, Irvine		X				Science advisors in various disciplines, including coastal processes, shoreline monitoring and economics
NGOs and Not-for-Profit Corporations						
Beach Cities Preservation Alliance					X	Public outreach to members

Agency/ Organization	Potential Roles					Notes
	Member Agency	Scientific or Technical Advisor	Permitting Authority	Funding Partner	Community Advisor	
Bring Back our Beaches				X	X	Community interest group promoting regional beach nourishment
Coastwalk/California Coastal Trail Association					X	Public outreach to members
Chamber of Commerce					X	Public outreach to members
Dana Point Historical Society					X	Public outreach to members
Doheny State Beach Foundation					X	Public outreach to members
Making Young Lives Count					X	Public outreach to members
Orange County Bike Coalition					X	Public outreach to members
Pier Pride					X	Public outreach to members
Save Our Beaches					X	Nonprofit entity of San Clemente residents
Surfrider Foundation					X	Public outreach to members
World Surfing League					X	Public outreach to members
Transportation Entities						
Amtrak					X	National passenger railroad company of the United States. It operates intercity rail service in 46 of the 48 contiguous U.S. states and 3 Canadian provinces.
BNSF						BNSF is one of North America's leading freight transportation companies, operating a rail network of 32,500 route miles in 28 states and 3 Canadian provinces.

Agency/ Organization	Potential Roles					Notes
	Member Agency	Scientific or Technical Advisor	Permitting Authority	Funding Partner	Community Advisor	
Metrolink/SCRRA						SCRRA or Metrolink (reporting mark SCAX) is a commuter rail system in Southern California, serving Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties, as well as to Oceanside in San Diego County. The system consists of eight lines and 67 stations operating on 547 miles (880 kilometers) of track.
LOSSAN Corridor					X	The 351-mile LOSSAN Corridor travels through a six-county coastal region in Southern California and is the second busiest intercity passenger rail corridor in the United States and the busiest state-supported Amtrak route.

Notes:
AB: Assembly Bill
BNSF: BNSF Railway
Caltrans: California Department of Transportation
CCC: California Coastal Commission
FRA: Federal Railroad Administration
LOSSAN Corridor: Los Angeles-San Diego-San Luis Obispo Rail Corridor
MPO: Metropolitan Planning Organization
NMFS: National Marine Fisheries Service
NOAA: National Oceanic Atmospheric Association
ROW: right of way
SCRRA: Southern California Regional Rail Authority
USACE: U.S. Army Corps of Engineers
USFWS: U.S. Fish and Wildlife Service
USGS: U.S. Geological Service

At a minimum, elected representatives from member agencies such as the County of Orange, City of Dana Point, City of San Clemente, Orange County Transportation Agency (OCTA), California Department of Parks and Recreation (State Parks) and representatives from local residential communities and homeowner's associations (HOAs) will need to be at the cooperative agreement "table."

The rationale for identifying the member agencies is based on underlying land ownership or land management responsibilities. "Member agencies" are the agencies likely to be the ones primarily responsible for funding coastal resiliency projects due to an underlying fiduciary responsibility and thus would be the voting members of any such regional organization.

Other non-voting stakeholders will provide valuable input on coastal resiliency project planning and development efforts and will generally include community groups, HOAs, environmental nonprofits, regulatory agencies, science advisors, and others who have an interest in projects but may not be a part of the decision-making process unless they are also a financial contributor.

The leadership would establish the preferred organizational structure and determine if they wanted to form a JPA as a new separate legal entity (similar to BEACON) or if they preferred to be a working group or subcommittee embedded within an existing established organization such as the County of Orange (similar to the SANDAG Shoreline Preservation Working Group).

Once the overall collaborative framework is agreed to, the parties would either enter into a MOA, MOU, or form a JPA. Examples of these collaborative agreements are provided as Attachment 1 of this appendix. These examples are intended to be illustrative and would need to be fine-tuned by the member agencies to outline specific goals, objectives, roles, responsibilities, and projects that the regional collaborative would commit to working on collectively as a unified regional coastal resiliency group.

The group could take on all tasks associated with implementing regional coastal resiliency shoreline protection and enhancement measures, from fundraising to project development, operations and maintenance activities and obtaining funding for project implementation, project delivery and post-project monitoring and reporting.

As previously discussed, the regional collaborative could be established to have committees or focused subgroups who would be tasked with specific aspects of coastal resiliency project implementation such as securing funding, serving as a liaison to other elected officials or technical supporting roles. Much of this would be an outgrowth of the governance structure that is ultimately selected.

The function of the group would be driven by the member agencies though an iterative process once the overall goals are fully articulated and mutually agreed upon. The group may also want to

consider retaining advocacy expertise for both the state and federal levels to assist in obtaining necessary project funding from the state and federal governments.

This list is intended to be a starting point and is based largely on the list of invited groups and participating groups involved in the development of the Strategic Plan. All interested parties, individuals and groups continue to be invited and encouraged to participate in coastal resiliency planning and project implementation efforts in South Orange County.

Information on Joint Powers Authorities

The term "joint powers" is a term used to describe government agencies that have agreed to combine their powers and resources to collectively work on addressing and resolving common problems. The JPA acronym can mean multiple things, including a Joint Powers Agreement and/or a Joint Powers Authority. The Strategic Plan uses JPA to refer to Joint Powers Authority because the text of California Government Code Section 6500 uses that term. The use of joint powers as a consortium of governments and other stakeholders is intended to facilitate collaboration and resource-sharing for mutual support on common actions and goals. The government agencies that participate in JPAs are called "member agencies."

Joint powers are exercised when the public officials of two or more agencies agree to create another legal entity or establish a joint approach to work on a common problem, fund a project or projects, or act as a representative body for a specific activity. Agencies that can exercise joint powers include federal agencies, state agencies, counties, cities, special districts (including HOAs formed as such), and Native American Tribes. Each JPA is unique, as there is no set formula for how governments should use their joint powers. One agency will typically administer the terms of the agreement, which may be short term, long term, or open ended with no sunset clause.

As noted, JPA is an acronym used for the following terms, which are explained in more detail below:

- Joint Powers Agreement (which could be in the form a MOA or MOU)
- Joint Powers Authority

Joint Powers Agreement: A Joint Powers Agreement is a formal, legal agreement between two or more public agencies or entities that share a common power and want to jointly implement programs, build facilities, or deliver services. Officials from those public agencies formally approve a cooperative arrangement. With a Joint Powers Agreement, a member agency agrees to be responsible for building a project or delivering a service on behalf of the other member agencies. This type of JPA can be established through a MOA or MOU. A sample MOA/MOU is included in Appendix E to this Strategic Plan.

Joint Powers Authority: An alternative way to exercise joint powers is to create a new organization or entity that is separate from the member agencies. This organization is known as a Joint Powers

Authority and is a new, separate government organization created by the member agencies, but is legally independent from them.

A Joint Powers Authority shares powers common to the member agencies, which are outlined in a Joint Powers Agreement or MOU/MOA. As mentioned above, a sample Joint Powers Agreement or MOU/MOA for a new entity is included as Attachment 1 to this appendix.

If an agreement's terms are complex or if one member agency cannot act on behalf of all members, forming a new government agency may be the best path forward. This new agency would typically be made up of officials from the member agencies on its governing board. Sometimes public officials establish Joint Powers Agreements specifically to arrange financing by selling bonds. These bonds are then sold to the public as an investment opportunity to create the capital needed to finance the construction of public infrastructure and/or public facilities.

Benefits of Joint Exercise of Powers

A public agency would enter into a Joint Powers Agreement or form a Joint Powers Authority to formally enable the sharing of resources and combining services with the intended goal that the member agencies, and their taxpayers, would save time and money. Officials create these collaborative agreements to reduce costs, be more operationally efficient, and reduce or eliminate overlapping or redundant planning efforts or services. If a public organization relies on a Joint Powers Agreement, the organization is a JPA, regardless of its title. JPAs are distinct and separate from special districts and/or nonprofit organizations, which are described below.

History and Context of Joint Exercise of Powers

In California, the concept of allowing public agencies to share powers started in the 1920s (California State Legislature 2007). The following is a brief overview of the history of JPAs in California as excerpted from a 2007 reference document prepared by the California State Legislature, Senate Local Government Committee (California State Legislature 2007):

- 1921: Senate Bill 18 is approved, which allows any two cities or counties to enter into agreements and provide funds to exercise a power common to each.
- 1941: Legislature authorizes special districts to form JPAs.
- 1943: Legislature allows the federal government and state agencies to enter into JPAs with California counties, cities, and special districts.
- 1947: Legislature approves the formation of a separate government agency—a JPA—to operate independently of its member agencies.
- 1949: Legislature gives JPAs the ability to incur debt and sell bonds to support public facility construction.

- 1985: Legislature passes the Marks-Roos Local Bond Pooling Act, which allows local agencies to form JPAs and sell bonds, then loan the money to local agencies. This practice, known as bond pooling, saves money on interest rates and finance charges.
- 2000: Legislature formally establishes the Joint Exercise of Powers Act.

Governments get their authority to work together from the Joint Exercise of Powers Act (see California Government Code Section 6500, et seq.). JPAs can exercise only those powers that are common to their member agencies. JPAs meetings are open to the public and subject to the Ralph M. Brown Act. Further, JPAs must follow the Public Records Act, the Political Reform Act, and other public interest laws that ensure political transparency. Special legislation allows some nongovernmental organizations to participate in Joint Powers Agreements, and specific Tribal governments have special statutory authority to enter Joint Powers Agreements.

JPAs differ from other forms of government because they are the only type of government formed by mutual agreement. Unlike other governments, JPAs are not formed by signatures on petitions, and they are not approved by a vote of the people. Public agencies create JPAs on a voluntary basis.

The formation of a JPA begins when public officials negotiate a formal agreement that spells out the member agencies' intentions, the powers that they will share, and other mutually acceptable conditions that define the intergovernmental arrangement. Each member agency's governing body then approves the Joint Powers Agreement, which is, in effect, a mutually negotiated document that governs and guides the resulting arrangement. Each JPA is unique, reflecting a mutually acceptable agreement among public agencies that have joined together for a common purpose, which in this instance is to develop coastal resiliency projects that benefit residents, businesses, and visitors to South Orange County.

If a Joint Powers Agreement creates a new JPA, the JPA must file a Notice of a Joint Powers Agreement with the secretary of state. Until public officials file those documents, a JPA cannot exercise any of its powers or incur any debts, liabilities, or obligations.

An agreement that creates a wholly new JPA describes the size, structure, and membership of the JPA's governing board and documents the JPA's powers and functions. As a legally separate public agency, the JPA can sue or be sued, hire staff, obtain financing to build public facilities, and manage property. Joint Powers Agreements usually protect their member agencies from a JPA's debts or other liabilities.

An example of a JPA that created a new legal entity for the purpose of coastal resiliency is the BEACON located in Ventura County. Since its formation, BEACON has shifted away from an implementation-focused mission toward a research- and study-focused mission, which differs from the goal of this Strategic Plan.

JPAs differ from other local governments in another important way. Before counties, cities, and/or special districts can issue revenue bonds, they need majority-voter approval. However, a JPA can issue revenue bonds without holding an election. State law allows a JPA to issue revenue bonds without voter approval, provided that each of the JPA's member agencies adopts a separate local ordinance.

Key Value of a Joint Exercise of Powers: Developing Unified Solutions to Common Problems

A joint exercise of powers can allow multiple agencies to collectively solve common problems and secure federal and state grants to aid in project completion. A joint exercise of powers allows local officials to deliver enhanced services and to deliver them more efficiently by combining resources, talents, and funds.

Orange County and local cities can form a JPA (via agreement or establishment of an authority) for coastal resiliency planning and project implementation purposes. In this instance, the JPA member entities would work together to solve regional coastal erosion problems within and beyond county lands and city limits. The JPA would bring together experts from several agencies to develop regional or subregional strategies, such as solutions for southern Orange County because they are all within the same part of the Oceanside Littoral Cell.

JPAs perform many functions, although many perform only one service. There are no official categories for the types of JPAs, but their services fall into five broad groups: public services, financial services, insurance pooling and purchasing discounts, planning services, and regulatory enforcement. Agencies create JPAs to deliver more cost-effective services, eliminate duplicative efforts, and consolidate services into a single agency/entity.

JPAs can use the Revenue Bond Act of 1941 and the Marks-Roos Local Bond Pooling Act of 1985 to generate public capital. Public officials use JPAs to finance the construction of public works, such as the types of coastal resiliency projects contemplated in this Strategic Plan. These authorities sell Marks-Roos bonds to finance public improvements, such as a new jail, local golf course, or parking lot. The California Debt and Investment Advisory Commission estimates that more than half of all JPAs formed since 1985 issue Marks-Roos Act bonds for public improvements (California State Legislature 2007).

JPAs offering insurance-pooling and reduced-price purchasing options usually involve agencies that want to buy insurance or supplies and equipment for their member agencies, such as leasing or purchasing a regionally based dredge that has been discussed in the context of regional coastal resiliency planning efforts recently (i.e., dredge consortium to lease or buy a dredge).

Funding Needs and Strategies

A JPA will need money to operate. The two most popular funding methods are either creating a revenue stream or raising capital by issuing bonds. Although JPAs do not need voter approval before issuing bonds, each member agency must pass an ordinance. Those ordinances have a 30-day period in which voters can object by signing referendum petitions that trigger an election. If there is no referendum petition or if the petition fails to qualify, the JPA can sell the bonds and use the proceeds to build identified coastal resiliency projects or buy equipment.

JPAs that provide financing and sell bonds for multiple agencies pay for their operations by collecting fees from their member agencies for the JPA's bond services. Fees for a regionwide project could potentially be decided by percentage of shoreline of the overall region that each entity owns (Table 2).

Bond transactions are complicated and require skilled financial professionals to ensure that the bond sales meet legal and market requirements. Large JPAs providing financial assistance hire financial experts and sell their services to local agencies that want to issue bonds. Marks-Roos Act bonds have the following features:

- Do not require voter approval or a referendum before a JPA can issue the bonds
- Can be issued at a public sale or privately, which provides more flexibility in finding a buyer who is best suited for the bond
- Can be sold as one large bond with the proceeds loaned to its member agencies, which reduces extra loan fees and other charges

A Joint Powers Agreement outlines the terms for ending the agreement. For JPAs that issue bonds, there would be provisions on how bonds would be repaid, regardless of whether the JPA is still operating. The assets that a JPA acquires during its operation would be divided among the member agencies, following the agreement's terms.

Like other local agencies, JPAs must follow the Ralph M. Brown Act, the California Public Records Act, the Political Reform Act, and other public interest laws. They must print agendas and permit the public to participate in their meetings.

The Joint Exercise of Powers Act does not allow a JPA to levy new taxes or assessments. However, a JPA's member agencies could levy their own taxes or benefit assessments and contribute the revenues to the JPA's operation. But the member agencies must still comply with the California Constitution and state law when levying taxes or assessments.

Table 2
Summary of Shoreline Length and Percentage by Jurisdiction/Entity

Municipal Jurisdiction	Entity (Ownership/Management Responsibility)	Shoreline Length (Miles)	Percentage of South Orange County Regional Shoreline
Dana Point	Dana Point Beaches (County)	1.22	13%
	Doheny State Beach (State Parks)	1.35	15%
	Capistrano Beach Park (County)	0.21	2%
	Capistrano Bay District (Private)	1.46	16%
	Poche Beach Park (County)	0.04	0.4%
	Poche City Beach (City)	0.2	2%
San Clemente	Shorecliffs Beach Club (Private)	0.05	1%
	Capistrano Shores Mobile Home Park (Private)	0.69	8%
	San Clemente City Beaches (City)	2.13	23%
	Calafia State Beach (State Parks)	0.27	3%
	San Clemente State Beaches (State Parks)	0.36	4%
	Cyprus Shores HOA Beach (Private)	0.3	3%
	Cyprus Cove HOA Beach (Private)	0.3	3%
	Cotton's Point Estates HOA Beach (Private)	0.25	3%
	Breakers HOA Beach (Private)	0.25	3%
	OCTA Railroad, Revetment, and ROW Along Beach[1]	7.3	80%
Total Shoreline Length in South Orange County Study Area		**9.08**	**100%**

Note:

1. OCTA railroad, revetment, and ROW along beach overlap with other entities; therefore, the sum of the total is greater than 9.08. The 7.3 miles of shoreline length are OCTA operated in conjunction with Metrolink, LOSSAN Corridor, and Amtrak.

Difference Between a JPA and a Special District

A JPA is distinct from a special district, though they may provide similar services. A special district is a separate local government with its own governing body that delivers services to a particular area. Special districts rely on state laws for their legal authority and elected or appointed boards of directors for their governance.

The legal authority for all JPAs comes from the California Joint Exercise of Powers Act. The formation of a JPA is relatively straightforward and requires only the signing of a Joint Powers Agreement by the member agencies. In contrast, procedures to form a new special district usually includes the approval by the Local Agency Formation Commission and may include voter approval.

Advantages and Disadvantages of JPAs

Potential advantages of establishing a regional coastal resiliency JPA include the following:

- JPAs are flexible and relatively easy to form. The Joint Exercise of Powers Act allows any government agency to participate in a JPA. The act permits the member agencies to negotiate their levels of commitment and structure their own governing boards.
- JPAs may be more efficient than separate governments. JPAs allow local agencies to join forces and tackle issues together. The personnel, expertise, equipment, and property of each agency can be consolidated, promoting economy and efficiency.
- JPAs finance public works. JPAs can finance physical improvements and can jointly purchase equipment, finance insurance pools, refinance member agencies' debts, and provide working capital by selling bonds.
- JPAs cooperate on regional solutions. JPAs serve as public forums for regional problems, providing residents with the opportunity to focus on regional issues.
- JPAs can assist communities in finding grants. Local agencies form JPAs to pursue grants to fund better services, start new programs, or purchase equipment. Participation in a JPA helps local authorities show the granting entities that they are cooperating on regional problems and not competing with each other for grant funds for separate projects.

Potential disadvantages of having a JPA include the following:

- JPAs require mutual trust to form. Getting separate public agencies to cooperate can be hard because each organization has its own powers, purposes, and politics. Sometimes it can take a while to build the trust that is required before public officials are ready to sign a Joint Powers Agreement that puts the common good ahead of individual needs.
- JPAs can be hard to keep together. Because a Joint Powers Agreement is merely a voluntary relationship among the member agencies, local problems may threaten to split up the JPA. Changes in local public support, new political leaders, or financial pressures may cause a member agency to reconsider participating in the JPA. If a member agency decides to leave the JPA, the departure may harm the JPA's long-term bonds or purchasing programs.
- JPAs can be hard to dissolve. To avoid the financial problems that can result if member agencies pull out of JPAs, some Joint Powers Agreements include specific protocols that make it difficult to dissolve the agreements. To keep petty problems from splintering a long-term JPA, a dissident government may have to give the other member agencies months or years of warning before dropping out.
- JPAs can be complex. Some people see JPAs as an additional and unnecessary layer of government, even when that may not be the case. Local residents may ask why they must call the JPA instead of a local office for answers to their questions. When agencies

combine forces or create a separate agency to provide a service, the visibility and accountability of the JPA may not be readily apparent.

JPAs can be a successful approach to achieving intergovernmental cooperation, which can save money and time for local agencies and their taxpayers/constituents.

JPA Fundamentals

In general, each of the JPAs shown in the four examples has the following organizational elements:

- Member Agencies (voting members, usually elected officials from the county and cities)
- Ex-Officio Members (non-voting members, such as regulatory entities)
- Scientific/Technical/Academic Advisors (non-voting members)
- Community Advisors and Nongovernmental Organizations (non-voting members)

Most JPAs' governing boards have five or seven members, but state law does not require a specific number. Each Joint Powers Agreement outlines its own rules about how its board will be set up, keeping in mind that each member agency will want to be sure that its interests are represented.

The member agencies that created the Joint Powers Authority pay for the organization's operation. Their Joint Powers Agreement usually spells out how much each member agency contributes, based on such factors as its projected use of services.

There is no fixed time frame for a JPA duration. Member agencies can dissolve a JPA when it no longer serves their interests, or a predetermined termination date may be part of the Joint Powers Agreement.

References

California State Legislature (California State Legislature, Senate Local Government Committee), 2007. *Governments Working Together: A Citizen's Guide to Joint Powers Agreements*. August 2007.

USACE (U.S. Army Corps of Engineers), 2013. *Orange County Coastal Regional Sediment Management Plan*. Prepared for U.S. Army Corps of Engineers, County of Orange, and California Coastal Sediment Management Workgroup. Prepared by Everest International Consultants, Inc., in association with Science Applications International Corporation and Dr. Philip King. June 2013.

Attachment 1
Draft Joint Powers Agreement and Memorandum of Understanding

9700 Research Drive
Irvine, California 92618
949.347.2780

ANCHOR QEA

March 4, 2024

~ Draft Examples ~

South Orange County Regional Coastal Resiliencye Strategic Plan

Joint Powers Agreement (JPA)

and

Memorandum of Understanding (MOU)/ Memorandum of Agreement (MOA)

South Orange County Shoreline Management Authority Joint Powers Agreement

This presentation reflects the Agreement made between the _____, hereinafter collectively or individually referred to as "Member Agencies" of the South Orange County Coastal Resiliency Authority (SOCCRA). This document reflects the Joint Powers Agreement (JPA) with an effective date of _____, 2024 as hereunder agreed to by the Member Agencies.

RECITALS

A. Member Agencies recognize the urgent need for a coordinated, regional, littoral sand cell and sediment management planning of beach and shoreline areas in order to maximize benefits to the region and avoid unwanted or adverse effects to adjoining shorelines.

B. Member Agencies believe that the joint exercise of their powers will provide the foundation for a regional organization capable of:

- *Developing beach sand replenishment and retention planning and management projects and;*
- *Protection and enhancement of the public beach, sand and shoreline resources and;*
- *Protection of critical public infrastructure along the coast of South Orange County.*

C. Member Agencies wish to create a regional organization that will collaboratively pursue and develop coastal resiliency and protection projects of public use and benefit.

D. Member Agencies will make comments to other Member Agencies and granting agencies regarding projects pursuing federal, state, regional, and local grants and/or regulatory permits and/or approvals to optimize collaboration, coordination, and cooperation to best serve local and regional interests.

E. Member Agencies believe that a regional organization directed by elected, appointed, or otherwise senior officials from each Member Agency is best suited for this area-wide beach sand replenishment and retention planning and project development task.

NOW, THEREFORE, in consideration of the recital and the mutual obligations of the parties herein expressed, Member Agencies agree as follows:

1. Definitions

The following terms shall have the meaning ascribed to them within this section unless the content of their use dictates otherwise:

A. "North Oceanside Littoral Sand Cell" shall mean a geographically designated coastal compartment with specified supplies and loss of sand and defined transport mechanism paths.

B. "North Oceanside Littoral Cell" shall mean the sand transport cell extending generally from just south of Dana Point Harbor to San Mateo Point in San Clemente near San Onofre State Park.

C. "Fiscal Year" shall mean that year beginning July 1 and ending June 30.

2. Establishment of the South Orange County Coastal Resiliency Authority (SOCCRA) Joint Powers Agreement (JPA)

There is hereby created the SOCCRA JPA to be known and denominated as the South Orange County Coastal Resiliency Authority (SOCCRA), which shall be a public entity separate and apart from any Member Agency. This Joint Powers Agency is established under authority of Title I, Division 7, Chapter 5 of the California Government Code (§6500 et seq.) with all powers and authority of such an agency, as hereunder more fully described.

The SOCCRA JPA shall be governed by the terms of this Joint Powers Agreement and any Bylaws passed and adopted by its governing board.

3. Purpose of the SOCCRA JPA

The various Member Agencies have a strong, common interest in the preservation and restoration of sandy public beaches and protection of public beaches and critical public infrastructure located along the coastline. The maintenance of wide, sandy beaches helps promote continued safe public access to the beach and to protect against costly property damage and, further, benefits the entire region economically by promoting a wide variety of no-cost and low-cost public recreation opportunities and continuing to support a visitor-based local and regional economy. Furthermore, because sand moves generally from north to south in the northern part of the Oceanside Littoral Cell, beach restoration activities undertaken in one area may affect the character of the shoreline in adjoining jurisdictions.

Therefore, the purpose of the SOCCRA JPA is to foster greater cooperation toward the maintenance and enhancement of the beaches within the jurisdiction of the SOCCRA JPA Member Agencies.

4. Objectives of the SOCCRA JPA

The primary objectives for which the SOCCRA is created are as follows:

A. Identify green, grey, and hybrid solutions to address and abate coastal erosion.

B. Coordinate the use of local, regional, state, federal, and private resources.

C. Facilitate design, financing, construction, and maintenance of beach restoration, shoreline protection, and coastal enhancement projects.

D. Collect and analyze data needed to facilitate the design of projects and to monitor their performance.

E. Coordinate local government involvement and keep elected officials and citizens informed.

F. Support the preparation of contingency plans by Member Agencies to be ready in emergencies, to direct public and private efforts to combat erosion, and to take steps necessary to coordinate the protection of public infrastructure and private property.

G. Spearhead local government lobbying efforts at the state and federal levels to secure funding.

5. Authority of the SOCCRA JPA

The SOCCRA is granted the authority by this JPA to:

A. Review emerging proposals for beach restoration, shoreline erosion control, and enhancement projects for consistency with local and regional goals, policies, and programs.

B. Comment on such proposals to Member Agencies and appropriate State and Federal agencies.

C. Propose and participate in joint or area-wide projects for beach restoration, shoreline erosion control, and protection projects.

D. Act as agent for regional project applications for beach restoration, shoreline erosion control, and shoreline protection and enhancement projects.

E. Coordinate funding for beach restoration, shoreline erosion control, protection, and enhancement projects from private and public sources at the local, regional, State, and Federal levels.

F. Adopt and amend Bylaws, rules, and regulations as may be required for the conduct of meetings and the orderly operation of the organization.

6. Limitation of Authority

Neither the SOCCRA JPA nor a majority of the members thereof shall have the authority to impose any plan, duty, obligation, or other responsibility upon any Member Agency thereof without the

consent of such Agency; further, no Agency shall be required to do anything it does not specifically agree to do. Any recommendations, plans, or programs promulgated by the SOCCRA shall be advisory only as to Member Agencies.

7. Governing Board of the SOCCRA

All powers of the SOCCRA shall be exercised by the Board of Directors. The Board of Directors shall be composed of one designated representative and one alternate from each Member Agency. Each designated director and alternate must be a mayor, council-person or supervisor, or other senior level agency official.

8. Ex-Officio Membership

The Board of Directors may designate ex-officio members of the SOCCRA. The ex-officio members shall have the right to participate in the SOCCRA but may not exercise a vote.

9. Ralph M. Brown Act

All meetings of the SOCCRA, including without limitation regular, adjourned regular, and special meetings of the Board of Directors, shall be called, noticed, held, and conducted in accordance with the provisions of the Ralph M. Brown Act (commencing with Section 54950 of the California Government Code).

10. Quorum

A majority of the voting members of the Board of Directors of the SOCCRA shall constitute a quorum for the transaction of business, except that less than a quorum may adjourn from time to time.

11. Voting

Each voting member of the Board of Directors shall be entitled to one vote. No action shall be taken without an affirmative vote of a majority of the voting members present.

12. Addition of Members

There may be future opportunities for the addition of new members to the SOCCRA at the discretion of the SOCCRA Board of Directors. To join, the agency/entity must execute the JPA then in effect and agree to abide by the Bylaws.

13. Termination of Agreement

This Agreement shall terminate upon the withdrawal of 50% or more of Member Agencies from this Organization by action of the governing board of each withdrawing Member Agency.

14. Disposition of Assets Upon Termination

Upon termination of this Agreement, any money or assets in the possession of the organization after the payment of all liabilities, costs, expenses, and charges validly incurred under this Agreement shall be returned to the Member Agencies in proportion to their contributions determined as of the time of termination.

15. Accountability of Funds

The auditor and controller of the County of Orange, a Member Agency, is hereby designated as the auditor and controller of this organization. The auditor and controller shall draw warrants or check-warrants against the funds of the organization in the treasury when the demands are approved by the Board of Directors or such other persons as may be specifically designated for that purpose in the Bylaws. Said auditor and controller shall comply with all duties under Article 1, Chapter 3, Division 7, Title I of the California government code commencing with Section 6500. At the end of every second fiscal year, there shall be an audit conducted by an independent, accredited certified public Accountant covering such a two-year period. The auditor and controller of the organization shall establish and maintain such funds and accounts as may be required by good accounting practices or Bylaws passed and as adopted by this organization. The books and records of the organization in the hands of the auditor and controller shall be open to inspection at all reasonable times by representatives of the Member Agencies. The auditor and controller of this organization, within 120 days after the close of each fiscal year, shall give a complete written report of all financial activities for such fiscal year to Member Agencies.

16. Designation of Treasurer

Pursuant to the requirement of Section 6505.5 of the California Government Code, the treasurer of this organization shall be the Treasurer of the County of Orange, a Member Agency. The treasurer shall receive, have the custody of, and disburse organization funds upon the warrant or check-warrant of the auditor and controller pursuant to the accounting procedures established by the auditor and controller, and shall make the disbursements required by this Agreement or to carry out any of the provisions or purposes of this Agreement. The treasurer of this organization may invest organizational funds in accordance with general law. All interest collected on said funds shall be accounted for and posted to the account of such funds.

17. Effective Date of Agreement

This Agreement shall become effective for all purposes at such time as this Agreement has been executed by all Member Agencies.

18. Agreement Repository

A fully executed copy of this JPA and any amendments thereto shall be filed with the Board of Directors and each signatory Member Agency with notice of the Agreement or amendment prepared and filed with the Office of the Secretary of State in accordance with California Government Code Section 6503.5.

Copies of the Bylaws and Amendments thereto shall be filed with each Member Agency.

IN WITNESS WHEREOF, each of the following Member Agencies has caused this JPA to be executed by having affixed thereto the signature of the official of said Agency authorized therefore by the legislative body of that Agency.

COUNTY OF ORANGE

By: _____ Resolution No.: _____

Date: _____

ATTEST: Approved as to Form

_____ _____

County Clerk

CITY OF DANA POINT

By: _____ Resolution No.: _____

Mayor

Date: _____

ATTEST: Approved as to Form

_____ _____

City Clerk

CITY OF SAN CLEMENTE

By: _____ Resolution No.: _____

Mayor

Date: _____

ATTEST: Approved as to Form

_____ _____

City Clerk

AGENCY

By: _____ Resolution No.: _____

Date: _____

ATTEST: Approved as to Form

_____ _____

Clerk

AGENCY

By: _____ Resolution No.: _____

Date: _____

ATTEST: Approved as to Form

_____ _____

Clerk

AGENCY

By: _____ Resolution No.: _____

Date: _____

ATTEST: Approved as to Form

_____ _____

Clerk

Appendix G
Historical Shoreline Data and Trends

9700 Research Drive
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949.347.2780

Coastal Resources, Processes, and Vulnerabilities

May 22, 2024

Introduction

This appendix includes a description of historical shoreline trends, an overview of coastal processes that affect the coastline, and a summary of existing vulnerabilities and coastal conditions in South Orange County.

Shoreline Trends from Monitoring Efforts

Historically (prior to the 1940s), the South Orange County coastline contained narrow beaches to the south of Dana Point. Shoreline changes have been monitored sporadically at several transects along the coastline, as shown in Figure 1. The U.S. Army Corps of Engineers (USACE) established beach transects between 1934 and 1984 to quantify shoreline/coastal processes. Other transects were added at Doheny State Beach in 2004 (Coastal Environments 2014) and by the San Clemente Shoreline Monitoring Program in 2001 (Coastal Frontiers 2023). The San Clemente Shoreline Monitoring Program ended in approximately 2012 but was restarted in 2022 with data being collected each fall and spring from San Juan Creek to San Mateo Point.

As noted in the South Orange County Regional Coastal Resilience Strategic Plan, beach erosion became problematic in the 1960s because of the lack of natural sand supply from San Juan Creek that resulted in a narrowing of usable beach width from Doheny State Beach to Capistrano Bay District. At that time, it was estimated that San Juan Creek only supplied half of the sand necessary to maintain a stable beach. In the 1960s and 1970s, significant beach nourishment occurred at Doheny State Beach and Capistrano Beach Park, as well as to the south of the study area at San Onofre State Beach (CCSMW 2005). A beach nourishment project of 800,000 cubic yards (cy) was planned to restore the beach to usable and safe dimensions (USACE 1986). Historical records show that in 1967, a large quantity of sand from old terrace deposits in Camp Pendleton was placed on the beach in response to narrowing shoreline conditions (CCSMW 2005; Coastal Environments 2014). To maximize retention of the placed sand, a groin was constructed along the west side of San Juan Creek, creating a wide, stable beach to the west of the groin (USACE 1986). In the following decade, the shoreline fluctuations increased and vacillated in the alongshore direction between erosional and accretional. Overall, the shoreline changes from 1980 to 1989 indicated an eroding shoreline downcoast of Dana Point Harbor, particularly south of Doheny State Beach (USACE 1991). Since the mid-1980s to 1990s, there has been a gradual erosion of the shoreline, resulting in narrower beaches and an increase In storm damages to railroad and public facilities along the South Orange County coastline.

In September 2022, the City of San Clemente formally reestablished a local Shoreline Monitoring Program, which had been inactive for approximately 15 years. Prior to 2022, the last complete shoreline survey of the South Orange County shoreline was conducted in 2007.

The primary goal in re-establishing a Shoreline Monitoring Program is to build a database of information on shoreline changes in San Clemente and vicinity, thereby providing a basis for evaluating effects of sea level and El Niño conditions as well as beach sand replenishment projects. The data will be used to develop a comprehensive understanding of seasonal, annual, and long-term coastal changes in the region.

The data derived by the Shoreline Monitoring Program will also be made publicly available and used to inform the City of San Clemente's Nature-Based Coastal Resiliency Project Feasibility Study. The program results will provide data needed to make informed decisions related to enhancing local coastal resiliency. The data acquired along each transect will form a continuous profile from the back beach to the offshore terminus of the transect. The offshore terminus will be the 45-foot depth contour or at 6,000 feet offshore, whichever is first reached when proceeding offshore).

The San Clemente Shoreline Monitoring Program is intended to document coastal changes (i.e., shoreline morphology) in the broader region on longer time scales including seasonal, annual, and long-term. The San Clemente Shoreline Monitoring Program is funded through the end of 2025 in part by a grant from the California Coastal Commission (CCC).

The Shoreline Monitoring Program includes beach profile data collection each spring (May) and fall (October) along 12 shore-perpendicular beach profile transects located between Doheny State Beach to the north and Cotton's Point near the City of San Clemente's southern terminus. Six of these locations are historical transects utilized in the Coast of California Storm and Tidal Waves Study for the San Diego Region. Five of the locations were established in October 2001 specifically for the City of San Clemente's Shoreline Monitoring Program. The twelfth transect was established at North Beach to monitor the movement of opportunistic beach sand material placed in May 2005 and November 2017.

More recent shoreline monitoring efforts have used aerial imagery to measure shoreline changes. Additional information on shoreline changes from CoastSat indicate an average shoreline change of -1.8 feet per year between Doheny State Beach and San Clemente Municipal Pier, with the greatest shoreline changes from the east end of Doheny State Beach to Capistrano Bay District. CoastSat is tool that uses satellite imagery (from 1984 to the present) to determine shoreline positions over time (Vos et al. 2019).

In addition, aerial imagery from unmanned aerial vehicles has been used by the University of California, Irvine to monitor beaches in South Orange County. The University of California, Irvine, in

partnership with State Parks, involves monthly monitoring using drones with the work aimed at improving the understanding of erosion trends to support coastal resilience measures.

The County of Orange (County) has installed CoastalCOMS monitoring stations at Capistrano Beach and Poche Beach to collect data for analysis of shoreline change. CoastalCOMS analytics products collect and analyze coastal surveillance video from cameras for automated tracking of beach width, usable beach area, and public usage. Shoreline position and wave activity are tracked over time and provided as both raw and processed/reported data that can be correlated back to storm impacts, tidal events, human use/influence, long-term weather patterns, and specific engineering or operational activity in support of resource management and allocation. Quarterly reports summarize the beach behavior information.

Coastal Processes Overview

The physical processes of sediment transport along the coastline can be characterized using a sediment budget approach of a littoral cell:

- **Bathymetric or topographic barrier:** A physical shoreline feature such as a shoreline headland or submarine canyon
- **Littoral cell:** A coastal compartment or segment of shoreline between two topographic or bathymetric barriers that minimizes sediment transport between the adjacent upcoast or downcoast shoreline
- **Sediment budget:** Accounts for sources, sinks, and storage of sediment within a littoral cell over a defined period
  - **Balanced sediment budget:** A shoreline with stable beaches
  - **Accreting beaches:** A sediment budget with a greater number of sources indicates a surplus of sediment and a shoreline with accreting beaches
  - **Eroding beaches:** A greater number of sinks indicates a deficit of sediment and a shoreline with eroding beaches

Sediment sources include watersheds (i.e., fluvial sources), bluffs, dunes, and beach nourishment. Historically, most sediment on beaches originated from the upland watershed (Griggs and Savoy 1985; Richmond et al. 2007). Natural hydrologic processes erode sediment from upland areas that is transported to the coastline via rivers, streams, and creeks (i.e., fluvial sources). Human development activities in watersheds have effectively reduced the natural sediment supply to the coastline as urban development hardens landscapes limiting erosion and sediment mining removes sediment, while dams, reservoirs, debris basins, other flood-control structures prevent sediment from being delivered to the coastline. Sediment sources from the coastline include the erosion of coastal bluffs and dunes. Beach nourishment activities have been conducted to artificially increase the

sediment supply along the coastline. Sediment sinks include aeolian (i.e., wind) losses to coastal sand dunes, cross-shore transport to the offshore, or losses to deeper waters via submarine canyons.

Understanding Coastal Processes

Once sediment enters the littoral transport system and exposed to tidal and wave actions, it can be moved either on or offshore (cross-shore transport) or through the littoral cell along the beach (longshore transport). The shape and width of beaches are influenced by ocean water levels that are driven by astronomical tides, sea level rise, storms, and global climatic oscillations.

Ocean water levels offshore of Orange County are mixed, semidiurnal tides with two unequal highs and two unequal lows occurring each day. NOAA monitors ocean water levels and establishes tidal datums. The closest tidal datum location is at Newport Bay (Station 9410580), while the closest monitoring location is at La Jolla (Station 9410230). Tidal datums based on the 19-year tidal epoch from 1983 to 2001 at Newport Bay and La Jolla are shown in Table 1. The tidal datums include extreme recorded water levels and defined vertical means representing the average daily peak highs and lows (i.e., mean higher high water [MHHW], mean high water [MHW], mean low water [MLW], and mean lower low water [MLLW]). Ocean water levels are also affected by long-term increases in mean sea levels.

Table 1
NOAA Tidal Datums

Datum	Water Level (feet NAVD88)	
	Newport Bay (9410580)	La Jolla (9410230)
Highest Observed Water Level	+7.49 (January 28, 1983)	+7.62 (November 25, 2015)
MHHW	+5.23	+5.14
MHW	+4.50	+4.41
Mean Sea Level	+2.59	+2.54
MLW	+0.74	+0.72
MLLW	-0.18	-0.19
Lowest Observed Water Level	-2.53 (January 20, 1988)	-3.06 (December 17, 1933)

Notes:
Tidal datums based on 1983 to 2001 tidal epoch.
NAVD88: North American Vertical Datum of 1988
Sources: NOAA 2003, 2017

Water levels in the nearshore are affected from storms and fluvial flows. Storms can increase water levels above tide water levels from storm surges depending on barometric pressure, wind shear, and

wave setup. Fluvial flows from rainfall in the watershed or dam releases can also result in localized increases in ocean water levels, particularly for enclosed waterbodies.

Global climatic oscillations such as the El Niño Southern Oscillation (ENSO) and Pacific Decadal Oscillation (PDO) can impact ocean water levels along the West Coast on a longer time scale compared to astronomical tides. The ENSO occurs every 4 to 7 years and results in temporary increases in ocean water levels for 1 to 2 years. In addition, strong ENSO events generally correspond to fluvial flooding events. The PDO occurs on a longer time scale and decreases ocean water levels.

Littoral sediment transport is driven by waves that generate cross-shore and longshore currents. The Channel Islands partially protect the Southern California coastline, limiting the wave exposure from deepwater wave sources. Waves impacting the Orange County coastline are produced by the following four sources (USACE 2013):

- Northern hemisphere swell is derived from extratropical cyclones that occur in the northern Pacific Ocean. This comprises the most severe waves reaching the Orange County coast, and these waves usually have the greatest impact of all the wave sources. These swells generally approach from a swell window of from 275 degrees to 285 degrees.
- Southern hemisphere swell is derived from extratropical cyclones from the South Pacific Ocean with the majority occurring from spring through early fall. These swells approach from approximately 170 degrees to 215 degrees.
- Tropical storm swell is derived from hurricanes off the west coast of Mexico during the summer and early fall. Most of these hurricanes take a westerly track sending swell out to the Pacific Ocean. On occasion, a northwest track sends swell up to Southern California, with the swell window ranging from 155 degrees to 200 degrees.
- Local sea is the term applied to steep, short period waves, which are generated by local winds and northwest winds in the outer coastal waters. The local winds can be further separated into pre-frontal winds from the southeast, gradient winds during the passage of a winter low pressure system from the west, and westerly sea breezes.

Beach Morphology and Cross-Shore Transport

The beach morphology is impacted by the wave climate causing sediment movement via cross-shore and longshore transport processes. Seasonal changes to the beach width occur in response to the ocean water levels and wave climate. In general, smaller longer period waves during the summer result in relatively wider beaches, while larger, shorter period waves during the winter erode and narrow the beach, as illustrated in Figure 2.

Cross-shore transport is the movement of sediment from wave and tidal action in the surf zone near the shoreline. Sediment movement occurs perpendicularly to the shoreline, either on or offshore. Offshore transport occurs from larger winter waves move sediment offshore, narrowing beaches and

forming an offshore sandbar. The winter beach profile illustrates the berm erosion from the beach to the offshore sandbar. The formation of the offshore sandbar causes waves to break farther offshore and dissipates wave energy. Conversely, summer beach profiles build back up from sediment transport in the onshore direction from the offshore sandbar to the beach. Onshore transport is also a source of sediment when beach nourishment is done by nearshore placement, which moves sediment onto the beach.

Longshore Transport

Longshore transport occurs when waves approach the shoreline at an oblique angle resulting in the movement of sediment in the downcoast direction (Figure 3). Over time, this results in the net movement of sediment along the shoreline, commonly referred to as longshore drift. The longshore drift continually moves sediment downcoast until sediment is lost by a topographic barrier (e.g., submarine canyon) or intercepted by a human-made barrier such as a harbor entrance that stops longshore transport. The predominance of wave energy reaching the Orange County coast from the northern hemisphere results in wave driven currents from northwest to southeast throughout the winter and spring and cause most of the longshore sediment transport. Typically, in the summer, there is a seasonal reversal in longshore sediment transport from southern swells. Variable climatic cycles result in a range of conditions from dominant southeastward sediment transport over certain periods, followed by periods of more balanced sediment transport directions. The shoreline morphology has equilibrated over time to follow predominant conditions and over the long-term is oriented to southeastward sediment transport, with sediment inputs to the littoral cells typically from the northwest and outputs from the littoral cells typically in the southeast.

Oceanside Littoral Cell

The Oceanside Littoral Cell, as shown in Figure 4, extends from Dana Point to Point La Jolla in San Diego County. It is bounded by the shoreline headlands at Dana Point Harbor and the La Jolla/Scripps Canyon at the south end. The Laguna Sub-Cells extending from Corona Del Mar to Dana Point is the adjacent littoral cell to the north of the Oceanside Littoral Cell. The adjacent littoral cell to the south is the Mission Bay Littoral Cell, which is from La Jolla to Point Loma. The Oceanside Littoral Cell shoreline consists of relatively narrow, semicontinuous sand or cobble beaches backed by wave-cut coastal bluffs. The natural sediment supply is from rivers and bluff erosion. Major fluvial sources are the San Juan Creek, Santa Margarita River, San Luis Rey River, and San Dieguito River with minor fluvial sources from the San Mateo and San Onofre Creeks. Additional sediment sources include coastal bluff and terrace erosion. The damming of rivers and use of shoreline protection measures along coastal bluffs has resulted in an overall 47% reduction in the Oceanside littoral sediment supply (Patsch and Griggs 2006). Barriers to littoral transport include Dana Point Harbor, Oceanside Harbor and coastal lagoons (Agua Hedionda, Batiquitos, San Elijo, and Los Penasquitos Lagoons). Sand bypassing to artificially pass sand across the barrier is conducted at Oceanside

Harbor and Agua Hedionda Lagoon. Beach nourishment is also conducted periodically within the Oceanside Littoral Cell including the large-scale San Diego Association of Governments (SANDAG) beach nourishment project conducted south of Oceanside. Sediment sinks include offshore losses in the vicinity of Oceanside Harbor and submarine canyons, such as the Carlsbad, Scripps, and La Jolla Submarine Canyons.

Vulnerabilities and Coastal Conditions

The South Orange County coastline is vulnerable to coastal storm wave damage to public facilities and private homes along the coastline. Beaches naturally protect the coastal bluffs and structures from storm wave damage, but the loss of beaches has reduced this protection and limited recreational space. It is expected that the continual loss of beaches will allow waves to directly impact and threaten coastal structures.

For this study, the South Orange County coastline has been delineated into the segments listed in Table 2. The segments and beaches can be seen in in Figure 5. The South Orange County coastline contains beaches backed by coastal bluffs. Beaches contain adjacent parking lots, public facilities, or private homes that are bordered by the Los Angeles to San Diego (LOSSAN) railroad corridor and Pacific Coast Highway. The LOSSAN railroad corridor, operated by the Southern California Regional Railroad Authority, runs parallel to the coastline and fronts the coastal bluffs. The U.S. Department of Defense has designated the LOSSAN railroad corridor as a Strategic Rail Corridor, a vital link for passenger and freight services that includes rail access through Marine Corps Base Camp Pendleton. The railroad is constructed on a conventional elevated rock ballast. Portions of the railroad are protected by rock riprap located seaward of the railroad. Landward of the railroad, the Pacific Coast Highway/El Camino Real also runs parallel to the railroad and shoreline. Specific features and previous storm wave damage along the South Orange County coastline are described in the following sections.

Table 2
South Orange County Coastline Segments

Segment	Beaches	Jurisdiction
Dana Point Harbor	Dana Point Harbor	County
Doheny State Beach	Doheny State Beach	State
City of Dana Point	Capistrano Beach Park	County
	Capistrano Bay District	Private
	Poche Beach	County
City of San Clemente	Shorecliffs	Private
	Capistrano Shores	Private

Segment	Beaches	Jurisdiction
	North Beach	City of San Clemente
	Linda Lane Park	
	San Clemente Municipal Pier	
	T-Street Beach	
	Calafia Beach Park	State
	San Clemente State Beach	State
	3800 Block of Vista Blanca to Cotton's Point	Private

The South Orange County project study area is within the northern portion of the Oceanside Littoral Cell (i.e., Dana Point Harbor to San Mateo Point) that can be referred to as the Dana Point Sub-Cell. This section of shoreline is characterized by varying low and high-relief coastal sections consisting of long, smoothly curving sandy beaches backed by the LOSSAN railroad corridor/right of way, Pacific Coast Highway, and coastal bluffs. The beach profile consists of a relatively thin layer of sand overlying hard bedrock substrate. In general, the sandy beach has a beach berm, relatively steep beach face (i.e., foreshore), and more gently sloped in the nearshore.

The dominant sediment source in the Dana Point Sub-Cell is from fluvial sources, which are primarily from San Juan Creek. San Mateo Creek supplies sediment to the coastline south of the Cyprus Shore segment, though this sediment can move northward in a southern swell condition.

Because the dominant longshore transport is to the south/southeast, sediment from San Mateo Creek, which is only a minor source to the Oceanside Littoral Cell, would mainly contribute to beaches south of Cyprus Shore and the shoreline along Camp Pendleton in San Diego County south of the project study area.

Natural fluvial sediment sources from the San Juan, Prima Deschecha, Segunda Deschecha,, and San Mateo Creeks have been significantly reduced due to dams and other structures that prevent historically significant volumes of sediment from being delivered to the coastline. Additionally, development of the watershed is a major contributor to reduced sediment transport to fluvial sources. Currently, fluvial sediment delivery to the coastline occurs mainly during flood events. The only sediment sink in the Dana Point Sub-Cell is littoral transport to the south to the southern portion of the Oceanside Littoral Cell, which means San Mateo Creek is not a major source of sediment for the Dana Point Sub-Cell. Sediment losses to offshore transport beyond the depth of closure, submarine canyons, or aeolian transport are estimated to be negligible in the project study area.

Historical sediment budgets for the Dana Point Sub-Cell have varied based on wave climate (USACE 1991). Under natural conditions (1900 to 1938), prior to construction of dams and harbors,

the Dana Point Sub-Cell was relatively balanced. During a mild, uniform wave climate (1960 to 1978), the littoral cell was slightly accreting with strong littoral transport to the south. A more variable wave climate (1983 to 1990) resulted in a relatively balanced sediment budget due to periodic net littoral transport to the north. While the long-term sediment budget indicates a relatively balanced littoral system, the Dana Point Sub-Cell is more dynamic on a year-to-year basis oscillating between erosion and accretional conditions. Another assessment of the littoral sediment budget for the Dana Point Sub-Cell indicated variations in the net sediment transport during dry and wet years (Coastal Environments 2014). It was estimated that there is 56,000 cy per year deficit in sand supply during dry years and a 3,000 cy per year surplus during wet years. Thus, prolonged dry years would result in more shoreline erosion.

In summary, littoral transport conditions between the 1960s and 1980s in the Dana Point Sub-Cell was primarily affected by the construction of Dana Point Harbor, a large-scale beach nourishment, and larger storms in the early 1980s. Since the 1990s, the shoreline along the Dana Point Sub-Cell has a lack of sediment supply that has resulted in a chronic, long-term erosional condition (USACE 1991, 2012; Coastal Environments 2014). Additional details of the historical beach erosion issues and existing vulnerabilities and coastal conditions are provided in the following sections.

Dana Point Harbor

Dana Point Harbor is a recreational and commercial marina managed by Orange County Parks and through a public-private-partnership under a long-term lease with the Dana Point Harbor Partners. Harbor facilities include 2,400 boat slips, boat launch ramps, commercial fishing and whale watching docks, yacht clubs, a protected beach area called Baby Beach, and a fishing pier. The harbor is protected by two breakwaters constructed and maintained by the USACE; the West Breakwater runs parallel to the shoreline and the East Breakwater extends perpendicular to the shoreline forming the entrance channel. The rubble mound breakwaters are semipermeable with multiple layers of varying-sized riprap and impermeable core that allow some flow through the breakwaters. The USACE is responsible for maintaining the navigation channels and the County maintains the berthing basins. Since the 1990s, the County has funded multiple maintenance dredging events to remove sand accumulation from inside the harbor along the West Breakwater. A federal funding allocation for harbor maintenance has been difficult to secure given the harbor's status as a recreational harbor, and relatively small dredge volumes cause it to be a low priority. Large storms have dislodged stones along the seaward side of the West Breakwater, which required repair to the breakwater following 1982–1983 storms. Access dredging is required to conduct repairs to the West Breakwater, which is planned for 2024.

There is minor contribution of sediment to the Dana Point Sub-Cell from littoral transport from the Laguna Sub-Cells (USACE 1991). However, littoral transport from the north would be intercepted by the Dana Point Harbor. Sediment accumulation in Dana Point Harbor occurs from littoral sediment

transport through the breakwater, forming a shoal along the harbor side of the West Breakwater. Maintenance dredging has been conducted by the County in 1990, 2000, 2009, and 2016. For the dredging episode in 1990, the County was not able to obtain permission from the California Regional Water Quality Control Board to place sand offshore Capistrano Beach Park, and sediment was transported by barge to U.S. Environmental Protection Agency Ocean Dump Site LA-3, located approximately 12 miles northwest of the harbor. Since then, sediment has been placed at Baby Beach within Dana Point Harbor and placed downcoast on Capistrano Beach Park.

Doheny State Beach

Doheny State Beach extends approximately 1.2 miles south from Dana Point Harbor to Capistrano Beach and is bisected by San Juan Creek, as shown in Figure 6. The lower portion of the creek was channelized into a concrete-lined trapezoidal channel between Camino Capistrano Road to Pacific Coast Highway in the 1960s. Downstream from the Pacific Coast Highway, the creek has concrete banks and earthen bottom with sand, gravel, and cobbles (Coastal Environments 2014). At the northern end between Dana Point Harbor and San Juan Creek, the west area includes a relatively wide beach area, park area, campsite, and other recreational facilities. The Doheny State Beach Campground is located on the east area, south of San Juan Creek. The Doheny State Beach Foundation, in cooperation with California State Parks, manages the park facilities including visitor center, aquarium, interpretive, and conservation programs.

The west area of Doheny State Beach has an approximately 1,400-foot-long, relatively wide, stable beach and is fixed by the Dana Point Harbor East Breakwater on the west side, Thor's Hammer rock groin on the east side, and 2-foot retaining wall on the north side. The Thor's Hammer rock groin was constructed along the west side of San Juan Creek to compartmentalize the beach between San Juan Creek and Dana Point Harbor to prevent erosion of the adjacent beach (Figure 6). Typically, from late spring to late fall, a natural beach berm forms across the creek mouth separating the creek and ocean. Large flows from San Juan Creek can and do breach the berm.

The relatively wide beach extends into the east area along the Doheny State Beach Campground. Flooding of the campground area from high tides previously occurred in June 2004; subsequently a beach berm was constructed in front of the campground to protect it from high tides in July (Coastal Environments 2014). Downcoast, the beach visibly narrows where the Pacific Coast Highway parking lot, LOSSAN railroad corridor, and Pacific Coast Highway become parallel to the coastline. The beach fronting the parking lot has experienced a loss of sand and an increase in exposed cobble. Damages have been observed along the parking lots and bike path including undermining of concrete slabs (Figure 6) and uprooting of palm trees. Rock has been placed along portions of the parking lot in response to the eroding beach. Littoral sediment transport conditions at Doheny State Beach differs from other areas in the Dana Point Sub-Cell because it has the following: 1) a more sheltered wave exposure; 2) a south-facing shoreline orientation; and 3) the only direct fluvial sediment supply, Dana

Point Harbor, shelters Doheny State Beach from the northern hemisphere swells, particularly for the west area. Fluctuations in the shoreline are expected to be relatively small during dry years without a fluvial sand supply, while being relatively stable during wet years because the fluvial sand supply effectively offsets erosion during large winter storms.

Historically from the 1960s to 1980s, the sediment supply was significantly increased by beach nourishment at Doheny State Beach, particularly during the time of construction of Dana Point Harbor. A summary of climatic and coastal extreme events and beach nourishments is provided in Table 3. Large flood events from San Juan Creek would provide an increase in the sediment supply, while extreme coastal events (e.g., ESNO) would result in erosion of the sediment.

Table 3
Historical Climatic and Coastal Extreme Events and Beach Nourishments at Doheny State Beach

Year	Climatic and Coastal Extreme Events	Beach Nourishment
1916	San Juan Creek flood (55,000 cfs)	--
1938	San Juan Creek flood (13,000 cfs)	--
1943	San Juan Creek flood (5,800 cfs)	--
1964	San Juan Creek flood	94,000 cy from San Juan Creek placed at west area
1966	ENSO and San Juan Creek flood (9,000 cfs)	690,000 to 840,000 cy from Camp Pendleton placed at east area
1969	San Juan Creek flood (22,400 cfs)	212,000 cy from San Juan Creek placed at beach 365,000 cy from San Juan Creek placed at west area
1970	NA	125,000 cy of dredged material from Dana Point Harbor placed offshore to enhance surfing
1978	San Juan Creek flood (14,700 cfs)	50,000 cy from San Juan Creek placed at beach
1980	Strong ENSO and San Juan Creek flood (11,400 cfs)	80,000 cy from San Juan Creek placed at beach
1983	January to March ENSO storms and San Juan Creek flood (5,770 cfs)	--
1993	San Juan Creek flood (8,320 cfs)	--
1995	San Juan Creek flood (25,600 cfs)	--
1998	January ENSO storm and San Juan Creek flood (18,300 cfs)	--

Sources: CCSMW 2005; Coastal Environments 2014
Note:
cfs: cubic foot per second

Sediment at Doheny State Beach is generally composed of sands with varying amounts of gravel and cobbles from alluvial sediments from San Juan Creek; intermittent deposits of gravel and cobbles have been reported for the East Beach area (Ninyo and Moore 2015). The beach profile at Doheny State Beach in the vicinity of San Juan Creek reflects a typical sandy beach with a beach berm,

relatively steep beach face, and more gently sloped in the nearshore. Since 1980, the west area beach width has generally ranged from approximately 320 to 500 feet, while the east area beach width has ranged from approximately 140 to 500 feet. Downcoast of the Doheny State Beach Campground parking lot, the beach berm has eroded back to the Pacific Coast Highway parking lot and the beach face visibly narrows. For the East Beach, the large beach widths occurred following large storms in the 1980s and has typically ranged from approximately 150 to 350 feet since 1990 (Coastal Environments 2014).

Dana Point Segment

The Dana Point segment extends from Palisades Drive (Beach Road) to Camino Capistrano and includes Capistrano Beach Park and Capistrano Bay District.

Capistrano Beach Park, which is owned and managed by County of Orange Parks Department (OC Parks), includes a parking lot and limited amenities that are located seaward of the LOSSAN railroad corridor and Pacific Coast Highway. At the north end of the beach, wave action has eroded the sandy beach, exposing a cobble foundation, and has also undermined the pavement of the bike path. 1-cy sand-filled geotextile units, or sand cubes, were placed at the south end of the park in 2016 on an emergency basis, and again in 2019 to protect the City of Dana Point stormwater infrastructure and bike trail because rock was not allowed by the CCC. Coastal storms have also damaged the 1,000-foot-long parking lot at the south end and eroded the sandy beach area. Riprap and sandcubes have been placed along portions of the parking lot edge in response to the beach erosion and portions of the parking lot were removed due to undermining and collapse (OC Parks 2021a). Figure 7 shows storm damage at Capistrano Beach Park. Storms in winter 2018 damaged portions of a basketball court, caused the boardwalk to collapse, destroyed firepits, and threatened a restroom building, all of which have been removed. In 2021, approximately 150 feet of geotextile bags filled with 4 cy of sand were placed to protect the parking lot. Approximately 220 linear feet of sandcubes at the southernmost end of the Park are currently being replaced with riprap. To address the ongoing beach erosion at Capistrano Beach Park, OC Parks has completed a feasibility study for a Nature-Based Coastal Resilience Pilot Project.

Along Capistrano Beach Park, the beach profile has eroded back towards the parking lot. The riprap and sandbags help to mitigate the beach erosion, as shown in Figure 7. Since 1985, a landward retreat of the shoreline has been observed; by 2019 the shoreline reached the rock revetment fronting the parking lot (OC Parks 2021b). Significant beach nourishment occurred in the 1960s and 1970s (Table3). Sand has been placed as a byproduct of harbor maintenance dredging conducted sporadically by the County (OC Parks 2021b). Nearshore placement at Capistrano Beach Park occurred in 2000, 2009, and 2016.

The next 1.5-mile segment of the coastline is the Capistrano Bay District, which is fronted by 205 residential homes along Beach Road. Site observations indicate oceanfront homes that are

protected by seawalls or rock revetments (Figure 7). The beach profile along the Capistrano Bay District and Capistrano Shores has also eroded back to the oceanfront homes requiring seawalls or rock revetments to protect homes from waves. The homes are situated atop the beach berm and exposed to normal tide and wave conditions. It should be noted that access to Beach Road, which is the only access to the residential homes, could be threatened by severe erosion at the south end of Capistrano Beach Park (OC Parks 2021a).

Poche Beach is a 1,500-foot-long beach that crosses the boundary of Dana Point and San Clemente extending from the relic San Clemente Creek mouth to Capistrano Shores. A 230-foot segment of the beach is owned by the County in the City of Dana Point. The remaining 1,270-foot segment adjacent to Shorecliffs Beach Club is within the jurisdiction of the City of San Clemente. Beach access across the railroad is via a pedestrian catwalk within the channel underneath the railroad and adjacent to stormwater infrastructure (Figure 7). At Poche Beach, natural sediment from San Clemente Creek (Prima Deshecha Canada flood control channel) has been eliminated (USACE 1991). Except for the Shorecliffs Beach Club, a sandy beach berm is visible to the railroad. Beach width monitoring has indicated the shoreline is accreting at this location; however, this is not consistent with shoreline trends along the San Clemente City Beaches (USACE 2012).

The Capistrano Shores 0.7-mile segment is lined with oceanfront homes. These homes face the same beach erosion issues as Capistrano Bay District and some homes are protected by seawalls or rock revetments and are exposed to tide and wave action, which can be large during extreme conditions (Figure 7).

San Clemente Segment

The San Clemente City Beaches segment extends approximately 2.3 miles from Poche (in Dana Point) and Shorecliffs Beach Club (in the City), North Beach to Calafia Beach Park including Linda Lane Park, San Clemente Municipal Pier, and T-Street Beach south all the way to the Orange County/San Diego County line near San Mateo Point. The existing conditions of the San Clemente City Beaches are shown in Figure 8. The San Clemente Beach Coastal Trail, also known as the California Coastal Trail, is a sandy dirt (decomposed granite) and gravel path that runs along the back beach of this entire shoreline segment from Avenida Estacion at North Beach to at Calafia Beach Park.

The LOSSAN railroad corridor within this segment is at a relatively lower elevation than other portions of the railroad with the lowest portions of the railroad are located at the Metrolink stations at San Clemente Station and the San Clemente Municipal Pier. Orange County Transportation Agency (OCTA) maintains a 75-foot-wide right of way along the beach in the City of San Clemente. Rail service shutdowns occurred in the 1960s and 1970s when waves overtopped the railroad ballast and eroded the embankment in the vicinity of San Clemente Municipal Pier. Beach erosion and storm damage to the railroad led to the installation of rock riprap along portions of the railroad line on the seaward slope of the railroad. In 1993, service was shut down for 5 days following a mudslide in San

Clemente. Severe storm wave damage to the riprap protection and service interruptions have occurred following storms in 1998, 2016, and 2021 through 2023.

North Beach is backed by the LOSSAN railroad corridor and the California Coastal Trail on the landward side of the railroad. Residential homes atop the coastal bluffs landward of the California Coastal Trail. There is pedestrian at-grade crossing with safety controls across the railroad at the south end of the Avendia Estacion parking area. On the beach, there is a concession and restroom facility. The northern 1,100-foot portion of the railroad is intermittently protected by riprap or vegetation.

The seaward side of the railroad along 204 Beach is continuously protected by riprap starting approximately 550 feet upcoast of the Dije Court beach access down to Linda Lane Park. For beach access, there are three pedestrian at-grade crossings with safety controls across the railroad (Dije Court, El Portal, and Mariposa) and one below-grade stormwater tunnel at Linda Lane Park. Erosion has occurred at the access tunnels at Dije Court and Linda Lane Park during high tides.

San Clemente Marine Safety Headquarters and parking lot are located seaward of the railroad near the San Clemente Municipal Pier. Beach access across the railroad is available at Corto Lane, Municipal Pier, and Trafalgar Canyon. The pier was damaged during ENSO storms in March 1983, which was estimated to have had 20 to 25-foot waves, and in 1988. Repair costs for the pier were approximately $2.1 million for the 1983 storm damage and approximately $2.3 million for the 1988 storm damage (USACE 2012). Similarly, the Marine Safety Building located on the beach, has experienced damage from large storms resulting in wave overtopping and erosion beneath the building piles. Repairs to the City's Marine Safety Headquarters Building were made in 1986, 2003, and 2020, and the City is currently evaluating options for facility upgrades in place as well as in a location landward of the railroad.

Intermittent riprap protection resumes south of T-Street Beach to Calafia Beach Park. Beach access via pedestrian at-grade crossings with safety controls are located at the end of West Paseo de Cristobal (T-Street) and Leslie Park (Lost Winds) and below-grade stormwater tunnels at Riviera and Montalvo. Calafia Beach Park is operated by the City of San Clemente on State Park property and there is a pedestrian at-grade crossing with safety controls across the railroad. Beach erosion has resulted in a steeper beach profile, as shown in Figure 8. In addition, stormwater infrastructure has been subjected to blockage from sand accumulation and riprap has been installed for storm damage protection.

San Clemente City Beaches have varying beach widths. Beach width monitoring shows that the overall shoreline is marginally erosive with most of the damage to public facilities occurring from storm conditions (USACE 2012). Variations in the beach width are seen from aerial photographs, with relatively wider beach at inundations along the coastline. In general, relatively wider beaches occur at

North Beach, Linda Lane Park, San Clemente Municipal Pier, T-Street Beach, and Calafia Beach Park. The narrowing of the beach is seen in between North Beach and Linda Lane Park and corresponds to the length of shoreline with riprap protection along the railroad. Storm damage to the railroad riprap protection has typically occurred from ESNO storms in 1998 and 1993. Beach nourishment was conducted as part of the San Clemente Opportunistic Beach Sand Replacement Program, which placed 5,000 cy at North Beach in 2005 and 12,000 cy in 2016 with material trucked from a Santa Ana River sediment clearing operation.

San Clemente State Beach

The LOSSAN railroad corridor is relatively lower along San Clemente State Beach Park. Portions of the railroad, which runs along the base of the coastal bluffs, are protected by riprap. There is a below-grade stormwater tunnel connecting the park and beach.

Beach width monitoring shows that the shoreline at San Clemente State Beach is eroding (USACE 2012). Based on aerial photographs, the beach berm is covered with vegetation seaward of the railroad.

Cyprus Shores

The Cyprus Shores segment between San Clemente State Beach to Cotton Point has a narrow beach fronting the LOSSAN railroad corridor that continues parallel to the coastline and is backed by high coastal bluffs with residential homes in the Cyprus Shore community. There are two privately maintained beach accessways/tunnels (Avenida de Las Palmeras and Calle Ariana) beneath the railroad for the Cyprus Shores, Cotton's Point Estates, Breakers Homeowner's Association and Cyprus Cove communities. Along the 1,500-foot northern portion of the Cyprus Shores segment, the seaward slope of the railroad contains vegetation with some riprap at culverts. Then, a continuous riprap segment protects the seaward slope of the railroad until Trestles Beach; OCTA has historically used riprap to protect the railroad tracks. Along most of the coastline in the segment, the beach has eroded back to the riprap protected railroad. Without the sandy beaches, the railroad effectively becomes the beach profile directly exposed to tidal inundation and wave action. Currently, there is essentially no beach in front of the existing riprap, thus cutting off direct downcoast beach access to Trestles Beach. Moreover, because the riprap was simply placed and not part of an engineering revetment, continued beach erosion has resulted in scour of the sand under the rock and subsequent subsidence and rolling of the rock downslope towards the ocean to Trestles Beach.

The Cyprus Shores coastline experiences beach erosion and slope stability issues. In 2021, OCTA suspended railroad service between South Orange County (Laguna Niguel and Mission Viejo) and Oceanside because of detected movement of the railroad tracks along Cypress Shore and required emergency track repair, placing an additional 20,000 tons of riprap along the seaward slope of the railroad ballast. Also, foundation cracking to of a few homes atop the coastal bluffs and damage to

the Cypress Shore community clubhouse parking lot worsened and was attributed to instability of the coastal bluffs. The slope instability is tied to an ancient landslide that has been reactivated (SC Times 2022). The railroad track movement in 2021 initiated the San Clemente Track Stabilization Project. In 2022, passenger train service between South Orange County and Oceanside was again suspended and freight train service reduced due to movement of the coastal bluffs. Construction of the San Clemente Track Stabilization Project started in November 2022 and was completed in March 2023. As of the time of writing of this Plan, railroad operations have resumed to normal service levels. However, an unrelated coastal bluff landslide near the central portion of the City of San Clemente, at the City-owned Casa Romantica historic building, has again interrupted rail service along this shoreline segment as of June 2023.

Regionwide Beach Erosion

The urbanization of watersheds, flood control infrastructure (e.g., dams, reservoirs, detention basin, and channelization and hardening of riverbanks) and sand mining has trapped a significant portion of the fluvial sediment in the upper watershed, resulting in an overall reduction in delivery of sand supply reaching the South Orange County coastline (USACE 1991, 2013). The available sediment is primarily delivered to the coastline during high rain events, hence the overall lack of sand in the littoral system is exacerbated during times of drought with no fluvial sand supply. Although the long-term net transport in South Orange County is to the south, shorter-term variations in the wave climate, particularly from storm events, will move sand upcoast and downcoast, as well as onshore and offshore from beaches. The culmination of these factors has resulted in background levels of mild, long-term beach erosion along the entire South Orange County coastline. This regionwide beach erosion is evidenced by fluctuations in the sandy beach area ranging from relatively narrow beaches during high wave energy and drought years, to relatively wider beach during low wave energy and wet years.

The review of existing vulnerabilities and coastal conditions verified that South Orange County is vulnerable to coastal storm wave damage to public facilities and private homes along the coastline. Most of the coastline is directly exposed to normal tidal and wave conditions including the coastline from the south end of Doheny State Beach to Linda Lane Park and from Cyprus Shores to Cottons Point including residential homes of Capistrano Bay District and Capistrano Shores and the railroad tracks along Buena Vista and Cyprus Shore. Homes in the Cyprus Shores community are also being threatened by instability of the coastal bluffs. Doheny State Beach and San Clemente City Beach still have some beach protection and are mainly threatened during extreme tide or storm conditions.

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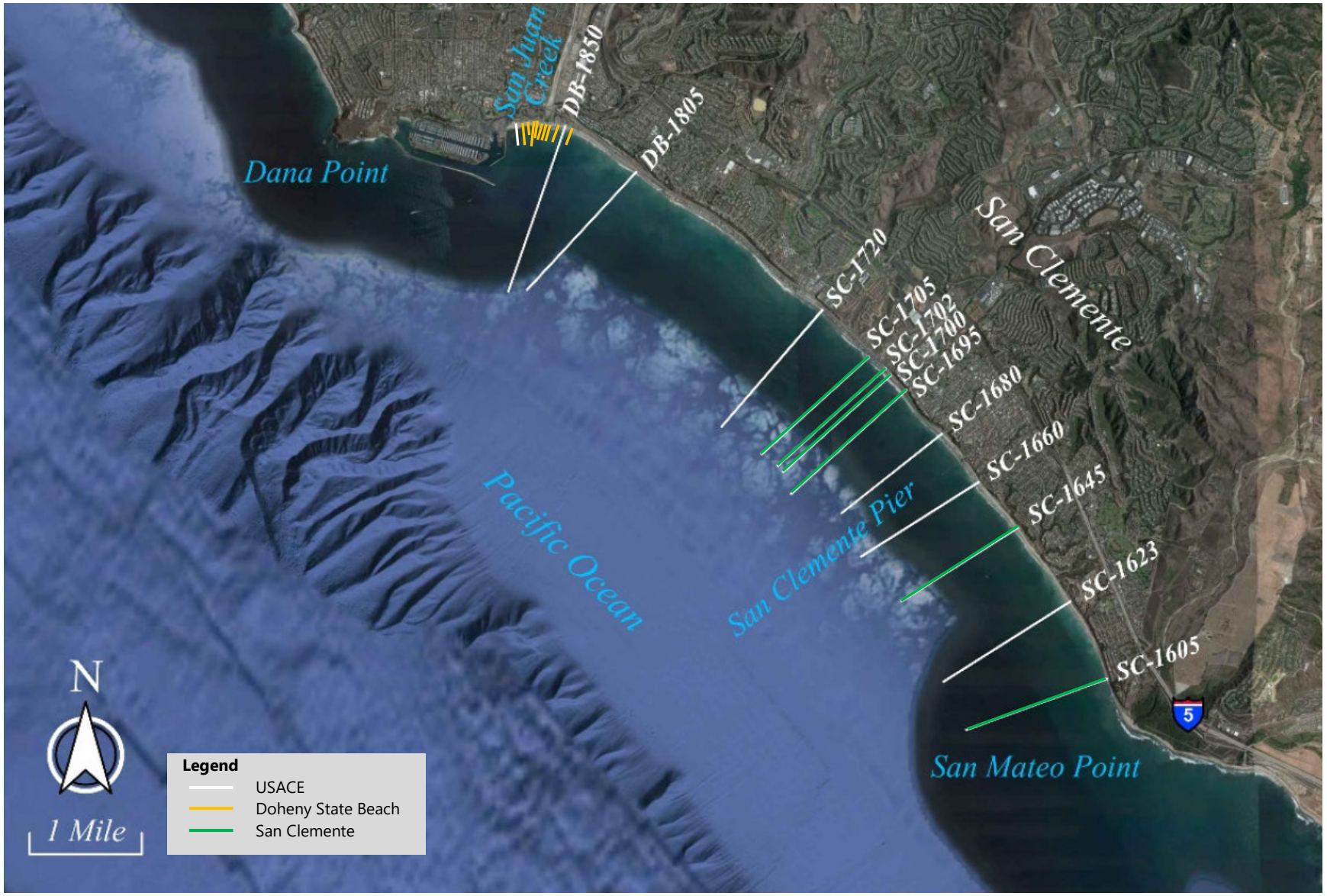
Figures



Notes: Background image from Coastal Frontiers 2023.

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Figure 1
Shoreline Monitoring Locations
South Orange County Regional Coastal Resilience Strategic Plan
South Orange County Coastal Resiliency

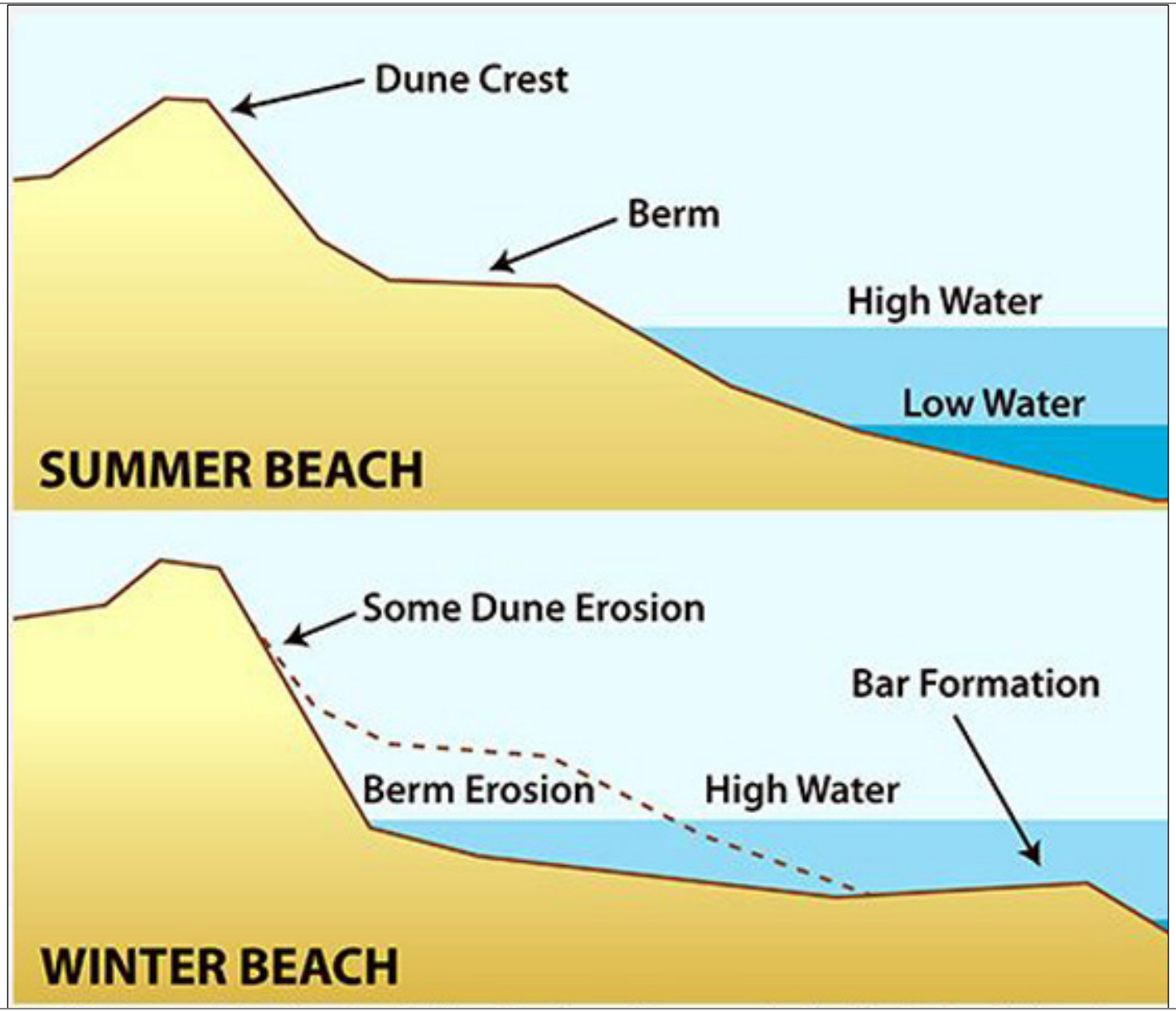

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Figure 2
Schematic of Beach Morphology from Cross-Shore Transport
South Orange County Regional Coastal Resilience Strategic Plan
South Orange County Coastal Resiliency

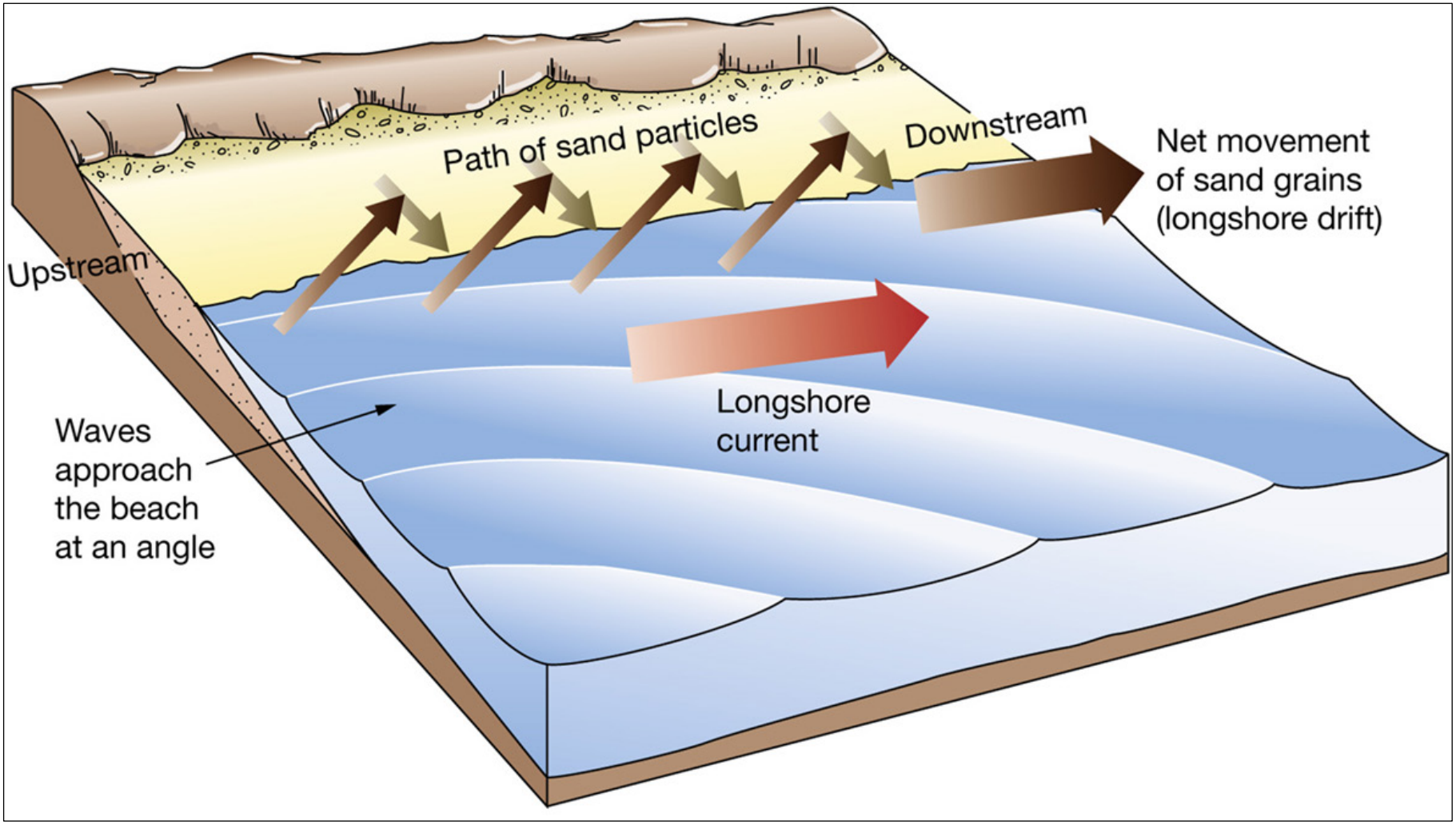

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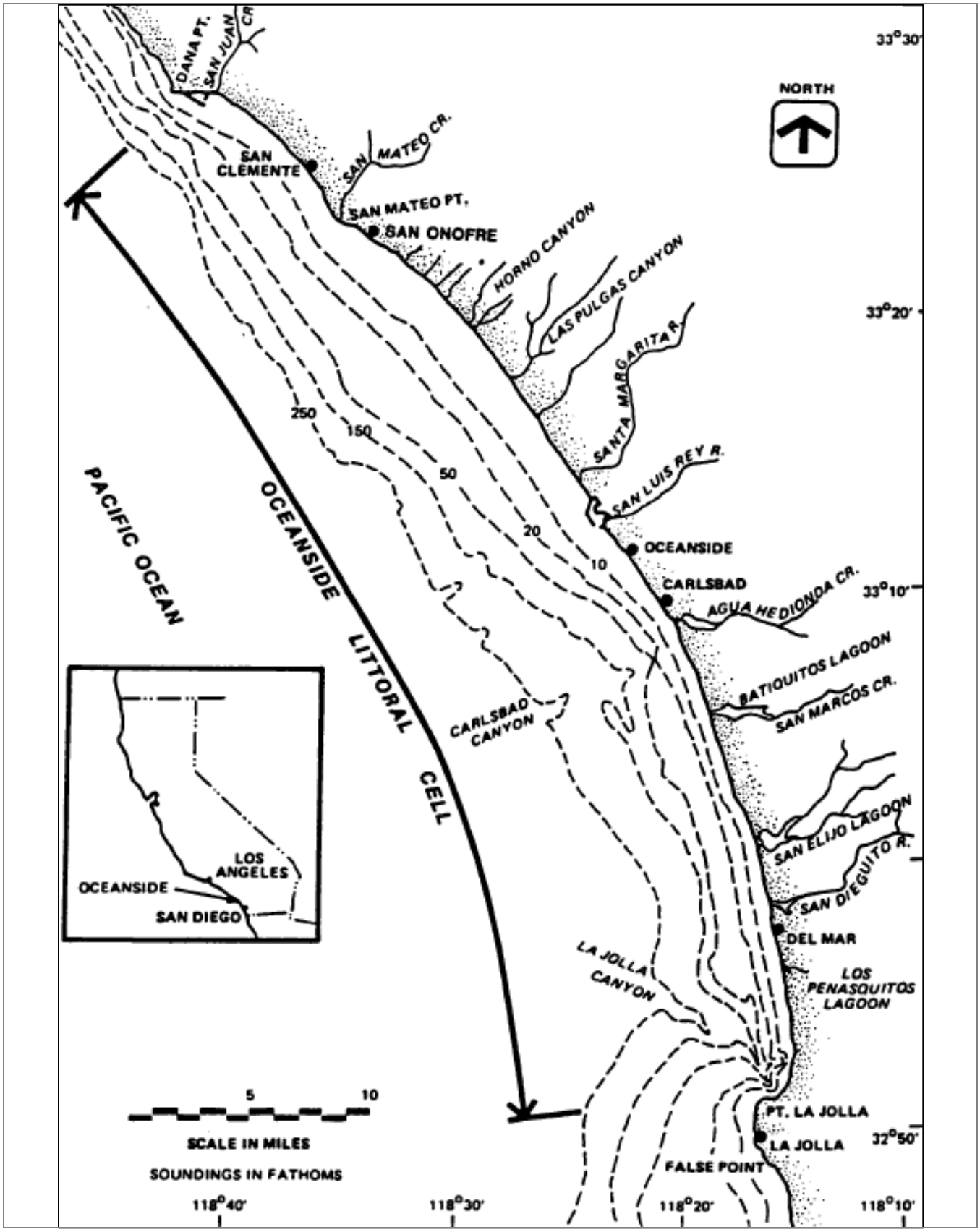
Figure 3
Schematic of Beach Morphology from Longshore Transport
South Orange County Regional Coastal Resilience Strategic Plan
South Orange County Coastal Resiliency



Source: USACE 1991

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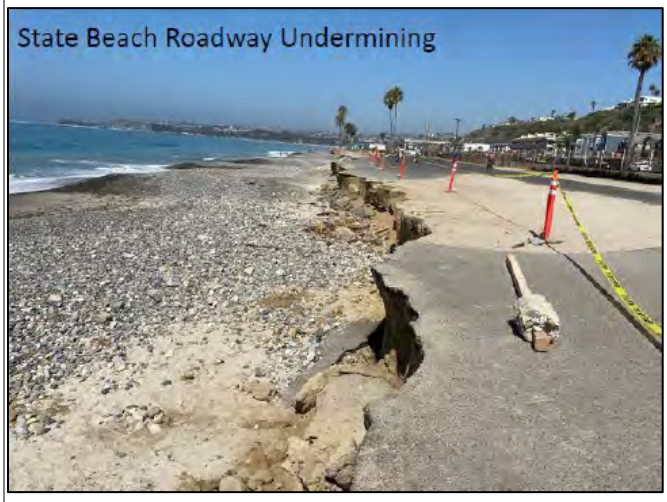
Figure 4
Oceanside Littoral Cell
South Orange County Regional Coastal Resilience Strategic Plan
South Orange County Coastal Resiliency

West area beach adjacent to Dana Point Harbor
(Anchor QEA, March 6, 2023)

West area beach with cobble in nearshore
(Anchor QEA, March 6, 2023)

San Juan Creek mouth and Thor's Hammer rock jetty
(Anchor QEA, March 6, 2023)

East area beach fronting campgrounds
(Anchor QEA, March 6, 2023)



Undermining of parking lot (OC Parks 2021a)

Exposed cobbles June 2020 (OC Parks 2021a)

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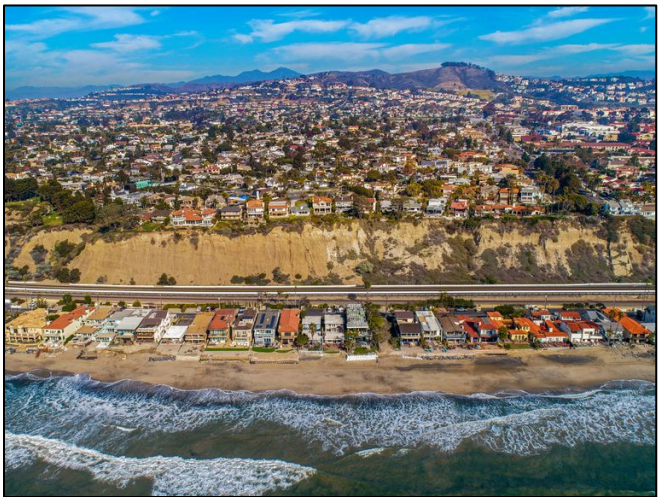
Figure 5
Photographs of Doheny State Beach
South Orange County Regional Coastal Resilience Strategic Plan
South Orange County Coastal Resiliency

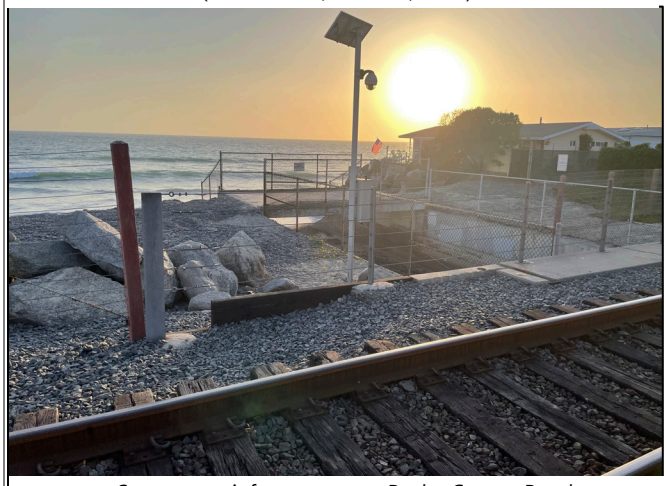
Capistrano Beach Park riprap and sandbags
(Anchor QEA, March 6, 2023)

Basketball court and boardwalk damaged in 2018 and removed
(Jeff Gritchen, Orange County Register/SCNG, December 4, 2018)

Capistrano Beach Park adjacent to Capistrano Bay District
(Anchor QEA, March 6, 2023)



Capistrano Bay District (Beach Road) oceanfront homes
(Beach Road Realty, 2019)



Stormwater infrastructure at Poche County Beach
(Anchor QEA, March 10, 2022)

Capistrano Shores from North Beach
(Anchor QEA, March 6, 2023)

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Figure 6
Photographs of Capistrano Beaches
South Orange County Regional Coastal Resilience Strategic Plan
South Orange County Coastal Resiliency

West area beach adjacent to Dana Point Harbor
(Anchor QEA, March 6, 2023)

West area beach with cobble in nearshore
(Anchor QEA, March 6, 2023)

San Juan Creek mouth and Thor's Hammer rock jetty
(Anchor QEA, March 6, 2023)

East area beach fronting campgrounds
(Anchor QEA, March 6, 2023)

Undermining of parking lot (OC Parks 2021a)

Exposed cobbles June 2020 (OC Parks 2021a)

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Figure 7
Photographs of Doheny State Beach
South Orange County Regional Coastal Resilience Strategic Plan
South Orange County Coastal Resiliency

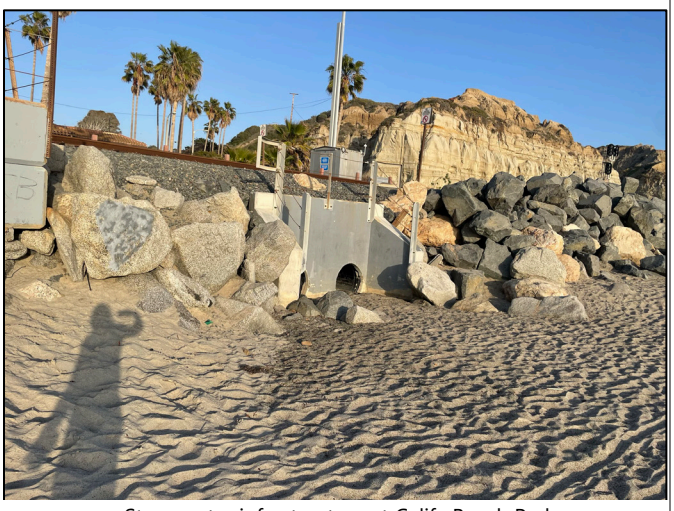
North Beach
(Anchor QEA, March 6, 2023)

San Clemente City Beach and Marine Safety Building
(Anchor QEA, March 6, 2023)

San Clemente Municipal Pier
(Anchor QEA, March 6, 2023)

LOSSAN Railroad with riprap
(Anchor QEA, March 6, 2023)

Califa Beach Park
(Anchor QEA, March 10, 2022)



Stormwater infrastructure at Califa Beach Park
(Anchor QEA, March 10, 2022)

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Figure 8
Photographs of San Clemente Beaches
South Orange County Regional Coastal Resilience Strategic Plan
South Orange County Coastal Resiliency

Appendix H
Ongoing and Anticipated Projects

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Ongoing and Anticipated Projects

May 22, 2024

Introduction

Existing and anticipated coastal resilience projects were identified the County of Orange (County) and stakeholders and are shown in Figure 1. A short description of each project is provided in the following sections in geographical order from north to south.

Dana Point Harbor Revitalization Project (DPHP)

Dana Point Harbor Partners, LLC (DPHP), entered into an agreement with the County to operate and redevelop Dana Point Harbor. DPHP is a public-private partnership that includes three real estate development firms: Burnham Ward Properties for commercial redevelopment, Bellwether Financial Group for marina operations, and R.D. Olson Development for hotel redevelopment. Dana Point Harbor is a recreational and commercial marina providing recreational facilities. Periodic maintenance dredging has occurred every 7 to 10 years and is a potential sand source, as described in Section 7.2 of the *South Orange County Regional Coastal Resilience Strategic Plan*.

West Breakwater Repair (USACE)

The West Breakwater of Dana Point Harbor requires repair to restore the structural integrity and full functionality of the protective breakwater (USACE 2014). Access dredging is required to facilitate the mobilization and use of equipment needed to conduct repairs to the West Breakwater. As currently planned, up to 45,000 cubic yards (cy) would be removed from the Main Channel and West Anchorage of the harbor and placed in the nearshore area to the east of the harbor entrance, offshore of Doheny State Beach (USACE 2023). This project is scheduled to begin in October 2024. Beneficial reuse of dredge material is a potential sand source.

San Juan Creek Channel (OC Public Works)

The San Juan Creek Stabilization Project aims to stabilize the bed of the San Juan Creek from the ocean to the I-5 crossing as well as the lower Trabuco Creek and provide a 100-year level flood protection. San Juan and Trabuco creeks have suffered from severe sediment degradation as a result of entrainment and urbanization of the watershed. The project would widen the invert of the channels to convey the 100-year storm event and at the same time install grade-stabilization structures to prevent ongoing channel incision. The project would be designed to allow the free passage of steelhead through the incorporation of fish pass structures on all grade stabilizers. The project is currently still in the design and modeling phase and is anticipated for construction in 2030.

Doheny Ocean Desalination Project (SCWD)

The South Coast Water District (SCWD) is planning the Doheny Ocean Desalination Project. The desalination plant with a capacity of 5 million gallons per day would be located on a 30-acre property along the east side of San Juan Creek. Brine wastes from the desalination process would be discharged to the ocean approximately 6,000 feet offshore of Doheny State Beach via the existing South Orange County Wastewater Agency ocean outfall pipeline from the J.B. Latham Wastewater Treatment Plant. The Doheny Ocean Desalination Project is currently in the planning and permitting stage and completion of the facility is anticipated for 2028.

Serra Siding Extension Project (Metrolink and OCTA)

Metrolink, in coordination with the Orange County Transportation Agency (OCTA), is proposing the Serra Siding Extension Project to replace the existing single-track bridge with two single-track bridges in Dana Point. The 1.2-mile siding track would be constructed adjacent to the existing main track from Victoria Boulevard to Beach Road, which runs along Doheny State Beach. The two-track system would improve operational efficiency of passenger services by reducing train delays and increase safety. This project is in the environmental review and preliminary design phase, and a time frame to release the draft environmental document has not been established.

Surfside Inn Pedestrian Bridge (OC Public Works)

Orange County Public Works (OC Public Works) is planning to upgrade or replace the existing Surfside Inn Pedestrian Bridge. The project is located approximately 1 mile south of Dana Point Harbor. The existing bridge spans over the existing railroad and provides pedestrian access from Pacific Coast Highway to Doheny State Beach. The project is currently on hold until a long-term plan to address erosion is in place.

Opportunistic Sand Placement at Capistrano Beach

The County and California Department of Parks and Recreation (State Parks) have begun work on a joint project at Capistrano State beach and the southern portion of Doheny State Beach. Approved by the California Coastal Commission (CCC), construction began in June 2023 to counter coastal erosion and enhance recreation area at the beach. This project includes the transportation of 45,000 cy of clean sand from the Santa Ana River for placement along approximately 2,000 feet of linear beach.

Capistrano Beach and Doheny Beach Nature-Based Coastal Resilience Pilot Project (OC Parks and California State Parks)

Capistrano Beach Park has been damaged by coastal storms and public spaces and facilities are at risk at being lost. The Orange County Parks Department (OC Parks) conducted the Nature-Based

Pilot Project Feasibility Study to assess the feasibility of a nature-based approach to shoreline stabilization and enhancement. Two different pilot projects were evaluated, one at the north end and one at the south end of Capistrano Beach Park. Project components included cobble berm, living shoreline (buried cobble berm or vegetated dunes), landward relocation of park infrastructure, beach nourishment, and sandbags or sand cubes. These project components were evaluated at both locations. The North Reach Pilot Project was identified as the preferred project with the following key components: cobble berm, sand berm, vegetated sand dune, beach access paths, and sand fencing (OC Parks 2021).

On November 15, 2022, the CCC approved the plan to implement a nature-based adaptation pilot project along approximately 1,150 feet of beach along both Capistrano County Beach and Doheny State Beach. A fronting beach sand berm will cover the naturally occurring cobble, enhancing wave energy dissipation and reflection to provide flood protection from wave overtopping and future sea level rise projections. A vegetated sand dune will raise the shoreline elevation to minimize inland flooding and capture wind-blown sand to increase the protection effectiveness and enhance the natural flora and fauna habitat. Timing for project implementation is dependent on funding. Grant applications have been submitted for Federal Emergency Management Agency (FEMA), Building Resilient Infrastructure and Communities, National Fish and Wildlife Foundation, and Division of Boating and Waterways funding opportunities.

San Clemente Beach Nourishment Project (USACE and City of San Clemente)

The City of San Clemente approved a project partnership agreement with the U.S. Army Corps of Engineers (USACE) and State Parks for the San Clemente Beach Nourishment Project, which is anticipated to start in fall 2023 or Winter 2023/2024. The USACE feasibility study (2012) evaluated 10 reaches along the City of San Clemente coastline from Poche Beach to Cotton's Point. In late 2023, this beach nourishment project will initially place approximately 251,000 cy of sand for beach nourishment from Linda Lane Park to T-Street Beach. The beach nourishment area will create a new beach area that is 3,700 feet long and 50 feet wide. Eight renourishment events would occur approximately every 6 years (251,000 cy for the first seven renourishments and 84,000 cy for the eighth renourishment events). The total quantity of sediment required over the 50-year project lifespan through 2073 is approximately 2.1 million cy. Sand will be sourced from north of Oceanside Harbor at Borrow Site 2A using hopper dredging equipment and transported 21 miles to San Clemente. A pipeline will be used to pump the sand from the hopper dredge to the beach. Bulldozers and front-end loaders will be used to spread and rework the sand placed on the beach. The project would reduce coastal storm damages, eliminate the need for seawall construction to protect the railroad, and increase recreational benefits (USACE 2012) by restoring a wide sandy beach.

Nature-Based Adaptation Project Feasibility Study and Shoreline Monitoring Program (City of San Clemente)

The City of San Clemente completed a Coastal Resiliency Plan in December 2021 and has initiated efforts to begin adaptation projects to advance coastal resiliency in the city. A key goal of the Coastal Resiliency Plan is the protection of public beach, which serves as a natural shoreline protective buffer. The City of San Clemente received a grant to fund the Nature-Based Adaptation Project Feasibility Study from the CCC through their Local Coastal Program Planning Grant program. This study focuses on identifying critical erosion hot spots and opportunities to develop nature-based or green infrastructure pilot projects or strategies. Pilot projects could provide multiple benefits such as sand retention and ecosystem benefits. The City of San Clemente anticipates pilot projects that are environmentally friendly, financially feasible, and approvable through the regulatory permitting process. Possible pilot projects include a sand engine nourishment project, living shoreline, coastal dune system, and cobble berm structure. The study will also facilitate key recommendations from their Land Use Plan and Sea Level Rise Vulnerability Assessment. The Nature-Based Adaptation Project Feasibility Study is being conducted and is expected to be completed by 2025. The City of San Clemente has also re-established their Shoreline Monitoring Program to document and establish baseline conditions of public beaches in South Orange County from 2022 to 2025, as noted previously.

San Clemente Opportunistic Beach Sand Replacement Program (City of San Clemente)

The City of San Clemente previously conducted two opportunistic beach fill projects, which placed 5,000 cy at North Beach in 2005 and 12,000 cy in 2016 with material trucked from a Santa Ana River sediment-clearing operation. The beach fill projects were conducted under separate Coastal Development Permits for a 5-year opportunistic beach sand replenishment program. As part of the efforts for the City of San Clemente to advance coastal resiliency, the city is evaluating the benefits of re-establishing the Opportunistic Beach Sand Replacement Program alone or in conjunction with the County.

Railroad Revetment Repair (OCTA and Metrolink)

Due to the lack of sand, portions of the Los Angeles-San Diego-San Luis Obispo Rail Corridor (LOSSAN Corridor) have been directly exposed to storm waves resulting in erosion along the railroad ballast. Unengineered riprap rock has been placed in segments along the seaward side of the railroad to protect the railroad ballast and tracks. Riprap repairs from storm wave damage (i.e., adding additional rock) is conducted on an as-needed basis. Visual inspections of the railroad track and riprap protection for damage are also made following extreme high tides and storm conditions. OCTA currently has a Coastal Development Permit for emergency riprap placement.

San Clemente Track Stabilization Project (OCTA and Metrolink)

OCTA and Metrolink have recently completed the installation of ground anchors/tiebacks into bedrock at the base of the coastal bluffs in southern San Clemente near Cyprus Shore. The ground anchors are designed to stabilize a landslide causing movement of the railroad tracks. This emergency repair project has a preliminary projected cost of $12 million and is being funded by $6 million from the State Transportation Improvement Program (Caltrans declared a state transportation emergency and allocated $6 million for the track stabilization project) and $6 million from the Surface Transportation Block Grant.

The San Clemente Track Stabilization Project constructed two rows of steel ground anchors drilled into bedrock along an approximately 700-foot section of the coastal bluffs in the vicinity of the Avenida de Las Palmera beach access. The first row of 104 ground anchors was installed and secured in January 2023, and the second row of 114 ground anchors was installed in March 2023.

South Coast Rail Infrastructure Study and Rail Planning Efforts (OCTA)

OCTA will initiate a feasibility study in fall 2023 on the LOSSAN Corridor to study beach erosion along Dana Point, San Clemente, and unincorporated areas. OCTA plans to analyze a range of options to protect the railroad corridor in place in the near term (in the next 10 years; i.e., 2024 to 2034) and midterm (in 10 to 30 years; i.e., 2034 to 2064). It is envisioned that the feasibility study will consider a variety of solutions including riprap, revetments, seawalls, and breakwaters, as well as soft solutions, such as beach sand nourishment (with and without sand retention devices), dune restoration, cobble beaches, and hybrid solutions (e.g., cobble and sand beach and dune with buried revetment/seawall). OCTA will seek input from the public and stakeholders during a multiyear study and public engagement process.

OCTA is also planning to conduct additional studies to evaluate additional longer-term options for an 11-mile segment of the railroad corridor including an assessment of potential inland alignments of the rail corridor from San Mateo Creek in the south to San Juan Capistrano in the north, building on data and analysis generated by the previously prepared LOSSAN Environmental Impact Report/Environmental Impact Statement.

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Figure

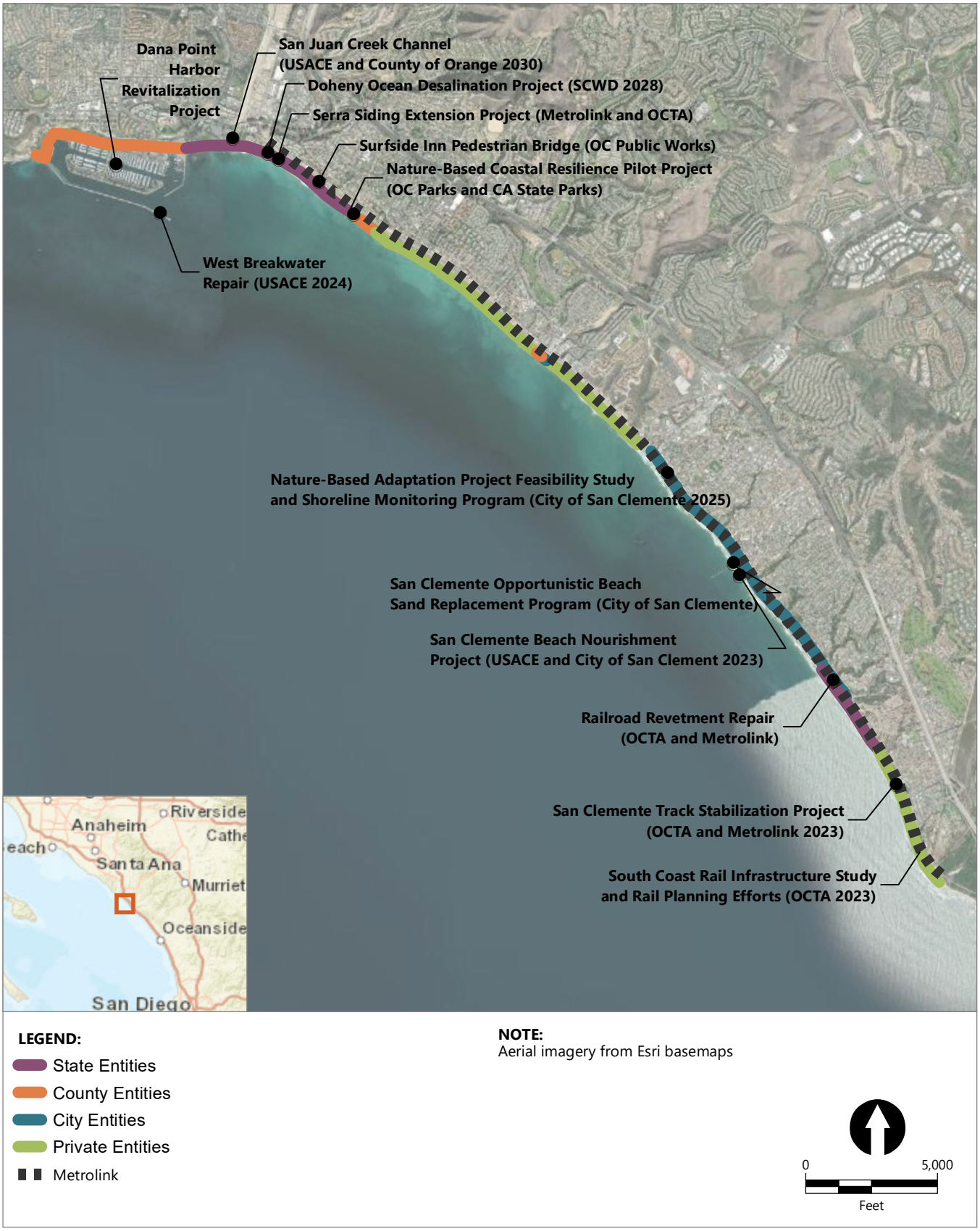

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Figure 1
Existing and Anticipated Projects in South Orange County
South Orange County Regional Coastal Resiliency Strategic Plan
South Orange County Coastal Resiliency

Appendix I
Sea Level Rise Analysis

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Sea Level Rise

May 22, 2024

Introduction

Although the *South Orange County Regional Coastal Resilience Strategic Plan* (Strategic Plan) focuses on the current beach erosion issues, beach nourishment and coastal resilience projects can also be used for adapting to rising sea levels. This appendix summarizes sea level rise (SLR) projections and effects of SLR on beaches and coastal resources for South Orange County.

Historical Sea Level Rise in South Orange County

The National Oceanic and Atmospheric Administration (NOAA) evaluates relative sea level trends at tide gauges. Monitored water levels at the La Jolla tide gauge (Station 9410230) have shown an increase of 0.08 inch per year (2.04 millimeters per year) based on monthly mean sea levels from 1924 to 2021 (NOAA 2023). The relatively small increases in sea levels over the past several decades suggest that beach erosion currently occurring is attributed to reductions in the fluvial sand supply from drought conditions or dams, and not from increases in sea levels.

Sea Level Rise Projections

The state has provided a statewide guidance for local agencies in analyzing and assessing risks associated with SLR (CNRA and OPC 2018). This guidance uses a science-based methodology representing the "best available science" for SLR projections. The latest SLR projections for California are based on advances in SLR modeling and understanding of global SLR (Griggs et al. 2017). The state's guidance provides a range of SLR projections at the 12 active NOAA tide gauges along the California coast. Probabilistic projections of SLR from 2030 to 2150 are included for four scenarios with different probabilities of occurring, as well as an extreme H++, or high-end climate change scenario. Projections between 2030 and 2050 are based on a high greenhouse gas emissions scenario, whereas projections from 2050 onward are provided as a range between low and high greenhouse gas emissions scenarios. The state's guidance recommends the use of three probabilistic projections corresponding to three risk aversion scenarios: low, medium-high, and extreme risk aversion scenarios.

The SLR projections for La Jolla are listed in Table 1. In general, the low risk aversion scenario is recommended for resources with low impacts, such as recreation facilities including an unpaved coastal trail, whereas the medium-high risk aversion scenario is recommended for resources lower ability to adapt, such as residential and commercial structures. The extreme risk aversion scenario is recommended only for development that poses a high risk to public health and safety, natural resources, or critical infrastructure.

Table 1
Sea Level Rise Projections for La Jolla

Year	Projected SLR (feet)		
	Low Risk Aversion	Medium-High Risk Aversion	Extreme Risk Aversion
2030	0.6	0.9	1.1
2040	0.9	1.3	1.8
2050	1.2	2.0	2.8
2060	1.6	2.7	3.9
2070	2.0	3.6	5.2
2080	2.5	4.6	6.7
2090	3.0	5.7	8.3
2100	3.6	7.1	10.2
2110	3.7	7.5	12.0
2120	4.3	8.8	14.3
2130	4.9	10.2	16.6
2140	5.4	11.7	19.2
2150	6.1	13.3	22.0

Notes:
Low risk aversion: Upper limit of "likely range" (approximately 17% probability SLR exceeds this level)
Medium-high risk aversion: 1-in-200 chance (0.5% probability SLR exceeds this level)
Extreme risk aversion: Single scenario (no associated probability)
SLR projections based on high greenhouse gas emissions scenario.
Source: CNRA and OPC 2018

Effects of Sea Level Rise

The potential future effects of SLR on beaches and coastal resources in South Orange County have been identified in prior SLR vulnerability assessments for the City of Dana Point (2019) and City of San Clemente (2019). The SLR vulnerability assessments provide information on the potential impacts of SLR, key SLR thresholds, and potential adaptation strategies for improving coastal resiliency. Impacts of SLR were determined using a combination of the Coastal Storm Modeling System (CoSMoS) for coastal flooding and the CoSMoS Coastal One-Line Assimilated Simulation Tool (CoSMoS-COAST) for shoreline erosion. CoSMoS contains predicted coastal flooding maps, whereas CoSMoS-COAST provides predicted future shoreline positions. Both models are based on a predefined increment of SLR, wave conditions, and management scenarios. A summary of the SLR vulnerability assessments for South Orange County is provided below.

Existing structures such as oceanfront homes, the Los Angeles-San Diego-San Luis Obispo Rail Corridor (LOSSAN Corridor), and Pacific Coast Highway would prevent the natural landward migration of the beach that would occur with projected rising sea levels. For beaches in South Orange County, SLR would worsen the already chronic beach erosion and reduce recreational beach

areas. The effects of storm waves are projected to increase in magnitude with higher sea levels. Key SLR thresholds were identified at 1.6 feet of SLR, which could occur between 2040 and 2060 and at 3.3 feet of SLR, which could occur between 2050 to 2100 (City of Dana Point 2019; City of San Clemente 2019).

Based on the SLR vulnerability assessments (City of Dana Point 2019; City of San Clemente 2019), coastal flooding is anticipated to occur with regular frequency even during non-storm conditions with SLR greater than 1.6 feet. In Dana Point Harbor, Baby Beach could lose up to 50 feet of beach area during high tides. Low-lying area of the harbor—such as parking lots, walkways, and bulkheads—could experience temporary flooding during extreme storm events and high tides, as well as damage to marina infrastructure, such as boat launch ramps, gangways, and docks. With 1.6 feet of SLR, it is anticipated that the east side of Doheny State Beach and Capistrano Beach Park would only have a seasonal beach area with no beach during a portion of the year. Over half of the Capistrano Bay District oceanfront homes along Beach Road could be subject to seasonal erosion impacts, particularly for homes on shallow foundation and without shoreline protection. Beach access to Poche Beach would be permanently inundated. Portions of the LOSSAN Corridor where riprap protection has already been installed, would be exposed to direct wave action and erosion and experience more frequent coastal flooding. In areas where there is no riprap protection along the railroad, such as between Linda Lane Park and T-Street Beach, beach erosion could reach the railroad starting at 2.5 feet of SLR.

A 3.3-foot rise in sea levels represents a significant threshold for the South Orange County shoreline. Dana Point Harbor could be inundated regularly at high tides, including the surrounding walkways and parking lots. At this 3.3-foot SLR threshold, a permanent loss of beach would occur at the east side of Doheny State Beach and Capistrano Beach Park. The sand berm protecting the camping grounds would no longer be effective. The shoreline along the Capistrano Bay District would be at or landward of the oceanfront homes, with permanent beach loss and homes regularly exposed to wave action. Permanent beach loss would also occur from Poche City Beach to T-Street Beach with 3.3 feet of SLR. This stretch of coastline includes Capistrano Shores, North Beach, Linda Lane Park, and San Clemente Municipal Pier. San Clemente State Beach and Cyrus Shore also have a high risk of permanent beach loss with 3.3 feet of SLR, and almost all beach access tunnels in San Clemente would also be impacted. For the LOSSAN Corridor, the entire length of railroad would be exposed to direct wave action and erosion.

Adaptation Measures

The best available science of SLR projections indicate that 3.5 feet of SLR could occur between 2060 and 2100. However, the California Ocean Protection Council (OPC) Strategic Plan and Proposition 68 require state-funded projects to evaluate potential SLR of 3.5 feet by the year 2050. Potential adaptation measures to protect the coastline from SLR include beach nourishment, living shorelines,

or shoreline protection. These adaptation measures could be implemented in combination for additional benefits and flexibility in project design (City of Dana Point 2019).

Both the Cities of Dana Point and San Clemente's SLR adaptation measures recommend participating in a regional beach nourishment program to increase efficiency and cost-effectiveness (City of Dana Point 2019; City of San Clemente 2019). A regional beach nourishment program could be effective and feasible to offset beach erosion, but only with SLR projections of up to 3.3 feet. The fifth climate change assessment for California is currently being prepared, so current SLR projections and time horizons may change when it is finalized.

Beach nourishment enables beaches to maintain or increase in width, providing wave protection while maintaining recreational and environmental resources. In addition, beach nourishment has been successfully implemented throughout Southern California. Major challenges for implementing a regional beach nourishment program include obtaining funding and environmental permits.

Living shorelines are shoreline stabilization techniques that use native material, vegetation, or other living elements in combination with a structural element to provide stability. Native vegetation is used to reduce coastal erosion and provide habitat resources. The structural element should be compatible with the existing ecosystem and natural coastal processes. Living shorelines could be implemented through habitat restoration to allow upward migration of habitat and enhancing protection of landward resources. A sand dune is an example of a living shoreline that has been identified as an adaptation measure for SLR (City of Dana Point 2019) and is being considered at Doheny State Beach, Capistrano Beach, and San Clemente as part of nature-based adaptation projects.

Higher rates of SLR would require adaptive management to increase the amount sand needed to retain a wide public beach and would have associated increased costs. Long-term adaptation measures would likely depend on what is done for the LOSSAN Corridor, such as reinforced coastal structures. Without shoreline protection of some type, the railroad would likely be inoperable from frequent coastal flooding and erosion damage with 4.9 feet of SLR (City of San Clemente 2019). Shoreline protection is the use of structures such as seawalls, riprap, and revetments.

Thus, maintaining an ongoing regional Shoreline Monitoring Program is essential to understand the condition of the beaches in South Orange County as is closely monitoring the nearest local NOAA tide gauge at La Jolla, which is currently reporting a relative SLR trend of 0.08 inch per year (2.04 millimeters per year; NOAA 2023).

Local agencies, as well as individual organizations, are planning or actively implementing various projects and programs to enhance shoreline communities, to construct or repair shoreline protection structures, or to implement adaptation measures as described in Appendix G.

Regional coordination would serve to create consistency for implementation and planning regionwide moving forward.

State Targets for Sea Level Rise

This Strategic Plan is a beneficiary of OPC's Proposition 68 Coastal Resiliency grant solicitation and should advance implementation of the OPC's *Strategic Plan to Protect California's Coast and Ocean 2020–2025* (OPC Strategic Plan; 2020) and support the Principles for Aligned State Action on Making California's Coast Resilient to Sea Level Rise. The Strategic Plan should show progress in ensuring California's coast is resilient to a minimum of 3.5 feet of SLR by 2050 and use a more protective baseline 2050 and 2100 targets for road, rail, port, power plants, water and waste systems, and other critical infrastructure.

The OPC sets forth a series of Targets and Actions in their OPC Strategic Plan. Action 1.1.1 for 2050 states:

> Ensure California's coast is resilient to at least 3.5 feet of SLR by 2050, as consistent with the State's Sea Level Rise Guidance Document as appropriate for a given location or project. This target will be modified periodically based on the best available science and updates to the State's Sea Level Rise Guidance Document.

This target is intended to be based on the best available science and updates to the state's Sea Level Rise Guidance Document. An update to this Guidance Document is anticipated in June 2024, with a draft version released in January 2024, which is based on data provided by NOAA in their *Sea Level Rise Technical Report* released in 2022 that suggests "greater certainty and a narrowing range of the amount of sea level rise through 2050, with a statewide average of 0.8 ft of rise projected in the next 30 years." Therefore, this best available science is likely to eliminate the most extreme scenarios provided in the state's current Sea Level Rise Guidance Document once the draft document is finalized in June 2024. NOAA indicates that "by 2050, the expected relative sea level (RSL) will cause tide and storm surge heights to increase and will lead to a shift in U.S. coastal flood regimes, with major and moderate high tide flood events occurring as frequently as moderate and minor and high tide flood events occur today. Without additional risk measures, U.S. coastal infrastructure, communities, and ecosystems will face significant consequences." NOAA's document goes on to anticipate high scenario projections for SLR of 1.14 feet (0.38 meters) for the southwest region by 2050, significantly lower than the 3.5 feet currently identified by OPC's target.

A regional beach nourishment program could be effective and feasible to offset beach erosion due to high tide flood events and for SLR projections between 1.6 feet and 3.1 feet by 2100 (OPC 2024). Therefore, the current Strategic Plan objective to pursue regional beach nourishment shows progress toward meeting this target for resiliency by 2050 based on the current best available science. This

Strategic Plan may serve as a continued networking opportunity for local and regional planning and coordination to create a forum for the planning process for SLR adaptation. The underlying premise of this Strategic Plan is to build upon existing sand replenishment projects and develop an ongoing regional coordination for the beneficial use of sediment to restore the natural sediment supply to the South Orange County region. The amount of coastal resiliency (e.g., 3.5 feet) should be included as a design goal for the regional beach nourishment program. Thus, implementation of this Strategic Plan meets the OPC Strategic Plan (OPC 2020) and Proposition 68 goal to ensure California's coast is resilient to 3.5 feet of SLR by 2050. The amount of coastal resiliency (e.g., 3.5 feet) should be included as a design goal for the regional beach nourishment program.

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Appendix J
Potential Sand Sources

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Potential Sand Sources

May 22, 2024

Introduction

Potential sand sources for a regional beach nourishment program would include upland sources or coastal and offshore sources. This appendix only provides a listing of potential sand sources and does not contain specific details on quantity, grain size, availability, or costs.

Upland Sand Sources

Upland sources represent the numerous sand sources from the watershed, such as rivers, lakes, reservoirs, retention basins, and debris basins. An extensive list of upland sources was previously identified in the *Orange County Coastal Regional Sediment Management Plan* (OC CRSMP; USACE 2013). Construction sources were excluded because these would only be opportunistically available sources and may not be available in the quantities needed for a regional scale beach nourishment program. Sand-mining sources are not included, but a listing is available in the OC CRSMP, and this option could be further explored in the next phase of this regional coastal resiliency collaborative effort.

Historically, upland sand from Camp Pendleton was used for a large beach nourishment at Doheny State Beach in 1967. Sand-mining sources from upland quarries should be considered for use in a South Orange County regional beach nourishment program due to direct access to local beaches from roadways, as well as via rail. These sources of sand could be cost competitive with other sand sources because they do not need to be dredged from the offshore, but rather could be placed directly on the beach via trucks and/or rail delivery.

Potential fluvial sources were identified as the major fluvial sources that supply sediment to their respective littoral systems. Major fluvial sources in Orange and San Diego counties include the following:

- San Gabriel River
- Santa Ana River
- San Diego Creek
- Laguna Canyon
- San Juan Creek
- San Mateo Creek
- Santa Margarita River
- San Luis Rey River

These major rivers have been modified (e.g., channelized with armoring of riverbanks) for flood-control purposes and in some cases, sand deposits at the river mouth are dredged to maintain

flood capacity. For example, the County of Orange (County) currently conducts maintenance dredging of the Lower Santa Ana River and has dredged the mouth of San Juan Creek. These river-mouth sediments are beach-quality sands and are normally placed within the same littoral cell. However, sand from the Santa Ana River has previously been used for beach nourishment at North Beach and at Capistrano Beach and Doheny Beach. In addition, sand accumulated within the riverbeds are a potential sand source. For example, sand deposits are found along channelized portions of San Diego Creek, upstream of Upper Newport Bay.

The major rivers are extensively regulated with dams, reservoirs, and other flood-control infrastructure and have trapped a significant portion of sediment supply in the upper watersheds (USACE 2013). For example, Prado Dam traps a significant portion of the Santa Ana River sediment supply, and the accumulated sediment has reduced the flood storage capacity of the reservoir. The Prado Basin Sediment Management Demonstration Project was recently completed to demonstrate the effects of sediment removal from Prado Basin and re-entrainment of sediment into the Lower Santa Ana River. If successful, changes in Prado Basin sediment management could result in a potential sand source. It should be noted that Prado Dam was not included in the following list because it is located in Riverside County; a full listing of potential upland sources in Los Angeles, Orange, and Riverside Counties is available in the OC CRSMP (USACE 2013). Lakes, reservoirs, retention basins, and debris basins in Orange County include the following:

- Agua Chinon Retarding Basin
- Bee Canyon Retarding Basin
- Big Canyon Reservoir
- Brea Flood Control Basin Reservoir
- Carbon Canyon Reservoir
- E. Hicks Canyon Retarding Basin
- Edinger, Sunset, and Wintersburg flood control channels
- El Toro Reservoir
- Irvine (Santiago River) Lake
- Laguna Reservoir
- Lagunas Lake
- Miller Retarding Basin
- Mission Viejo Lake
- Orchard Estates Retarding Basin
- Palisades Reservoir
- Peters Canyon Reservoir
- Rattlesnake Canyon Reservoir
- Rossmoor Number 1 799 Reservoir
- Round Canyon Retarding Basin

- San Joaquin Reservoir
- Sand Canyon Dam
- Trabuco Retarding Basin
- Upper Oso Dam Reservoir
- Veeh Reservoir
- Walnut Canyon Reservoir
- Yorba Linda Reservoir

Offshore Sand Sources

Coastal and offshore sources are the potential sand sources from harbor, lagoons, and offshore region. Sand sources from harbors and bays come from maintenance or access dredging conducted to remove accumulated sediment within navigation channels. Lagoon sand sources are from sediment dredged to maintain tidal inlets or removal of fluvial sediment deposition. Harbors, bays, and lagoons along the Orange County coastline include the following:

- Anaheim Bay
- Huntington Harbor
- Bolsa Chica Ecological Reserve
- Huntington Beach Wetlands and Talbert Marsh
- Newport Bay
- Upper Newport Bay
- Newport Banning Ranch Wetlands and Semeniuk Slough
- Dana Point Harbor

Offshore sources refer to sand sources just offshore of the active littoral zone and may include known borrow sites. An example of using an offshore source for beach nourishment is the large-scale San Diego Association of Governments Regional Beach Sand Project (RBSP), a beach nourishment project conducted in 2001 and again in 2011 to 2012. The RBSP used approximately 3.5 million cubic yards of sand from offshore borrow sites located off the San Diego County coastline to nourish receiver beaches along the coastline between the cities of Oceanside (north) and Imperial Beach (south).

In Orange County, the U.S. Army Corps of Engineers (USACE) has previously designated four offshore borrow sites: ORA-1 offshore of Seal Beach, ORA-2 offshore of Huntington Harbor, ORA-3 offshore of the Santa Ana River, and a site offshore of Dana Point Harbor. A map of these four offshore borrow sites is available in the OC CRSMP (USACE 2013). Additionally, a beach nourishment study by OC Parks (2021) determined two possible offshore borrow sites located east of Dana Point Harbor, offshore of Doheny State Beach and Capistrano Beach Park. The City of San Clemente, in the planned USACE project scheduled for later in 2023 will utilize an offshore borrow site located west of Oceanside and known as Borrow Site 2A.

A key recommended next step in the *South Orange County Regional Coastal Resilience Strategic Plan* (Strategic Plan) is to conduct additional investigations of the offshore area to include further analysis of known borrow sites and to identify new borrow sites to assess sediment quantity and quality that could be available to support a regional beach nourishment program as contemplated within this Strategic Plan. There are a variety of ongoing independent agency projects with opportunities to coordinate sand nourishment on a regional level going forward.

References

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Appendix K
Funding Approaches

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Funding Approaches

May 22, 2024

Introduction

This appendix identifies potential funding sources to fund the *South Orange County Regional Coastal Resilience Strategic Plan's* (Strategic Plan) objectives, including formation of a regional collaborative and implementation projects and programs. The regional collaborative will need to secure funding to implement the projects and programs described in this Strategic Plan. There are also administrative cost considerations for implementation of a collaborative organization. Anticipated challenges will include acquiring the necessary funding for implementing strategies and gaining commitment and support from federal and state government agencies to collectively address local conditions in a coordinated and collaborative manner.

Identifying and obtaining funding commitments is an essential element of this Strategic Plan. To support its success, the member entities will continue to support the regional focus and encourage ongoing dialogue to identify, fund, and implement the full range of coastal resiliency projects. This Strategic Plan identifies potential funding sources; however, this is not an exhaustive list because new funding sources come online periodically. Potential known sources of funding that should be explored are described below.

Establishment of Account Managed by the Regional Collaborative

As one of the first tasks, the group will need to establish a Shoreline Account that will serve as the primary account where all funds generated pursuant to furthering the efforts of the group will be held. The group will need to invest the Shoreline Account funds prudently and expend them for purposes outlined in this Strategic Plan, including, without limitation, the following:

- Sand replenishment studies and project(s)
- Sand retention studies and project(s)
- Offshore borrow site analysis to identify additional available sand sources
- Sampling and analysis plans and reporting analysis
- Preparing mean high tide line surveys
- Preparation of other shoreline surveys, monitoring programs and technical reports
- Preparing environmental review and compliance documentation (California Environmental Quality Act [CEQA]/National Environmental Policy Act [NEPA])
- Preparing and processing regulatory permit applications for specific projects
- Opportunistic beach nourishment programs and development of stockpile locations
- Insurance premiums
- Project/ permit fees
- Meeting coordination and staffing

Cost-Sharing Framework

To fund the regional collaborative, there would likely be various cost-sharing agreements or arrangements that will come into play depending on whether the costs relate to the following:

- Governance structure and/or operations
- Project type (federal lead agency versus nonfederal lead agency)
- Project phase (planning versus construction)

In general, costs would be allocated among the member agencies (or participating entities) according to the land ownership or maintenance responsibilities and/or benefits derived by each of the member agencies (or participating entities). Each of these scenarios/considerations is described in the following sections.

Cost-Sharing by Governance Structure

Some of the governance structures described in this Strategic Plan involve creating a brand-new entity that is a Joint Powers Agency or Joint Powers Authority (JPA), whereas others rely on a Joint Powers Agreement, Memorandum of Agreement, or Memorandum of Understanding (MOU) as the formal guiding agreement. The latter examples operate based on a governance structure framework embedded within an existing agency to take the lead role in coordinating and facilitating the efforts of the multiple entities toward resiliency project implementation. Depending on whether the South Orange County Coastal Resilience stakeholders choose to move forward with establishing a new governance structure or rely on an existing agency to coordinate and lead the coastal resiliency efforts, funding will be needed to carry out the mission and cost-share responsibilities must be equitably allocated.

A new agency will need a new source of money to operate. The two most popular funding methods are either creating a revenue stream or raising capital by issuing bonds. Grant funding may also be an option to fund a start-up coastal resiliency organization. An organization such as Beach Erosion Authority for Clean Oceans and Nourishment has staff, legal counsel, and physical offices and likely has higher costs compared to a new start-up agency. A cost-sharing agreement will have to be defined and negotiated to ensure the new entity is fully funded and operational and that costs are allocated among the member agencies.

To establish a new coastal resiliency working group comprising the member agencies and other stakeholders, existing agency funding and staff could be used, thus building on optimizing organizational efficiency, which would likely serve to reduce costs associated with getting a newly formed South Orange County group focused coastal resiliency fully operational. This effort would be comparable to existing County of Orange (County)-led cooperative arrangements, including development of an annual budget and work plan approved by all parties where the County may charge direct labor, materials, equipment, and outside contract services to the program.

The San Diego Association of Governments (SANDAG) Shoreline Preservation Working Group is a contemporary and relevant cost-sharing framework example. SANDAG recently initiated efforts to implement Phase 1 of Regional Beach Sand Project (RBSP) III and has asked all coastal jurisdictions to explore their interest in participating in RBSP III and advise SANDAG accordingly. Interested jurisdictions have been asked to enter into an MOU with SANDAG to support Phase 1, which is the initial planning phase of RBSP III. The Phase 1 cost is currently estimated to be $200,000. If all 10 coastal cities participate in Phase 1 of RBSP III, the cost per city is a uniform $20,000 per city because all cities benefit equally from a coordination planning process. If only nine cities chose to participate, then the $200,000 cost would be shared among all parties, and the cost per agency would increase to $22,222. Thus, the cost-sharing framework is based on an equal allocation for all participants as all benefits are equal. If cities intend to participate in future phases, they must sign a MOU for Phase 1. If they do not sign the MOU with SANDAG for Phase 1, they would not be able to participate in future phases of RBSP III. The rationale is that all cities benefit equally from the work products and technical studies developed during Phase 1, which will in turn inform and support Phase 2 efforts. Therefore, if an agency seeks to benefit from the collaborative work efforts, they must contribute financially to a successful outcome.

Phase 2 of RBSP III would be the environmental review and permitting phase, and it is anticipated that costs for this phase will also be shared equally among all participating entities because all benefit equally from the collective efforts to advance a regional project.

Phase 3 of the RBSP III would be the construction and monitoring phase, and the cost-sharing framework for this phase would be based on either of the following: 1) miles of shoreline as a percent of the total regional shoreline; or 2) the volume/cubic yards (cy) of sand to be placed on a member agency beach (or beaches if there are multiple receiver beaches) within any given city. The cost-sharing framework for this phase of the project differs from earlier phases as each city will have different volumes of sand placed, which has a distinct and direct cost and benefit correlation too.

Cost-Sharing by Project Type

Depending on whether a project is jointly developed with U.S. Army Corps of Engineers (USACE) as a federal partner or solely among the member agencies, there may be cost-sharing/cost-match requirements that have to be satisfied. For example, in the case of the San Clemente and Solana Beach and Encinitas USACE 50-year projects, each of the cities had to sign a project partnership agreement with USACE for each of the three project phases (i.e., feasibility phase; planning, engineering, and design phase; and the construction phase).

The general cost-share agreement with USACE and cities for where the entities function like partners in these projects is 65% federal and 35% nonfederal for all three phases. Importantly, the cities applied for and were successful in obtaining grant funding from California Department of Parks and Recreation (State Parks) Division of Boating and Waterways (DBW) for up to 85% of the required 35%

nonfederal share. This supplemental funding from the State of California has been essential to advancing the project to anticipated construction phase later in 2023. More information on funding opportunities (including grant programs) with these agencies can be found below.

If the South Orange County Coastal Resilience group elects not to pursue a partnership with USACE, the additional funding sources would need to be obtained. Most grants, whether local, regional, state, or federal, all have some cost-share or funding-match requirement. The cost share can typically be contributed in the form of direct cash payments and can also often times be contributed as a work-in-kind contribution of staff time, technical studies, monitoring data, or other work products that are needed to support project development and implementation. The concept of work in-kind must be negotiated early on at the outset of discussions of the cost-share requirements so that all agencies can plan and budget accordingly.

Cost-Sharing by Project Phase

Typical coastal resilience projects—whether they are public beach restoration projects, such as those contemplated as the priority in this Strategic Plan, or future multi-benefit, nature-based, green, gray, or hybrid sand retention projects—include the following general project development phases:

- Phase 1: Preliminary Planning/Plan Formulation Phase
- Phase 2: Environmental Compliance under CEQA/NEPA and Regulatory Permitting Phase
- Phase 3: Preliminary and Final Project Design Phase
- Phase 4: Pre-Construction Monitoring Phase
- Phase 5: Construction Phase
- Phase 6: Post-Construction Monitoring and Reporting Phase

Cost-sharing frameworks for various project phases are distinguished as follows:

- Project phases that benefit all member agencies equally; therefore, the cost share is the same for all member agencies (e.g., divide cost by the number of member agencies/entities and allocate all members an equal cost share)
  - Typically, this will include the Preliminary Planning, CEQA/NEPA, Regulatory Permitting, and Design phases and may include the Post-Construction Monitoring and Reporting Phase.
- Project phases that have jurisdiction-specific cost variations and corresponding varying benefits for various members/entities
  - Typically, this will include the Pre-Construction Monitoring and Construction phases and may include the Post-Construction Monitoring and Reporting Phase, and costs may be allocated based on relative length of shoreline as a percent of the total regional shoreline or based on volume of sand to be placed on the beach.

Table 1 illustrates the cost-sharing frameworks by project phase. Further refinements to the cost-sharing frameworks would occur once the preferred governance structure is defined and the first regional coastal resiliency project is defined.

Table 1
Cost-Sharing Frameworks by Coastal Resiliency Project Phase

Cost-Sharing Framework	Typical Coastal Resiliency Project Phases					
	Preliminary Planning	**CEQA/NEPA and Regulatory Permitting**	**Design**	**Pre-Construction Monitoring**	**Construction**	**Post-Construction Monitoring and Reporting***
Cost-share allocation is equal for all (i.e., cost is quantified as the total cost divided by the number of member agencies)	X	X	X			X
Cost-share allocation based on project differences and direct benefits to member agency/entity (i.e., costs vary among member agencies depending on relative length of shoreline nourished or cy of sand placed)				X	X	X

Note:
*Assignment of costs may vary depending on differing monitoring or mitigation requirements.

Grant Funding Opportunities

California State Parks, Division of Boating and Waterways Grants

In conformance with Assembly Bill 64 (Ducheny), Chapter 798, Statutes of 1999, Section 69.8 of the Harbors and Navigation Code, the State Parks DBW and the California State Coastal Conservancy submitted a report to the legislature that discussed the following required subjects:

- Activities Undertaken Under the California Public Beach Restoration Act Program
- Need for Continued Funding of the Public Beach Restoration Program
- Effectiveness of the Program
- Ways to Increase the Natural Sediment Supply

The general objectives of State Parks DBW's coastal erosion control programs are to protect public safety along the California shoreline and reduce the public costs of shoreline erosion. This can be achieved by cosponsoring the planning and construction of cost-effective erosion control projects with local and federal agencies; improving present knowledge of oceanic forces, coastal erosion factors, and evolving shoreline conditions; and sharing and applying this knowledge to help prevent or reduce future erosion.

State Parks DBW can provide funding for beach nourishment and dune restoration projects, as well as sand retention projects or hybrid projects. DBW has been the state entity with responsibility for statewide coastal/shoreline erosion control since 1970. This responsibility was reconfirmed in a 1997 Executive Order and in the 1999 bill that established the Public Beach Restoration Program under DBW. State Parks DBW continues to fulfill its responsibilities by facilitating coastal studies statewide and providing local assistance grants to government agencies that plan and construct cost-effective coastal erosion solutions. These grants come from two programs, the Shoreline Erosion Control and Public Beach Restoration programs, both of which are cost-shared by local agencies and which are described in greater detail below.

The Public Beach Restoration Program funds beach nourishment projects to restore or widen public beaches and maintain coastal access that will reduce wave energy and runup, thereby reducing the erosive power of ocean waves. The cost-share requirement for these grants is 85% state/15% local match. In general, the Shoreline Erosion Control Program funds projects that provide hard structure solutions to resisting erosive wave forces. The cost-share requirement for these grants is 50% state/50% local match.

The most recent grant funding applications for Fiscal Year (FY) 2024–2025 were due in December 2022. The next round of grant applications were due at the end of 2023 (application typically due in December), and if successful, funds would be available in FY 2025–2026 (i.e., beginning July 2025). Additional information on the two DBW grant programs is provided below.

Sections 65 through 67.3 of the Harbors and Navigation Code authorize DBW to study erosion problems; act as shore protection advisor to all agencies of government; and plan, design and construct protective works when funds are provided by the legislature. The Rivers and Harbors Act of 1962, as amended, allows DBW to participate in beach erosion control projects undertaken by USACE.

Limited funds are available through these competitive grant programs. Projects that qualify for funding may not receive funding authorization in the state budget, and the state may authorize a lesser amount of funding than requested in the application.

A project may be fundable through this program, provided the study is focused on addressing a public beach restoration need. In general, DBW does not fund routine shoreline monitoring and maintenance, including general condition surveys. If multiple agencies are sponsoring the project, such as when a regional entity like the proposed collaborative is involved, the collaborative would be designated the "lead agency" for purposes of submitting the application and corresponding with DBW.

Bipartisan Infrastructure Law/Infrastructure Investment and Jobs Act Funding

The Infrastructure Investment and Jobs Act (IIJA) was signed into law on November 15, 2021, and is a federal authorization that provides new federal funding opportunities for infrastructure projects, including coastal resiliency projects such as those described in this Strategic Plan. The IIJA, also known as the Bipartisan Infrastructure Law (BIL), is intended to help coastal communities like South Orange County build coastal resiliency capacity. This historic $1.2 trillion-dollar legislation contains tens of billions of dollars to be spent over the next 5 years for resilience investments, ecosystem restoration, and water infrastructure. The money will flow through both existing and new channels spanning many agencies, including National Oceanic and Atmospheric Administration (NOAA), the U.S. Environmental Protection Agency (EPA), Federal Emergency Management Agency (FEMA), the Department of Interior, USACE, and the Department of Transportation. This funding package authorized USACE funding for the upcoming 50-year San Clemente beach replenishment project that began in 2023 and helped fund the Solana Beach and Encinitas 50-year beach sand replenishment project that will begin in 2023–2024, as well as funds for planning and environmental work for the Dana Point Harbor Breakwater Repair Project. The IIJA represents a historic investment and opportunity to enhance coastal protection, restoration, and resiliency that will increase community resilience to climate change and extreme weather events. Funding through this resource would be through a grant opportunity or require a federal project partner such as USACE. Under the IIJA, USACE received a total allocation of $17 billion.

FEMA's BRIC Program

FEMA's Building Resilient Infrastructure and Communities (BRIC) grant program give states, local communities, Tribes, and territories funding to address future risks to natural disasters, including wildfires, drought, hurricanes, earthquakes, extreme heat, and flooding. Addressing these risks helps

make communities more resilient. The BRIC program aims to categorically shift the federal focus away from reactive disaster spending and toward research-supported, proactive investment in community resilience. Example projects demonstrate innovative approaches to partnerships, such as shared funding mechanisms, and/or project design.

For example, an innovative project may bring multiple funding sources or in-kind resources from a range of private and public sector partners. Or an innovative project may offer multiple benefits to a community in addition to the benefit of risk reduction.

Through BRIC, FEMA continues to invest in a variety of mitigation activities with an added focus on infrastructure projects benefiting disadvantaged communities, nature-based solutions, climate resilience and adaptation, and adopting hazard-resistant building codes.

NOAA National Coastal Resilience Fund

On December 6, 2022, the National Fish and Wildlife Foundation (NFWF) and NOAA announced $136 million to fund 88 projects under the 2022 National Coastal Resilience Fund using funds from their annual appropriations and funds from the BIL. The projects will restore, increase, and strengthen natural infrastructure—the landscapes that help absorb the impacts of storms and floods—to ultimately protect coastal communities from storm and flooding impacts and enhance fish and wildlife habitat. The total investment, including grants announced earlier this year, as well as nonfederal match, is $241 million. This is a competitive grant funding program, established in partnership between United States Fish and Wildlife Service, the NFWF, and other governmental and private sector partners. Funded projects cover the spectrum of nature-based infrastructure efforts, and include project planning, design, and implementation.

NOAA Climate Resilience Regional Challenge

In June 2023, NOAA announced a new funding opportunity called the Climate Resilience Regional Challenge, which will provide $575 million in funding to help coastal communities become more resilient to extreme weather and other impacts of the climate change. The NOAA funding program focuses on regional approaches to strengthening climate resilience and is intended to ensure that communities have the resources they need to prepare for climate change. Funds are available to help communities that share common challenges work together to develop innovative solutions while equipping them with essential resources to build a climate-ready future. This competitive grant program has two tracks for investing in holistic, collaborative approaches to coastal resilience at regional scales including Regional Collaborative Building and Strategy Development ($25 million) and Track Two, which will support the implementation of resilience and adaptation actions ($550 million), with a focus on implementing transformational climate adaptation actions. The NOAA Climate Resilience Regional Challenge focuses on building capacity within and across regional networks and its holistic approach to climate resilience. With NOAA technical support and assistance,

this collaboration and coordination across regions will help coastal communities prepare for climate change, reduce risks and address vulnerabilities.

Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation Program

Created by the BIL, Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation Program is a part formula, part competitive grant opportunity to help transportation infrastructure be more resilient in the face of extreme weather and climate change. The formula funds will flow through the states. Eligible project choices may include the use of natural, or green, infrastructure to buffer future storm surges and provide flood protection, as well as aquatic ecosystem restoration.

USACE Partnership Funding Opportunities: CAP Section 103 and Section 204 Programs

USACE currently maintains nine water resource-related Continuing Authorities Programs (CAPs), which are codified in several different laws. All CAPs have a specific project type focus and corresponding statutory limits on federal participation known as per project limits. The purpose of the USACE CAP is to plan, design, and construct projects of limited scope and complexity. The fundamentals or characteristics of a CAP project include the following: small project or project area, obvious and well-understood problem(s), simple solution(s), and limited scope and complexity. A CAP must be requested by a plan sponsor (e.g., county, city, or other public entity), have an established federal cost limit, and include two phases: Feasibility Phase and a Design and Implementation Phase. Of the nine CAP programs, two would be a best fit for the collaborative and are described in greater detail below.

CAP 103: The USACE Hurricane and Storm Damage Reduction (Beach Erosion) Section 103, 1962 River and Harbor Act, as amended, provides 100% federal funding to initiate a feasibility study up to $100,000, then the cost-share requirement is 50% federal/50% nonfederal to complete the feasibility study. The implementation cost share is 65% federal/35% nonfederal. The CAP 103 program has a $10,000,000 project cost limit. A study of a prospective Section 103 project will be initiated after receipt of a written request from an authorized sponsoring agency and provided federal funds are available.

CAP 204: Section 204 of the Water Resources Development Act of 1992, as amended, authorizes USACE to implement projects to reduce storm damage to property, in connection with dredging for the construction or operations and maintenance of an existing authorized federal navigation project. There is a $10.0 million federal project limit. Section 204 projects start with the Feasibility Phase, which is funded 100% federally. After approval of the feasibility study, the project enters the Design and Implementation Phase. Costs of the Design and Implementation Phase are shared 65% federal

and 35% nonfederal. Operation, maintenance, repair, rehabilitation, and replacement of the project in the future is at 100% nonfederal cost. A study of a prospective Section 204 project will be initiated after receipt of a written request from an authorized sponsoring agency and provided federal funds are available.

NOAA Science, Service and Stewardship Funding

In the 2022 Inflation Reduction Act, $2.6 billion was provide through NOAA for coastal communities and climate resilience projects to support vulnerable populations in preparing, adapting, and building resilience to weather and climate events; improve supercomputing capacity and research on weather, oceans and climate; strengthen NOAA's hurricane hunter fleet; and replace aging NOAA facilities. This, in combination with funds NOAA received from Congress through the BIL, will further strengthen NOAA's efforts to build a "Climate-Ready Nation." This funding will support NOAA in its efforts to assist California, Tribal governments, local governments, nonprofit organizations, and institutions of higher education to become more prepared and resilient to changes in climate. These investments will also support NOAA's understanding of marine resource trends in the face of climate change, enabling more targeted conservation, restoration, and protection measures for coastal and marine habitats, fisheries, and marine mammals.

Impact Mitigation Fees: Sand and Public Recreation

Impact mitigation, or in lieu fees, are another way to generate funds for coastal resilience strategies. Certain structured fees could be established to generate revenues for the following: 1) covering the necessary planning of, technical studies for, design of, and implementation of coastal resilience strategies; or 2) developing an emergency cleanup fund to be able to respond quickly and opportunistically following disasters. Disasters, through a different lens, are opportunities to implement changes.

There are currently two structured fees that the California Coastal Commission (CCC) uses to address the impacts of shoreline protection: a Sand Mitigation Fee and a Public Recreation Fee. The Sand Mitigation Fee is a fee intended to mitigate for the loss of sand supply and loss of recreational beaches in front of structures attributed to a coastal structure. The Public Recreation Fee addresses impacts to the loss of public recreation based upon the loss of beach area physically occupied by a coastal protective device.

Sand Mitigation Fees

Such a fee would mitigate for actual loss of beach-quality sand, which would otherwise have been deposited on the beach. For all development involving the construction of a coastal protective device, a Sand Mitigation Fee could be collected to be used for coastal resiliency purposes. The fee could be deposited in an interest-bearing account designated by the collaborative in lieu of providing sand directly to replace the sand that would be lost due to the impacts of any coastal protective device.

Consideration of sand volumes lost over time should factor into whether actual sand placement is preferred or whether the volume per dollar should be retained until a substantial volume can be contributed. The methodology used to determine the appropriate mitigation fee has been approved by the CCC in past cases. The funds should solely be used to implement projects that provide sand to the region's beaches, not to fund other public operations, maintenance, or planning studies. In addition to the CCC fee methodology, the City of Solana Beach (San Diego County) has established their own fee program, which could be reviewed for applicability in South Orange County.

Public Recreation Impact Fees

Like the methodology used by the CCC for the Sand Mitigation Fee, the CCC has developed a methodology for calculating a statewide Public Recreation Fee. The collaborative could develop administrative processes consistent with CCC methodology, including development of impact mitigation fees for public access and recreation, proposing a public recreation/access project in lieu of payment of Public Recreation Fees to provide a direct recreation and/or access benefit to the general public, and project prioritizations. In addition to the CCC fee methodology, the City of Solana Beach has established their own fee program which could be reviewed for applicability in South Orange County.

Regional Coastal Resiliency Funding Through Dedicated Transient Occupancy Tax or Sales Tax

Dedicated Transient Occupancy Tax Increase

A Transient Occupancy Tax (TOT) is paid by visitors from hotel stays and short-term vacation rentals, and the funds are remitted to the county or city. TOT can provide a source of General Fund revenues for the County and cities and requires a public vote for approval. A dedicated increase in TOT (e.g., 2% for coastal resiliency) could be reserved specifically for resiliency approaches that maintain the regions beaches and shoreline. Presently the TOT rate is 10% in Dana Point, San Clemente, and for hotels located in unincorporated parts of the County. A potential increase of 2% could yield an additional $530,000 annually. A regionally coordinated increase in TOT could provide regional funding for coastal resiliency improvements, maintenance, or coastal infrastructure repairs as outlined in the Strategic Plan.

Dedicated Sales Tax Increase

The County and cities may consider this approach or coordinate on a countywide approach such as a quality-of-life initiative (as contemplated by SANDAG for example) to generate local revenues to be used to finance long-term coastal resilience strategies. For example, the City of Solana Beach, located in San Diego County, instituted a 2% sales tax increase that is used as a dedicated source of funding

for coastal resiliency building for public coastal infrastructure, facilities, and access projects. As with TOT, this would likely require a public vote for approval.

Local Hazard Mitigation Planning and Pre-Disaster Assistance

The California Office of Emergency Services (Cal OES) Hazard Mitigation Planning Division and FEMA's Hazard Mitigation Assistance grant programs are available to provide opportunities to reduce or eliminate potential losses to public assets through hazard mitigation planning and project grant funding. Currently, Cal OES and FEMA have three grant programs: Hazard Mitigation Grant Program, Pre-Disaster Mitigation, and Flood Mitigation Assistance. The total value in each of the grants vary annually based on federal funding authorizations and typically each is in the 10s to 100s of million dollars.

The California Infrastructure and Economic Development Bank

The California Infrastructure and Economic Development Bank (IBank) was created in 1994 to finance public infrastructure and private development that promote a healthy climate for jobs, contribute to a strong economy, and improve the quality of life in California communities. IBank has broad authority to issue tax-exempt and taxable revenue bonds, provide financing to public agencies, provide credit enhancements, acquire or lease facilities, and leverage state and federal funds. IBank's current programs include the Infrastructure State Revolving Fund Loan Program, California Lending for Energy and Environmental Needs Center, the Climate Catalyst Revolving Loan fund, Small Business Finance Center, and the Bond Financing Program.

Green Bonds

Bonds are debt instruments that allow governments (such as a JPA) and other entities to borrow money from investors and repay that investment over a certain time at a certain rate. Government bonds often remain tax-exempt, meaning the interest that investors earn is tax-exempt. Bonds are a traditional platform for financing public infrastructure and government programs. "Green" bonds have been specifically developed to finance green adaptation infrastructure, such as the coastal resiliency projects contemplated in this Strategic Plan.

Proposition 1 and Proposition 68 Grant Opportunities

The California Department of Fish and Wildlife (CDFW) has available funding opportunities for multi-benefit restoration and protection projects under Proposition 1 (Water Quality, Supply, and Infrastructure Improvement Act of 2014). This grant funding opportunity makes funds available to public agencies for planning activities that lead to specific on-the-ground implementation projects; funds for implementation activities, such as construction and monitoring; and funds for acquisition or purchases of interests in land or water.

Following passage of Proposition 68 (California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access for All Act of 2018), funds have been appropriated to the California Natural Resources Agency for competitive grant funds that protect, restore, and enhance California's cultural, community, and natural resources to address climate resiliency and adaptation projects. Funding under this program is available to local agencies for enhancement of park, water, and natural resources and improvement of community and visitor serving venues and infrastructure. This Strategic Plan is also the beneficiary of Proposition 68 grant funds, and further opportunities may be available for future projects.

Integrated Climate Adaptation and Resiliency Program's Regional Resilience Planning and Implementation Grant Program

The governor's Office of Planning and Research, Regional Resilience Planning and Implementation Grant Program (RRGP), and Adaptation Grant Programs are competitive grant funding programs that are intended to address local, regional, and Tribal climate resilience needs for regional climate adaptation and resiliency planning and implementation projects. Approximately $125 million will be available through multiple rounds of grant funding awards. The RRGP supports projects that improve regional climate resilience and reduce climate risks from SLR and flooding and other effects of climate change including increasing temperatures and extreme heat.

Cutting the Green Tape and Restoration Grant Programs

The CDFW Restoration Grants Program is a relatively new funding opportunity for multi-benefit ecosystem restoration and protection projects through the Watershed Restoration Grants Branch. Currently, approximately $200 million has been allocated for restoration and enhancement projects, and CDFW is accepting proposals for planning, implementation, acquisition, monitoring, capacity building, and scientific study projects.

Climate Adaptation and Resiliency Grants

The California Wildlife Conservation Board is providing funding for projects that protect and restore ecosystems on natural and working lands to provide climate change adaptation and resilience for wildlife; assist natural and working lands managers in implementing practices that provide climate adaptation and resilience; increase carbon sequestration in natural and working lands; and provide additional social, economic, and environmental co-benefits.

Habitat Enhancement and Restoration Grants

The California Wildlife Conservation Board is providing grant funding for eligible projects, including restoration of coastal, tidal habitat; other native habitat restoration projects, including threatened

and endangered species habitats; and projects that remove obstructions and otherwise improve the quality of native habitats in California.

California State Coastal Conservancy Grants

The California State Coastal Conservancy provides grant funding for projects along the California coast and in coastal watersheds to increase availability of beaches, parks, and trails for the public; protect and restore public beaches, natural lands, and wildlife habitat; preserve working lands; and increase community resilience to the effects of climate change. This agency was a major funding sponsor for the Cardiff Living Shoreline Project in Encinitas in San Diego County. The California State Coastal Conservancy will fund most stages of a project, including pre-project feasibility studies, property acquisition, project planning (including community involvement), design, environmental review, permitting, construction, and project-related monitoring. It does not fund operation and maintenance activities.

California’s State Parks Statewide Park Development and Community Revitalization Program

JPAs, cities, counties, and districts are eligible to apply for this grant funding opportunity of up to $8.5 million per project. California’s State Parks Statewide Park Development and Community Revitalization Program is the largest park related grant program in California's history, with over $1 billion in funding between the 2016 Proposition 68 and 200 Proposition 84 Bond Acts. This competitive grant program creates new parks and new recreation opportunities in underserved communities across California. There is no match requirement and this grant by itself may fund the entire project. Eligible Projects must involve either development or a combination of acquisition and development to create a new park, expand an existing park, or renovate an existing park.

Appendix L
Economic Analysis

The Fiscal Impact of Beaches in California

A Report Commissioned by The California Department of Boating and Waterways

by Philip King, Ph.D

Public Research Institute
San Francisco State University
September 1999

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Contents

Executive Summary

- In 1998, California's beaches generated $14 billion dollars of direct revenue. When the indirect and induced benefits of this spending are added, California's beaches total contribution to the national economy is $73 billion.
- The federal tax revenues generated by this beach activity are substantial. The direct federal tax revenues generated are $2.6 billion; however, the total federal tax revenues generated are much higher: $14 billion.
- California's beaches generated 883,000 jobs across the U.S.
- California receives less than one tenth as much in federal appropriations as New York and New Jersey, which have much smaller coastlines and fewer miles of beaches.
- California ranks eighth in terms of federal appropriations for shoreline protection, just ahead of Delaware. It receives just under $12,000 per mile of coastline, compared with well over $800,000 per mile for New York and New Jersey.
- While California receives twice as much in federal shoreline protection appropriations as Delaware (the ninth largest recipient of federal funds) its beaches generate twenty times more economic activity for the national economy and roughly twenty times more tax revenues than Delaware's beaches. In other words, California generates ten times more federal tax dollars, per dollar of shoreline appropriation, than Delaware.
- Our study of Huntington Beach indicates that much of the federal and state tax revenues generated by local beach communities do not go back to local communities. In our survey in Huntington Beach, one-half of all spending on beach activities occurred outside the city. Furthermore, many of the tax dollars generated within the city go to state and federal authorities. Overall, Huntington Beach's beaches generated $135 million in federal tax revenues and $25 million in state sales tax revenues compared to only $4.8 million in local revenues from sales taxes and parking fees.

Introduction

Beaches are an important destination for tourists in California. They generate very large revenues for local, state and federal governments. The purpose of this report is to estimate these revenues. In particular, this study will provide data on the total economic impact that beach visits have on the national economy and the total federal revenues that are generated by this activity. The study also seeks to compare the amount of economic activity generated in California relative to another state which ranks just behind California in overall federal spending for shoreline preservation: Delaware.

The study also seeks to examine the economic impact at the local level by studying one particular beach city: Huntington Beach. One often-made claim is that local beach communities benefit substantially from beach tourism, so that little assistance from state or federal authorities is required. The case study examines federal tax revenues as well as state sales tax revenues generated in Huntington Beach. We find in fact that the revenues generated from these tax sources are substantial.

This study was commissioned by the California Department of Boating and Waterways (DBW) to examine the economic and tax impact of California's beaches. The study is an outgrowth of a previous study performed for DBW in 1995. This study is divided into three sections: **Chapter 1** updates the data from the 1995 study. **Chapter 2** compares the fiscal impact of California's beaches to another state: Delaware. Finally, **Chapter 3** provides a case study of a one-beach community, Huntington Beach, and examines the fiscal impact of the state and city beaches.

1. The Economic Impact of California's Beaches: 1998

During the fall of 1995, the Public Research Institute (PRI) at San Francisco State University conducted a telephone survey under a contract with the California Department of Boating and Waterways. Over 600 residents throughout the state were randomly selected and asked a series of questions regarding their beach-going activities during the previous year. The results of this survey were published and they have been widely disseminated throughout the state and on the World Wide Web. Results from the survey were used to calculate the total economic impact of California's beaches on the state and national economies.[1]

Although the study is still relatively recent, the tremendous growth in California's economy in the late nineties coupled with a substantial increase in the growth of population of the state and moderate inflation mean that the 1995 statistics now significantly underestimate the economic impact of California's beaches. In addition, the figures provided in this study develop the analysis of the impact California's beaches have on federal tax revenues. As in the 1995 study, the impact has been analyzed using IMPLAN software; we have used the latest available data to ensure the accuracy of the results. IMPLAN uses data provided by federal, state and local governments and uses the same methodology (input-output matrices) used by the U.S. Bureau of Economic Analysis. IMPLAN's software has become the standard methodology for conducting this type of analysis. It is used by academics and applied economists all over the United States.[2]

Since conducting an entirely new survey would be prohibitively expensive and it is very unlikely that peoples' basic preferences for beaches has changed significantly, the data here has been updated from the 1995 data. The 1995 survey determined average household spending for one-day trips and for overnight trips by state residents. Tables 1.1 to 1.4 update the old study in several ways. First while inflation has been low, it has not been nonexistent and three years of inflation compounded has a significant effect on the overall impact. Using monthly Consumer Price Index (CPI) data for Western consumers from the Bureau of Labor Statistics (BLS), the total cumulative change in prices is 9.4%.

In addition, California's population has grown significantly. The number of households in California has increased from 10.8 million to an (estimated) 11.45 million (data from California Statistical Abstract). In the previous report, all spending was computed at the household level and then multiplied by the number of households. Since the number of households has now increased, the corresponding state numbers should increase proportionately. As in the previous report, spending was broken down into day-trip spending by Californians, overnight spending by Californians, and spending by tourists from out of state including foreign visitors. Except for the changes mentioned above, the methodology employed is the same as in the 1995 study.

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[1] King, Philip and Michael Potepan, *The Economic Value of California's Beaches*, Public Reseach Institute Report Commision by the California Department of Boating and Waterways, May 1997.
[2] For more information on IMPLAN software see www.implan.com.

The Fiscal Impact of Beaches in California

Table 1.1 Average Number of and Average Expenditure on Beach Trips by California Households: A Summary of Survey Responses

Based on 9.47% inflation from 1995 to 1998

Total Number of Households Responding to Survey	641 Households

A. Households Taking Day Trips

Total Number of Households Taking Day Trips	409 Households (63.8%)
Mean Number of Day Trips per Year	15.24 Day Trips
Mean Number of Persons on Typical Day Trip	4.0 Persons

Mean Expenditures Per Household on Typical Day Trip	1995 Dollars	1998 Dollars
Gas & Auto	$11.05	$12.10
Parking & Entrance Fees	$3.15	$3.45
Food & Drinks from stores	$15.04	$16.46
Restaurants	$15.78	$17.27
Equipment Rental	$2.53	$2.77
Beach Sporting Goods	$2.35	$2.57
Incidentals	$4.97	$5.44
All Items	$54.87	$60.07

B. Households Taking Overnight Trips

Total Number of Households Taking Overnight Trips	234 Households (36.5%)
Mean Number of Overnight Trips per Year	4.6 Overnight Trips
Mean Number of Days of Typical Overnight Trip	2.65 Days
Mean Number of Persons on Typical Overnight Trip	4.34 Persons

Mean Expenditures Per Household on Typical Overnight Trip	1995 Dollars	1998 Dollars
Gas & Auto	$35.28	$38.62
Beach Related Lodging	$90.47	$99.04
Parking & Entrance Fees	$4.63	$5.07
Food & Drinks from stores	$39.45	$43.19
Restaurants	$53.39	$58.45
Equipment Rental	$9.11	$9.97
Beach Sporting Goods	$2.34	$2.56
Incidentals	$11.11	$12.16
All Items	$246.83	$269.06

The Fiscal Impact of Beaches in California

Table 1.2 Estimates of Beach Attendance and Spending for California Households on Day Trips to the Beach

	1995		1998	
	Sub-Sample of 409 Taking Day Trips	Full Sample of 641 Total Households Surveyed	Sub-Sample of 409 Taking Day Trips	Full Sample of 641 Total Households Surveyed
A. Attendance Days from Survey				
Mean Number of Day Trips	15.24	10.13		
Mean Number of Persons Per Day Trip	4	2.66		
Mean Annual Person Attendance Days	48.14	32.02		
B. Spending From Survey				
Mean Household Spending Per Trip	$54.87	$36.49	$60.07	$39.95
Mean Per Person Spending Per Trip	$16.45	$10.94	$18.01	$11.98
Mean Annual Household Spending	$518.40	$344.75	$567.51	$377.41
Mean Annual Per Person Spending	$171.57	$114.10	$187.82	$124.91
C. Statewide Attendance Projections				
Mean Annual Person Attendance Days per Household		32.02		32.02
Total California Households (millions)		10.8		11.45
Total Person Attendance Days (millions)		345.78		366.63
D. Total Direct Statewide Spending on Day Trips				
Mean Annual Spending Per Household		344.75		382.84
Total CA Households (millions)		10.8		11.45
Total Statewide Spending (millions)		$3,723.34		$4,383.52

The Fiscal Impact of Beaches in California

Table 1.3 Estimates of Beach Attendance and Spending for California Households on Overnight Trips to the Beach

	1995		1998	
	Sub-Sample of 409 Taking Day Trips	Full Sample of 641 Total Households Surveyed	Sub-Sample of 409 Taking Day Trips	Full Sample of 641 Total Households Surveyed
A. Attendance Days from Survey				
Mean Number of Overnight Trips	4.6	1.75		
Mean Number of Days per Trip	2.65	1.01		
Mean Number of Persons Per Trip	4.34	1.65		
Mean Annual Person Attendance Days	33.1	12.59		
B. Spending From Survey				
Mean Household Spending Per Trip	$246.83	$93.92	$270.21	$102.82
Mean Per Person Spending Per Trip	$82.09	$31.24	$89.87	$34.20
Mean Annual Household Spending	$907.79	$345.40	$993.79	$378.12
Mean Annual Per Person Spending	$345.24	$131.36	$377.95	$143.80
C. Statewide Attendance Projections				
Mean Annual Person Attendance Days per Household		12.59		12.59
Total California Households (millions)		10.8		11.45
Total Person Attendance Days (millions)		135.97		144.16
D. Total Direct Statewide Spending on Overnight Trips				
Mean Annual Spending Per Household		345.4		383.57
Total CA Households (millions)		10.8		11.45
Total Spending (millions)		$3,730.32		$4,391.88

The Fiscal Impact of Beaches in California

Table 1.4 Estimates of Beach Attendance and Spending for Out-of-State Tourists Taking Trips to California's Beaches

A. Statewide Attendance Estimates			
Total Attendance Days (Tourists 15% of Total)		566.76	
California Residents' Total Attendance Person Days		481.75	
Out-of-State Tourist Person Attendance Days (millions)		85.01	
B. Converting Attendance Days to Out-of-State Tourist Trips			
Out-of-State Tourist Attendance Days		85.01	
Mean Trip Length for Out-of-State Tourists (days)		2.65	
Out-of-State Tourists Visiting State's Beaches (millions)		32.08	
Total Out-of-State Tourist Trips to the Beach (millions)		12.83	
C. Statewide Spending Projections			
		1995	1998
Household Spending Per Trip (3)		$246.83	$270.21
Out of State Tourist Trips (millions)		12.83	12.83
Total Statewide Spending (millions)		$3,166.87	$3,466.84

Tables 1.5 to 1.8 provide the "Economic Impact" numbers using the data provided in Tables 1.1–1.4. As one can see, total direct statewide spending on California's beaches is just over $12 billion dollars, a significant increase from 1995, when it was just over $10 billion. However, one must also take into account the indirect and induced effects of state spending on beaches since this spending provides jobs and income for California and non-California residents, who in turn spend their added income. Since the numbers provided here are national figures, this indirect and induced effect is much larger than the effects formerly calculated for the state. This is because more of the spillover effect of adding new jobs is captured at the national level. As a result, the employment generated by California's beaches has a substantial impact on the national economy, generating $63 billion in revenue when all effects are taken into account.

The primary purpose of this investigation is to examine the impact of California's beaches on federal tax revenues. Tables 1.6 and 1.7 provide this information. If one just looks at the direct expenditures, California's beaches provide $2.3 billion in tax revenues for the federal government. If one includes indirect and induced effects, the number rises to $12 billion. Finally, Table 1.8 estimates the number of jobs created by California's beaches in 1998. The direct effect is 273,000 jobs; the total effect is 883,000 jobs.

The Fiscal Impact of Beaches in California

Table 1.5 Total National Economic Impact of Beach Spending in California in 1998: Expenditures Updated for Inflation and Population

A.	Spending by California Households on Day Trips	$4,321,537,219
	Spending by California Households on Overnight Trips	$4,311,359,394
	Spending by Out-of-State Tourists	$3,452,096,522
	Total Direct Statewide Spending	$12,084,993,135
B.	Indirect Spending	$6,582,000,000
	Induced Spending	$44,698,000,000
C.	Combined National Economic Impact of Beach Spending	$63,364,993,135

Table 1.6 Impact of California Beach Direct Expenditure on Federal Tax Receipts, Updated Updated for Inflation and Population

	Ratios of Tax Receipts to GDP are average values from 1995-1997		
	Estimated 1998 California Beach Direct Expenditure: Updated using Inflation	$	12,084,993,135
A.	Ratio of Income Tax Receipts to GDP		0.0861
	Estimated 1998 Federal Income Tax Revenue Generated By Direct California Beach Spending	$	1,041,065,831
B.	Ratio of Corporate Tax Receipts to GDP		0.0222
	Estimated 1998 Federal Corporate Tax Revenue Generated By Direct California Beach Spending	$	268,541,360
C.	Ratio of Excise Tax Receipts to GDP		0.0073
	Estimated 1998 Federal Corporate Tax Revenue Generated By Direct California Beach Spending	$	88,734,893
D.	Ratio of Total Tax Receipts to GDP		0.1906
	Estimated 1998 Federal Tax Revenue Generated By Direct California Beach Spending	**$**	**2,303,116,875**

The Fiscal Impact of Beaches in California

Table 1.7 Total Impact of California Beach Spending on Federal Tax Receipts: Expenditures Updated for Inflation and Population

Ratios of Tax Receipts to GDP are average values from 1995-1997		
	Estimated 1998 National Economic Impact of California Beach Spending : Updated using Inflation	$ 63,364,993,135
A.	Ratio of Income Tax Receipts to GDP	0.0861
	Estimated 1998 Federal Income Tax Revenue Generated By California Beach Spending	$ 5,458,598,815
B.	Ratio of Corporate Tax Receipts to GDP	0.0222
	Estimated 1998 Federal Corporate Tax Revenue Generated By California Beach Spending	$ 1,408,037,328
C.	Ratio of Excise Tax Receipts to GDP	0.0073
	Estimated 1998 Federal Corporate Tax Revenue Generated By California Beach Spending	$ 465,261,821
D.	Ratio of Tax Receipts from Other Sources* to GDP	0.0749
	Estimated 1998 Federal Tax Revenue From Other Sources Generated by California Beach Spending	$ 4,743,986,842
E.	Ratio of Total Tax Receipts to GDP	0.1906
	Estimated 1998 Federal Tax Revenue Generated By California Beach Spending	$ 12,075,884,806

*Comprised primarily of social insurance and retirement receipts.

Table 1.8 Total National Employment Impact of 1998 California Beach Spending: Expenditures Updated for Inflation and Population

A.	Total Direct National Employment	278,180
B.	Indirect and Induced National Employment	
	Indirect Employment	68,296
	Induced Employment	537,067
	Total Induced and Indirect Spending	605,363
C.	The Combined National Employment Impact	883,543

In addition to changes in the overall price level and population, California has also experienced significant growth in income per capita, particularly given the recent boom in technology spending. *The numbers calculated in tables 1.1 to 1.8 do not take the increase in household income into account*. Further, economists also have found that spending on beaches and other recreational activities is highly sensitive to changes in income. In economic parlance, a 5% increase in income will not necessarily reflect a 5% increase in spending. To correct for the change in income properly, one must use data on the income elasticity of demand.[3] Tables 1.9 to 1.13 are analogous to tables 1.5 to 1.8 except that they take into account the effect of an increase in Californian's income. As one can see, when this effect is taken into account, **total direct spending at California's beaches increases to $14 billion and direct federal tax revenues increase to $2.6 billion. The combined national impact is $73 billion and the total federal tax impact is just over $14 billion.**

Table 1.9 Total 1998 California Beach Spending by Expenditure Category Updated for Income

Category	Estimated 1998 Total CA Day Trip Spending (adjusted for pop growth ($mil)	Estimated 1998 Total CA Overnight Trip Spending (adjusted for pop growth ($mil)	Estimated 1998 Out-of-State Beach Spending ($mil)	Total 1998 CA Direct Beach Spending ($mil)
Gas & Auto	$944.11	$671.36	$655.19	$2,270.66
Beach Related Lodging	$0.00	$1,583.05	$1,558.93	$3,141.97
Parking & Entrance Fees	$253.65	$83.04	$81.55	$418.23
Food & Drinks from Stores	$1,271.61	$742.88	$725.78	$2,740.27
Restaurants	$1,391.15	$1,048.32	$1,019.81	$3,459.28
Equip Rental	$279.71	$224.32	$213.78	$717.81
Beach Sporting Goods	$259.81	$57.62	$54.91	$372.34
Incidentals	$466.58	$232.30	$224.60	$923.48
TOTALS	$4,866.63	$4,642.88	$4,534.54	$14,044.05

[3] The data used here was obtained from Falvey, Rodney and Gemmell, Norman "Are Services Income-Elastic? Some New Evidence", *Review of Income and Wealth*, 42, No 3, 1996.

The Fiscal Impact of Beaches in California

Table 1.10 Impact of California Beach Direct Expenditure on Federal Tax Receipts, Updated for Income

	Ratios of Tax Receipts to GDP are average values from 1995-1997		
	Estimated 1998 California Beach Direct Expenditure: Updated using Elasticities	$	14,044,049,092
A.	Ratio of Income Tax Receipts to GDP		0.0861
	Estimated 1998 Federal Income Tax Revenue Generated By Direct California Beach Spending	$	1,209,829,370
B.	Ratio of Corporate Tax Receipts to GDP		0.0222
	Estimated 1998 Federal Corporate Tax Revenue Generated By Direct California Beach Spending	$	312,073,661
C.	Ratio of Excise Tax Receipts to GDP		0.0073
	Estimated 1998 Federal Corporate Tax Revenue Generated By Direct California Beach Spending	$	103,119,396
D.	Ratio of Total Tax Receipts to GDP		0.1906
	Estimated 1998 Federal Tax Revenue Generated By Direct California Beach Spending	**$**	**2,676,467,094**

Table 1.11 Total National Economic Impact of Beach Spending in California in 1998: Updated for Income

A.	Spending by California Households on Day Trips	$	4,866,630,047
	Spending by California Households on Overnight Trips	$	4,642,877,898
	Spending by Out-of-State Tourists	$	4,534,541,147
	Total Direct Statewide Spending	$	14,044,049,092
B.	Indirect Spending	$	7,718,000,000
	Induced Spending	$	51,786,000,000
C.	Combined National Economic Impact of Beach Spending	$	73,548,000,000

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Table 1.12 Total Impact of California Beach Spending on Federal Tax Receipts: Updated for Income

	Ratios of Tax Receipts to GDP are average values from 1995-1997		
	Estimated 1998 National Economic Impact of California Beach Spending : Updated using Income Elasticities	$	73,548,000,000
A.	Ratio of Income Tax Receipts to GDP		0.0861
	Estimated 1998 Federal Income Tax Revenue Generated By California Beach Spending	$	6,335,817,394
B.	Ratio of Corporate Tax Receipts to GDP		0.0222
	Estimated 1998 Federal Corporate Tax Revenue Generated By California Beach Spending	$	1,634,314,537
C.	Ratio of Excise Tax Receipts to GDP		0.0073
	Estimated 1998 Federal Corporate Tax Revenue Generated By California Beach Spending	$	540,031,249
D.	Ratio of Tax Receipts From Other Sources* to GDP		0.0749
	Estimated 1998 Federal Tax Revenue From Other Sources Generated By California Beach Spending	$	5,506,364,430
E.	Ratio of Total Tax Receipts to GDP		0.1906
	Estimated 1998 Federal Tax Revenue Generated By California Beach Spending	**$**	**14,016,527,609**

* Comprised primarily of social insurance and retirement receipts.

Table 1.13 Total National Employment Impact of 1998 California Beach Spending; Updated for Income

A.	Total Direct National Employment	321,647 jobs
B.	Indirect and Induced National Employment	
	Indirect Employment	79,793
	Induced Employment	622,264
	Total Induced and Indirect Spending	702,057
C.	The Combined National Employment Impact	1,023,704 jobs

2. How does Delaware compare to California?

As shown in Table 2.1, although California has the longest coastline of the twelve states receiving funds and the second longest shoreline (after Florida), it ranks eight overall in federal appropriations for shoreline protection. In terms of overall spending per mile of shoreline, California again ranks second to last. If one includes only coastline, the comparison is even starker. California receives just under $12,000 per mile of coastline compared to over $800,000 for New York and New Jersey. In other words, New York and New Jersey receive over 75 times more federal dollars per mile of coastline than California.

Given the substantial revenues generated by California's beaches, a useful point of comparison might be another state that receives substantial assistance from the federal government. To make an accurate comparison, we chose a state that has performed a similar study to the one completed in Section 1. The most comprehensive study has been performed by the state of Delaware, prepared by Jack Faucett Associates.[4] Although at first glance Delaware, a small state, might seem to be a strange comparison with California, in terms of federal funding, the two states rank eighth and ninth, as one can see from Table 2.1. The two states also rank tenth and eleventh in terms of federal appropriations per mile of shoreline.

Table 2.1 Federal Appropriations for Shoreline Protection by State

State	Total Federal Appropriations FY 95-99 (millions of $)	Coastline*	Shoreline*	Appropriations per mile of Coastline	Appropriations per mile of Shoreline
New Jersey	111	130	1792	$ 853,846.15	$ 61,941.96
New York	104	127	1850	$ 818,897.64	$ 56,216.22
Florida	90	770	5095	$ 116,883.12	$ 17,664.38
South Carolina	46	187	2876	$ 245,989.30	$ 15,994.44
Virginia	45	112	3315	$ 401,785.71	$ 13,574.66
Illinois	30	0		N.A	N.A.
North Carolina	18	301	3375	$ 59,800.66	$ 5,333.33
California	10	840	3427	$ 11,904.76	$ 2,918.00
Delaware	5	28	381	$ 178,571.43	$ 13,123.36
Pennsylvania	2	0	89	N.A.	$ 22,471.91
Maryland	2	31	3190	$ 64,516.13	$ 626.96

* Source: National oceanographic and Atmospheric Atministration; U.S. Department of Commerce

[4] Jack Faucett Associates, "The Economic Effects of a Five Year Nourishment Program for the Ocean Beaches of Delaware", Final report, March 1998.

The survey data contained in the Delaware study was remarkably similar in scope and methodology to the one conducted through PRI. Consequently, it was relatively straightforward to update the data. As in Section 1, the data was updated for changes in the price level, in incomes and in population. The national impact figures were calculated using IMPLAN software and the same methodology used as in Section 1. In short, the comparison of the economic impacts in the two states should be quite appropriate given that the same methodologies were applied. Tables 2.2 to 2.5 provide information on spending in Delaware comparable to the tables in Section 1. In all cases, we have updated for inflation, for population increases and for increases in income as we did in Section 1. Table 2.6 provides a breakdown of out-of-state spending at Delaware's beaches.

As one can see, the differences are quite dramatic, reflecting the differences in the size of the state. While California receives only twice as much in shoreline protection as Delaware, the total direct spending by beach visitors in Delaware is $652 million, compared to $14 billion in California. If one accounts for indirect and induced effects, Delaware's beaches contribute $3.7 billion to the national economy, but California's total impact is over $73 billion. The revenue impact tells the same story: Delaware's total economic impact from beach tourism contributed $715 million in federal tax revenues, while California contributed $14 billion.

In sum, California's beaches contribute roughly twenty times more to the national economy and to federal tax revenues than Delaware Beaches, while receiving only twice as much from the federal government in shore protection appropriations. Another way of thinking about this difference is: California's beaches generate approximately 10 times the federal tax benefit per dollar spent by the federal government in shore protection.

Table 2.2 Delaware Overnight Trip Beach Expenditures by Category Updated for Income and Population Growth

Category	1996 Expenditure per Overnight Trip by Category	Total 1996 Expenditure on Overnight Trips	Income Elasticities	Estimated 1998 Expenditures on Overnight Trips
Lodging	$179.37	$167,616,555.35	0.7115	$183,805,410.58
Restaurants	$106.20	$99,236,114.47	1.6126	$117,872,448.27
Entertainment	$59.00	$55,131,174.70	2.1498	$68,482,665.62
Food Shopping	$45.30	$42,326,514.77	1.2735	$48,822,448.95
Non Food Shopping	$68.18	$63,712,075.28	3.7162	$89,243,926.39
Transportation	$17.65	$16,494,891.79	1.3572	$19,166,151.16
Totals	$475.69	$444,517,326.36		$527,393,050.98

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Table 2.3 Delaware Day Trip Beach Expenditures by Category Updated for Income and Population Growth

Category	1996 Expenditure per Day Trip by Category	Total 1996 Expenditure on Day Trips	Income Elasticities	Estimated 1998 Expenditures on Overnight Trips
Lodging	$0.00	$0.00	0.7115	$0.00
Restaurants	$19.95	$ 36,621,044.43	1.6126	$ 43,498,399.63
Entertainment	$9.28	$ 17,036,634.86	2.1498	$ 21,162,512.40
Food Shopping	$11.74	$ 21,553,144.56	1.2735	$ 24,860,948.40
Non Food Shopping	$22.69	$ 41,652,256.08	3.7162	$ 58,343,898.85
Transportation	$6.44	$ 11,825,277.52	1.3572	$ 13,740,317.88
Totals	**$70.11**	**$128,688,357.45**		**$161,606,077.17**

Table 2.4 National Impact of 1998 Delaware Beach Spending

A. National Spending Impacts	
Direct Spending	$ 652,030,302.00
Indirect Spending	$ 381,424,442.00
Induced Spending	$ 2,722,655,693.00
Total Impact	**$ 3,756,110,438.00**
B. National Employment Impacts	
Direct Employment	17,060
Indirect Employment	4,046
Induced Employment	32,716
Total Employment	**53,821**

The Fiscal Impact of Beaches in California

Table 2.5 Total Impact of Delaware Beach Spending on Federal Tax Receipts

	Ratios of Tax Receipts to GDP are average values from 1995-1997	
	Estimated 1998 National Economic Impact of Delaware Beach Spending : Updated using Inflation	$3,756,110,438
A.	Ratio of Income Tax Receipts to GDP	0.0861
	Estimated 1998 Federal Income Tax Revenue Generated By Delaware Beach Spending	323,571,407
B.	Ratio of Corporate Tax Receipts to GDP	0.0222
	Estimated 1998 Federal Corporate Tax Revenue Generated By Delaware Beach Spending	83,464,756
C.	Ratio of Excise Tax Receipts to GDP	0.0073
	Estimated 1998 Federal Corporate Tax Revenue Generated By Delaware Beach Spending	27,579,499
D.	Ratio of Total Tax Receipts to GDP	0.1906
	Estimated 1998 Federal Tax Revenue Generated By Delaware Beach Spending	**$715,826,748**

Table 2.6 Estimated 1998 Expenditures on Overnight Trips to Delaware Beaches by State of Residence of Beach Visitors

State of Residence	Percent of All Visitors	Estimated 1998 Number of Overnight Trips by State of Origin		Estimated 1998 Overnight Trip Direct Expenditure by State of Origin
Maryland	22.6	2,930,994	$	119,190,830
Pennsylvania	19.59	2,540,627	$	103,316,299
New Jersey	19.28	2,500,423	$	101,681,380
New York	9.71	1,259,290	$	51,209,865
Virginia	8.3	1,076,427	$	43,773,623
Delaware	8.24	1,068,646	$	43,457,187
Connecticut	1.93	250,302	$	10,178,686
Massachusetts	1.53	198,426	$	8,069,114
Florida	1.05	136,175	$	5,537,627
West Virginia	1.04	134,878	$	5,484,888
Other	6.73	872,814	$	35,493,552
		12,969,000	**$**	**527,393,051**

3. A Case Study of Huntington Beach

In many ways, Huntington Beach is a typical beach community in Southern California. Huntington Beach is a small to medium sized city (population about 190,000) city just 35 miles southeast of Los Angeles. One issue of concern to many policy makers is the extent to which tax revenues generated by local governments benefit the locality itself, as opposed to the state or the federal government. This case study examines the revenues generated by federal taxes, by state sales taxes and by parking revenues (some go to the state and some go to the city). The purpose is to estimate the tax revenue impact of beach spending from one specific community. Although Huntington Beach represents only one community, it is quite likely that spending patterns in other Southern California beach communities will be similar, so that the relative ratios between state, local and federal tax dollars generated will likely be similar.

The data used for this study was obtained from several sources. Information on total beach attendance was obtained from the City of Huntington Beach, which maintains monthly and yearly statistics on beach attendance at its state and city beaches. In addition a survey of beach visitors was undertaken by Kim Sterret and Philip King on July 9, 1999. Care was taken to get a full, representative sample throughout all portions of both the city and state beaches. A Friday was chosen as the most representative day since it on the cusp between a weekday and a weekend day. Respondents were given a brief survey about their spending habits, in particular how much they spent and *where* the money was spent. As one can see in the tables below, a substantial amount of the beach spending occurred in inland communities—not at Huntington Beach. In addition, visitors were asked how far away from Huntington Beach they lived (including out-of-state and foreign visitors). Overall, the spending percentages conformed closely to those in our survey from 1995, and the relative spending percentages from this study were used with one exception; parking was a significantly larger proportion of overall expenses for day-trippers in our July 9th survey than in the 1995 telephone survey. This result is not surprising since Huntington Beach requires visitors to pay for parking and some other beaches do not.

The results of the survey are presented in Table 3.1. The overall breakdown of visitors is also consistent with the percentage breakdown provided by the City of Huntington Beach from their records of people needing medical attention at the beach. For a more detailed breakdown of survey results, the reader may consult the appendix.

Table 3.1 Results of the Huntington Beach Survey

Category	Number of Parties	Number of People	Percent of Total Number of People	Avg. Daily Expenditure per Party	Avg. Daily Expenditure per Person	Avg. Percent of Expenditure in Huntington Beach
Local	18	53	12%	$ 11.93	$ 4.05	68.33%
Less Than 60 Miles	54	274	60%	$ 54.46	$ 10.73	42.43%
In-State, > 60 Miles	10	39	8%	$ 102.30	$ 26.23	48.30%
Out of State	23	86	19%	$ 109.61	$ 29.31	61.39%
Out of Country	4	8	2%	$ 70.75	$ 35.38	62.00%
Totals	109	460	100%	$ 64.06	$ 15.18	49.80%*

*Average, weighted by number of people in each category.

Please note that only about half (49.80%) of all spending that results from trips to Huntington Beach actually occurs in Huntington Beach. Most of the other spending occurs within a 60-mile radius of Huntington Beach. For example, note that by far the largest category of beach attendees come from Orange county and neighboring counties, but do not reside in Huntington Beach. A substantial portion of their spending occurs outside of the city. In addition, many people visiting Southern California (e.g., Disneyland) plan to attend Huntington Beach for a day, but the majority of their expenditures for that day lie outside city limits.

Given the information from Table 3.1, it is possible to estimate the total impact of beach spending generated at Huntington Beach. This is presented in Table 3.2. The total direct yearly expenditure by all visitors is estimated to be $139 million.

Table 3.2 Estimated 1998 Direct Beach Expenditure Generated by Huntington Beach Tourists

Category	Percent	1998 Estimated Attendance	Avg. Daily Expenditure per Person	Total 1998 Direct Exp.
Local	11.5	1,055,109	$4.05	$4,276,176
Less Than 60 Miles	59.6	5,454,713	$10.73	$58,548,578
In-State, > 60 Miles	8.5	776,401	$26.23	$20,365,588
Out of State	18.7	1,712,063	$29.31	$50,187,339
Out of Country	1.7	159,262	$35.38	$5,633,882
Totals	**100**	**9,157,547**		**$139,011,563**

Tables 3.3 and 3.4 estimate the national impact of these expenditures using the same methodology applied in Sections 1 and 2. As before, the indirect and induced effect implies that the total national impact is substantially greater than the direct impact. In this case, the total national impact is $711 million. The total amount of federal taxes generated by this activity is $135 million.

Table 3.3 National Impact of 1998 Huntington Beach Expenditures

Direct Expenditure	$	130,391,325
Indirect Expenditure	$	73,785,749
Induced Expenditure	$	507,158,111
Total	**$**	**711,335,183**

Table 3.4 Impact of 1998 Huntington Beach Direct, Indirect and Induced Expenditure on Federal Tax Receipts

Ratios of Tax Receipts to GDP are average values from 1995-1997

	Estimated 1998 Huntington Beach Total Expenditure	$	711,335,183
A.	Ratio of Income Tax Receipts to GDP		0.0861
	Estimated 1998 Federal Income Tax Revenue Generated By Total Huntington Beach Spending	$	61,278,210
B.	Ratio of Corporate Tax Receipts to GDP		0.0222
	Estimated 1998 Federal Corporate Tax Revenue Generated By Total Huntington Beach Spending	$	15,806,622
C.	Ratio of Excise Tax Receipts to GDP		0.0073
	Estimated 1998 Federal Corporate Tax Revenue Generated By Total Huntington Beach Spending	$	5,223,028
D.	Ratio of Total Tax Receipts to GDP		0.1906
	Estimated 1998 Federal Tax Revenue Generated By Total Huntington Beach Spending	**$**	**135,563,839**

Since the state economy is smaller than the national economy, the total effect of Huntington Beach spending is smaller. Nevertheless, the total impact on California's economy of Huntington Beach tourism is $329 million as shown in Table 3.5.

Table 3.5 Impact of 1998 Beach Expenditures at Huntington Beach on the CA Economy

Direct Expenditure	$	139,939,222
Indirect Expenditure	$	38,956,845
Induced Expenditure	$	160,895,602
Total	**$**	**329,791,669**

Tables 3.6 and 3.7 estimate the total sales tax impact from the direct spending ($10 million) as well as the total sales tax effect ($25.5 million).

Table 3.6 CA Sales Taxes Generated by Total Huntington Beach Spending

Jurisdiction	Rate		Revenue Generated
State (General Fund)	5.00%	$	16,489,583.45
State (Local Revenue Fund)	0.50%	$	1,648,958.35
State (Local Public Safety Fund)	0.50%	$	1,648,958.35
Local (City and County Operations)	1.00%	$	3,297,916.69
Local (County Transportation Funds)	0.25%	$	824,479.17
Orange County (Transportation)	0.50%	$	1,648,958.35
Total	**7.75%**	**$**	**25,558,854.35**

Table 3.7 CA Sales Taxes Generated by Direct Huntington Beach Expenditure

Jurisdiction	Rate		Revenue Generated
State (General Fund)	5.00%	$	6,698,488.58
State (Local Revenue Fund)	0.50%	$	669,848.86
State (Local Public Safety Fund)	0.50%	$	669,848.86
Local (City and County Operations)	1.00%	$	1,339,697.72
Local (County Transportation Funds)	0.25%	$	334,924.43
Orange County (Transportation)	0.50%	$	669,848.86
Total	**7.75%**	**$**	**10,382,657.29**

As one can see in Table 3.7 the total sales tax revenue generated from direct spending is $7.7 million.[5] However, most of the revenue goes to the State of California, not to local authorities. Table 3.8 gives a detailed breakdown of where the money is allocated by the State of California's Board of Equalization (BOE). In fact, according to the BOE, only just over $1 million goes directly to Huntington Beach. Another $1.7 million is distributed to Orange County; some of this is distributed to Huntington Beach. *In all, we estimate that only $1.1 million in sales tax revenues generated from beach activity goes back to the City of Huntington Beach.*

Table 3.8 California Sales Tax Revenue From Direct Expenditure

Jurisdiction	Rate	Revenue Generated*
1. State (General Fund)	5%	$ 5,014,142
2. State (Local Revenue Fund, Disbursed to county)	0.50%	$ 501,414
3. State (Local Public Safety Fund, Disbursed to county)	0.50%	$ 501,414
4. Orange County (Transportation)	0.50%	$ 501,414
5. Local (County Transportation Funds)	0.25%	$ 250,707
6. Local (City and County Operations, Disbursed to incorporated city	1%	$ 1,002,828
Total	**7.75%**	**$ 7,771,921**

*Revenues are calculated by multiplying direct expenditures subject to sale taxes by the various tax rates. Revenue from Items 2 and 3 are earmarked for indigent healthcare and general public safety, and are disbursed at the county level. Item 4 is a special district tax imposed and allocated to Orange County. Items 5 and 6 form the Bradley-Burns Uniform Local Sales and Use Tax. Revenues from Item 6 are distributed to the location of sale if the transaction took place in an incorporated city, or, otherwise, to the county level.

[5] Not all of the direct expenditures are subject to sales tax; for example, some food items are exempt. Our survey results were used to estimate the total expeditures subject to sales tax.

Finally, tables 3.9 and 3.10 show the estimated local tax benefits from Huntington Beach tourism. As one can see, the numbers are quite modest compared to the state and national totals, and parking fees (on valuable property) generate most of the local revenues. This result occurs for two main reasons: (1) half of all spending on beach activities occurs outside of the city, (2) as shown in table 3.9, most of the sales tax revenues go to the state, not to local governments. Including parking fees, the city receives $3.2 million in revenues. If indirect and induced effects are added, the number increases to $4.8 million.

Table 3.9 Local Revenues From Direct Expenditures

Direct Sales Tax Revenue to Orange County	$	1,754,950
Huntington Beach Population as a Percentage of Orange County		x 0.07
Estimated Sales Tax Revenue to Huntington Beach disbursed by the county	$	122,846
Direct Sales Tax Revenue to Huntington Beach	$	1,002,828
Revenue from Parking and Entrance Fees	$	2,076,679
Total Local Revenue from Direct Expenditures	**$**	**3,202,354**

Table 3.10 Local Revenues From Total (Direct and Indirect) Expenditures

Total CA Sales Tax Revenue from Direct and Indirect Expenditures	$	18,702,111
Percent of Sales Tax Revenue to County Level		x 0.226
Total Sales Tax Revenue to Orange County	$	4,223,057
Huntington Beach Population as a Percentage of Orange County		x 0.07
Estimated Sales Tax Revenue to Huntington Beach Disbursed from County Level	$	295,614
Proportion of Sales Tax Revenue Allocated to City		x 0.129
Huntington Beach Sales Tax Revenue	$	2,413,176
Revenue from Parking and Entrance Fees	$	2,076,679
Total Local Revenue from Direct and Indirect Expenditures	**$**	**4,785,469**

4. Conclusion

Our study indicates that the impact that California's beaches has on the state and national economy, which was substantial in 1995, has grown significantly. California's beaches contribute $73 billion to the national economy and generate $14 billion in tax revenues for the federal government. In comparison, California only received $10 million in shore protection appropriations from fiscal year 1995-1999. In terms of overall federal spending for shoreline preservation, California ranks eighth out of eleven states receiving funds. When compared with Delaware, a state ranking just behind California in overall federal funding, California generates twenty times more economic activity per federal dollar appropriated than Delaware. When compared to New York or New Jersey, the largest recipients of federal shoreline funding, California receives roughly 75 times *fewer* dollars per mile of coastline than New York or New Jersey.

Our study of Huntington Beach indicates that much of the federal and state tax revenues generated by local beach communities does not go back to local communities. In our survey in Huntington Beach, one-half of all spending on beach activities occurred outside the city. Further, many of the tax dollars generated within the city go to state and federal authorities. Overall, Huntington Beach's beaches generated $135 million in federal tax revenues and $25 million in sales tax revenues compared to only $4.8 million in local revenues from sales taxes and parking fees.

Appendix 1: Detailed Results from the Huntington Beach Survey

Table A.1 Huntington Beach Pier

Category	Number of Parties	Number of People	Percent of Total	Avg. Daily Expenditure per Party	Avg. Daily Expenditure per Person	Avg. Percent of Expenditure in Huntington Beach
Local	5	10	20%	$5.20	$2.60	80%
Less Than 60 Miles	4	15	31%	$16.25	$4.33	95%
In-State, > 60 Miles	3	9	18%	$36.00	$12.00	77%
Out of State	7	14	29%	$68.29	$34.15	100%
Out of Country	1	1	2%	$18.00	$18.00	80%
Totals	20	49	100%	$34.75	$14.18	89.76%*

Table A.2 City Beach

Category	Number of Parties	Number of People	Percent of Total	Avg. Daily Expenditure per Party	Avg. Daily Expenditure per Person	Avg. Percent of Expenditure in Huntington Beach
Local	5	12	11%	$22.50	$9.38	57.50%
Less Than 60 Miles	12	50	48%	$56.33	$13.52	64.58%
In-State, > 60 Miles	3	12	11%	$198.33	$49.58	68.33%
Out of State	8	27	26%	$103.13	$30.56	48.75%
Out of Country	2	4	4%	$125.00	$62.50	34.00%
Totals	30	105	100%	$81.95	$23.41	58.97%*

Table A.3 North of Pier

Category	Number of Parties	Number of People	Percent of Total	Avg. Daily Expenditure per Party	Avg. Daily Expenditure per Person	Avg. Percent of Expenditure in Huntington Beach
Local	3	6	11%	$10.00	$5.00	33.33%
Less Than 60 Miles	10	30	53%	$15.60	$5.20	34.50%
In-State, > 60 Miles	2	13	23%	$55.00	$8.46	20.00%
Out of State	3	5	9%	$56.67	$34.00	36.00%
Out of Country	1	3	5%	$15.00	$5.00	100.00%
Totals	19	57	100%	$25.32	$8.44	34.65%*

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Table A.4 Huntington State Beach

Category	Number of Parties	Number of People	Percent of Total	Avg. Daily Expenditure per Party	Avg. Daily Expenditure per Person	Avg. Percent of Expenditure in Huntington Beach
Local	1	2	1%	$20.00	$10.00	100.00%
Less Than 60 Miles	14	105	73%	$49.00	$6.53	10.43%
In-State, > 60 Miles	2	5	3%	$105.00	$42.00	4.00%
Out of State	3	31	22%	$326.00	$31.55	36.67%
Out of Country	0	0	0%	$ -	$ -	0.00%
Totals	20	143	100%	$94.70	$13.24	17.14%*

Table A.5 City Beach, South End

Category	Number of Parties	Number of People	Percent of Total People	Avg. Daily Expenditure per Party	Avg. Daily Expenditure per Person	Avg. Percent of Expenditure in Huntington Beach
Local	4	23	22%	$12.20	$2.12	100.00%
Less Than 60 Miles	14	74	70%	$35.23	$6.67	46.07%
In-State, > 60 Miles	0	0	0%	$ -	$ -	0.00%
Out of State	2	9	8%	$35.00	$7.78	52.00%
Out of Country	0	0	0%	$ -	$ -	0.00%
Totals	20	106	100%	$30.60	$5.77	58.28%*

Appendix 2 : Distribution of Funds Generated by Sales and Use Taxes in Orange County

The sales tax rate in Orange County is 7.75%, which can be broken down into its components of the standard statewide sales tax rate of 7.25%, and the Orange County special district transactions and use tax of 0.5%.

The standard statewide tax can be further decomposed into the sales and use tax portion (6%), and the Bradley-Burns Uniform Local Sales and Use Tax (1.25%). The destination of the funds generated by these components are given in the table below.

Orange County Sales and Use Tax Revenue Distribution		
Sales and Use Tax	5%	General Fund
	0.5%	Local Revenue Fund
	0.5%	Local Public Safety Fund
Bradley-Burns	1%	County and Incorporated City General Fund
	0.25%	County Transportation Funds
District Transactions and Use Tax	0.5%	Orange County Local Transportation Authority
Total	**7.75%**	
Sources:	California State Board of Equalization Annual Report 1998, Appendix Table 2.	
	CA Board of Equalization, California City and County Sales and Use Tax Rates, April 1999.	

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MILLIMAN REPORT

Market Value at Risk from Sea Level Rise in selected California cities

January 11, 2023

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Background

The California Coastal Commission (CCC) has authority regarding land use in California in the Coastal Zone, a region of California extending inland from the coast up to five miles. The CCC was initially established in 1972 through voter initiative Proposition 20. The California Coastal Act of 1976 (Coastal Act) later made the CCC permanent. Broadly speaking, the CCC assists coastal cities and counties in the planning and regulation of land and water use in the Coastal Zone. The Coastal Zone was also established by the Coastal Act and does not include the San Francisco Bay, where the Bay Conservation and Development Commission regulates development.[1]

In response to concerns about the CCC's recommendations, Smart Coast California (Smart Coast) was established in 2019 as a 501(c)6 to promote and advocate for private property rights in the Coastal Zone. Smart Coast engaged Milliman, Inc. (Milliman) in November 2021 to assist in synthesizing some of the material used and promulgated by the CCC. The scope of this work focused on understanding the information used by the CCC and local planners in the Local Coastal Program amendment process. We reviewed four sea level rise studies that were pertinent to the CCC's work over the past decade and examined seven climate change vulnerability studies performed for various California coastal cities. We also reviewed the CCC's guidance on incorporating sea level rise considerations into Local Coastal Programs.

In July 2022, Smart Coast requested that Milliman perform an analysis evaluating the residential market value potentially affected by sea level rise in selected communities. This report is the result of that analysis.

Executive Summary

This study quantified the residential market value that may be affected by flooding under different sea level rise and storm scenarios. It includes the cities of Carlsbad, Coronado, Santa Barbara, Santa Cruz, and Imperial Beach. As the sea level rises, some coastal properties may be threatened and could be inhabitable or have future increased risk of flood damage . One option to address this risk is managed retreat, which can include purchasing properties from owners or the taking of private property via eminent domain, which requires just compensation. This study estimates this cost by comparing the market value of affected coastal properties under different scenarios and compares them to current city budgets.

The key findings addressed in this report are:

- Sea level rise has different implications for each city reviewed. The cities of Coronado and Imperial Beach are the most affected among the cities included. The cities of Santa Barbara and Santa Cruz are less affected, while residential property in Carlsbad is not affected in the scenarios we considered. For this analysis, a property is affected if more than half of the building footprint intersects the hazard scenario.
- When sea level rise is small, the main cause of flood damage is storms and in particular infrequent storms such as a 100-year storm[2]. However, as sea level rise increases, residential properties may be affected even without a storm.
- In some cities condominiums are less at risk than single family home or multi-family dwellings.
- There is considerable uncertainty in trying to estimate when sea level rise will occur and by what amount. It can be helpful to think about the potential impact from different amounts of sea level rise, instead of forecasting when sea level rise will occur.

Data and Methodology

In order to evaluate the market value that may be affected for coastal properties under different sea level rise and storm scenarios, residential property and hazard model scenario data are required. The following section first details the data vendors used for this study. We then explain how we identify properties at risk under different scenarios.

[1] "Our Mission," California Coastal Commission. Accessed February 14, 2022. https://www.coastal.ca.gov/whoweare.html

[2] A-100 year storm is a storm that has a chance of occurring of 1% each year.

Data Sources

The residential property data were provided by LightBox, a company that provides geographical, spatial, and environmental building data to its customers. For this study, we ordered parcel, building, assessment, and building footprint data for properties located in the counties that contain the cities defined in the scope section. Only residential properties, including single family, condominium, townhouse, duplex, etc., are the subject of the study. Other properties such as commercial and timeshare residential properties are excluded from the analysis. The fair market values of the residential properties are estimated using Automated Valuation Model (AVM) data provided by LightBox[3]. AVMs use information such as property characteristics and sales data to estimate property market values.

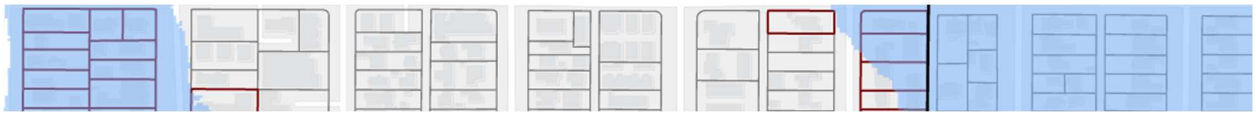
The hazard data were provided by the Coastal Storm Modeling System (CoSMoS), developed by the United States Geological Survey (USGS). CoSMoS has been used for local coastal planning efforts in California, including municipalities, major utilities, California state agencies, and the federal government. The model provides predictions of coastal flooding due to various sea level rise and storm scenarios over large geographic areas. Sea level rise scenarios are available from zero to two meters[4] and there is an additional five-meter scenario. We did not include the five-meter scenario in this study since the latest sea level rise projections consider that less likely to occur in the near future. The storm scenarios are available for return periods from zero to 100-years.

Methodology

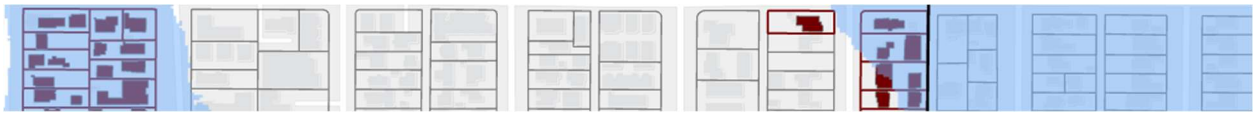
We identified residential properties affected by the combination of each sea level rise and storm scenarios as follows:

- Start with all parcel data from LightBox and filter down to only those parcels within or intersecting city boundaries.

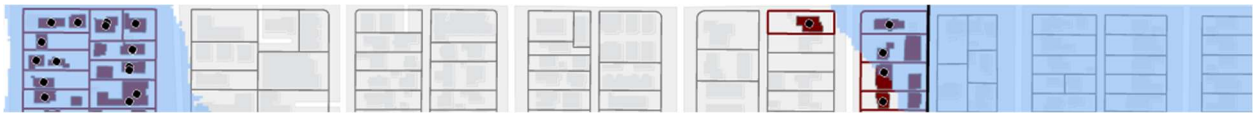
- Choose parcels that intersected with hazard scenario from CoSMoS, shown in blue



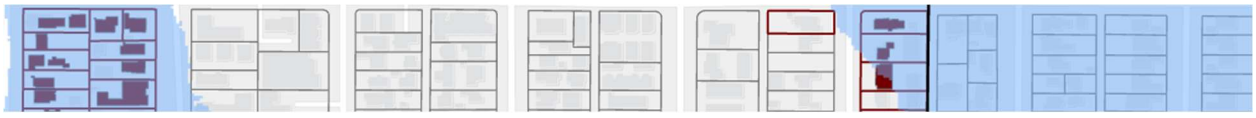
- Identify buildings that are within these at-risk, residential parcels.



- Filter buildings down to only those with address points, in order to relate buildings to assessed values.



- Select buildings that have more than half of their area within the hazard polygon. These buildings are considered affected by the hazard scenario.



Note that in some cases, buildings that are not located within the cities in the scope may be included, because part of the parcel is located within the city.

3 Modeled by Black Knight, inc. using their propriety model EZVal. We used model version 6.45.20 released on March 18th, 2022, and currently evaluates 14 different property types.

4 The metric system is used throughout the report. 1 meter is about 3.28 feet.

Market Value affected by Sea Level Rise

The following section reviews the fair market value of residential properties affected under different sea level rise and storm scenarios and compares them to city budgets. It is important to note that this analysis considers a property "affected" if more than half of the building footprint intersects the hazard scenario, but does not evaluate the impact of the hazard scenario on the building, which can vary. For example, we do not assess the flood depth for each scenario and how much damage is produced, which would vary with flood depth. This could be especially important for high rise structures.

City of Coronado

- County: San Diego
- Fiscal year 2022-2023 budget: $107.6 million[5]
- Number of residential properties included in study: 6,935
- Fair market value of residential properties included in study: $16.1 billion
- Distribution of property types included in study
  - Single family home: 52.3%
  - Condominium[6]: 45.6%
  - Townhouse: 0.0%
  - Duplex, triplex, and other multi-family dwellings: 5.1%

Table 1, below, displays the fair market value and number of residential properties affected under each sea level rise and storm scenario.

Table 1. Market Value and Number of Residential Locations Affected- City of Coronado

Sea Level Rise (meter)	0-Year Storm		20-Year Storm		100-Year Storm	
	Fair Market Value (MM)	Number of Locations	Fair Market Value (MM)	Number of Locations	Fair Market Value (MM)	Number of Locations
0.00	$0	0	$0	0	$0	0
0.25	0	0	0	0	55	11
0.50	0	0	27	12	649	181
0.75	10	2	256	102	2,091	641
1.00	867	260	1,018	331	3,164	1,001
1.50	2,782	935	3,031	1,037	3,888	1,256
2.00	4,250	1,444	4,357	1,505	5,445	1,908

As shown in Table 1, no residential properties in the city of Coronado would be affected without sea level rise, even in the event of a 100-year storm. However, once sea level rise reaches 0.25 meters, a 100-year storm would affect residential properties worth more than half of the 2022-2023 city budget of $107.6 million. If sea level rise were to reach 1 meter, 3.7% of all residential properties would be affected, with a value of $867 million, even without a storm. Under the most extreme scenario considered, which is 2 meters in sea level rise and a 100-year storm, 28% of residential properties would be affected, worth over $5.4 billion.

[5] "Fiscal Year 2022-2023 Operating Budget," City of Coronado.

[6] Throughout this study location counts for condominiums are for number of units, not number of buildings. In some cases more than one unit can be in a building.

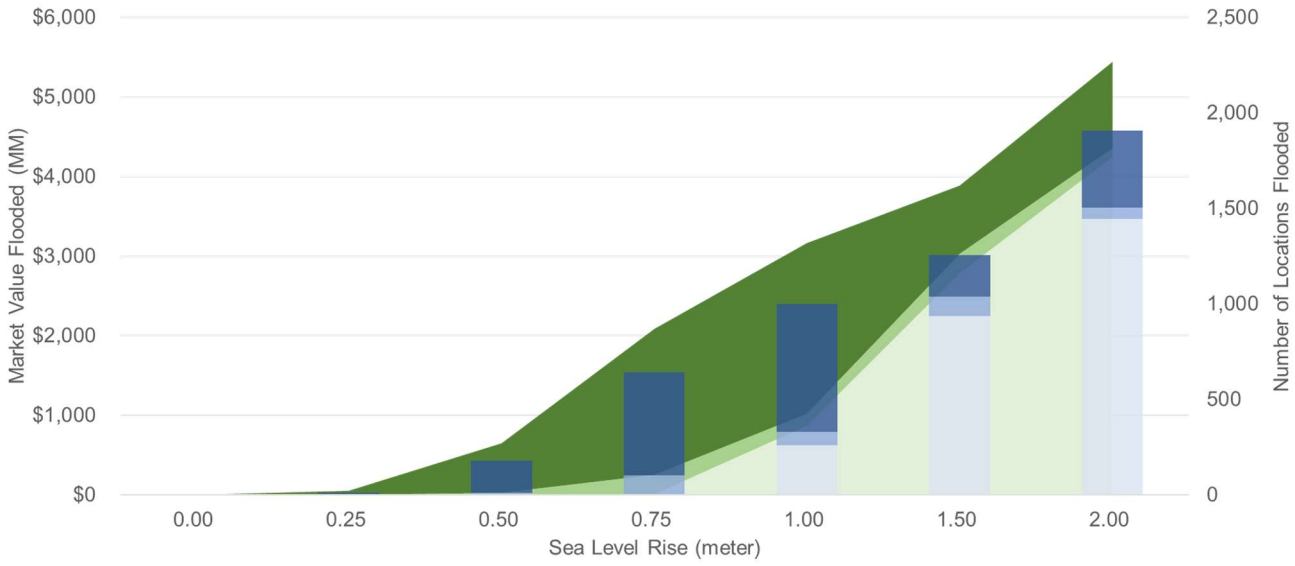
Table 2. Percent of buildings affected by property type – City of Coronado									
	Single Family Home			Condominium			Townhouse, Duplex, and Other		
Sea Level Rise (meter)	0-Year Storm	20-Year Storm	100-Year Storm	0-Year Storm	20-Year Storm	100-Year Storm	0-Year Storm	20-Year Storm	100-Year Storm
0.00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.25	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.50	0.0%	0.3%	4.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%
0.75	0.1%	2.7%	17.2%	0.0%	0.1%	0.4%	0.0%	0.0%	1.7%
1.00	7.1%	9.0%	25.8%	0.0%	0.2%	1.7%	0.0%	0.0%	3.7%
1.50	22.7%	25.8%	31.8%	3.7%	3.7%	8.0%	1.1%	2.0%	7.7%
2.00	35.3%	36.9%	43.5%	4.4%	4.4%	9.7%	8.8%	9.7%	12.8%

As shown in Table 2, single family homes in Coronado are more affected than other property types.

In Figure 1, below, the line graphs represent the market value of residential properties affected by sea level rise for different storm scenarios. Light green corresponds to no storm, the darker green corresponds to a 20-year storm, and the darkest green corresponds to a 100-year storm. The primary y-axis, on the left, shows the market values.

The bars, in blue, represent number of residential properties affected by sea level rise for different storm scenarios. Light blue corresponds to no storm, the darker blue to a 20-year storm, and the darkest blue to a 100-year storm. The secondary y-axis, on the right, shows the number of locations affected.

Figure 1. Fair market value and number of affected residential properties – City of Coronado



As shown in Figure 1, it can be seen that up to one meter sea level rise, the majority of residential properties are affected as a result of storms. As sea level increases above one meter most affected properties are affected even without a storm. For example, a 1.5-meter sea level rise affects nearly as many residential properties as a 100-year

storm, coupled with one meter of sea level rise. Once sea level rise reaches two meters, the damage exceeds what a 100-year storm causes under other sea level rise scenarios.

City of Imperial Beach

- County: San Diego
- Fiscal year 2022-2023 budget: $39.7 million[7]
- Number of residential properties included in study: 5,365
- Fair market value of residential properties included in study: $4.4 billion
- Distribution of property types included in study
  - Single family home: 51.7%
  - Condominium: 29.7%
  - Townhouse: 0.0%%
  - Duplex, triplex, and other multi-family dwellings: 18.6%

Table 3. Market Value and Number of Residential Buildings Affected - City of Imperial Beach

	0-Year Storm		20-Year Storm		100-Year Storm	
Sea Level Rise (meter)	Fair Market Value (MM)	Number of Locations	Fair Market Value (MM)	Number of Locations	Fair Market Value (MM)	Number of Locations
0.00	$9	10	$50	56	$46	52
0.25	15	17	56	63	77	86
0.50	19	22	68	77	137	151
0.75	44	49	93	104	245	273
1.00	55	62	174	188	314	334
1.50	107	119	317	338	446	477
2.00	334	378	487	521	651	685

As shown in Table 3, residential properties in the city of Imperial Beach are affected by storm scenarios even without sea level rise. A 20-year storm today could affect residential properties worth $50 million, exceeding the 2022-2023 city budget of $39.7 million. Once sea level rise reaches 0.75 meters, it could affect residential properties worth more than the city budget, even without a storm event. Under the most extreme scenario we considered, around 12.7% of residential properties of the city would be affected, worth more than $446 million.

Table 4. Percent of buildings affected by property type – City of Imperial Beach

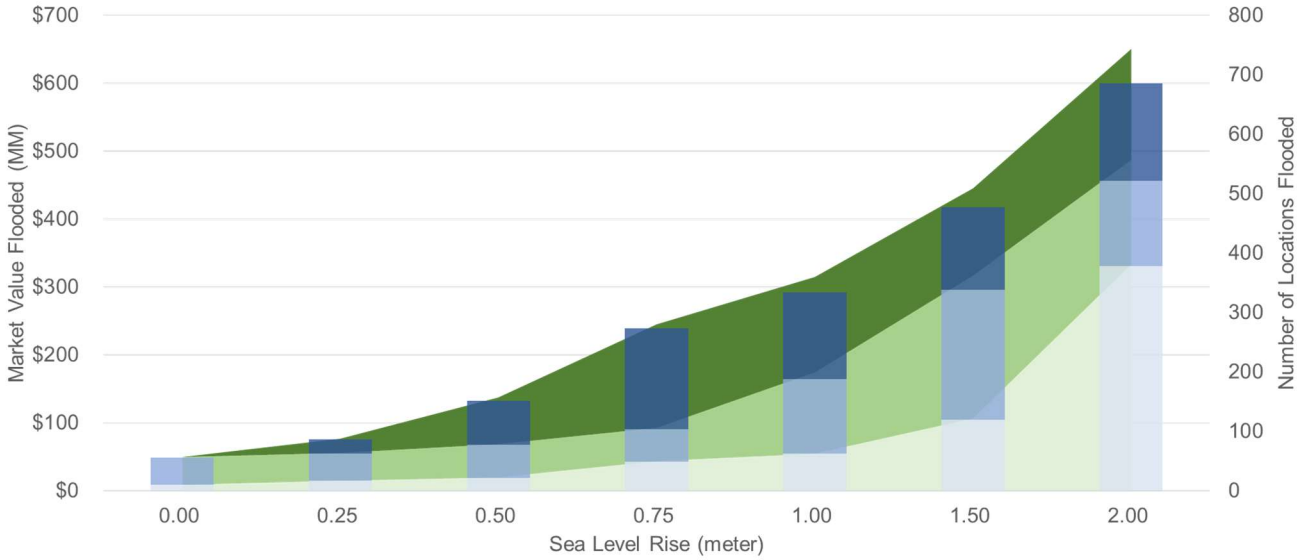
	Single Family Home			Condominium			Townhouse, Duplex, and Other		
Sea Level Rise (meter)	0-Year Storm	20-Year Storm	100-Year Storm	0-Year Storm	20-Year Storm	100-Year Storm	0-Year Storm	20-Year Storm	100-Year Storm
0.00	0.4%	2.0%	1.7%	0.0%	0.1%	0.1%	0.0%	0.0%	0.5%
0.25	0.5%	2.1%	2.4%	0.1%	0.1%	0.2%	0.3%	0.4%	1.6%
0.50	0.5%	2.4%	4.0%	0.1%	0.2%	1.0%	0.6%	0.8%	2.3%
0.75	1.1%	3.0%	6.2%	0.2%	0.3%	3.8%	1.6%	1.8%	4.1%
1.00	1.4%	4.4%	7.5%	0.4%	1.9%	4.1%	1.7%	3.6%	6.2%
2.00	8.4%	11.1%	13.7%	4.2%	6.3%	9.0%	7.9%	11.3%	16.2%

As shown in Table 4, a similar proportion of single-family home, townhouse, duplex, and other occupancies are affected by sea level rise. Just as in Coronado and Imperial Beach, condominiums are affected less than other property types. However, the degree of difference is smaller. Under the two-meter scenario with a 100-year storm in Coronado 43.6%

[7] "2022-2023 Biennial Budget" City of Imperial Beach.

of single-family homes and 9.7% of condominiums are affected, while in Imperial Beach 13.7% of single family homes and 9.0% of condominiums are affected.

Figure 2. Fair market value and number of affected residential properties – City of Imperial Beach



As shown in Figure 2, most properties are affected by storms until sea level rise reaches 2 meters, at which point most affected properties are affected even without a storm.

City of Santa Barbara

- County: Santa Barbara
- Fiscal year 2022-2023 budget: $477.1 million[8]
- Number of residential properties included in study: 20,184
- Fair market value of residential properties included in study: $20.2 billion
- Distribution of property types included in study
  - Single family home: 71.0%
  - Condominium: 17.8%
  - Townhouse: 0.0%%
  - Duplex, triplex, and other multi-family dwellings: 11.2%

Table 5. Market Value and Number of Residential Buildings Affected - City of Santa Barbara

Sea Level Rise (meter)	0-Year Storm		20-Year Storm		100-Year Storm	
	Fair Market Value (MM)	Number of Locations	Fair Market Value (MM)	Number of Locations	Fair Market Value (MM)	Number of Locations
0.00	$0	0	$0	0	$0	0
0.25	0	0	0	0	0	0
0.50	0	0	0	0	0	0
0.75	0	0	0	0	0	0
1.00	0	0	0	0	2	1
1.50	2	1	11	5	26	19
2.00	24	15	47	36	408	477

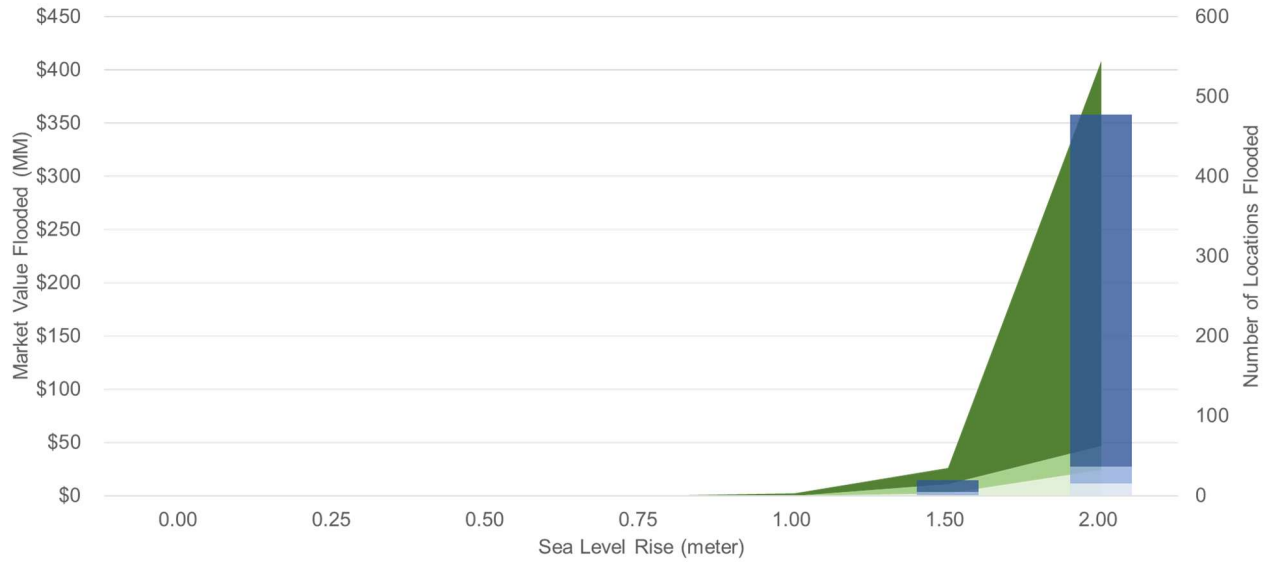
[8] "Summary of Revenues by Fund", https://stories.opengov.com/santabarbara/published/h7l_sMbTl.

In contrast to the cities of Coronado and Imperial Beach, Santa Barbara is less affected by sea level rise. It is not until a 1-meter sea level rise, coupled with a 100-year storm, that any residential properties are affected. Under the most extreme scenario considered, the fair market value of all residential property affected is roughly $408 million, which is less than the city's 2022-2023 fiscal year budget.

Table 6. Percent of buildings affected by property type – City of Santa Barbara

	Single Family Home			Condominium			Townhouse, Duplex, and Other		
Sea Level Rise (meter)	0-Year Storm	20-Year Storm	100-Year Storm	0-Year Storm	20-Year Storm	100-Year Storm	0-Year Storm	20-Year Storm	100-Year Storm
0.00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.25	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.50	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.75	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.50	0.0%	0.0%	0.0%	0.0%	0.1%	0.3%	0.0%	0.0%	0.3%
2.00	0.0%	0.0%	0.6%	0.1%	0.5%	9.9%	0.4%	0.5%	1.9%

Figure 3. Fair market value and number of affected residential properties – City of Santa Barbara



As shown in Figure 3, even with up to two meters of sea level rise very few properties affected without a storm. However, sea level rise does enable storm, especially the 100-year storms, to affect many properties that are unaffected in the absence of sea level rise.

City of Santa Cruz

- County: Santa Cruz
- Fiscal year 2022-2023 budget: $421.2 million[9]
- Number of residential properties included in study: 14,449
- Fair market value of residential properties included in study: $18.6 billion

[9] "FY 2023 Annual Budget", City of Santa Cruz.

- Distribution of property types included in study
  - Single family home: 76.4%
  - Condominium: 9.0%
  - Townhouse: 6.6%%
  - Duplex, triplex, and other multi-family dwellings: 8.0%

Table 7. Market Value and Number of Residential Buildings Affected - City of Santa Cruz

	0-Year Storm		20-Year Storm		100-Year Storm	
Sea Level Rise (meter)	Fair Market Value (MM)	Number of Locations	Fair Market Value (MM)	Number of Locations	Fair Market Value (MM)	Number of Locations
0.00	$0	0	$0	0	$0	0
0.25	0	0	0	0	0	0
0.50	0	0	0	0	0	0
0.75	0	0	0	0	0	0
1.00	0	0	0	0	0	0
1.50	0	0	0	0	0	0
2.00	0	0	0	0	39	45

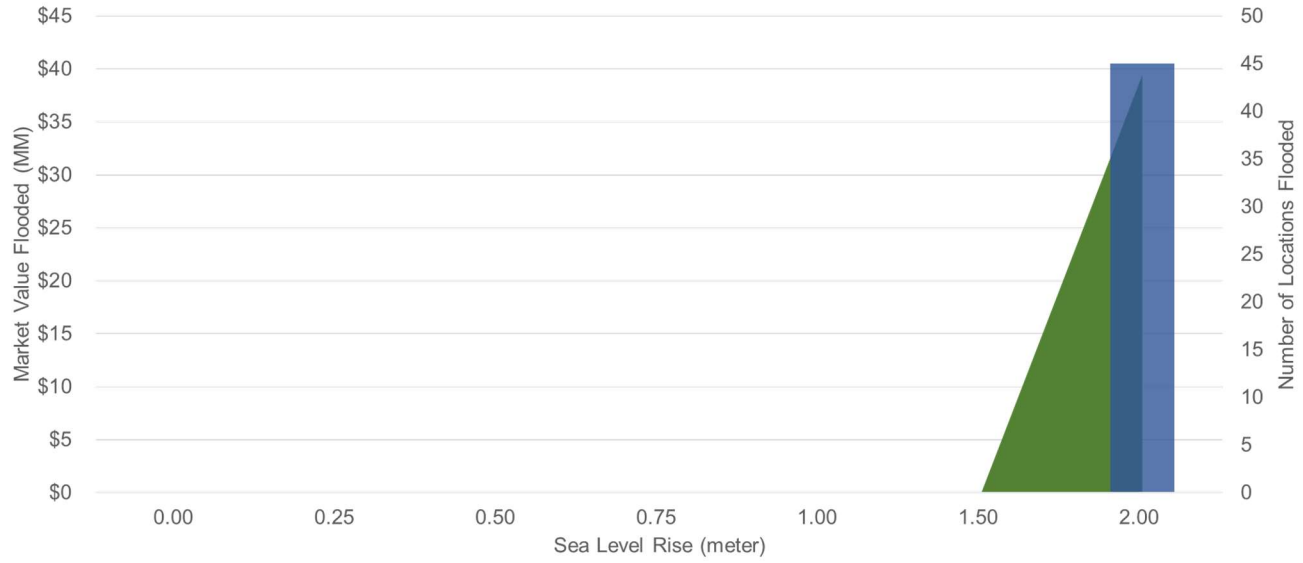
For the city of Santa Cruz, no residential property is affected except in the most extreme scenario considered, two-meters of sea level rise and a 100-year storm. This scenario would affect $39 million worth of residential properties compared to the city's 2022-2023 budget of $421 million.

Table 8. Percent of buildings affected by property type – City of Santa Cruz

	Single Family Home			Condominium			Townhouse, Duplex, and Other		
Sea Level Rise (meter)	0-Year Storm	20-Year Storm	100-Year Storm	0-Year Storm	20-Year Storm	100-Year Storm	0-Year Storm	20-Year Storm	100-Year Storm
0.00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.25	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.50	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.75	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.00	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.50	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2.00	0.0%	0.0%	0.3%	0.0%	0.0%	0.2%	0.0%	0.0%	0.6%

As shown in Table 8, less than one percent of buildings are affected in any scenario.

Figure 4. Fair market value and number of affected residential properties – City of Santa Cruz



The results for Santa Cruz are similar to Santa Barbara in that sea level rise enables the possibility of properties being affected by 100-year storms that would not be affected in the absence of sea level rise.

City of Carlsbad

- County: San Diego
- Fiscal year 2022-2023 budget: $342.3 million[10]
- Number of residential properties included in study: 36,624
- Fair market value of residential properties included in study: $45.8 billion
- Distribution of property types included in study
  - Single family home: 71.7%
  - Condominium: 26.8%
  - Townhouse: 0.0%%
  - Duplex, triplex, and other multi-family dwellings: 1.5%

The city of Carlsbad is the least affected city we reviewed. No residential property is affected even under the most extreme scenario of 2-meter sea level rise with a 100-year storm. As a result, no tables or figures are included for this city.

Appendices

- Enclosed Appendix A shows the market value and number of residential buildings affected by property type.
- Enclosed Appendices B to F show maps of which residential buildings are affected in all of the scenarios considered.

[10] "Fiscal Year 2022-23 Budget", City of Carlsbad.

Limitations

Use of Report

The data and exhibits in this report are provided to support the conclusions contained herein, limited to the scope of work specified by Smart Coast, and may not be suitable for other purposes. Milliman is available to answer any questions regarding this report or any other aspect of our review.

Data Reliances.

In performing this analysis we relied upon information obtained from Smart Coast, CoSMoS, LightBox and other publicly available information. We have not audited or verified this data and information. If the underlying data or information is inaccurate or incomplete, the results of our analysis may likewise be inaccurate or incomplete. In that event, the analysis may not be suitable for its intended purpose.

Uncertainty.

Differences between our projections and actual amounts depend on the extent to which future experience conforms to the assumptions made for the analyses. It is certain that actual experience will not conform exactly to the assumptions to be used in these analyses. Actual amounts will differ from projected amounts to the extent that actual experience is better or worse than expected.

Model Reliance.

Our analysis is based on the CoSMoS model. To the extent that the model is biased, the results of our analysis may be biased.

Variability of Results.

Any projection of future insurance costs or asset values involves estimates of future contingencies. While our analysis will be based on sound actuarial principles, it is important to note that variation from the projected result is not only possible, but, in fact, probable. While the degree of such variation cannot be quantified, it could be in either direction from the projections. Such uncertainty is inherent in any set of actuarial projections.

Use of Milliman's Name.

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For more information about the Milliman Climate Resilience Initiative, please visit us at:

https://www.milliman.com/pt-br/insurance/milliman-climate-resilience-initiative

Milliman

Milliman is among the world's largest providers of actuarial and related products and services. The firm has consulting practices in life insurance and financial services, property & casualty insurance, healthcare, and employee benefits. Founded in 1947, Milliman is an independent firm with offices in major cities around the globe.

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Appendix A

Smart Coast California

Fair Market Value of Buildings Flooded
City of Carlsbad

0-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	$0	$0	$0	$0	$0	$0	$0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	0	0	0	0	0	0	0
2.00	0	0	0	0	0	0	0	0

20-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	$0	$0	$0	$0	$0	$0	$0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	0	0	0	0	0	0	0
2.00	0	0	0	0	0	0	0	0

100-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	$0	$0	$0	$0	$0	$0	$0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	0	0	0	0	0	0	0
2.00	0	0	0	0	0	0	0	0

Appendix A

Smart Coast California

Number of Buildings Flooded
City of Carlsbad

0-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	0	0	0	0	0	0	0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	0	0	0	0	0	0	0
2.00	0	0	0	0	0	0	0	0

20-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	0	0	0	0	0	0	0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	0	0	0	0	0	0	0
2.00	0	0	0	0	0	0	0	0

100-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	0	0	0	0	0	0	0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	0	0	0	0	0	0	0
2.00	0	0	0	0	0	0	0	0

Appendix A

Smart Coast California

Fair Market Value of Buildings Flooded
City of Coronado

0-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	$0	$0	$0	$0	$0	$0	$0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	10	0	0	0	0	0	0	10
1.00	865	2	0	0	0	0	0	867
1.50	2,613	152	2	0	0	0	15	2,782
2.00	3,970	188	8	0	0	0	85	4,250

20-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	$0	$0	$0	$0	$0	$0	$0	$0
0.25	0	0	0	0	0	0	0	0
0.50	27	0	0	0	0	0	0	27
0.75	250	7	0	0	0	0	0	256
1.00	1,010	8	0	0	0	0	0	1,018
1.50	2,879	134	4	0	0	0	14	3,031
2.00	4,069	188	12	0	0	0	89	4,357

100-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	$0	$0	$0	$0	$0	$0	$0	$0
0.25	55	0	0	0	0	0	0	55
0.50	639	0	0	0	0	0	10	649
0.75	2,043	20	0	0	0	0	28	2,091
1.00	3,040	74	2	0	0	0	47	3,164
1.50	3,694	111	8	0	0	0	75	3,888
2.00	4,796	511	14	0	0	0	124	5,445

Appendix A

Smart Coast California

Number of Buildings Flooded
City of Coronado

0-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	0	0	0	0	0	0	0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	2	0	0	0	0	0	0	2
1.00	259	1	0	0	0	0	0	260
1.50	823	108	1	0	0	0	3	935
2.00	1,282	131	4	0	0	0	27	1,444

20-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	0	0	0	0	0	0	0	$0
0.25	0	0	0	0	0	0	0	0
0.50	12	0	0	0	0	0	0	12
0.75	98	4	0	0	0	0	0	102
1.00	326	5	0	0	0	0	0	331
1.50	938	92	2	0	0	0	5	1,037
2.00	1,340	131	5	0	0	0	29	1,505

100-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	0	0	0	0	0	0	0	$0
0.25	11	0	0	0	0	0	0	11
0.50	179	0	0	0	0	0	2	181
0.75	623	12	0	0	0	0	6	641
1.00	938	50	1	0	0	0	12	1,001
1.50	1,155	74	4	0	0	0	23	1,256
2.00	1,578	285	6	0	0	0	39	1,908

Appendix A

Smart Coast California

Fair Market Value of Buildings Flooded
City of Imperial Beach

0-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	$9	$0	$0	$0	$0	$0	$0	$9
0.25	12	1	0	0	0	0	3	15
0.50	13	1	1	0	0	0	5	19
0.75	26	2	3	0	0	0	12	44
1.00	34	4	4	0	0	0	12	55
1.50	64	7	5	0	0	0	31	107
2.00	205	46	26	0	0	0	57	334

20-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	$49	$1	$0	$0	$0	$0	$0	$50
0.25	51	1	0	0	0	0	4	56
0.50	59	2	3	0	0	0	5	68
0.75	72	3	3	0	0	0	14	93
1.00	108	27	10	0	0	0	30	174
1.50	192	53	15	0	0	0	56	317
2.00	290	77	37	0	0	0	84	487

100-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	$41	$1	$1	$0	$0	$0	$4	$46
0.25	59	2	3	0	0	0	12	77
0.50	100	12	8	0	0	0	16	137
0.75	154	48	10	0	0	0	33	245
1.00	196	51	16	0	0	0	52	314
1.50	264	74	33	0	0	0	76	446
2.00	357	116	57	0	0	0	122	651

Appendix A

Smart Coast California

Number of Buildings Flooded
City of Imperial Beach

0-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	10	0	0	0	0	0	0	$10
0.25	13	1	0	0	0	0	3	17
0.50	15	1	1	0	0	0	5	22
0.75	30	3	4	0	0	0	12	49
1.00	39	6	5	0	0	0	12	62
1.50	73	10	6	0	0	0	30	119
2.00	232	67	27	0	0	0	52	378

20-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	55	1	0	0	0	0	0	$56
0.25	58	1	0	0	0	0	4	63
0.50	66	3	3	0	0	0	5	77
0.75	82	4	4	0	0	0	14	104
1.00	122	30	9	0	0	0	27	188
1.50	204	69	15	0	0	0	50	338
2.00	307	101	39	0	0	0	74	521

100-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	46	1	1	0	0	0	4	$52
0.25	67	3	4	0	0	0	12	86
0.50	112	16	8	0	0	0	15	151
0.75	171	61	10	0	0	0	31	273
1.00	207	65	16	0	0	0	46	334
1.50	280	97	34	0	0	0	66	477
2.00	381	143	58	0	0	0	103	685

Appendix A

Smart Coast California

Fair Market Value of Buildings Flooded
City of Santa Barbara

0-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	$0	$0	$0	$0	$0	$0	$0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	2	0	0	0	0	0	2
2.00	2	7	15	0	0	0	0	24

20-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	$0	$0	$0	$0	$0	$0	$0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	7	3	0	0	0	0	11
2.00	4	24	19	0	0	0	0	47

100-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	$0	$0	$0	$0	$0	$0	$0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	2	0	0	0	0	0	2
1.50	3	12	11	0	0	0	0	26
2.00	84	278	46	0	0	0	0	408

Appendix A

Smart Coast California

Number of Buildings Flooded
City of Santa Barbara

0-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	0	0	0	0	0	0	0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	1	0	0	0	0	0	1
2.00	2	4	9	0	0	0	0	15

20-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	0	0	0	0	0	0	0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	4	1	0	0	0	0	5
2.00	5	19	12	0	0	0	0	36

100-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	0	0	0	0	0	0	0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	1	0	0	0	0	0	1
1.50	3	9	7	0	0	0	0	19
2.00	81	354	42	0	0	0	0	477

Appendix A

Smart Coast California

Fair Market Value of Buildings Flooded
City of Santa Cruz

0-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	$0	$0	$0	$0	$0	$0	$0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	0	0	0	0	0	0	0
2.00	0	0	0	0	0	0	0	0

20-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	$0	$0	$0	$0	$0	$0	$0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	0	0	0	0	0	0	0
2.00	0	0	0	0	0	0	0	0

100-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	$0	$0	$0	$0	$0	$0	$0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	0	0	0	0	0	0	0
2.00	25	1	4	2	4	0	3	39

Appendix A

Smart Coast California

Number of Buildings Flooded
City of Santa Cruz

0-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	0	0	0	0	0	0	0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	0	0	0	0	0	0	0
2.00	0	0	0	0	0	0	0	0

20-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	0	0	0	0	0	0	0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	0	0	0	0	0	0	0
2.00	0	0	0	0	0	0	0	0

100-Year Storm

Sea Level Rise (meter)	Single Family Home	Condominiums	Duplex	Triplex	Quadruplex	Townhouse	Multi-Family Dwellings	Total
0.00	0	0	0	0	0	0	0	$0
0.25	0	0	0	0	0	0	0	0
0.50	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0
1.50	0	0	0	0	0	0	0	0
2.00	30	2	5	2	4	0	2	45

Appendix B

Coronado Area 1

Sea Level Rise 0.0 m - No storm

Coronado Area 1

Sea Level Rise 0.0 m - 001 year storm

Coronado Area 1

Sea Level Rise 0.0 m - 020 year storm

Coronado Area 1

Sea Level Rise 0.0 m - 100 year storm

Coronado Area 1

Sea Level Rise 0.25 m - No storm

Coronado Area 1

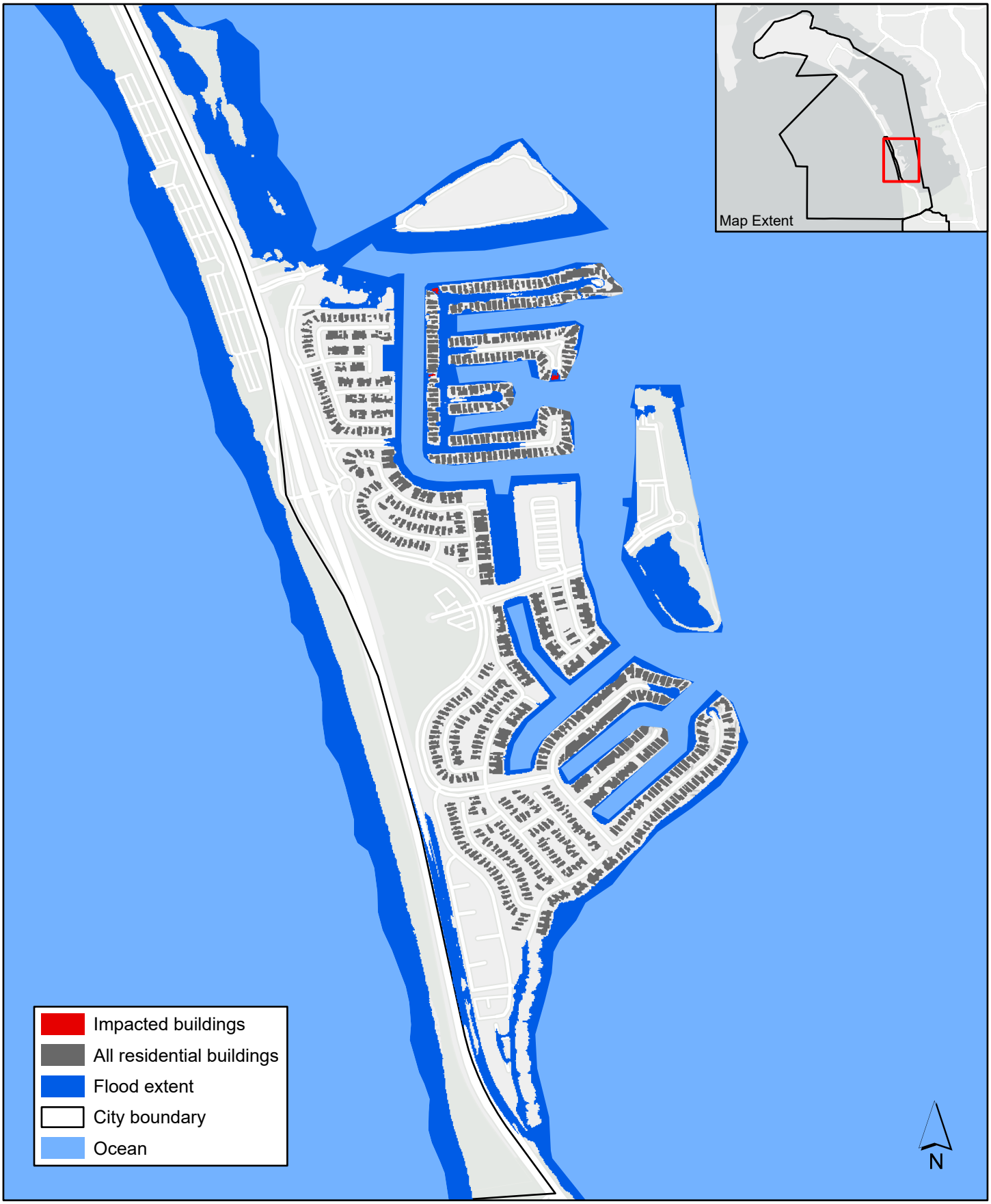
Sea Level Rise 0.25 m - 001 year storm

Coronado Area 1

Sea Level Rise 0.25 m - 020 year storm

Coronado Area 1

Sea Level Rise 0.25 m - 100 year storm



Coronado Area 1

Sea Level Rise 0.5 m - No storm

Coronado Area 1

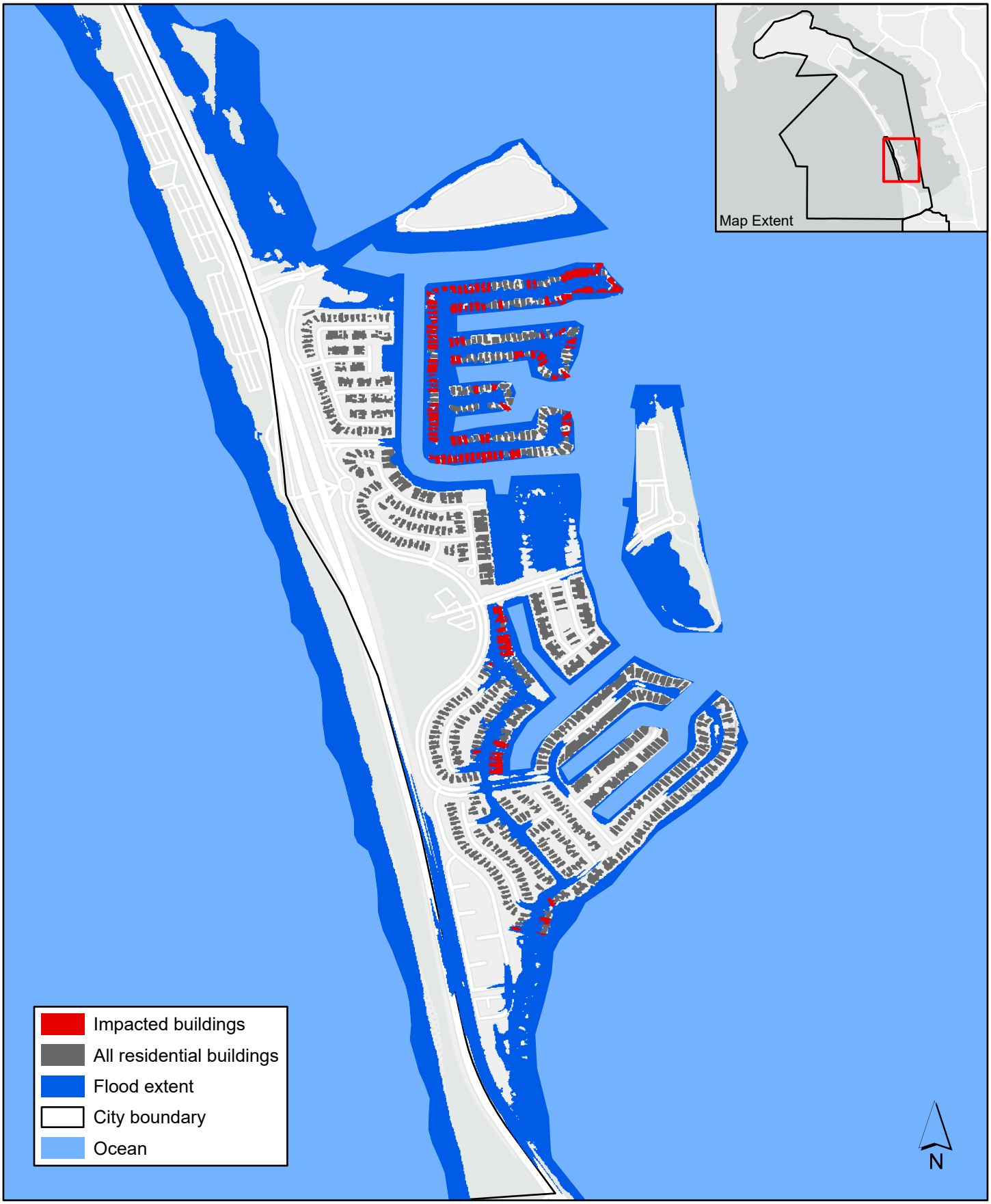
Sea Level Rise 0.5 m - 001 year storm

Coronado Area 1

Sea Level Rise 0.5 m - 020 year storm

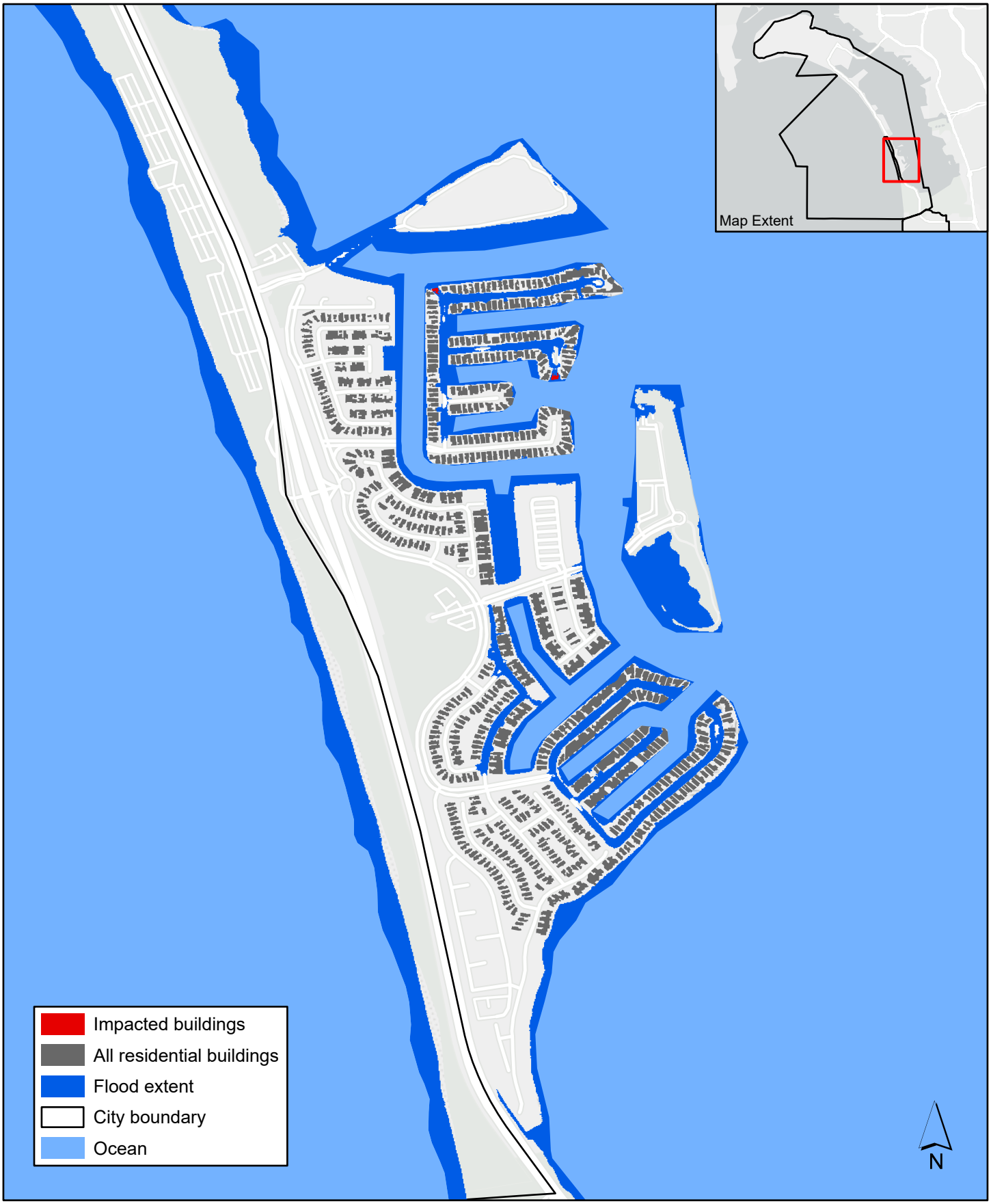
Coronado Area 1

Sea Level Rise 0.5 m - 100 year storm



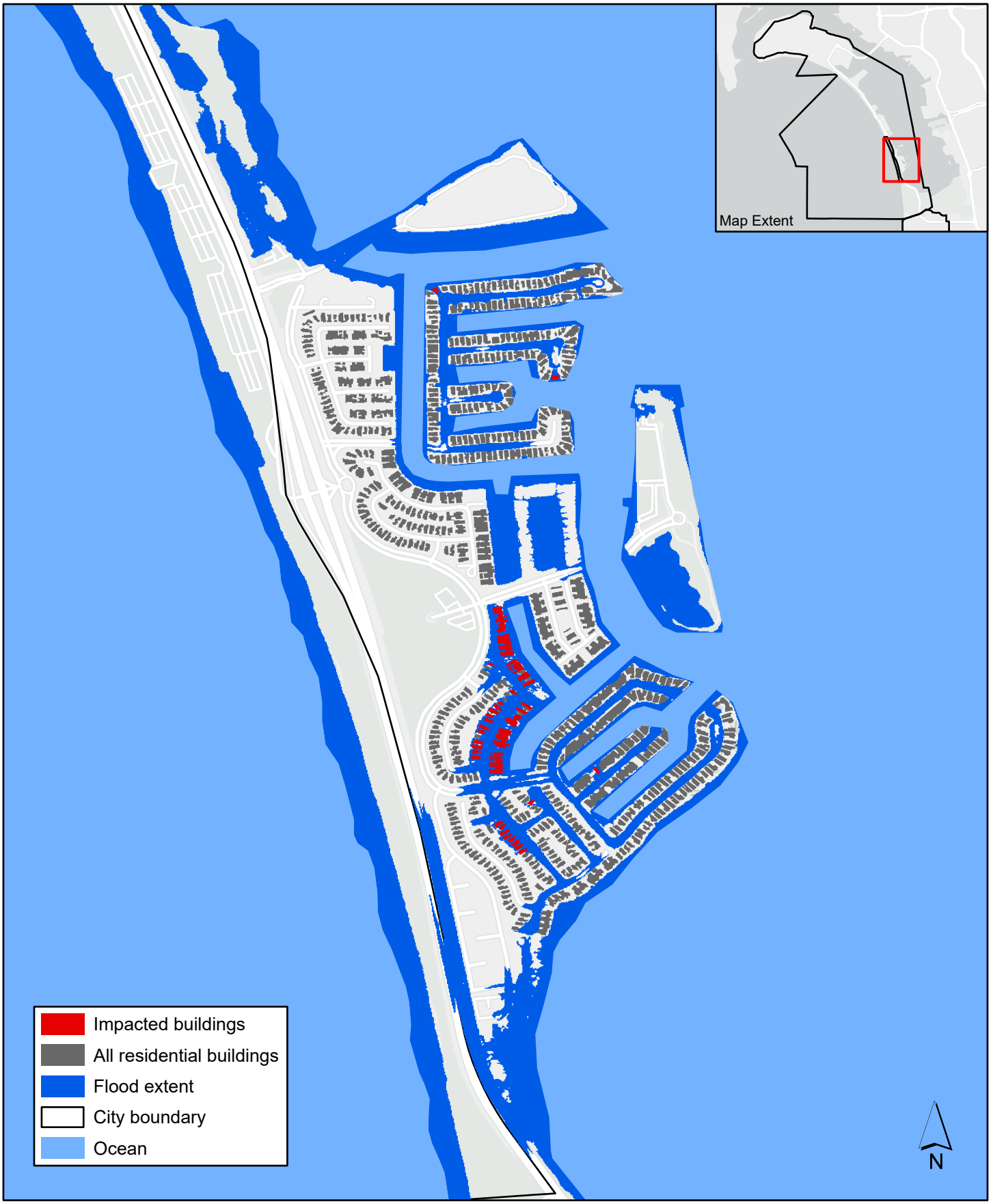
Coronado Area 1

Sea Level Rise 0.75 m - No storm



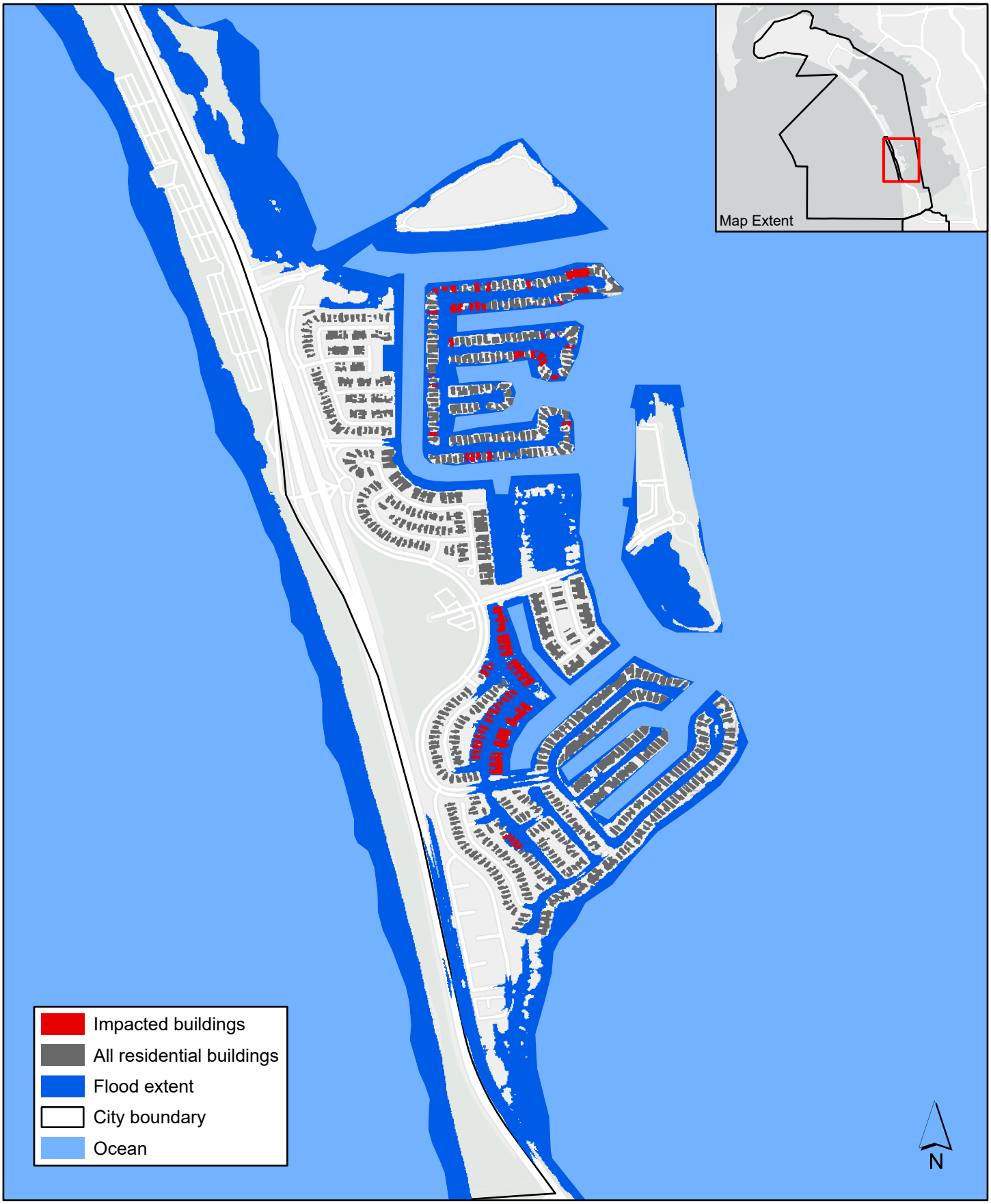
Coronado Area 1

Sea Level Rise 0.75 m - 001 year storm



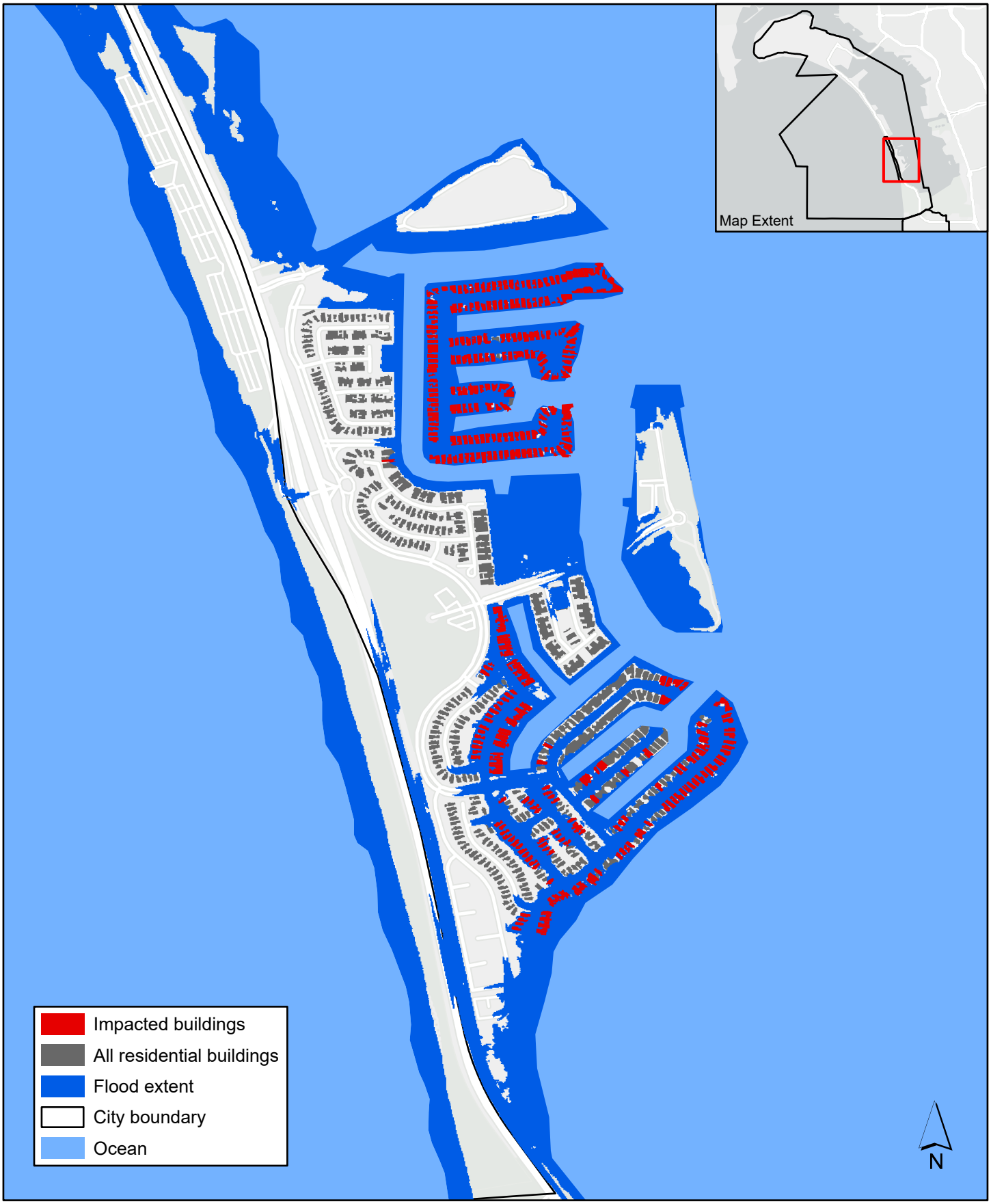
Coronado Area 1

Sea Level Rise 0.75 m - 020 year storm



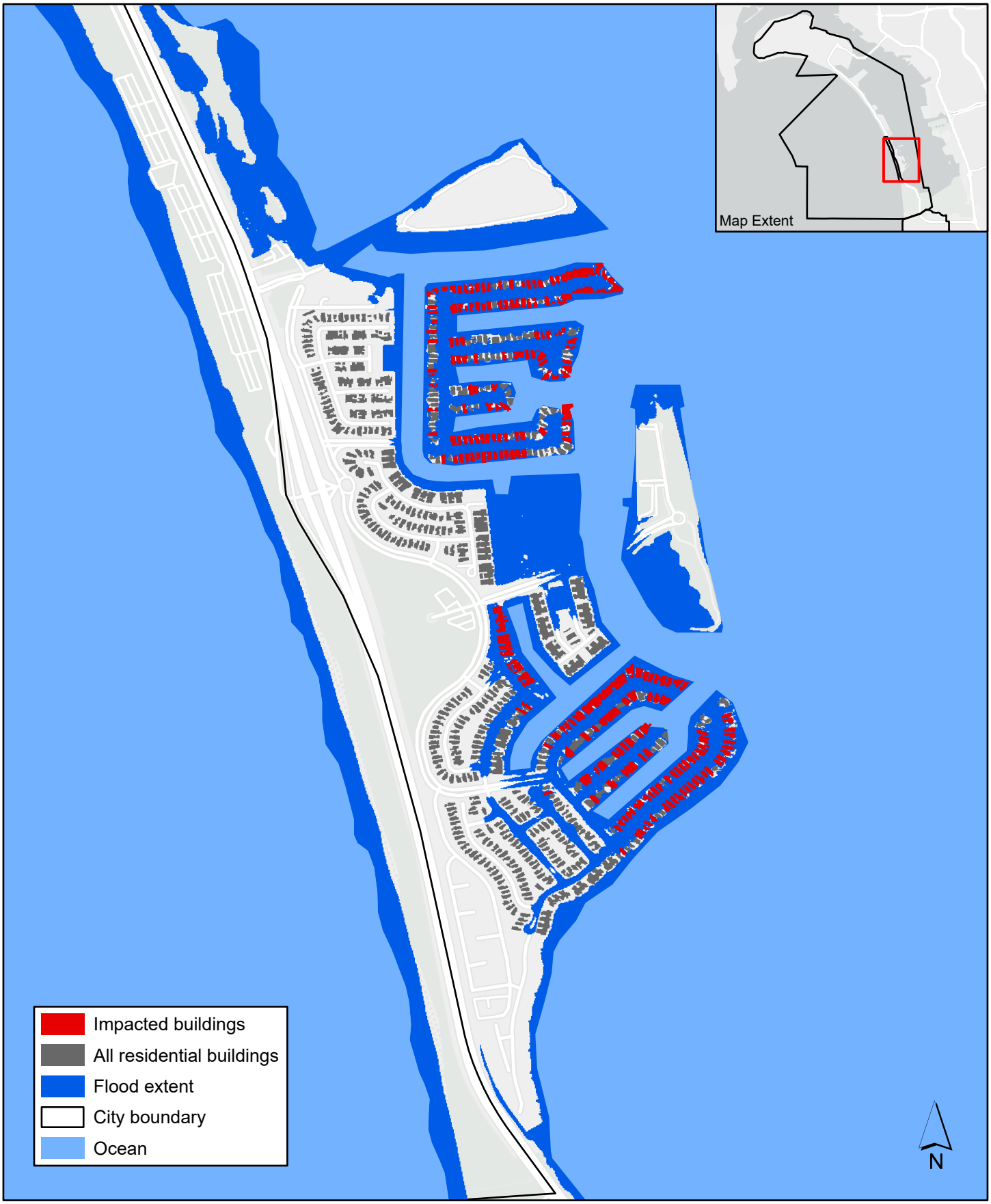
Coronado Area 1

Sea Level Rise 0.75 m - 100 year storm



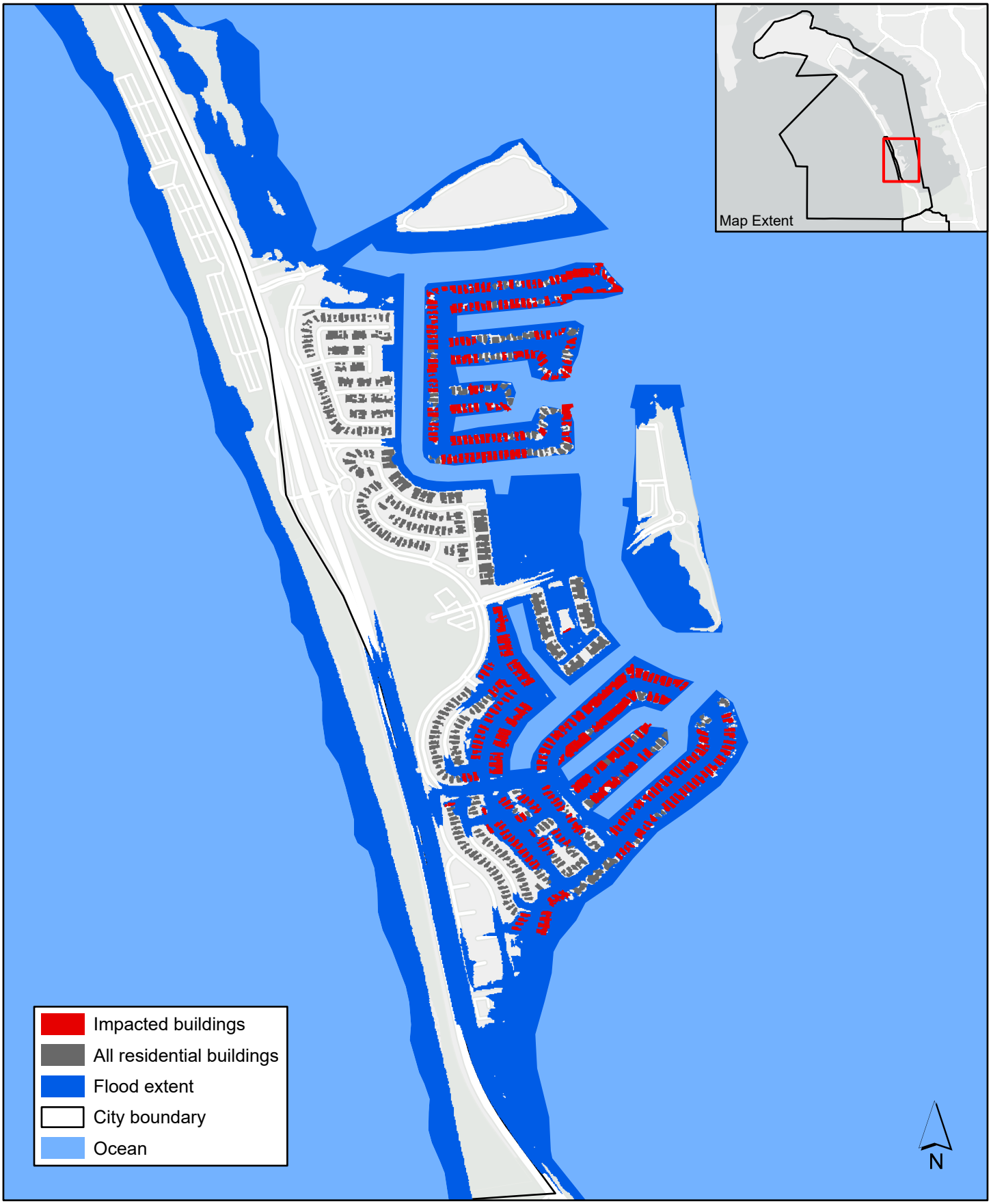
Coronado Area 1

Sea Level Rise 1.0 m - No storm



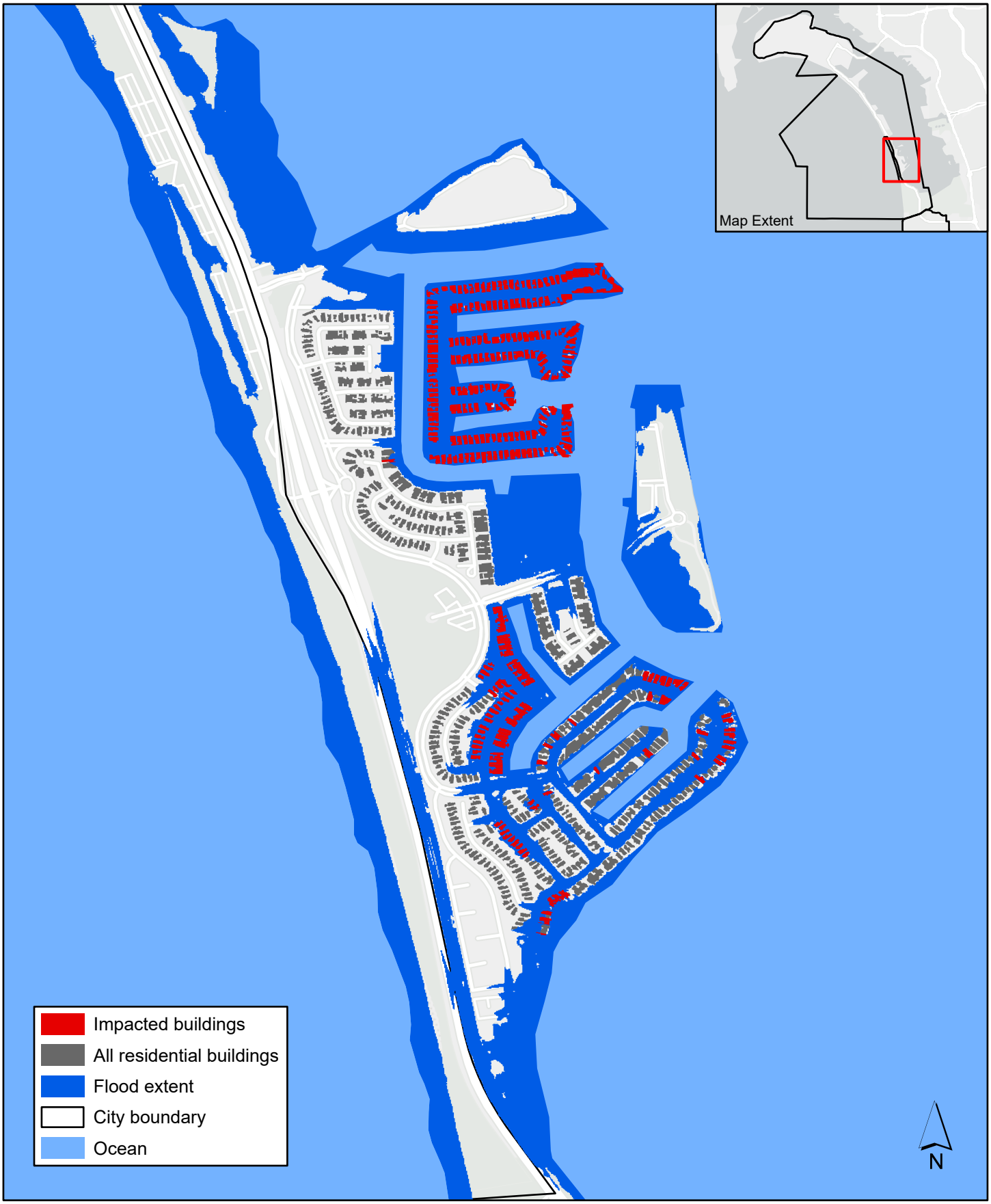
Coronado Area 1

Sea Level Rise 1.0 m - 001 year storm



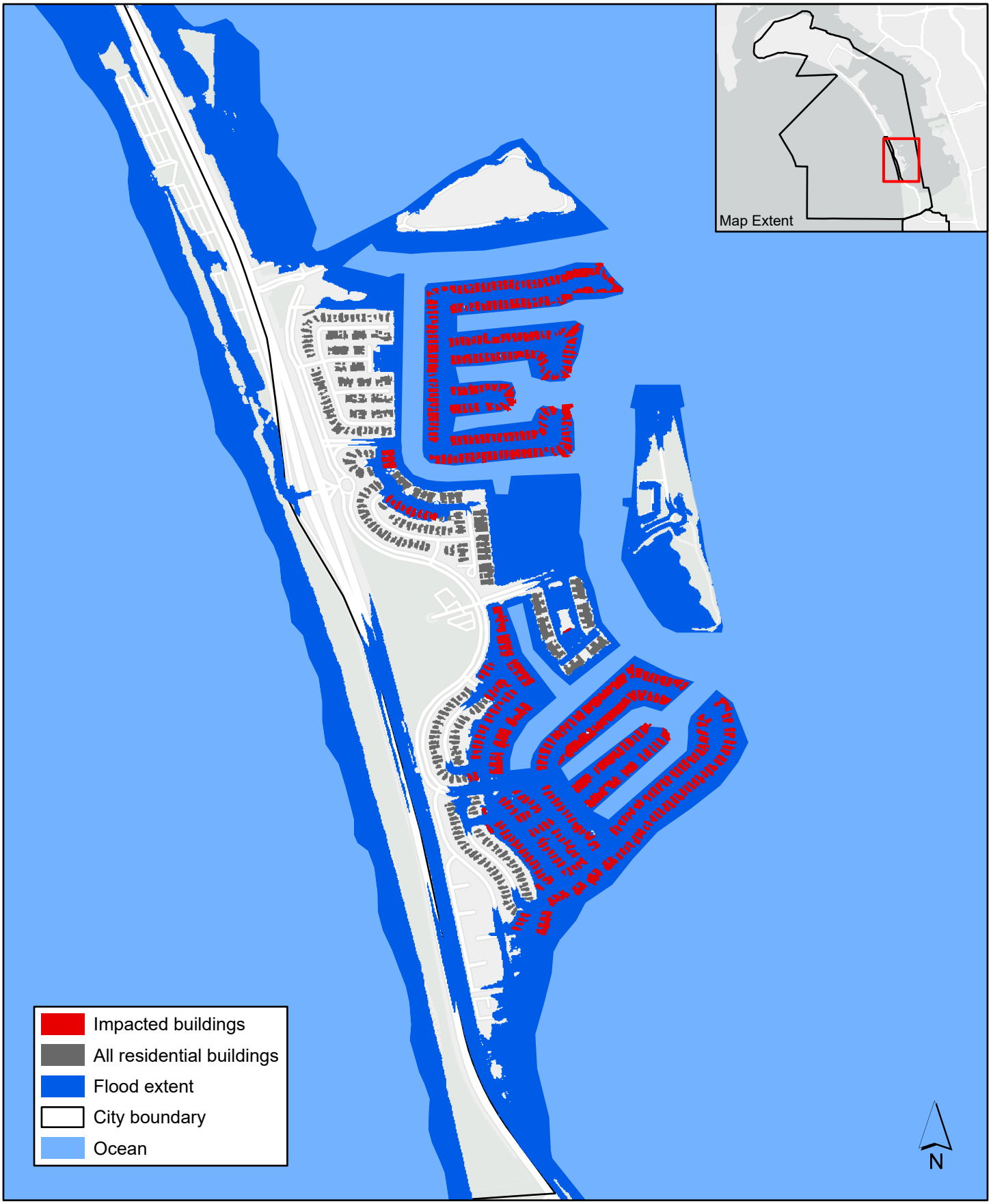
Coronado Area 1

Sea Level Rise 1.0 m - 020 year storm



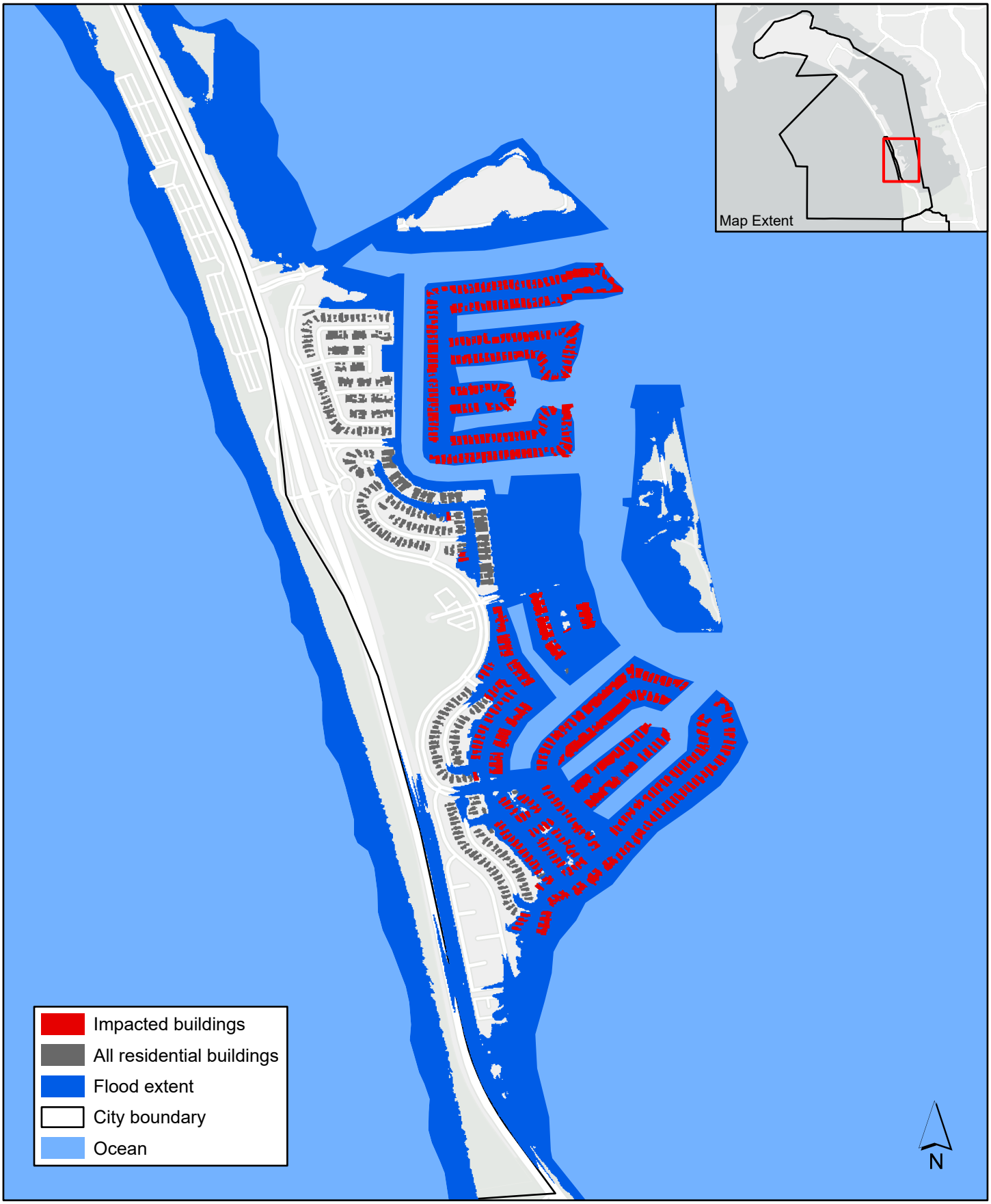
Coronado Area 1

Sea Level Rise 1.0 m - 100 year storm



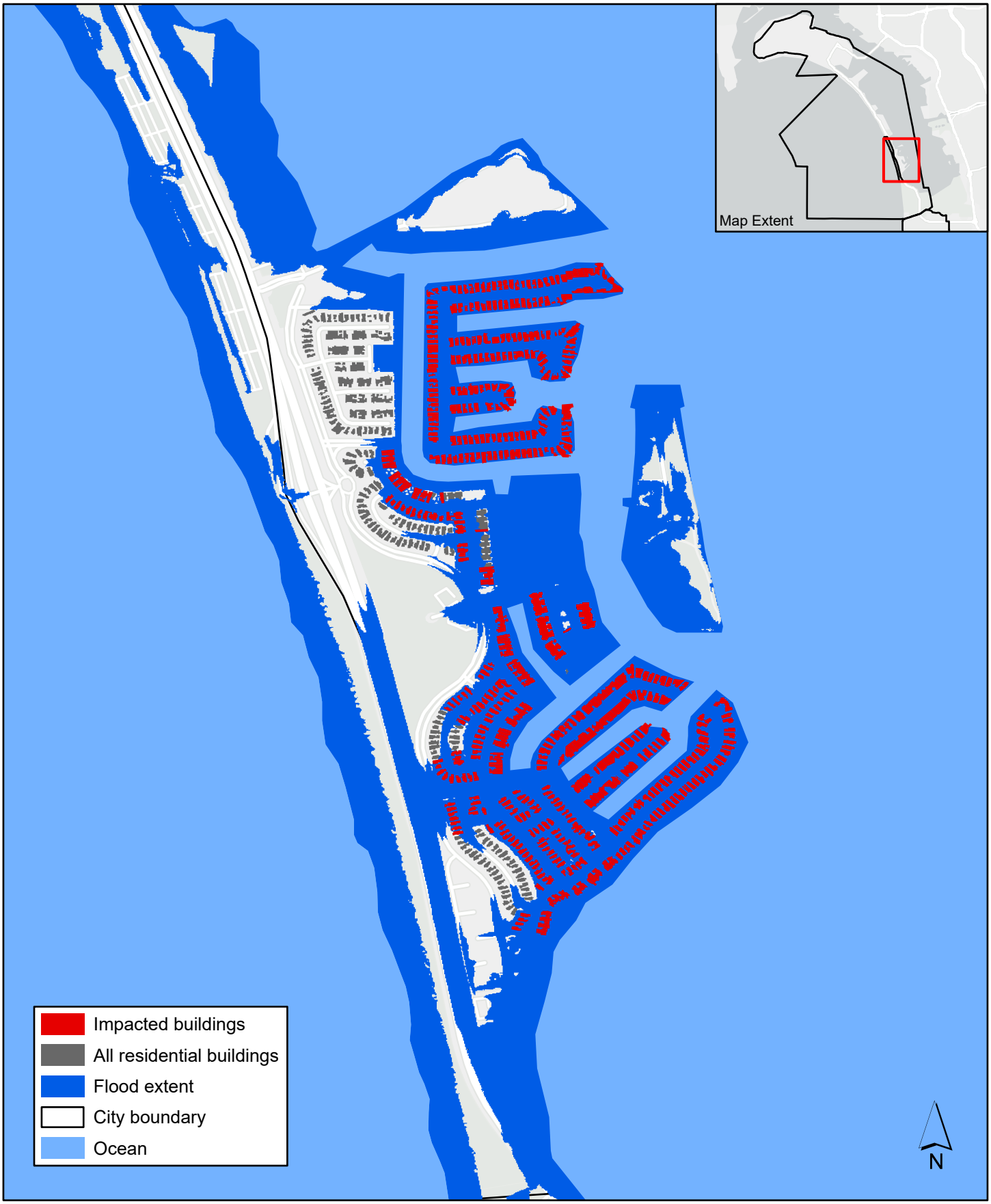
Coronado Area 1

Sea Level Rise 1.5 m - No storm



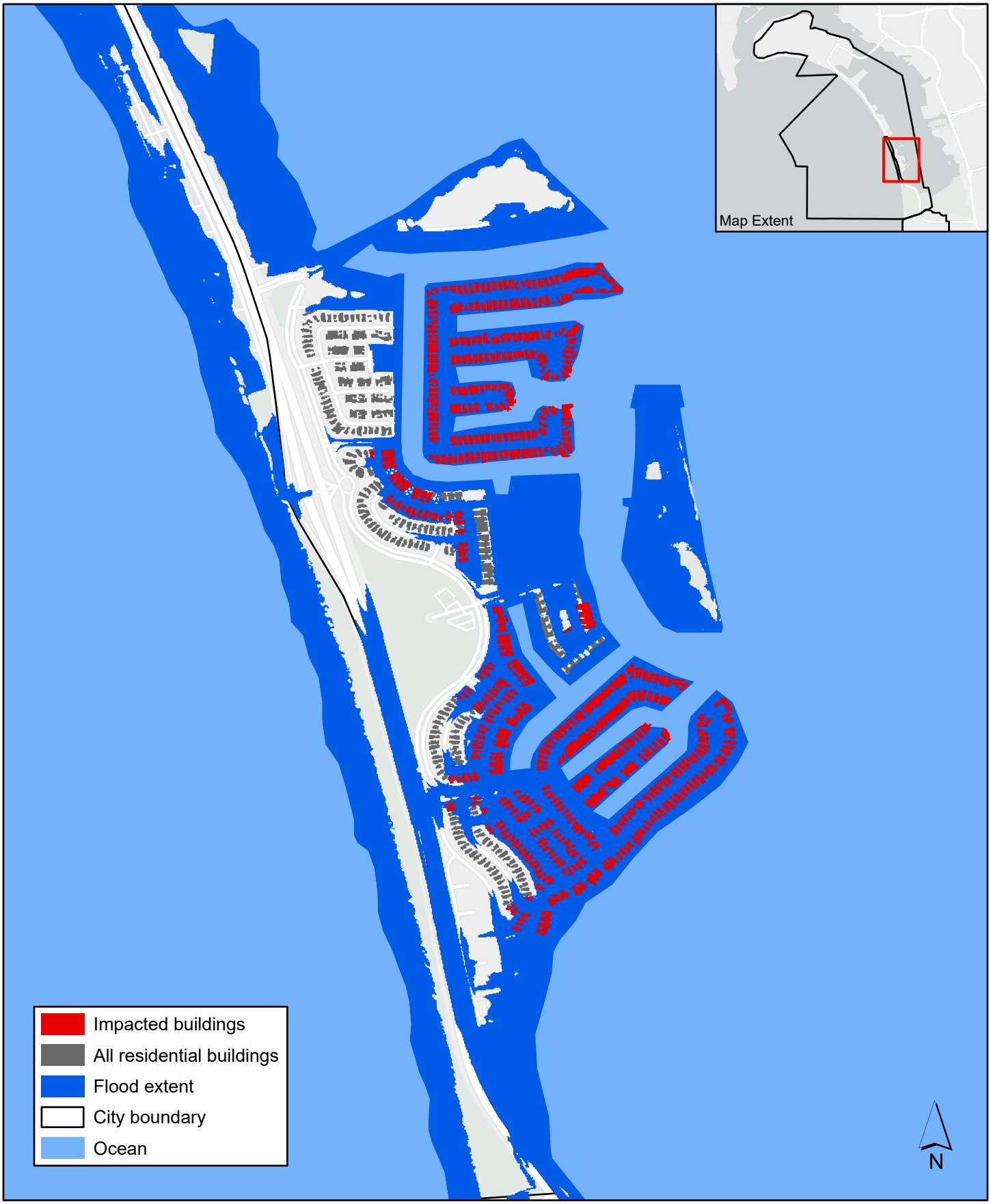
Coronado Area 1

Sea Level Rise 1.5 m - 001 year storm



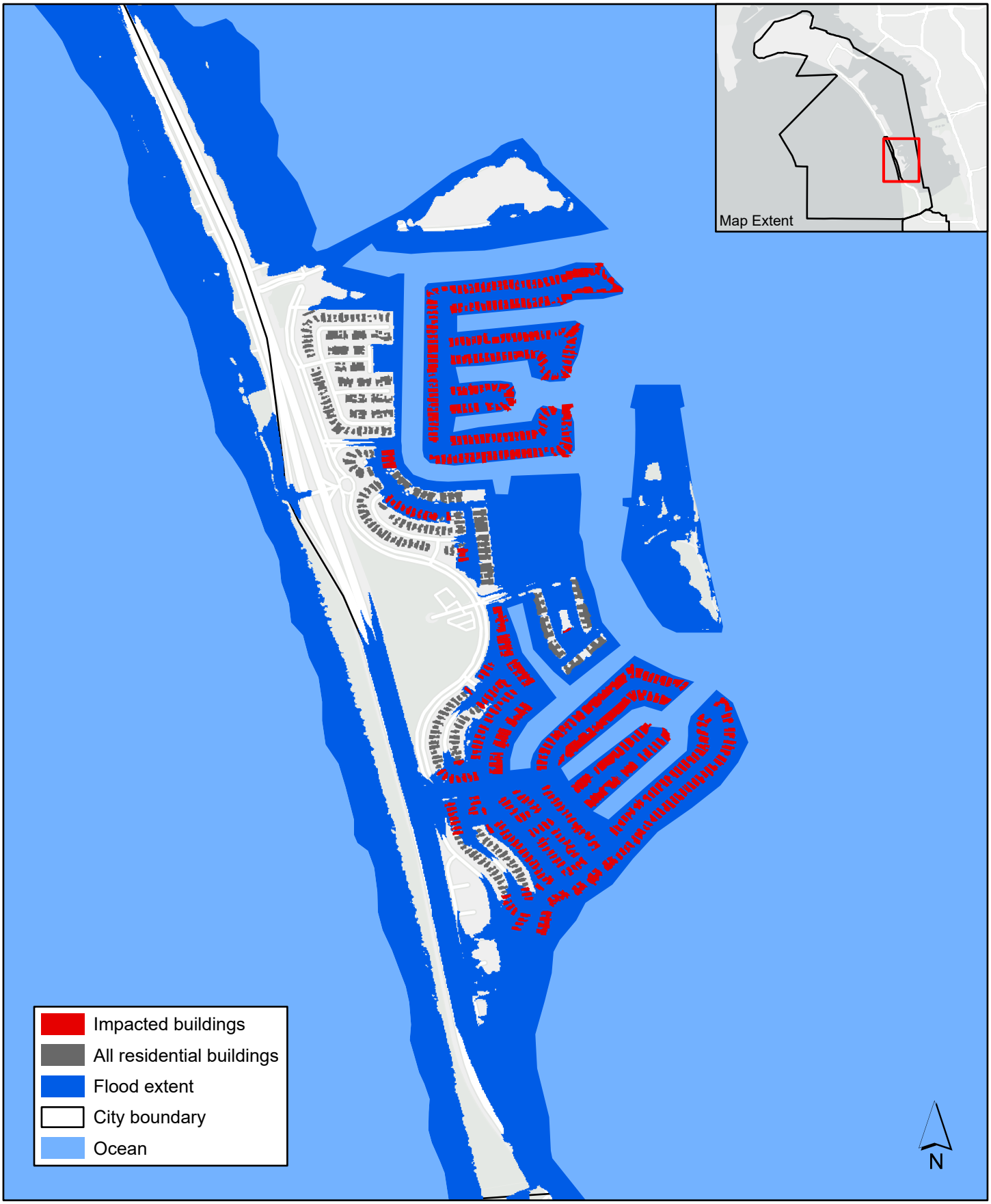
Coronado Area 1

Sea Level Rise 1.5 m - 020 year storm



Coronado Area 1

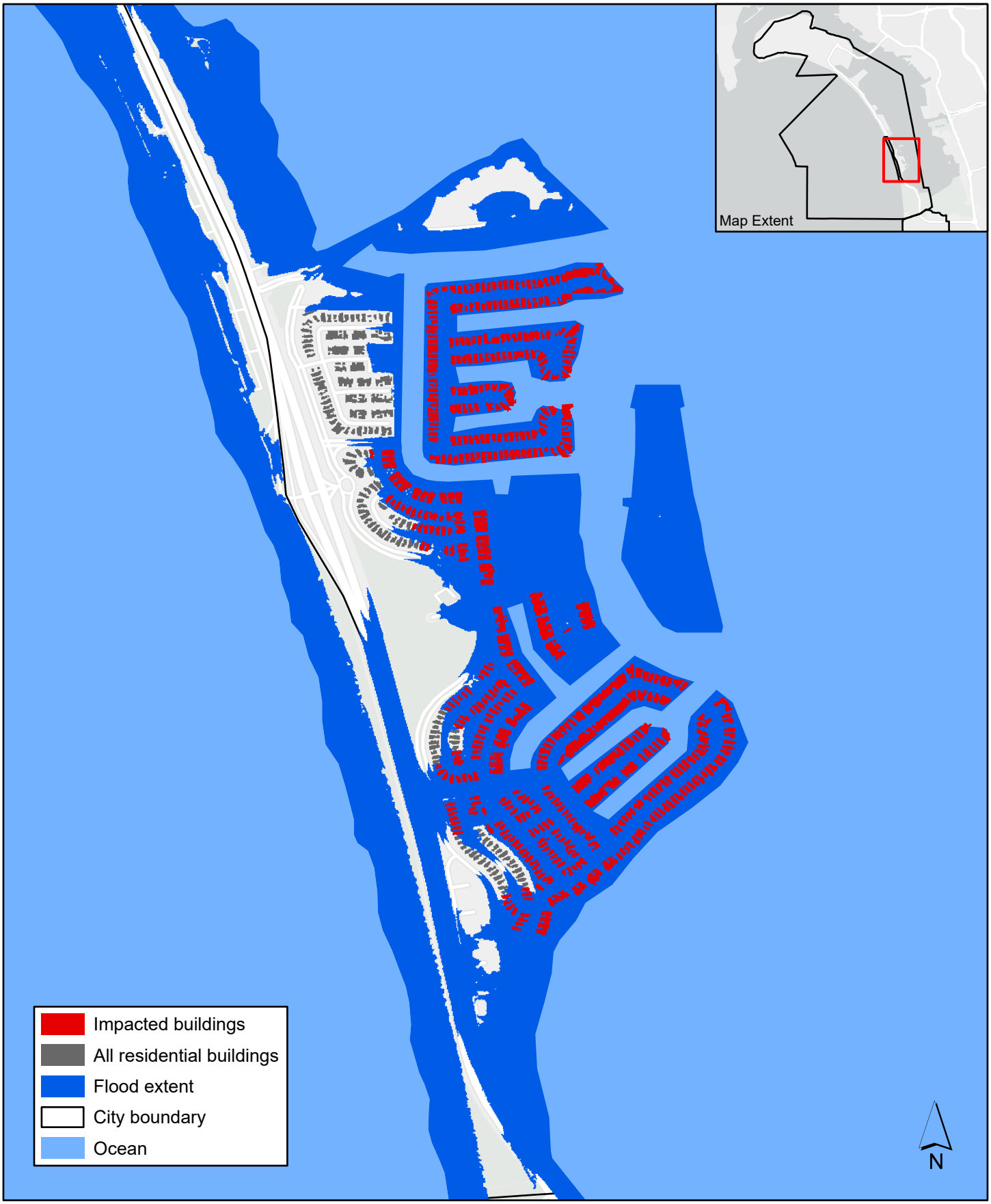
Sea Level Rise 1.5 m - 100 year storm



Appendix B

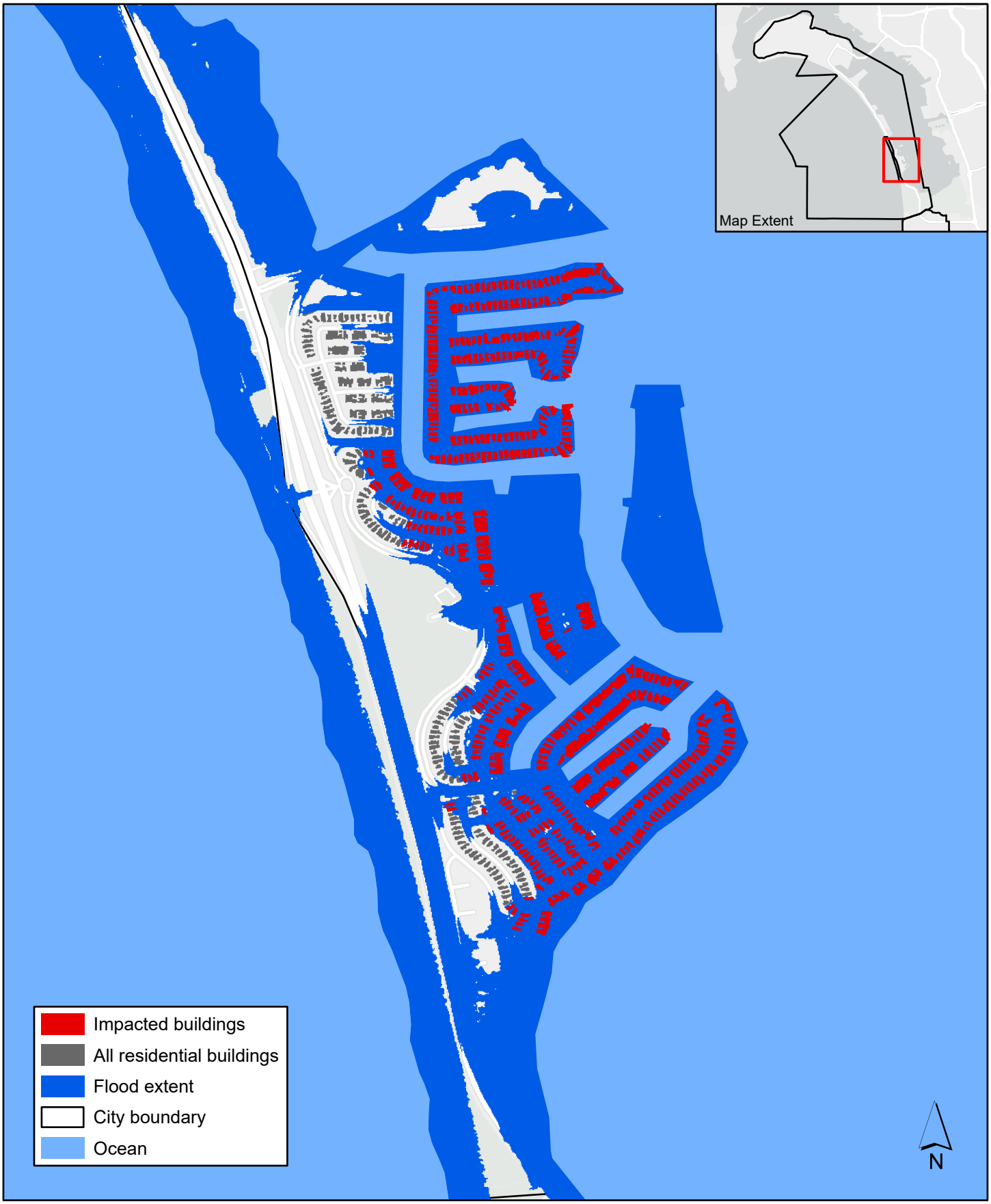
Coronado Area 1

Sea Level Rise 2.0 m - No storm



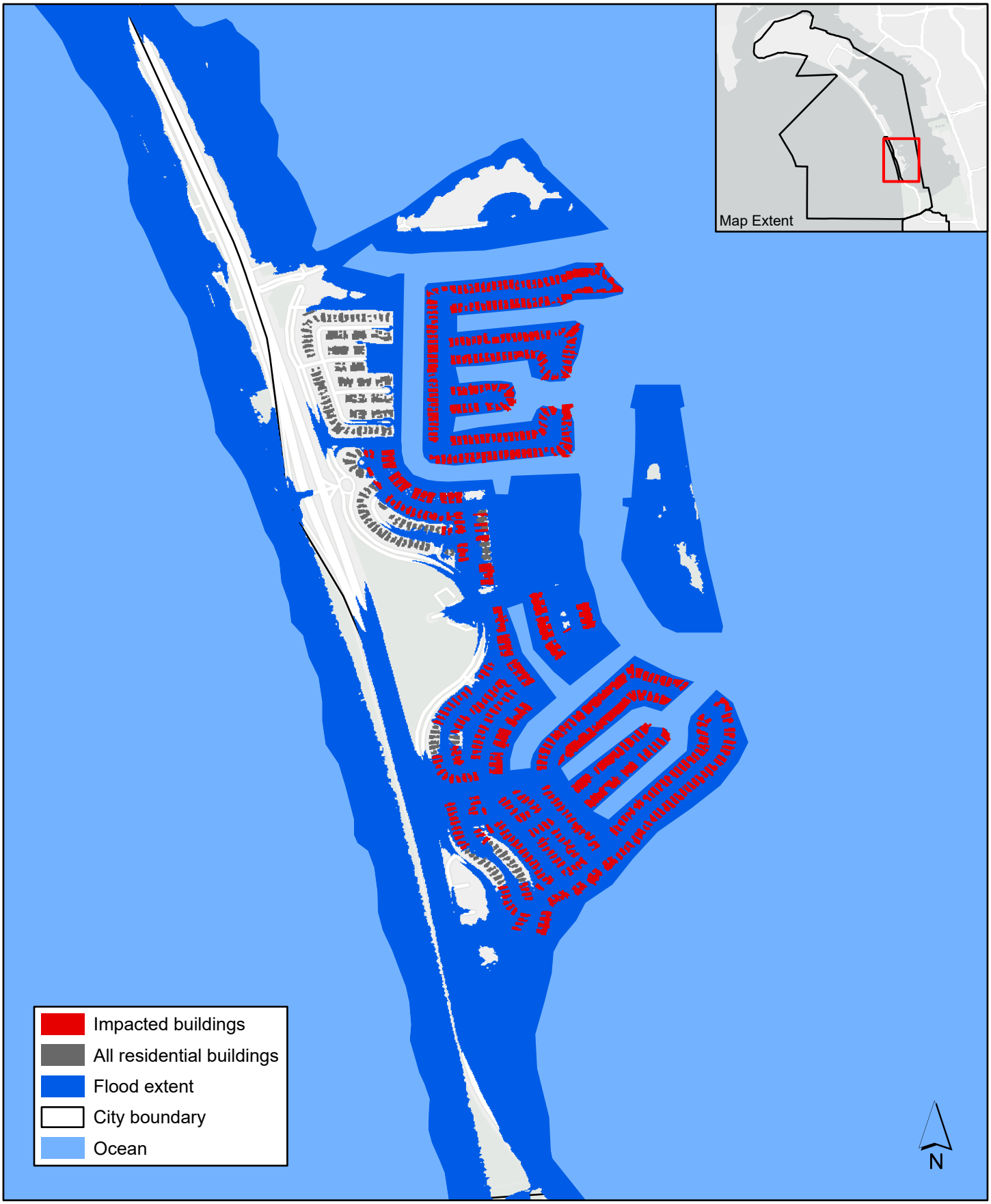
Coronado Area 1

Sea Level Rise 2.0 m - 001 year storm



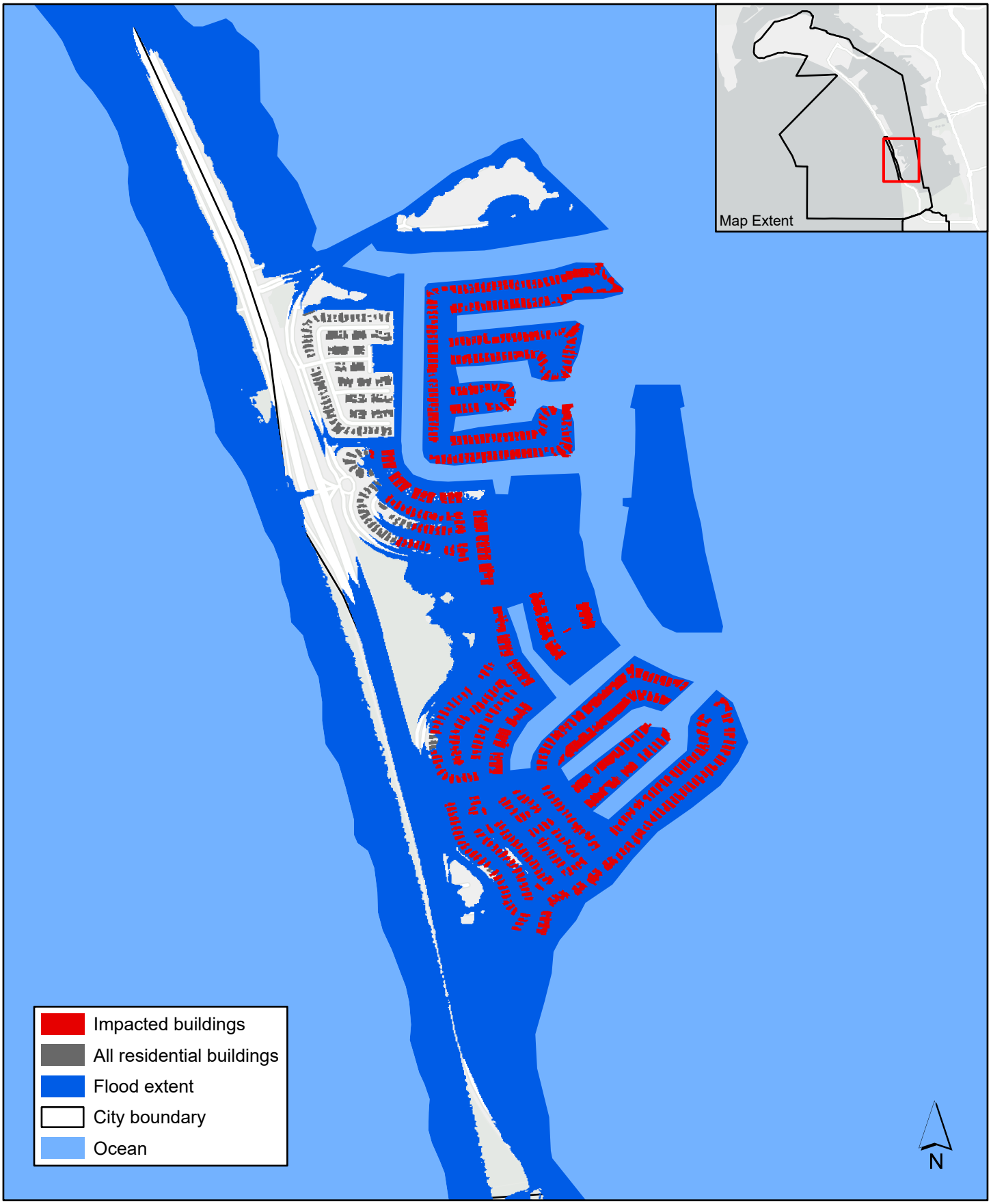
Coronado Area 1

Sea Level Rise 2.0 m - 020 year storm



Coronado Area 1

Sea Level Rise 2.0 m - 100 year storm



Coronado Area 2

Sea Level Rise 0.0 m - No storm

Coronado Area 2

Sea Level Rise 0.0 m - 001 year storm

Coronado Area 2

Sea Level Rise 0.0 m - 020 year storm

Coronado Area 2

Sea Level Rise 0.0 m - 100 year storm

Coronado Area 2

Sea Level Rise 0.25 m - No storm

Coronado Area 2

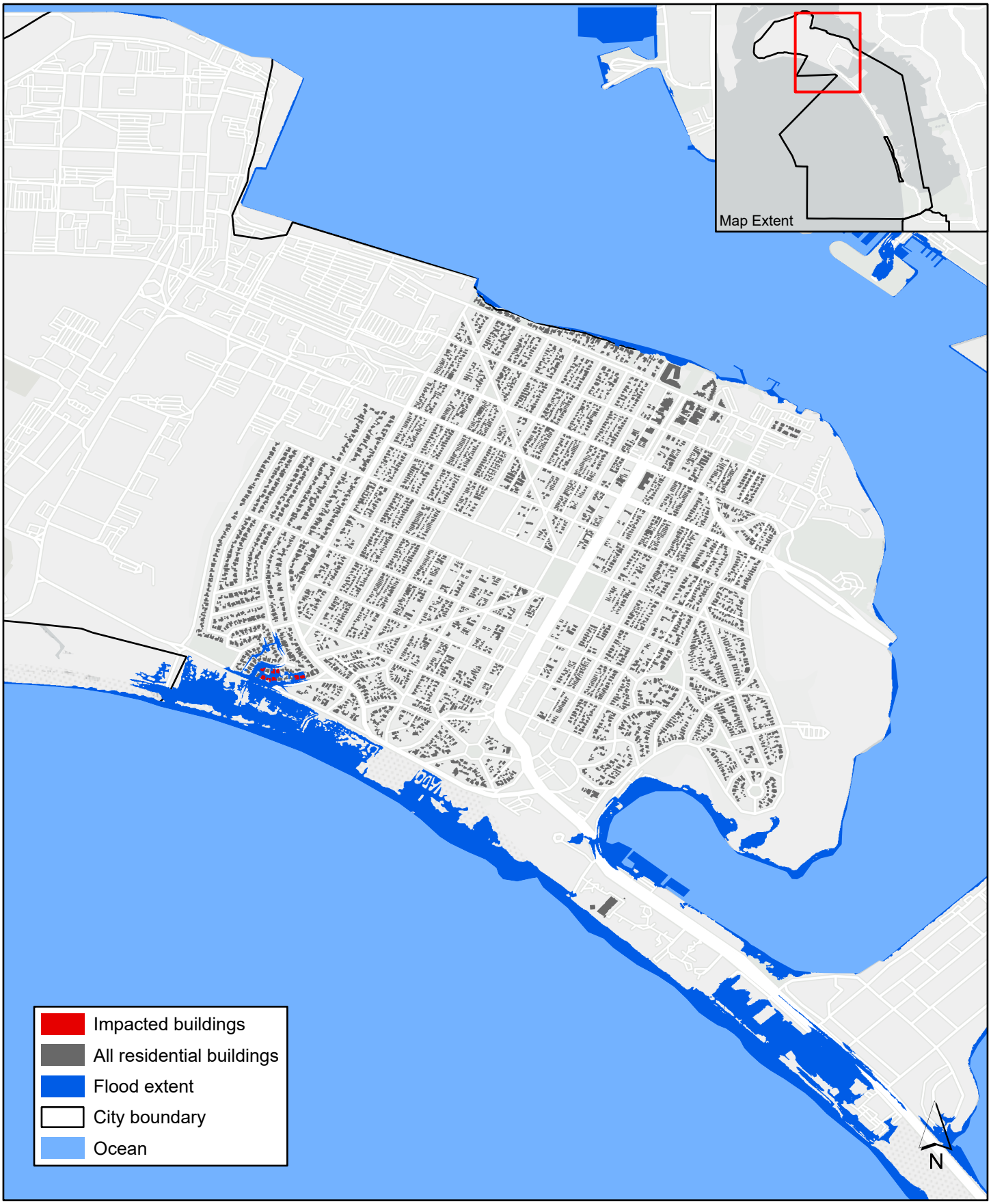
Sea Level Rise 0.25 m - 001 year storm

Coronado Area 2

Sea Level Rise 0.25 m - 020 year storm

Coronado Area 2

Sea Level Rise 0.25 m - 100 year storm



Coronado Area 2

Sea Level Rise 0.5 m - No storm

Coronado Area 2

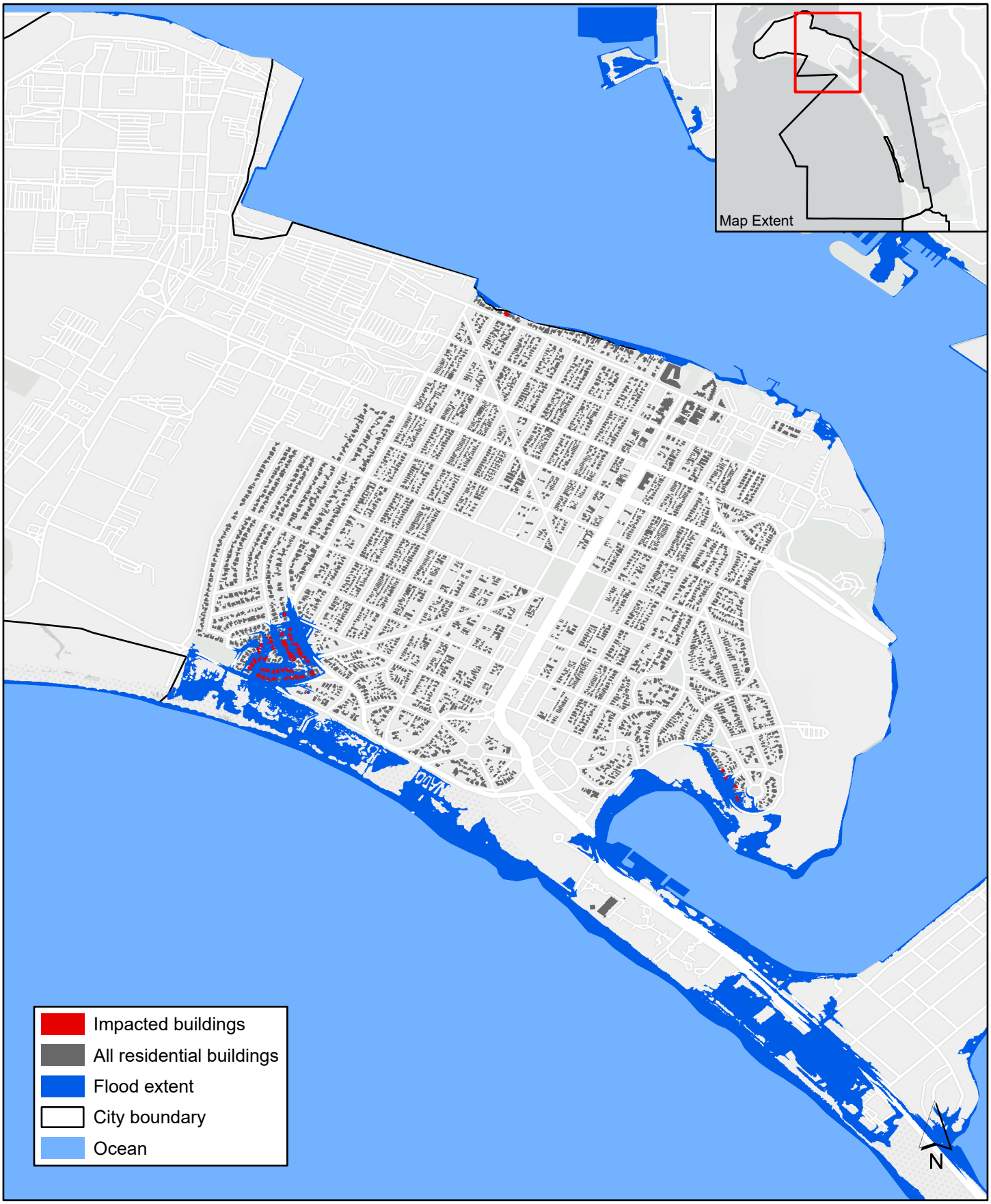
Sea Level Rise 0.5 m - 001 year storm

Coronado Area 2

Sea Level Rise 0.5 m - 020 year storm

Coronado Area 2

Sea Level Rise 0.5 m - 100 year storm



Coronado Area 2

Sea Level Rise 0.75 m - No storm

Coronado Area 2

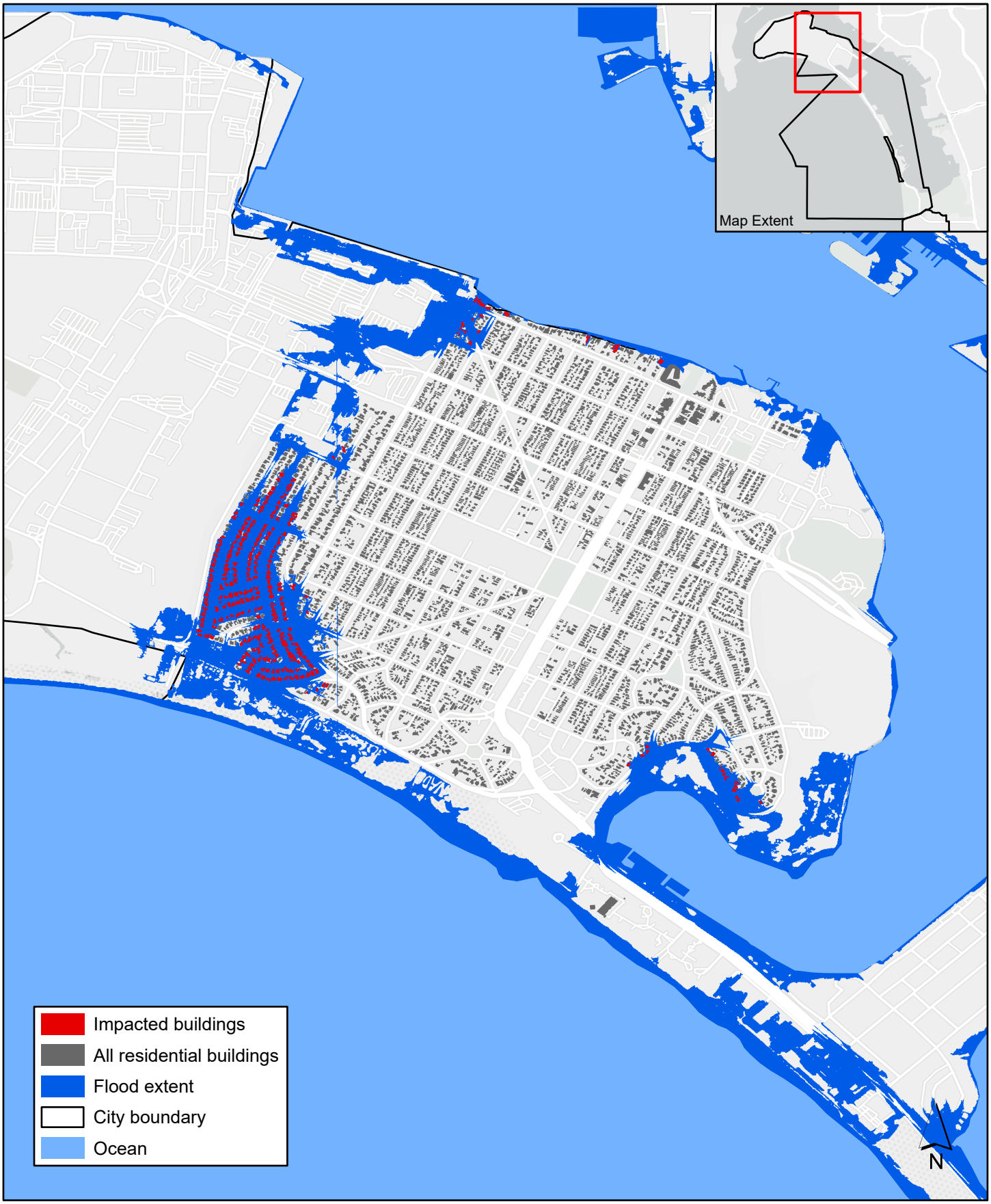
Sea Level Rise 0.75 m - 001 year storm

Coronado Area 2

Sea Level Rise 0.75 m - 020 year storm

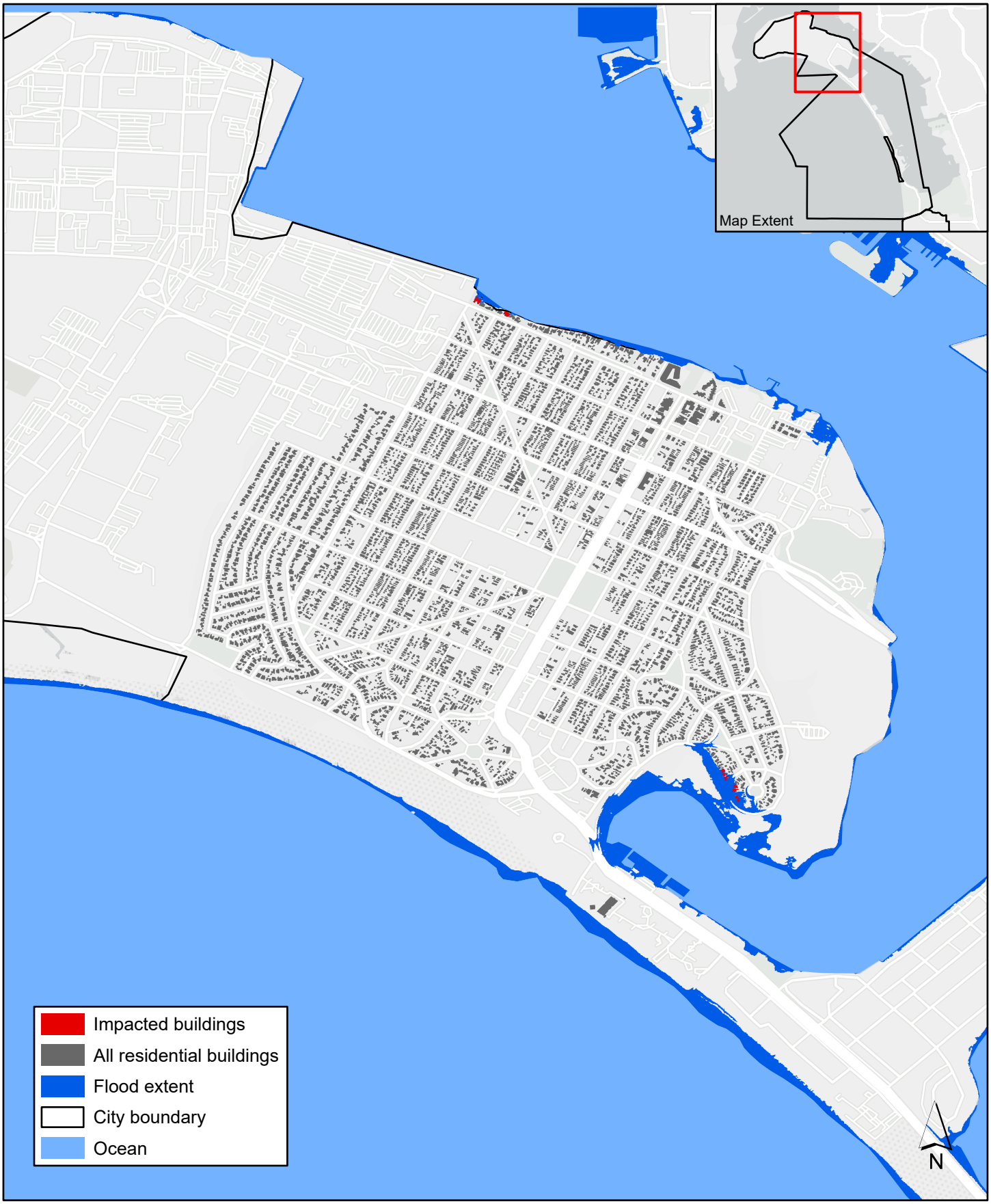
Coronado Area 2

Sea Level Rise 0.75 m - 100 year storm



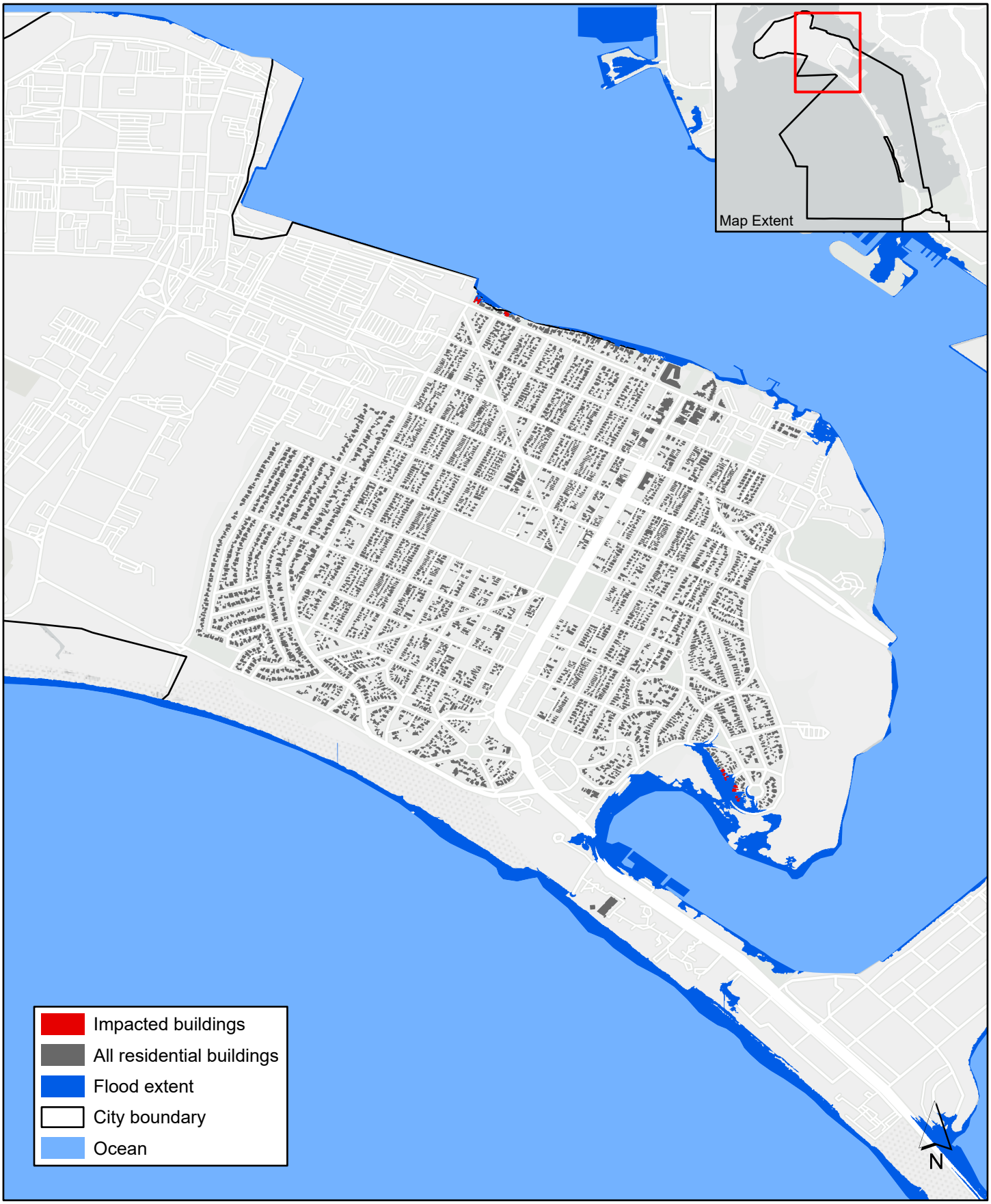
Coronado Area 2

Sea Level Rise 1.0 m - No storm



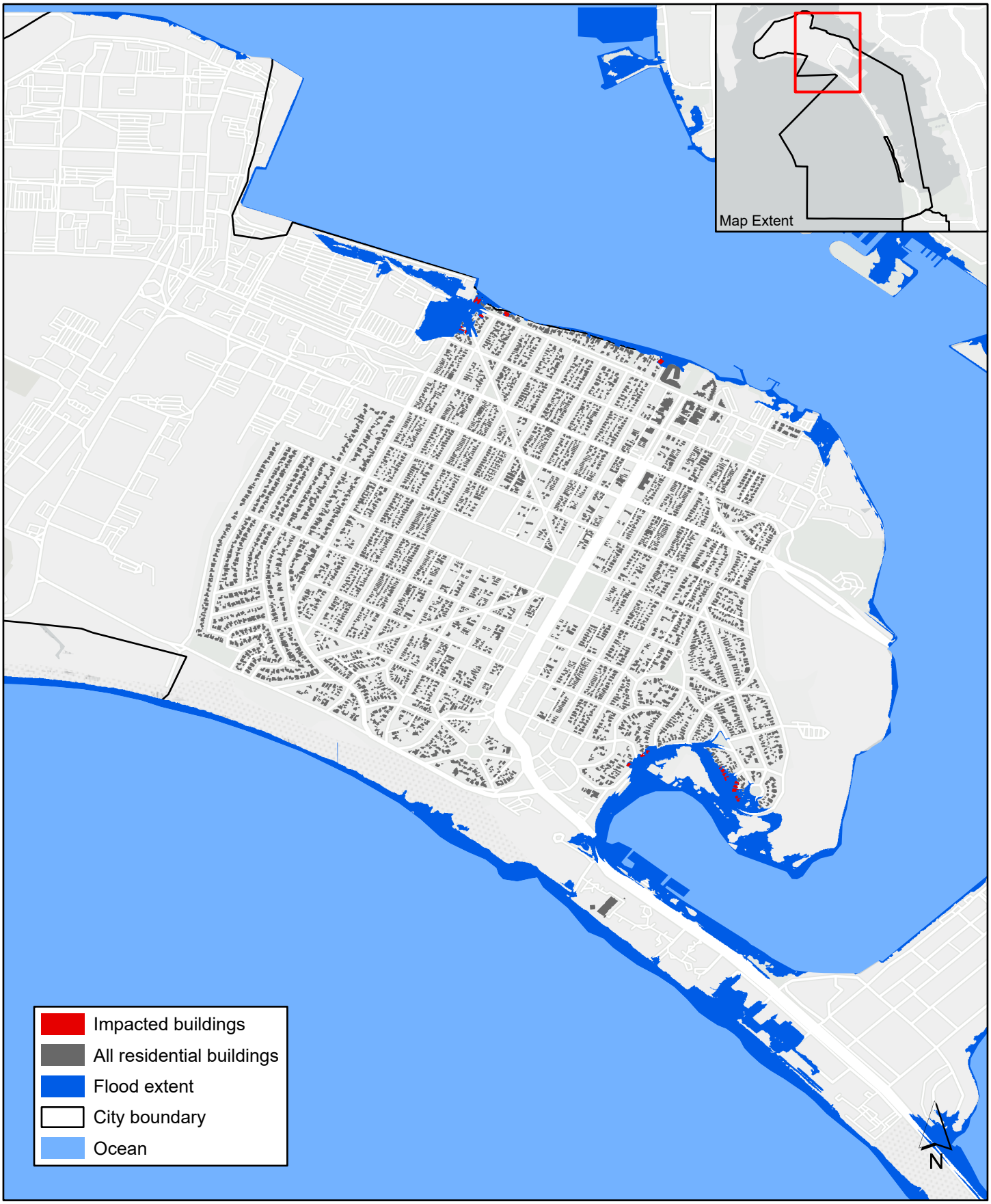
Coronado Area 2

Sea Level Rise 1.0 m - 001 year storm



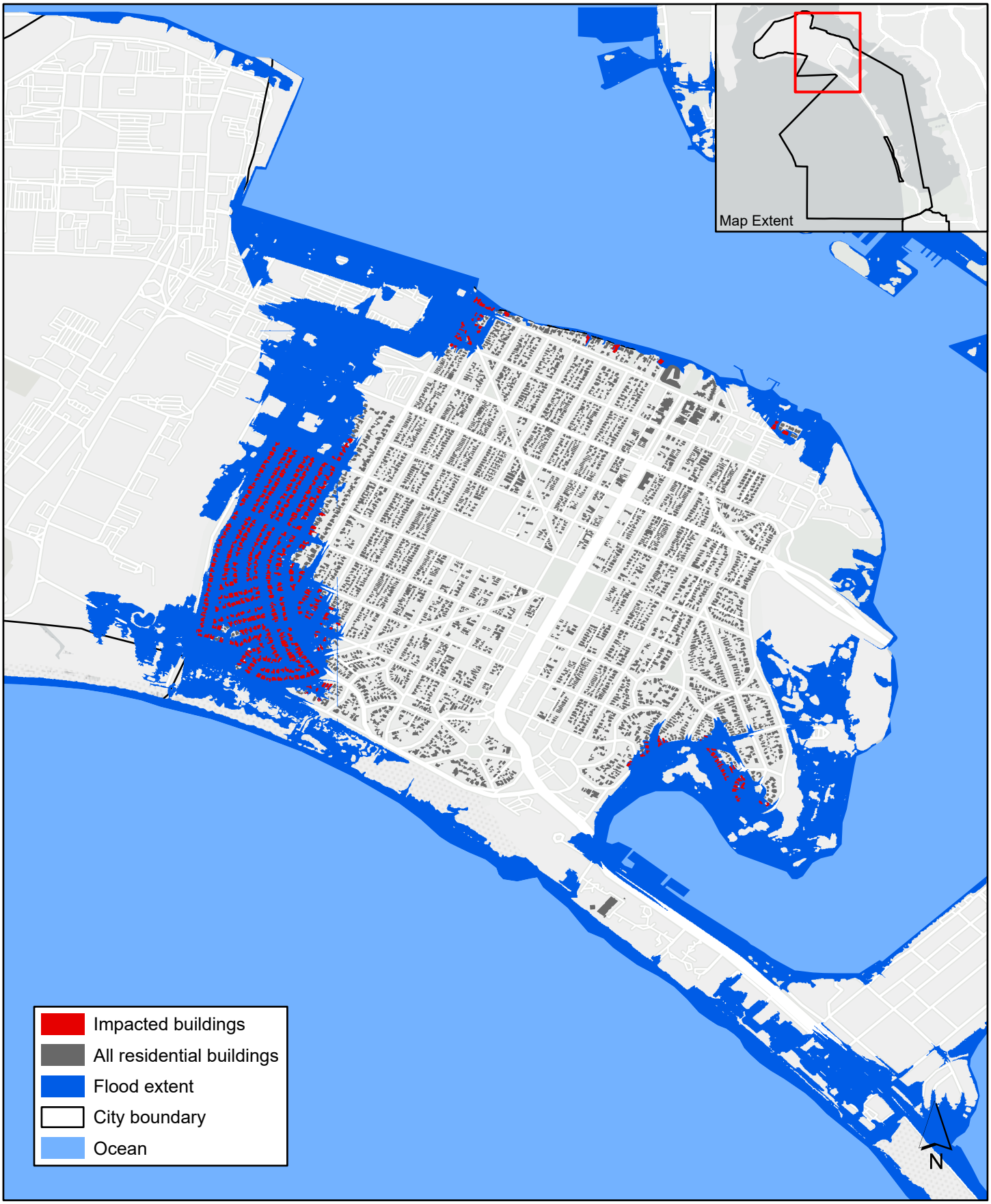
Coronado Area 2

Sea Level Rise 1.0 m - 020 year storm



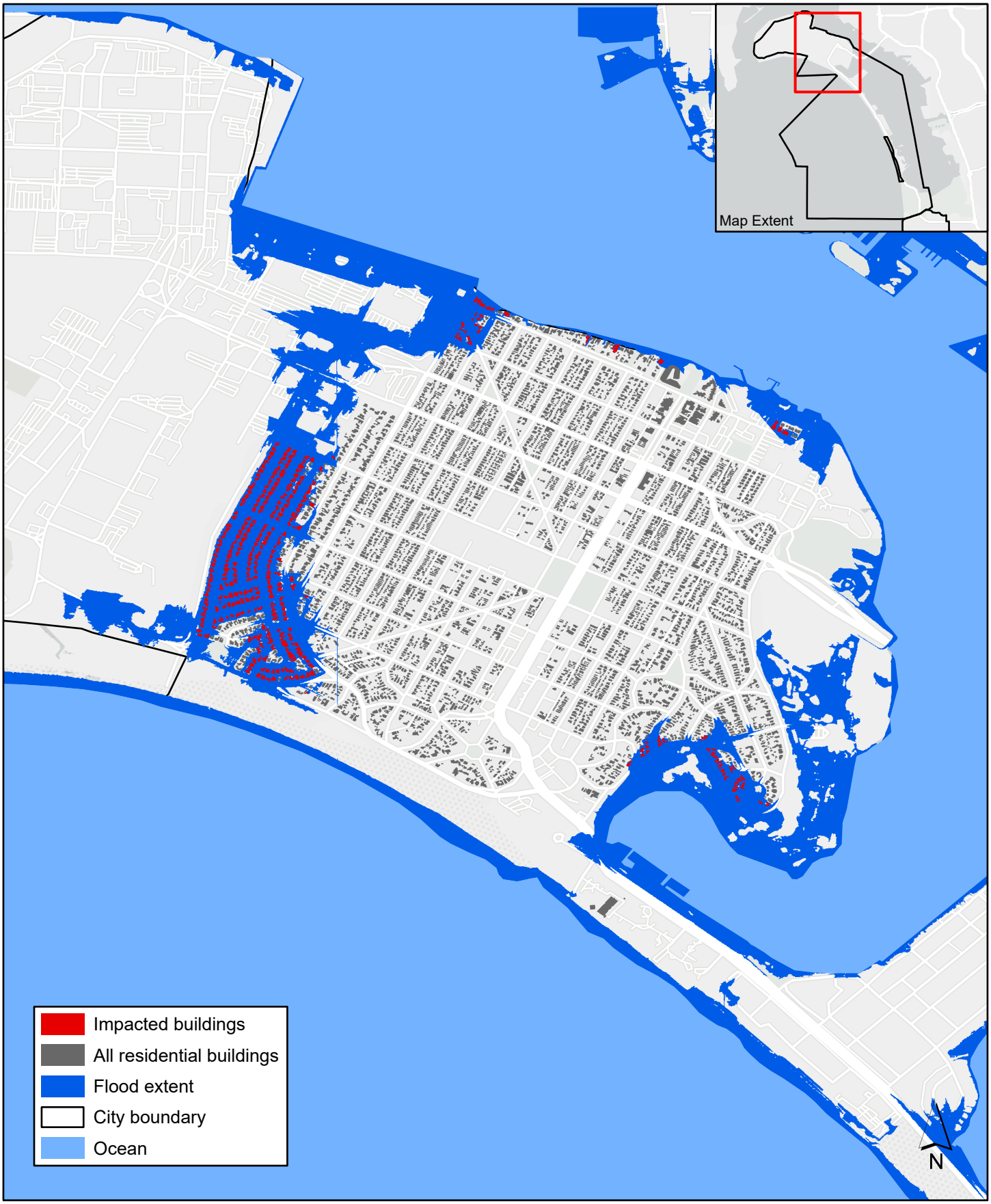
Coronado Area 2

Sea Level Rise 1.0 m - 100 year storm



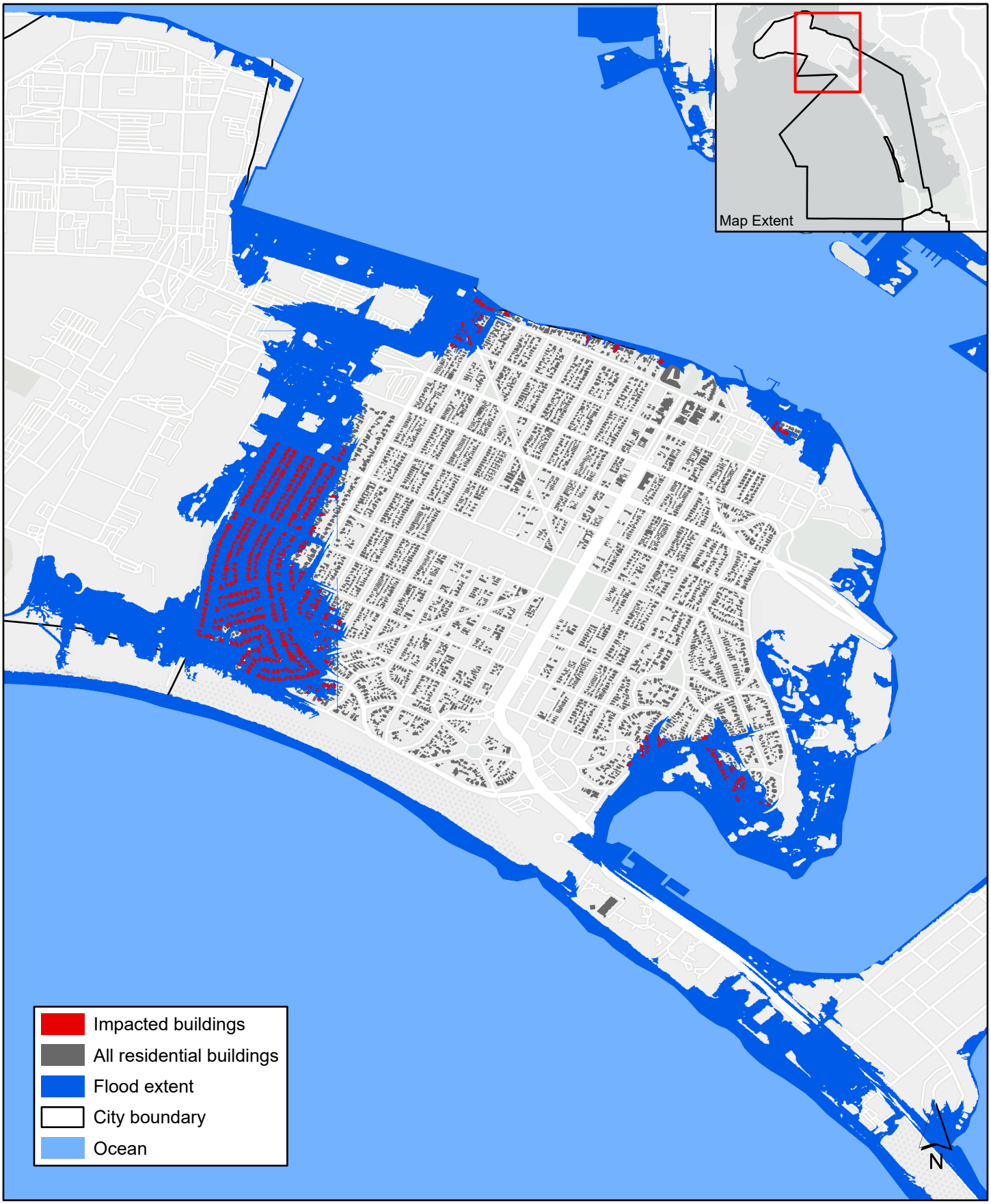
Coronado Area 2

Sea Level Rise 1.5 m - No storm



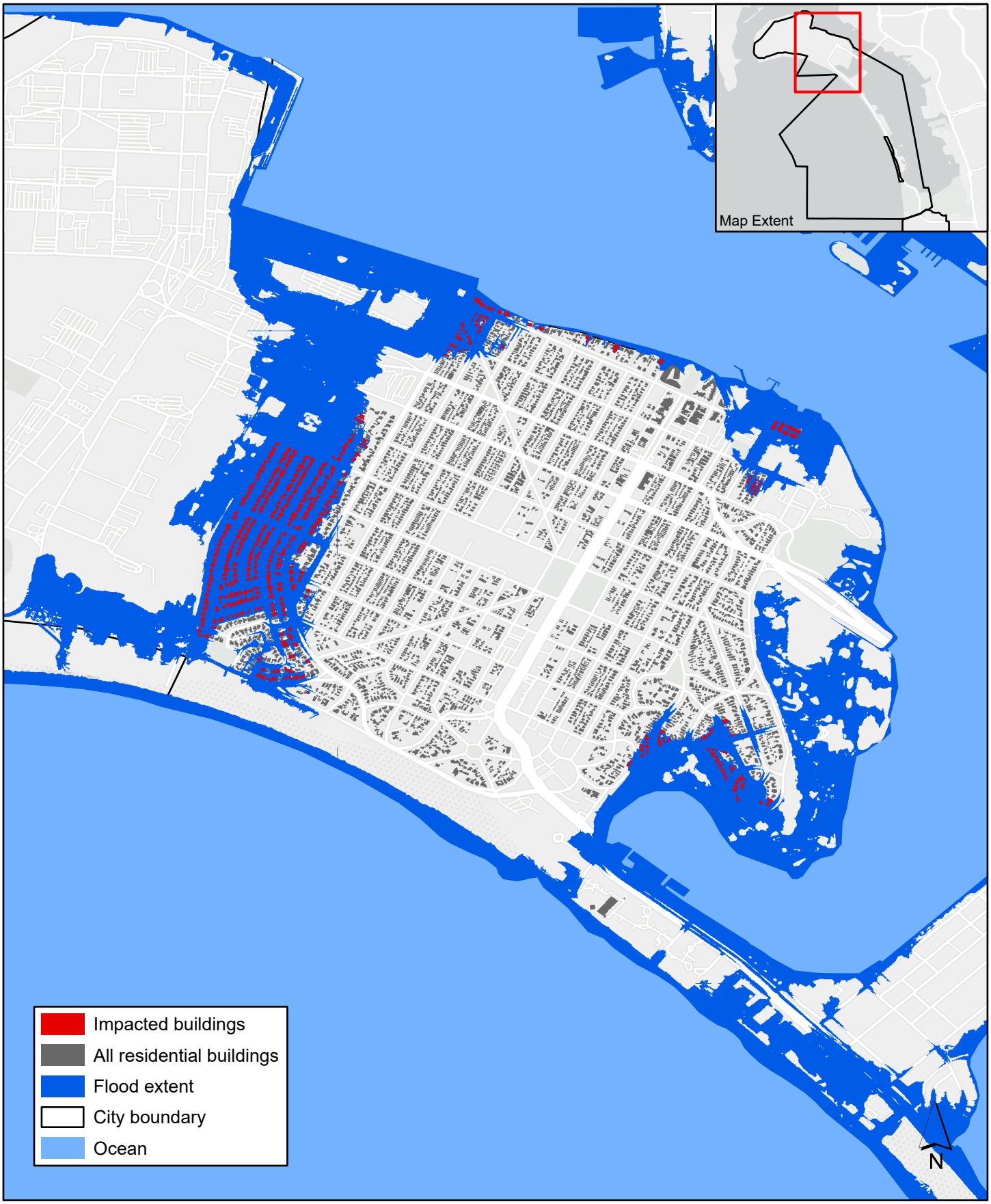
Coronado Area 2

Sea Level Rise 1.5 m - 001 year storm



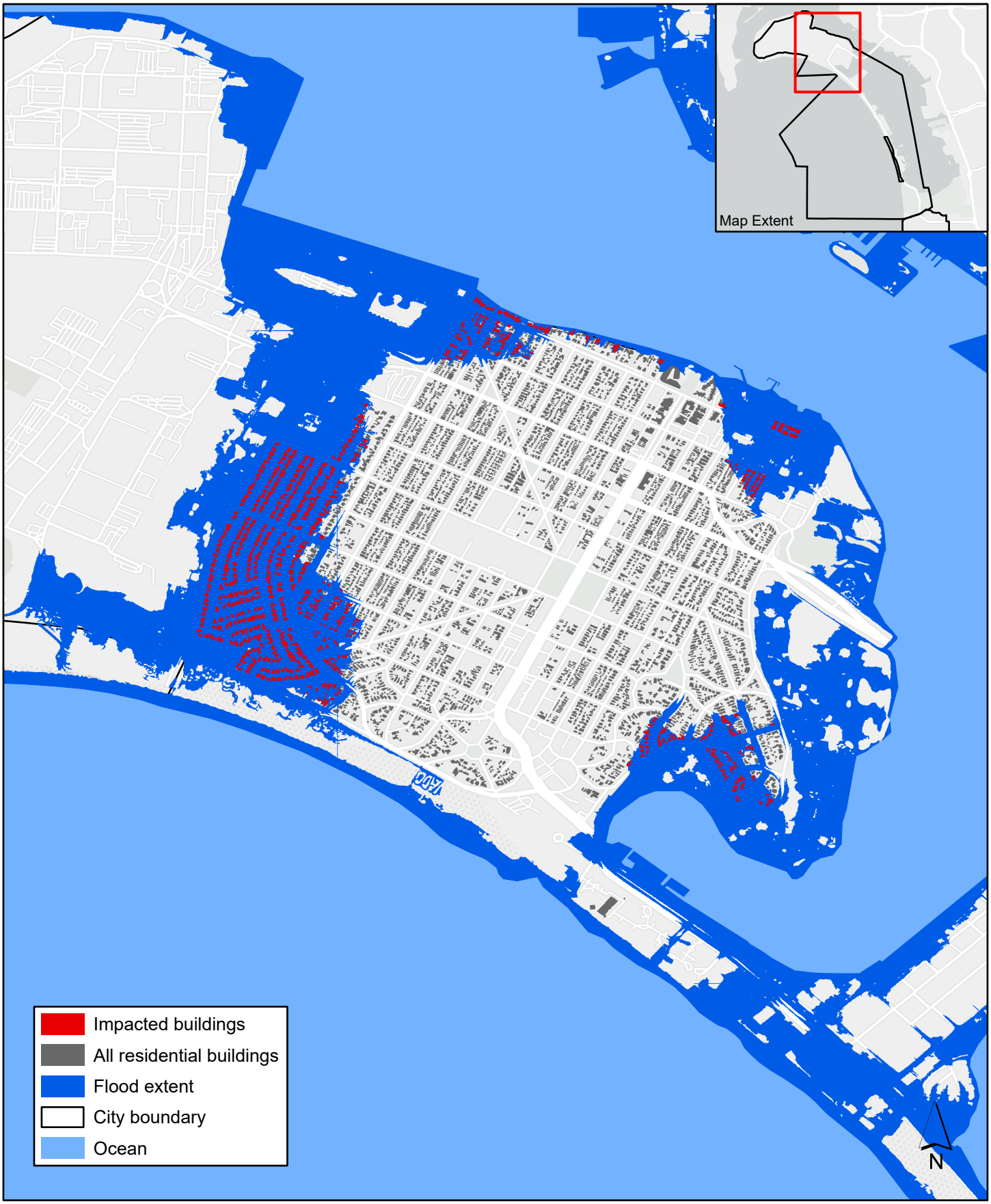
Coronado Area 2

Sea Level Rise 1.5 m - 020 year storm



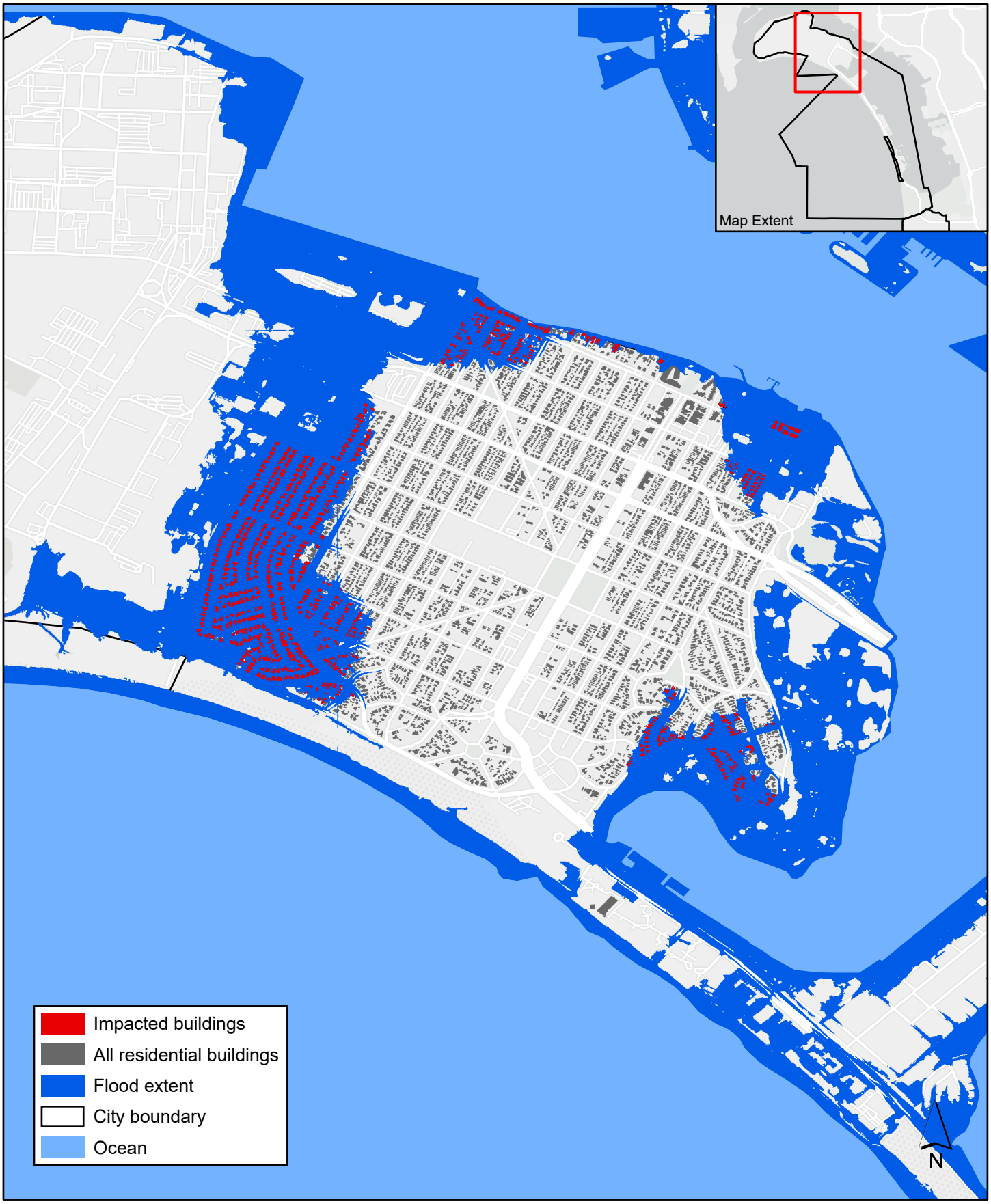
Coronado Area 2

Sea Level Rise 1.5 m - 100 year storm



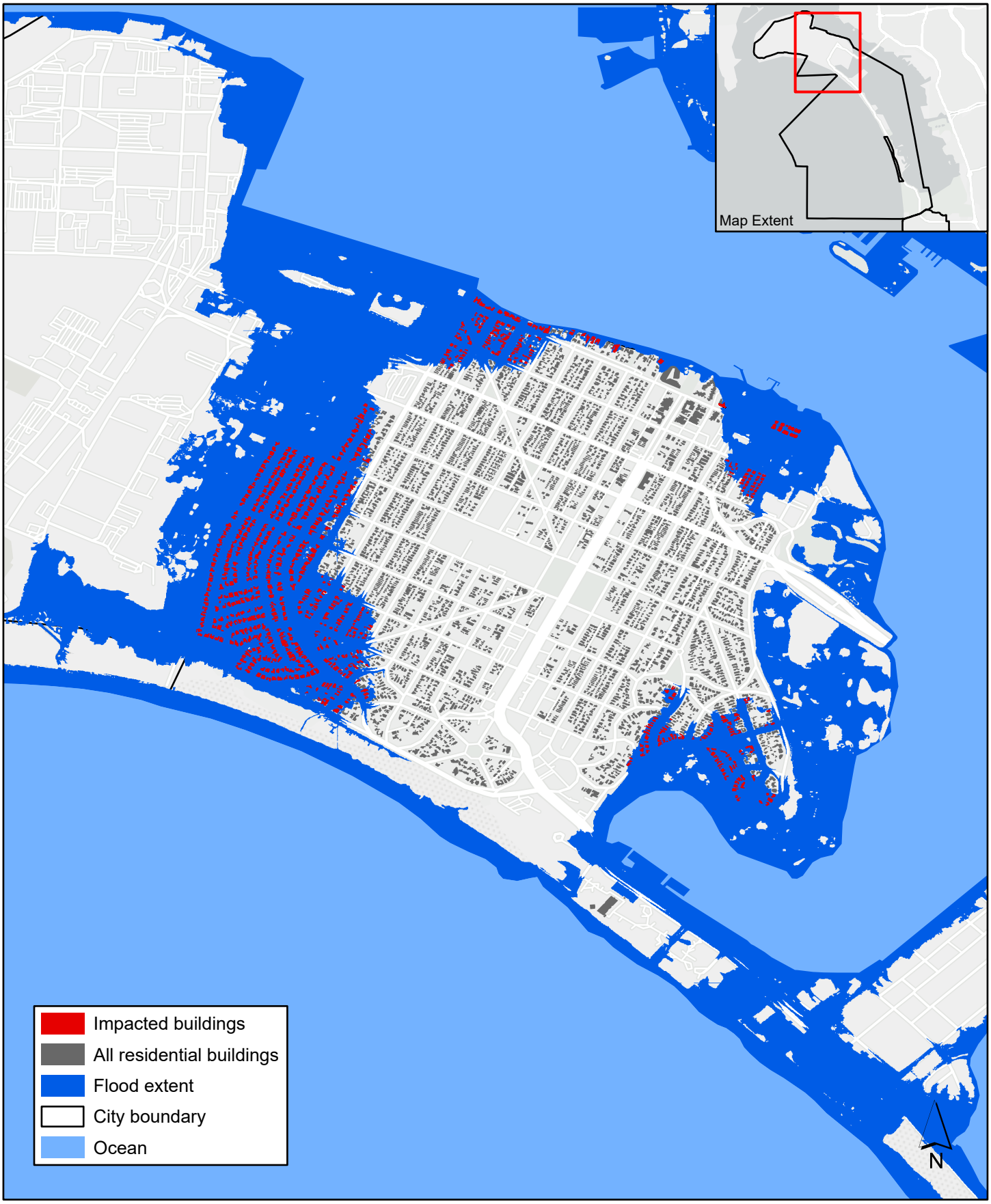
Coronado Area 2

Sea Level Rise 2.0 m - No storm



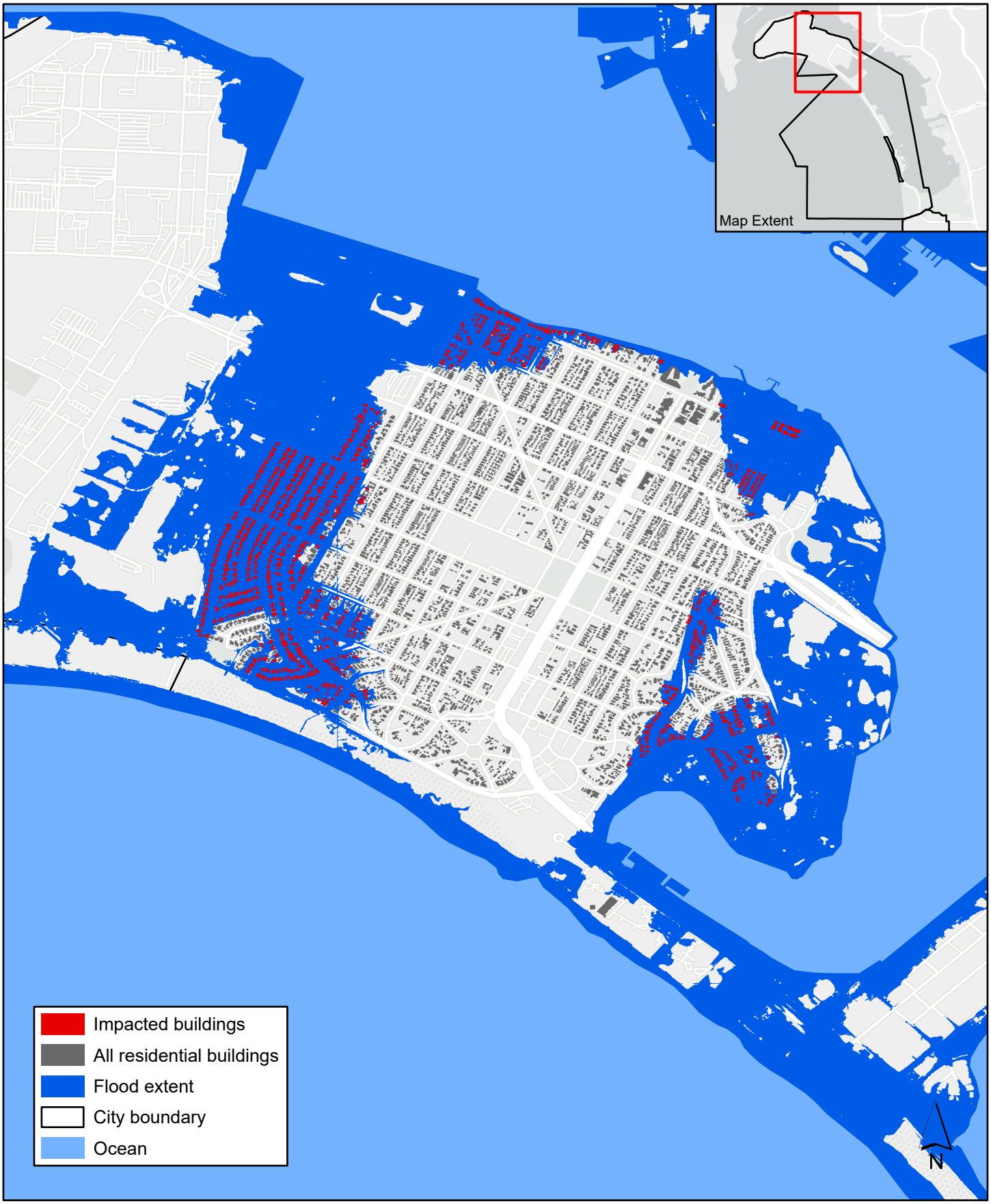
Coronado Area 2

Sea Level Rise 2.0 m - 001 year storm



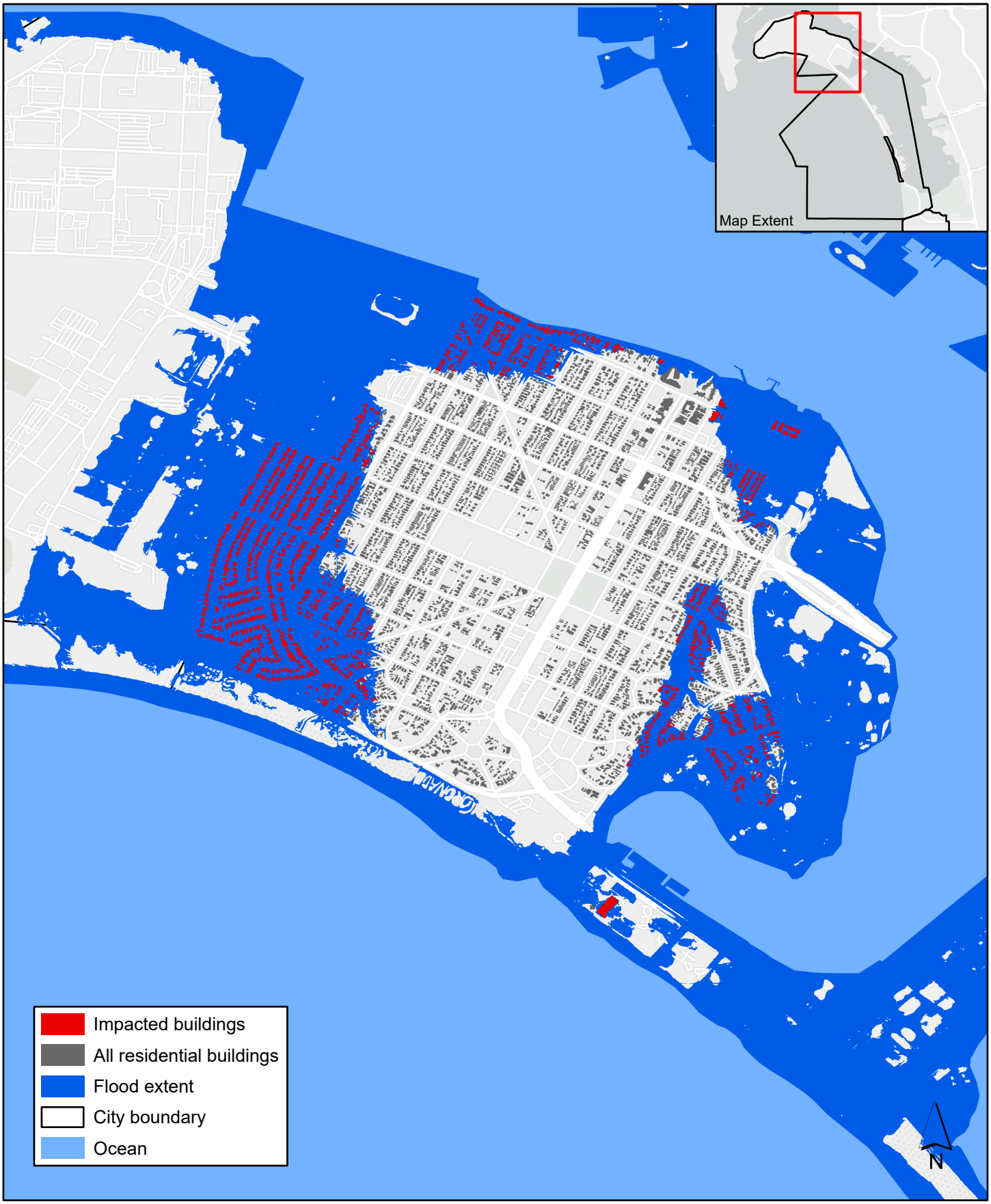
Coronado Area 2

Sea Level Rise 2.0 m - 020 year storm



Coronado Area 2

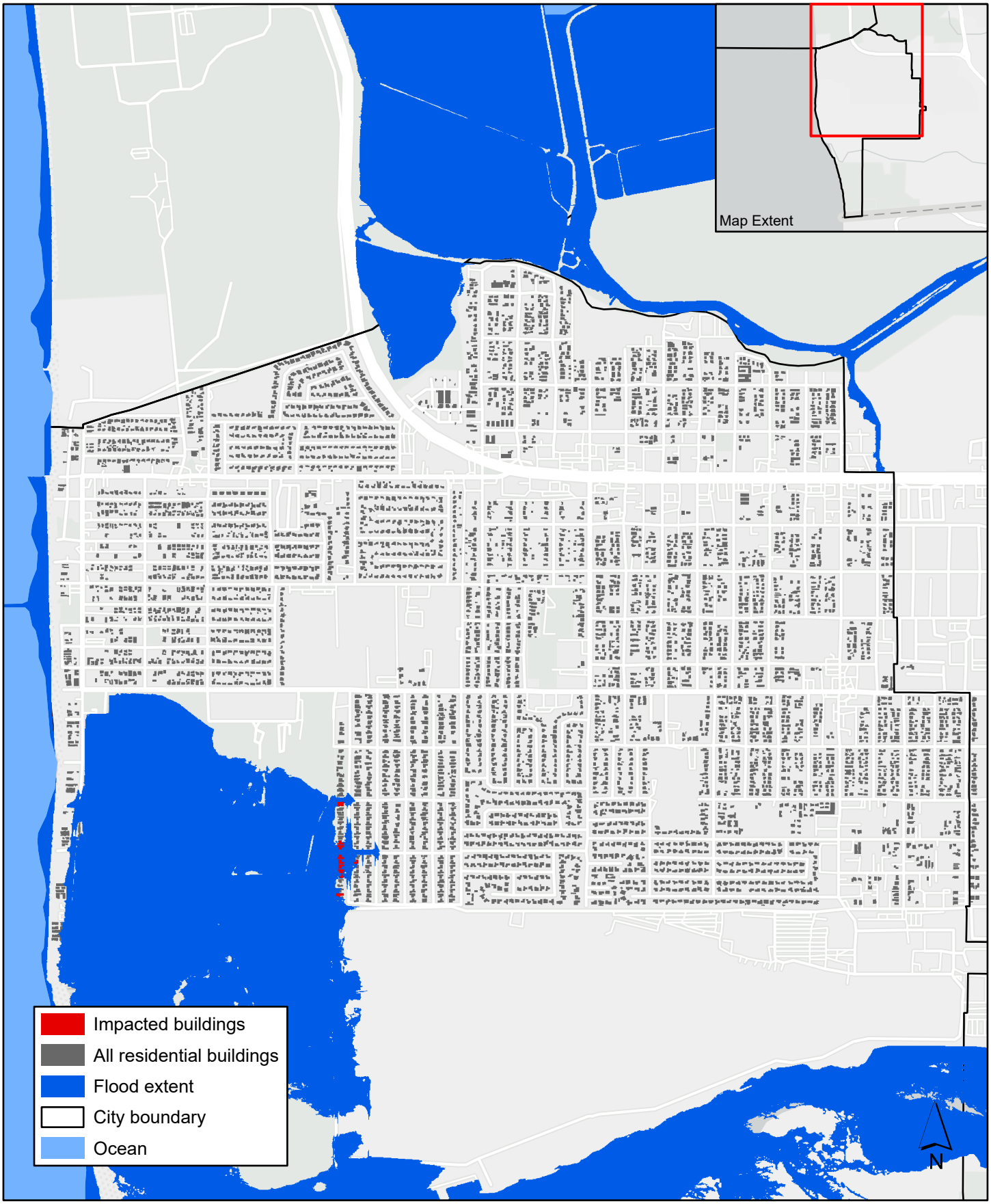
Sea Level Rise 2.0 m - 100 year storm



Appendix C

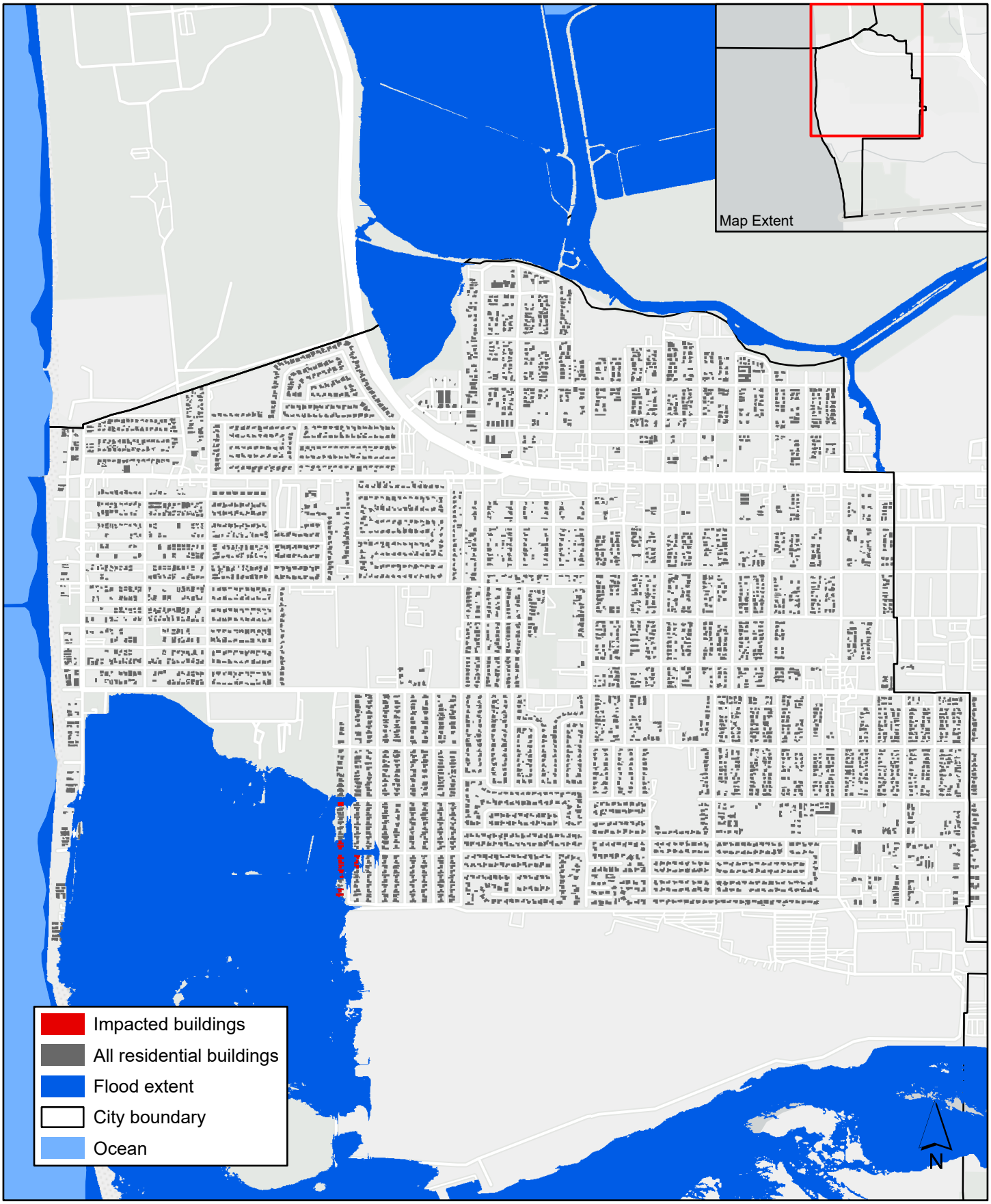
Imperial Beach Area 1

Sea Level Rise 0.0 m - No storm



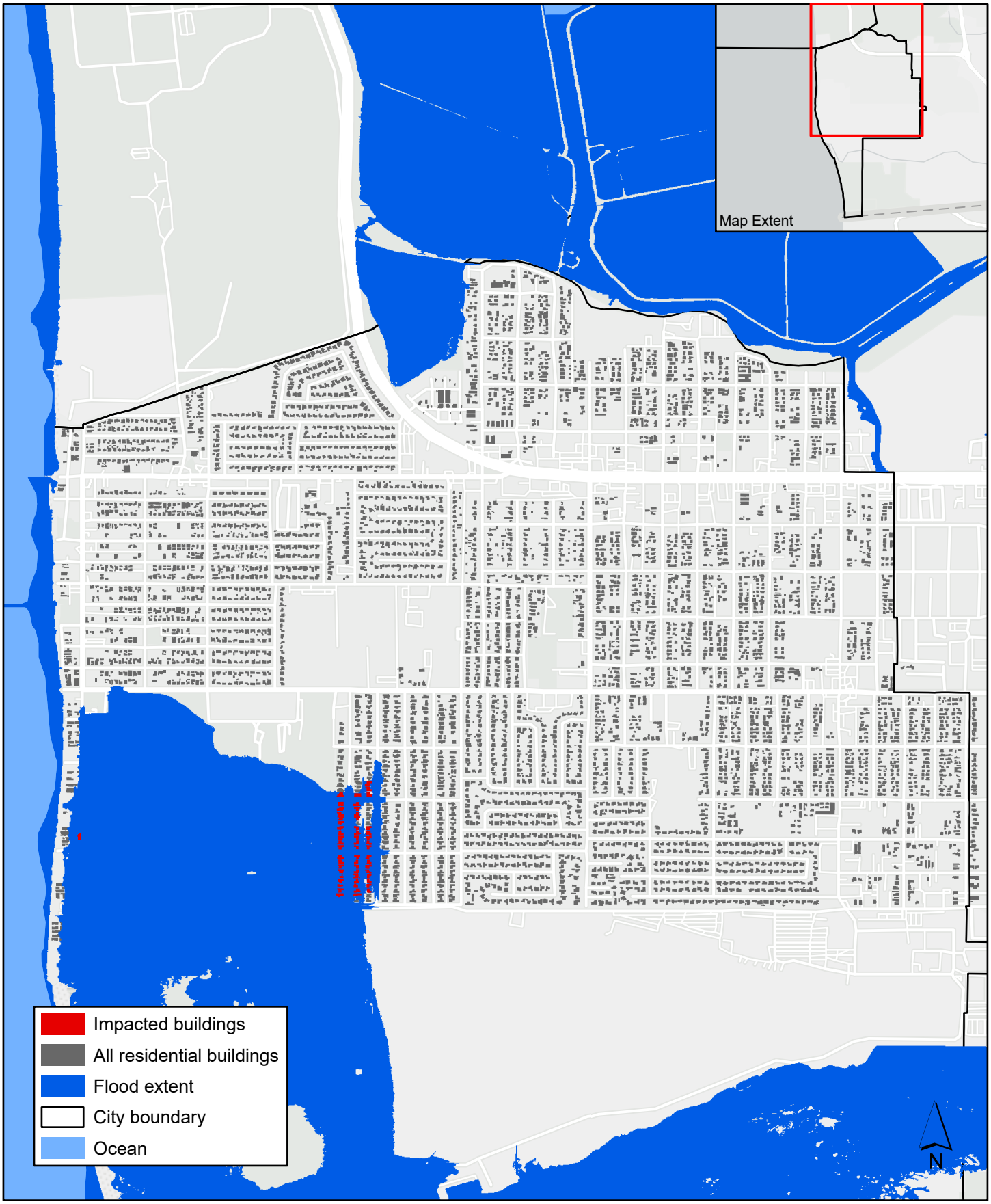
Imperial Beach Area 1

Sea Level Rise 0.0 m - 001 year storm



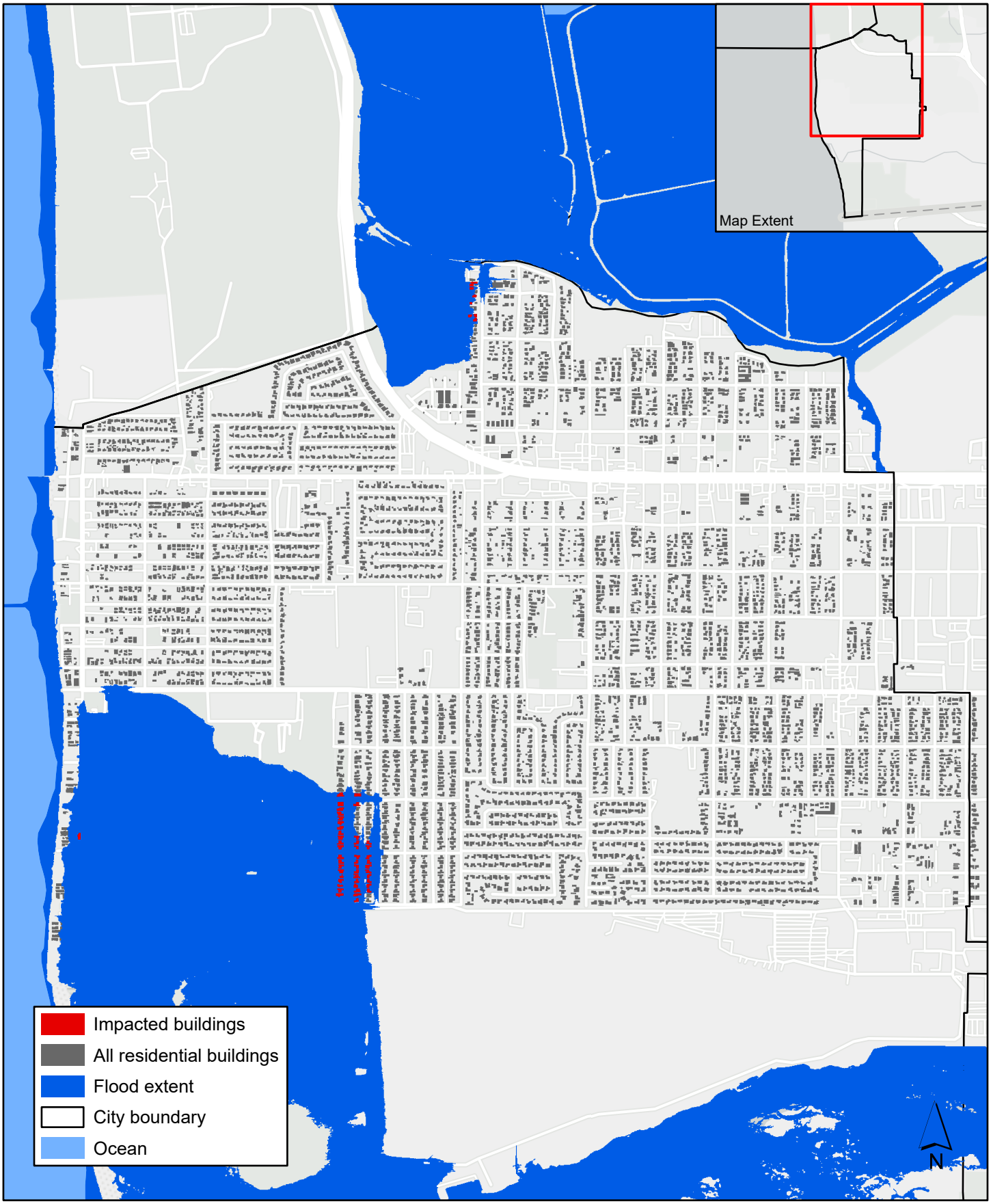
Imperial Beach Area 1

Sea Level Rise 0.0 m - 020 year storm



Imperial Beach Area 1

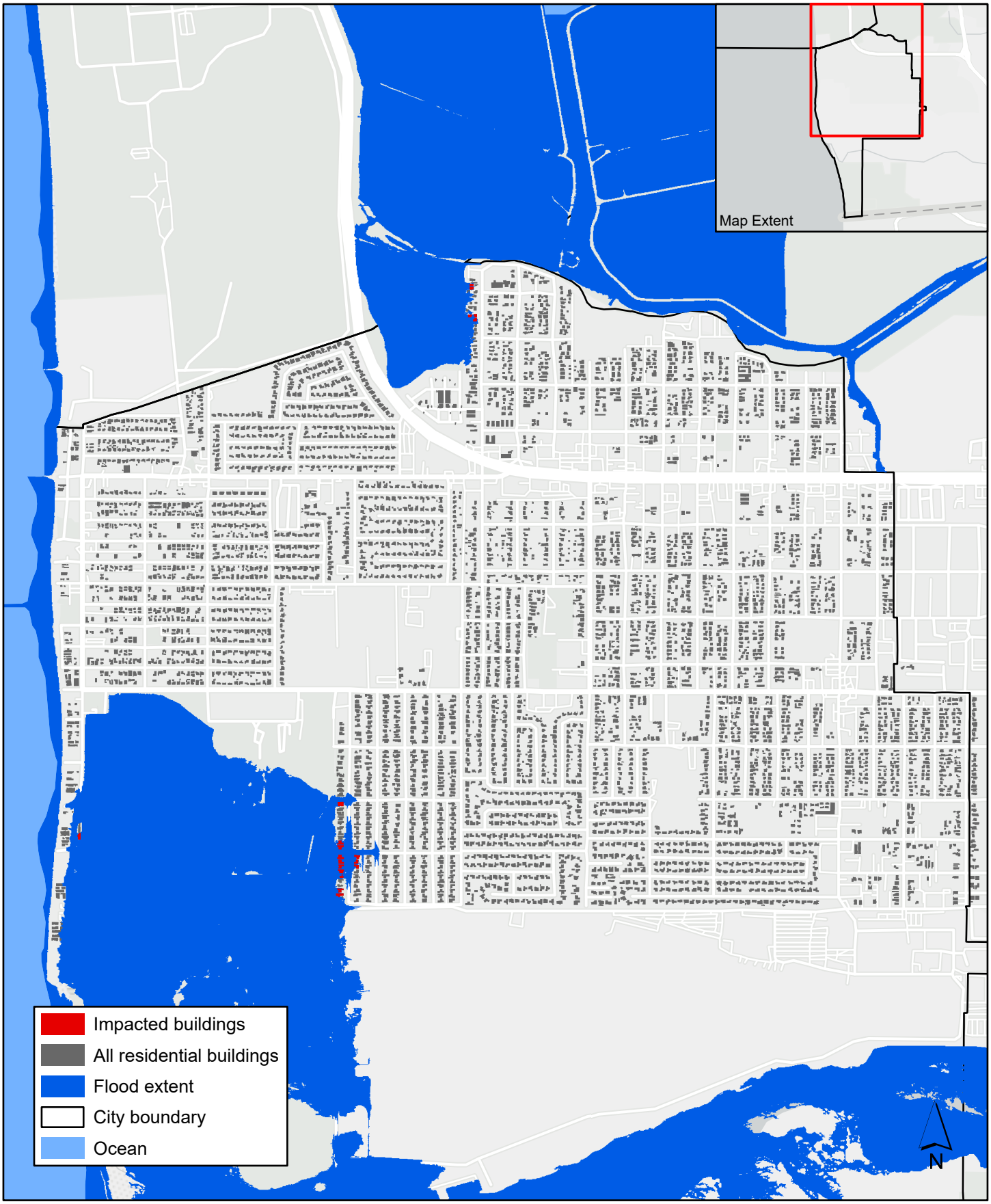
Sea Level Rise 0.0 m - 100 year storm



Appendix C

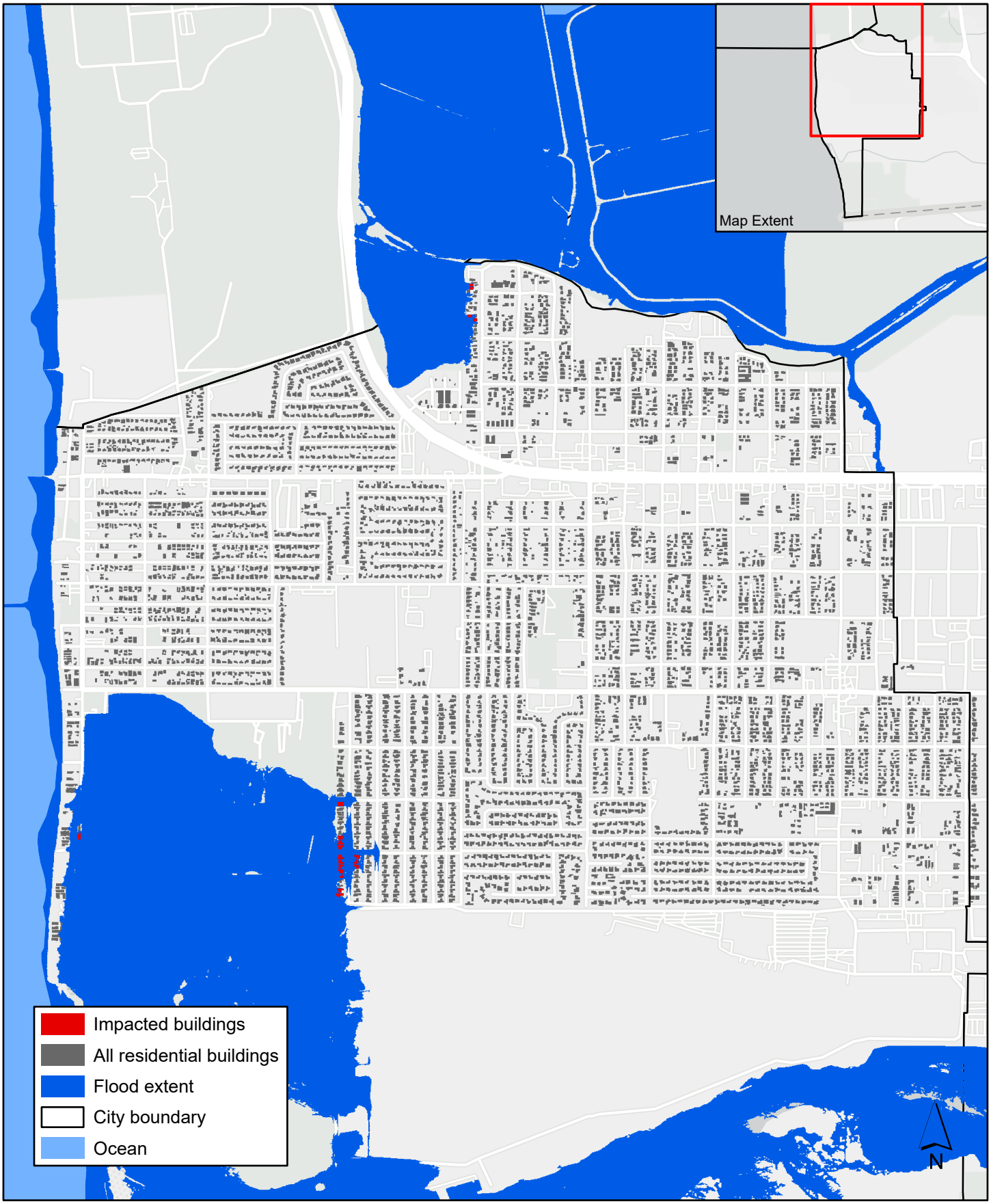
Imperial Beach Area 1

Sea Level Rise 0.25 m - No storm



Imperial Beach Area 1

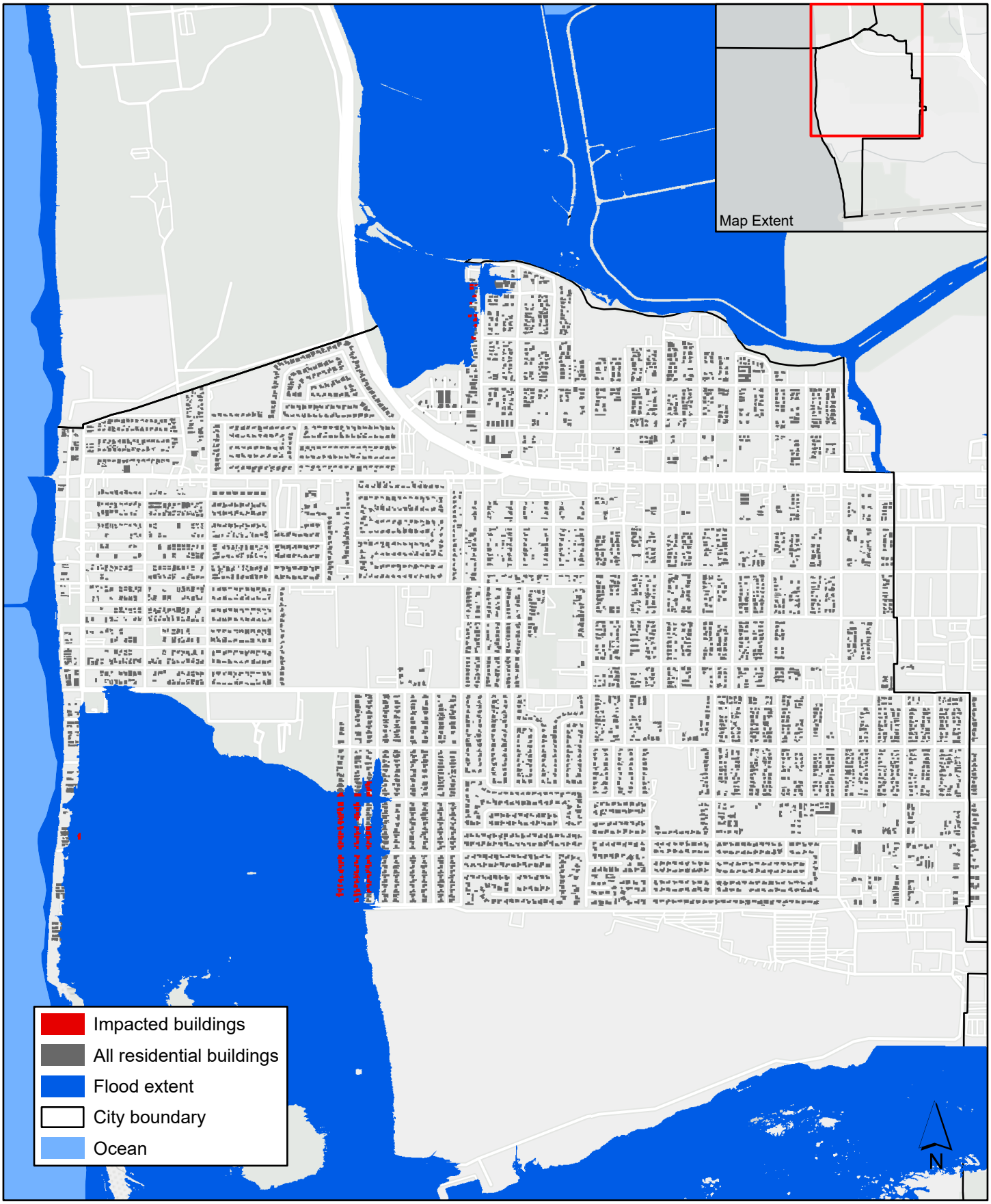
Sea Level Rise 0.25 m - 001 year storm



Appendix C

Imperial Beach Area 1

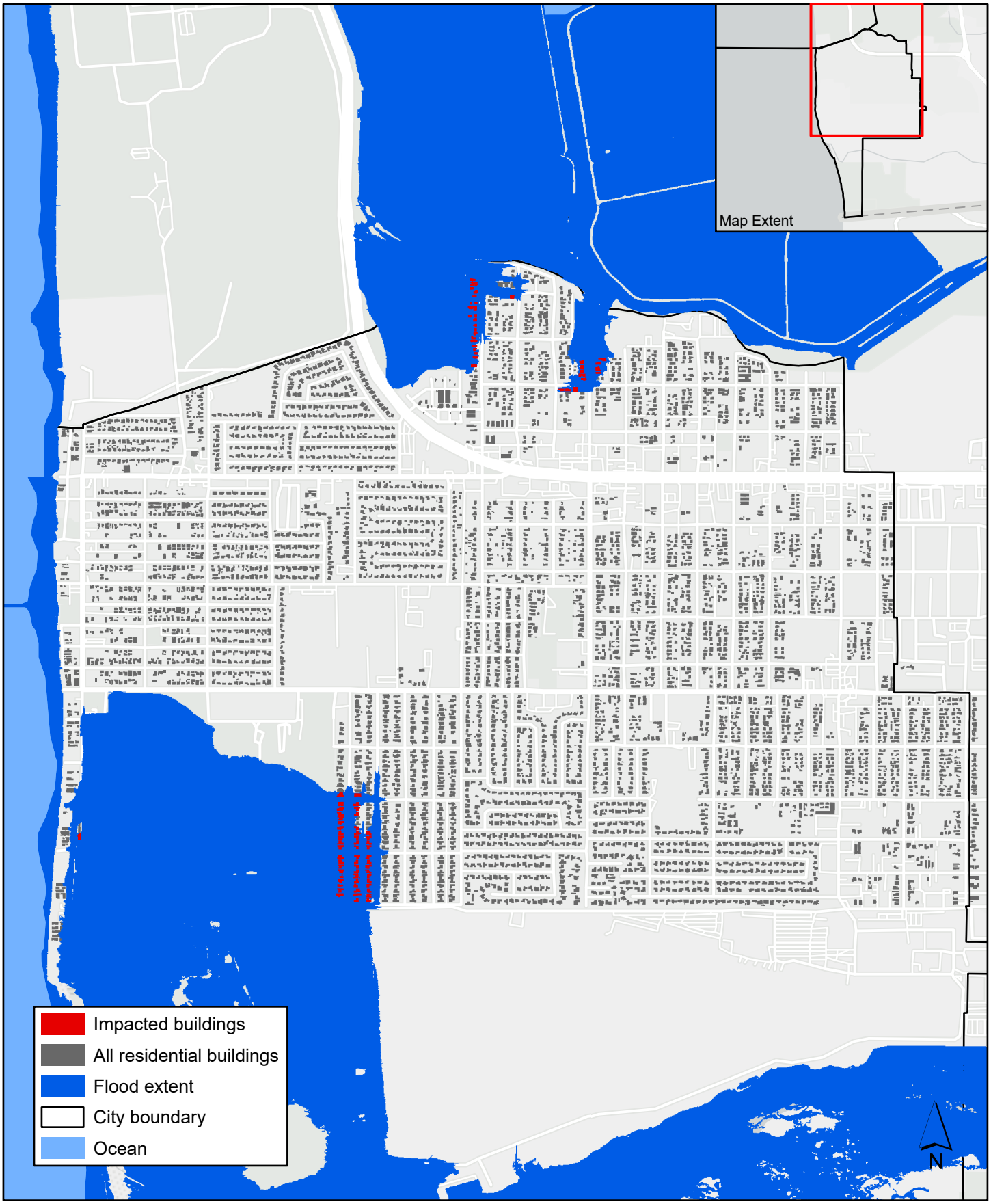
Sea Level Rise 0.25 m - 020 year storm



Appendix C

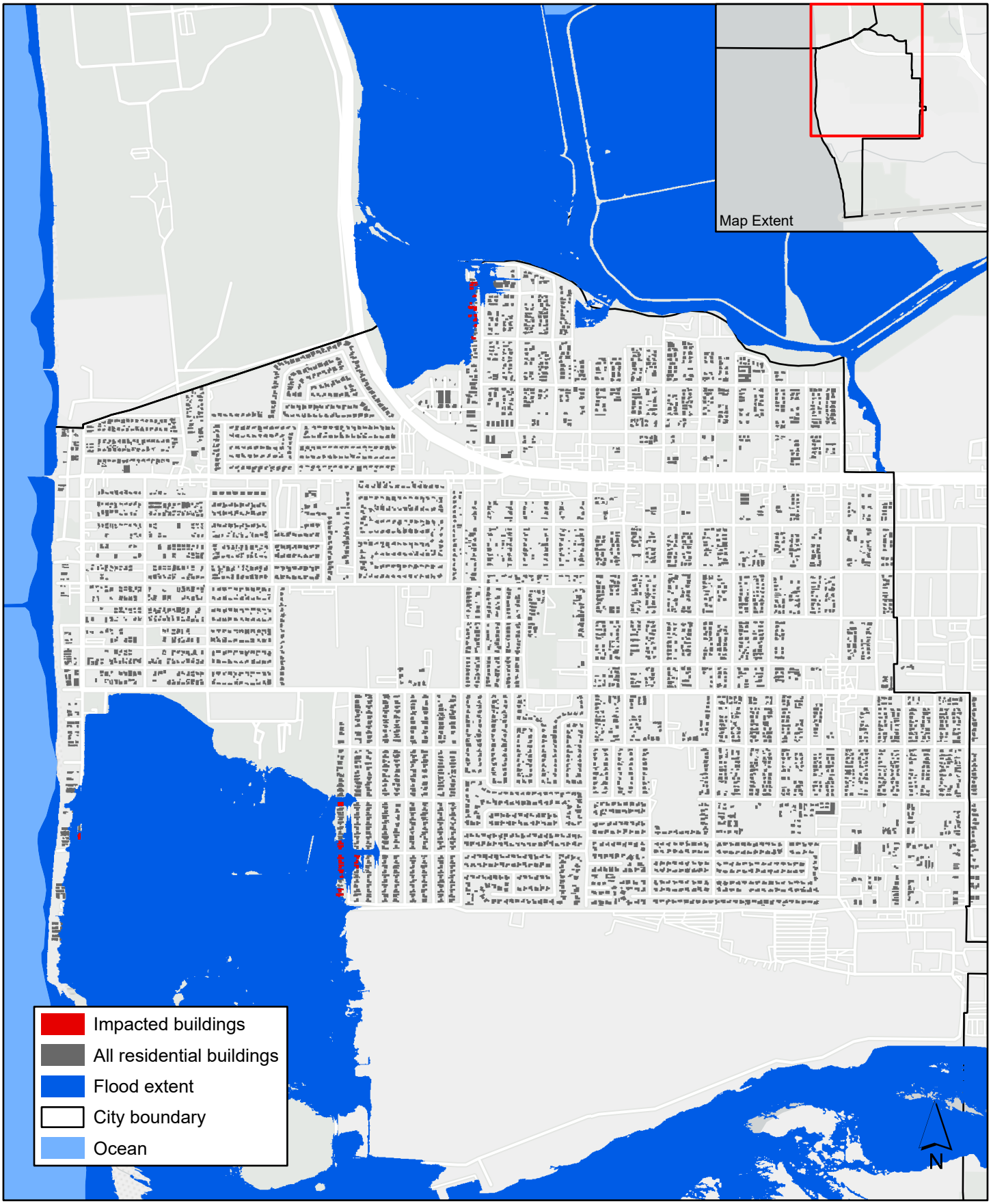
Imperial Beach Area 1

Sea Level Rise 0.25 m - 100 year storm



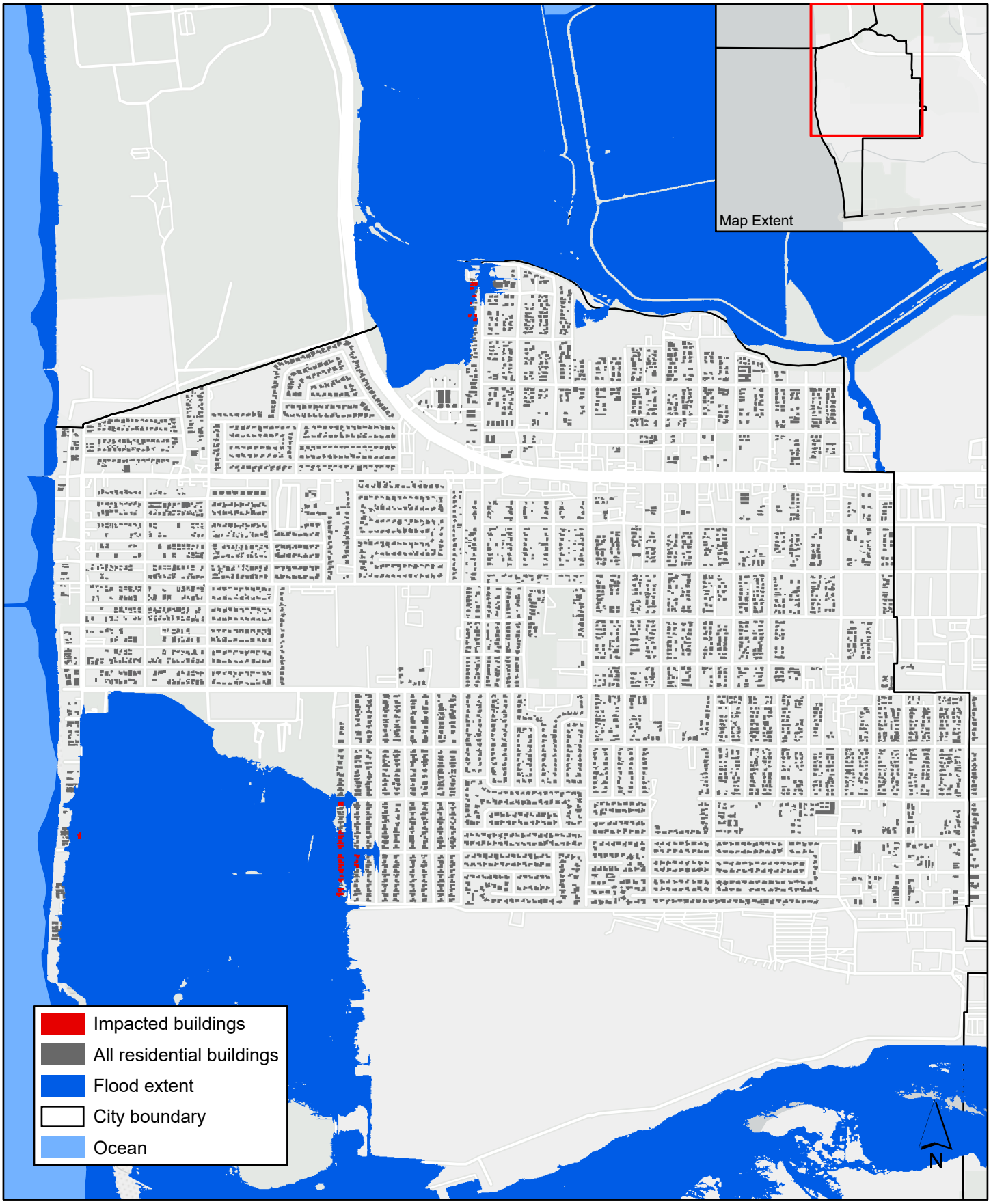
Imperial Beach Area 1

Sea Level Rise 0.5 m - No storm



Imperial Beach Area 1

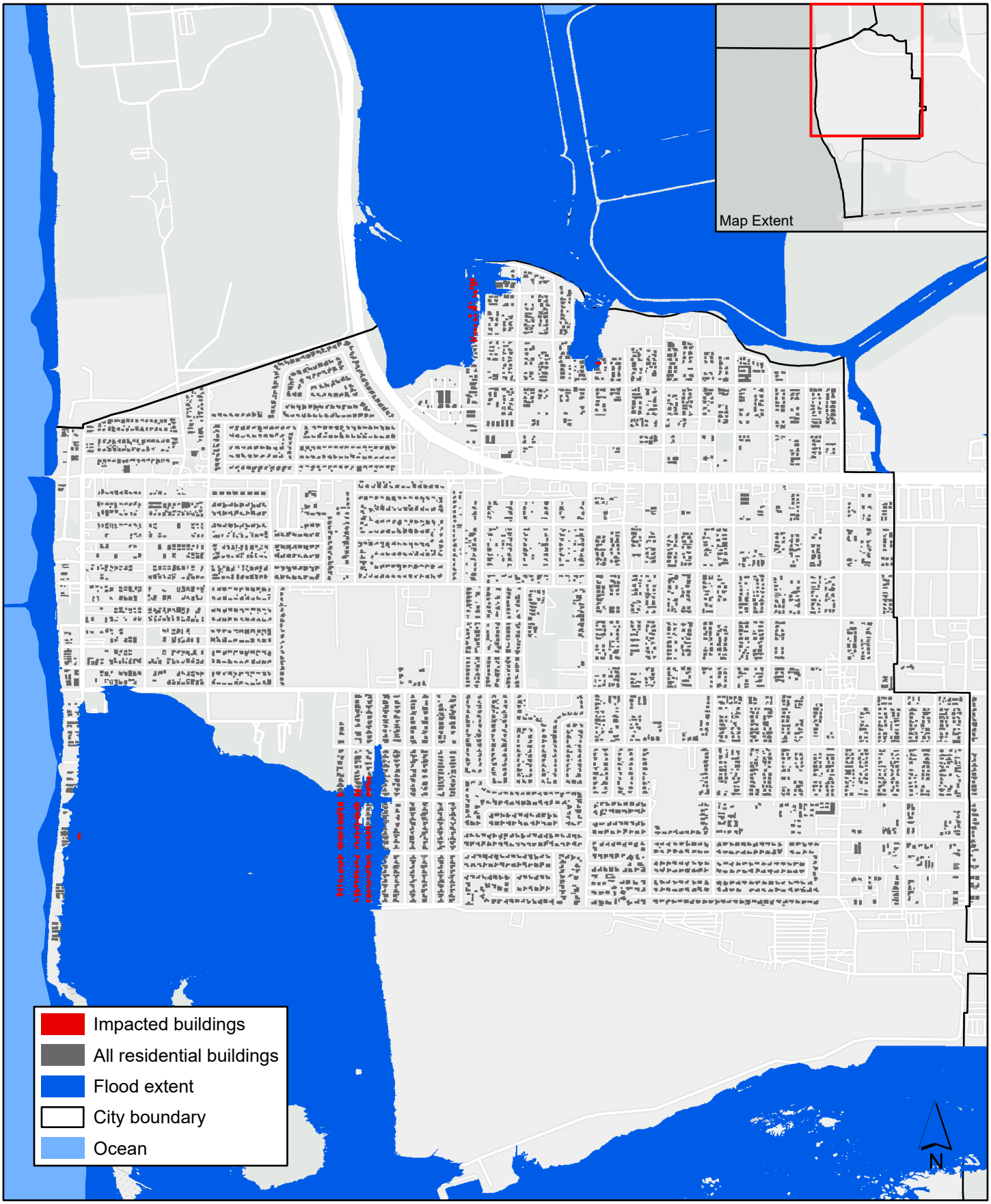
Sea Level Rise 0.5 m - 001 year storm



Appendix C

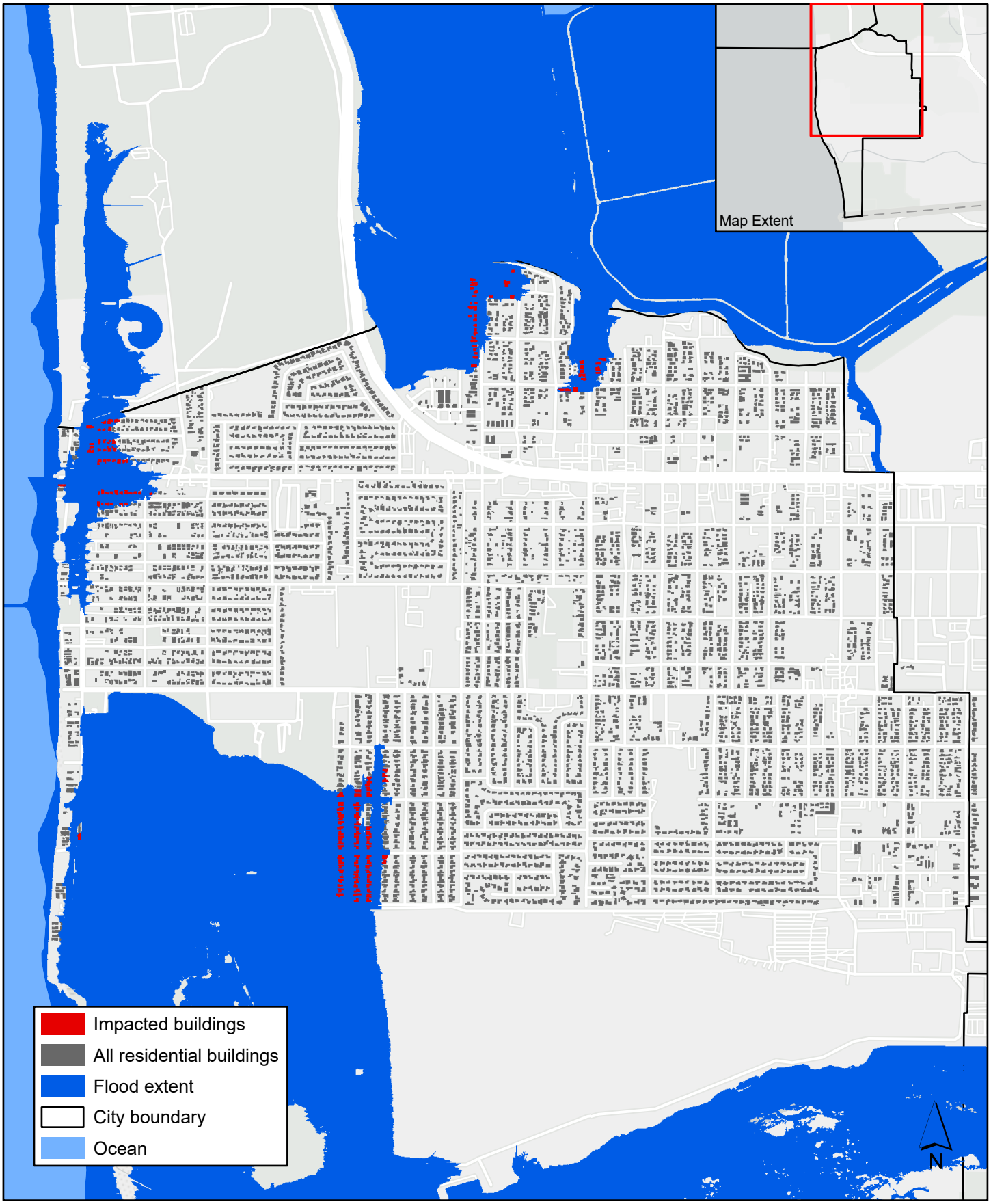
Imperial Beach Area 1

Sea Level Rise 0.5 m - 020 year storm



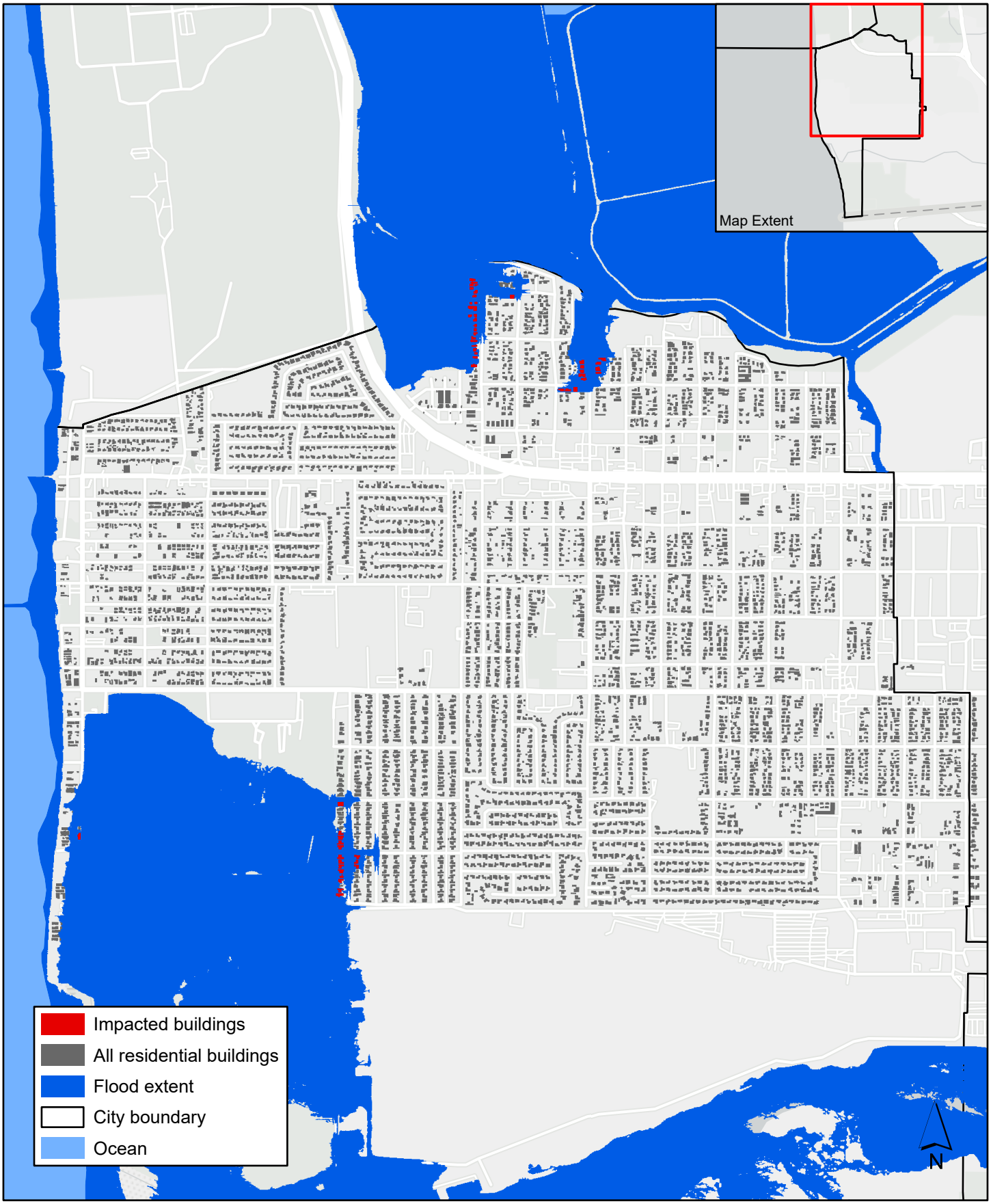
Imperial Beach Area 1

Sea Level Rise 0.5 m - 100 year storm



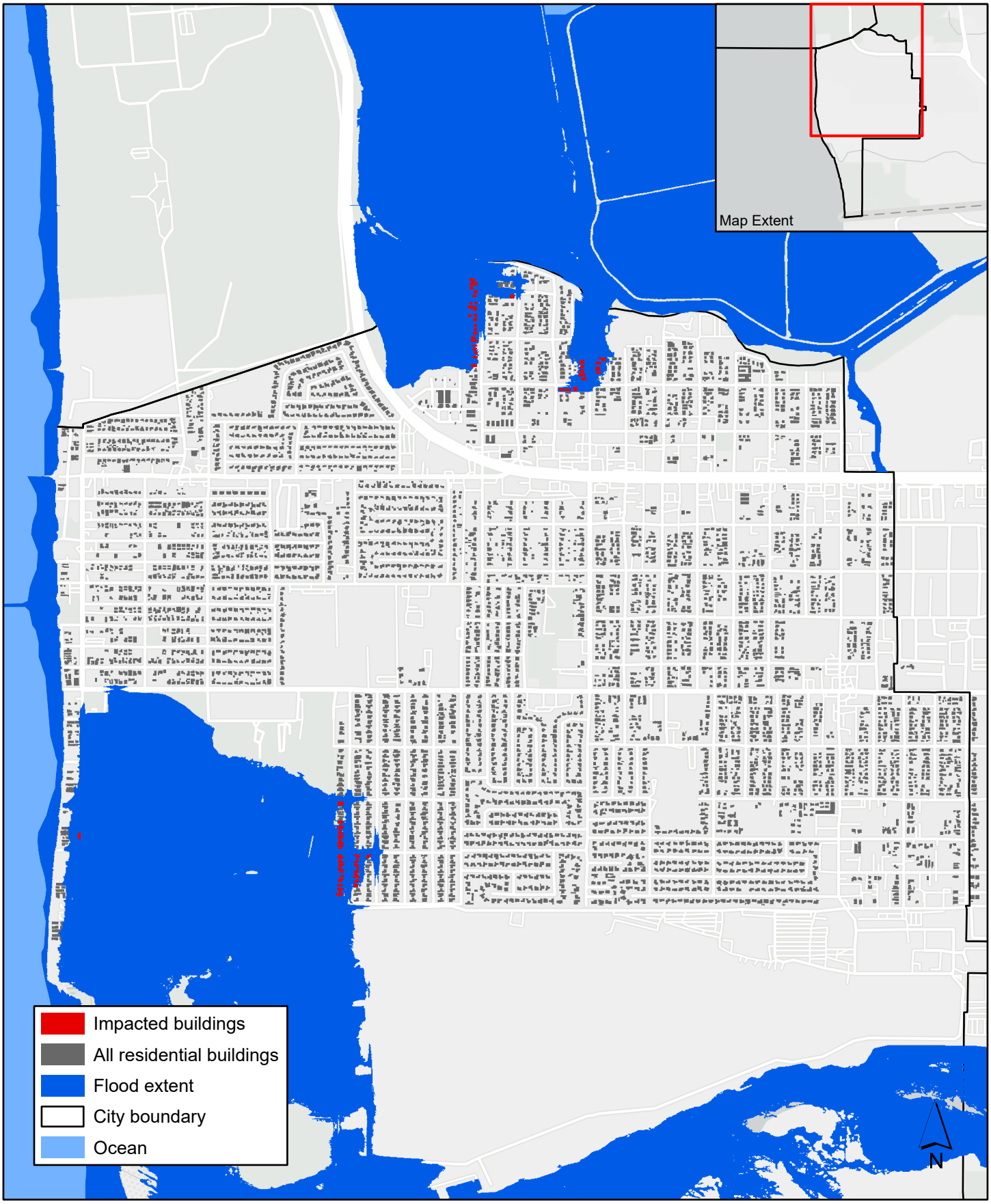
Imperial Beach Area 1

Sea Level Rise 0.75 m - No storm



Imperial Beach Area 1

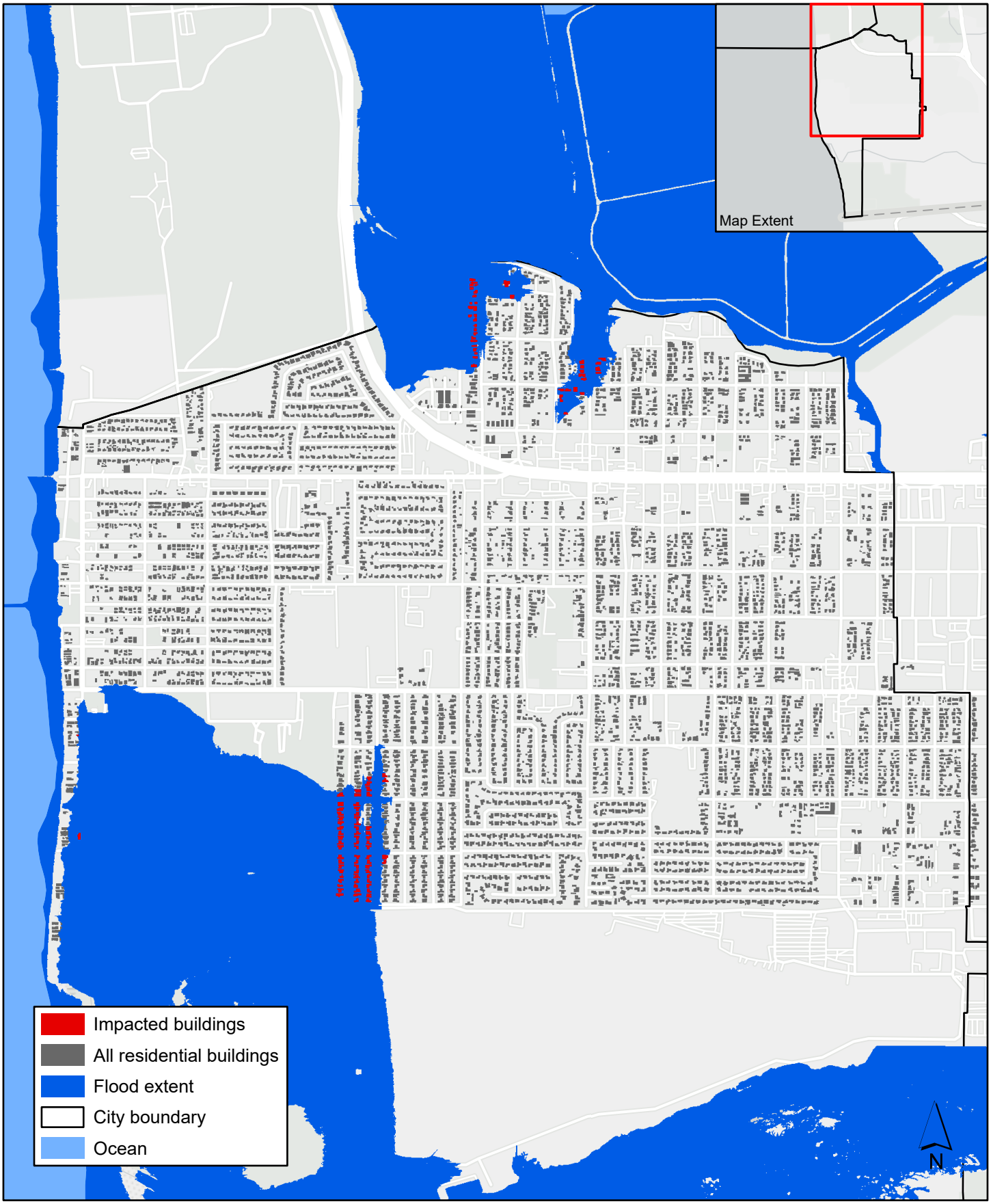
Sea Level Rise 0.75 m - 001 year storm



Appendix C

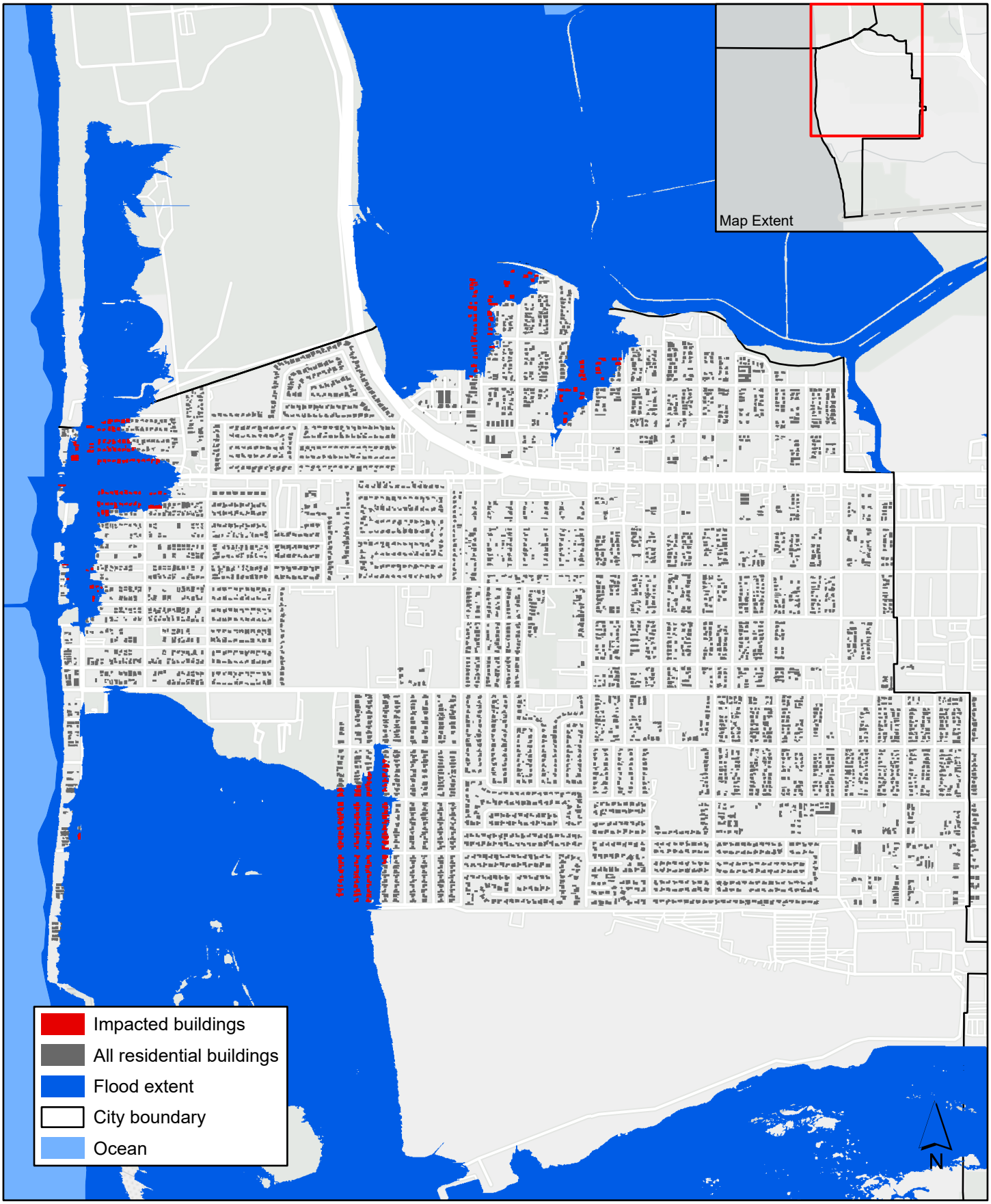
Imperial Beach Area 1

Sea Level Rise 0.75 m - 020 year storm



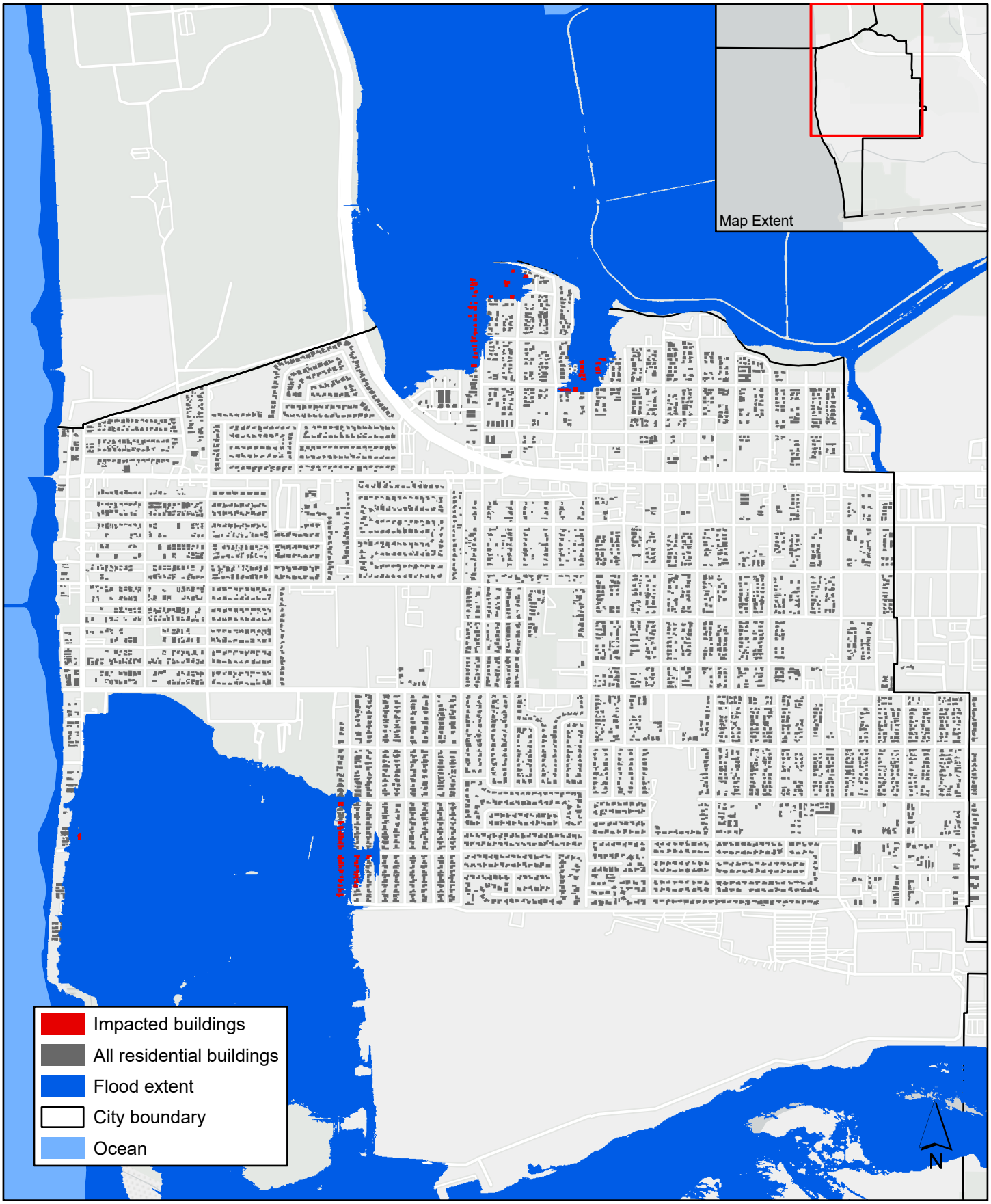
Imperial Beach Area 1

Sea Level Rise 0.75 m - 100 year storm



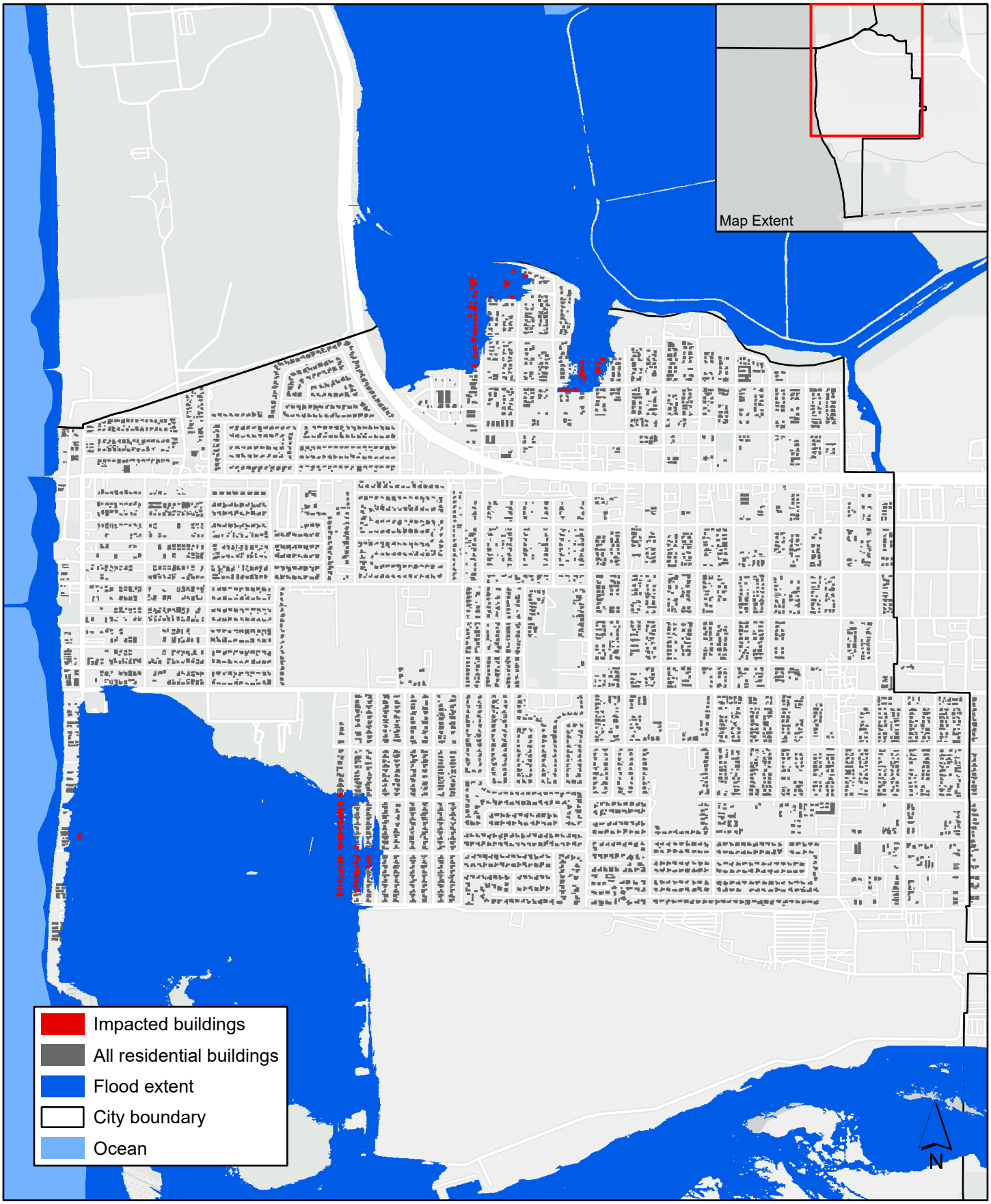
Imperial Beach Area 1

Sea Level Rise 1.0 m - No storm



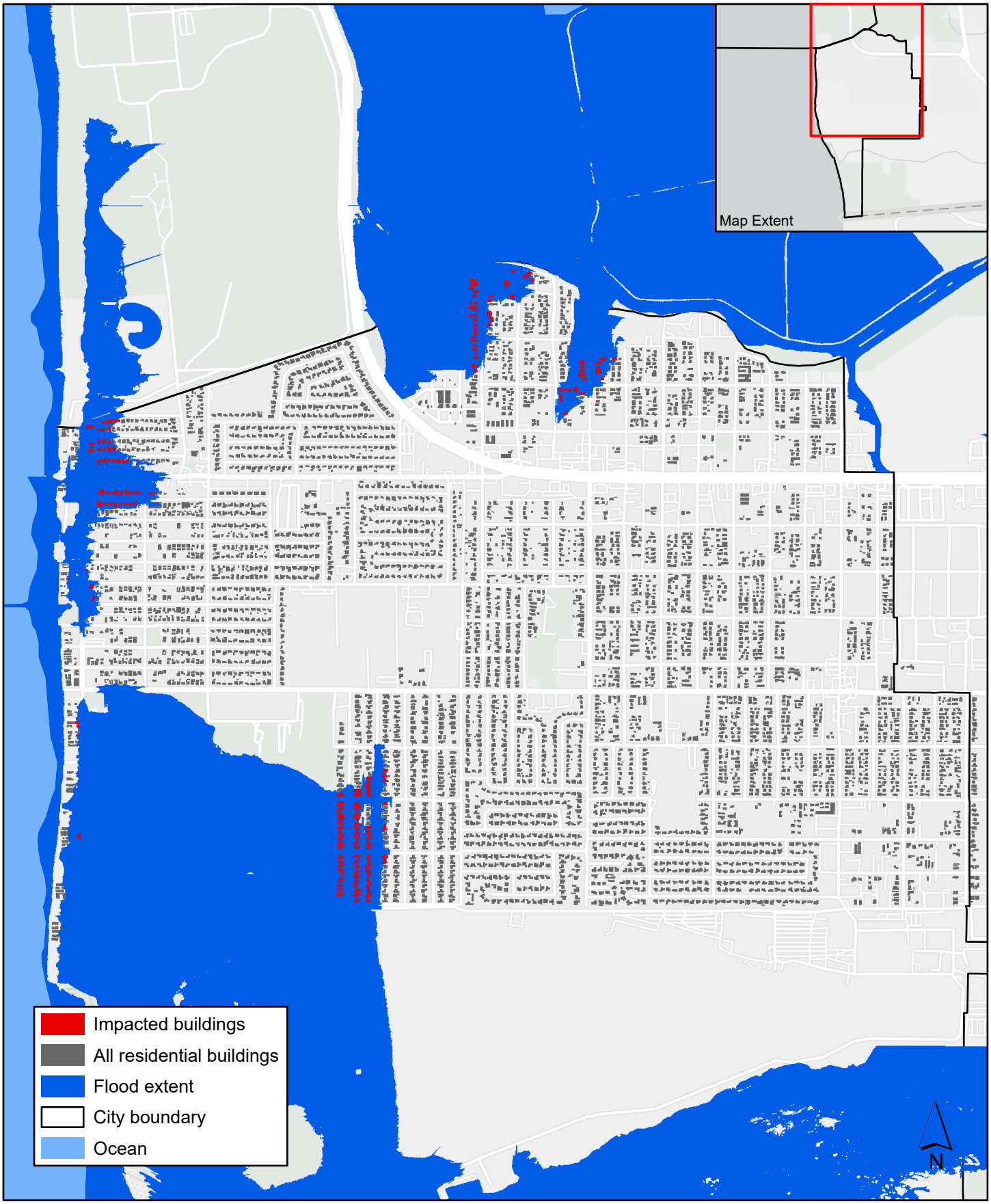
Imperial Beach Area 1

Sea Level Rise 1.0 m - 001 year storm



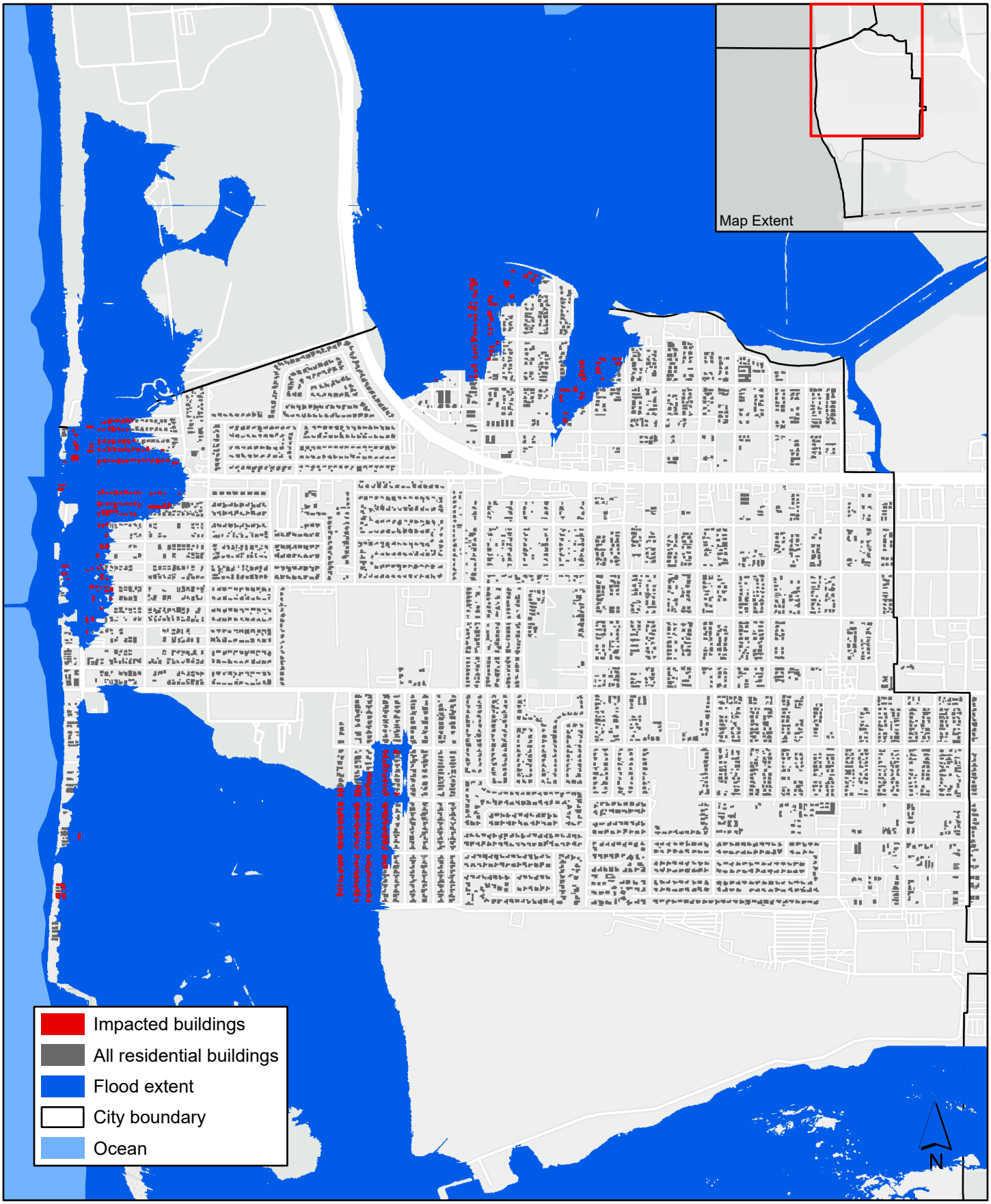
Imperial Beach Area 1

Sea Level Rise 1.0 m - 020 year storm



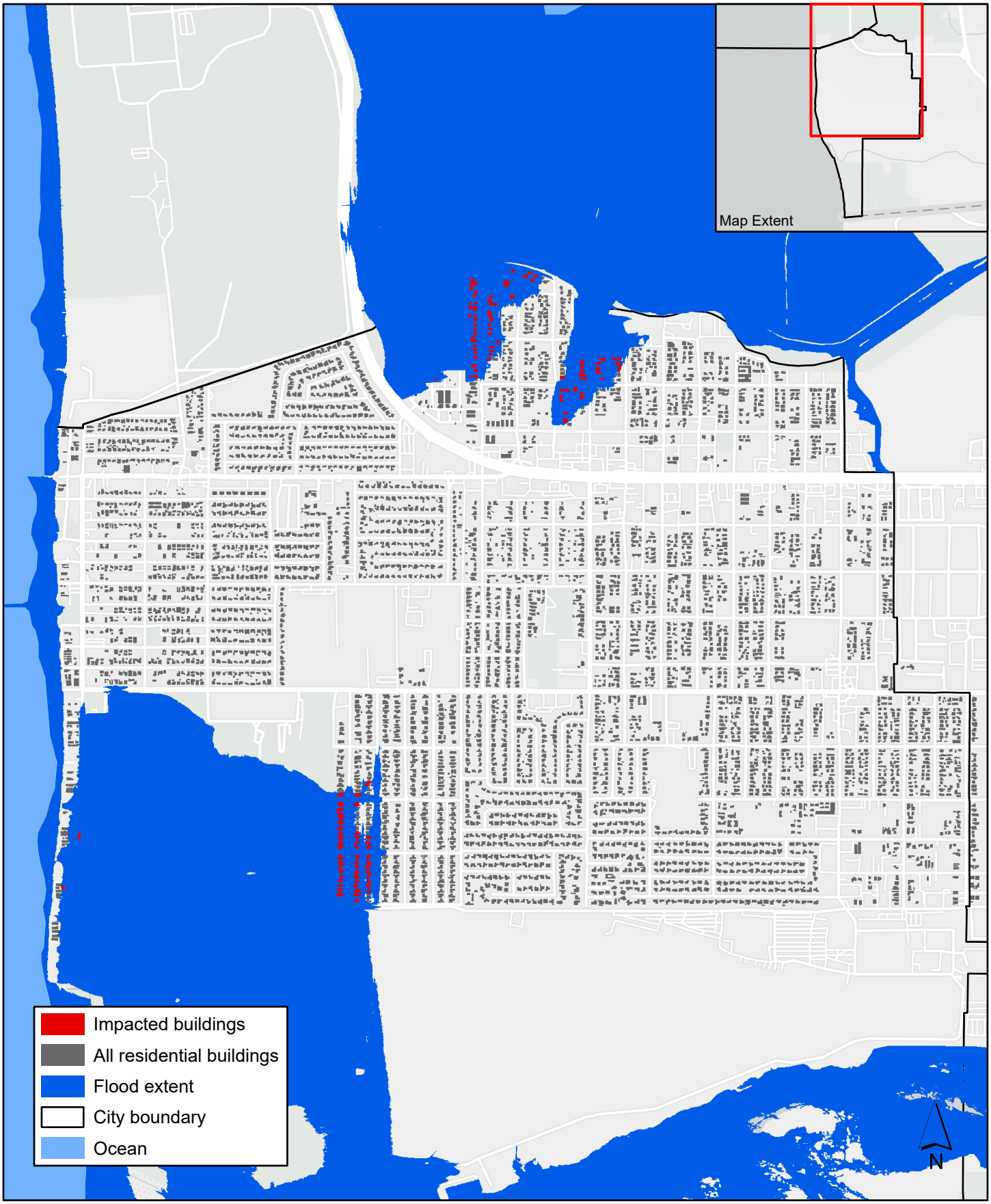
Imperial Beach Area 1

Sea Level Rise 1.0 m - 100 year storm



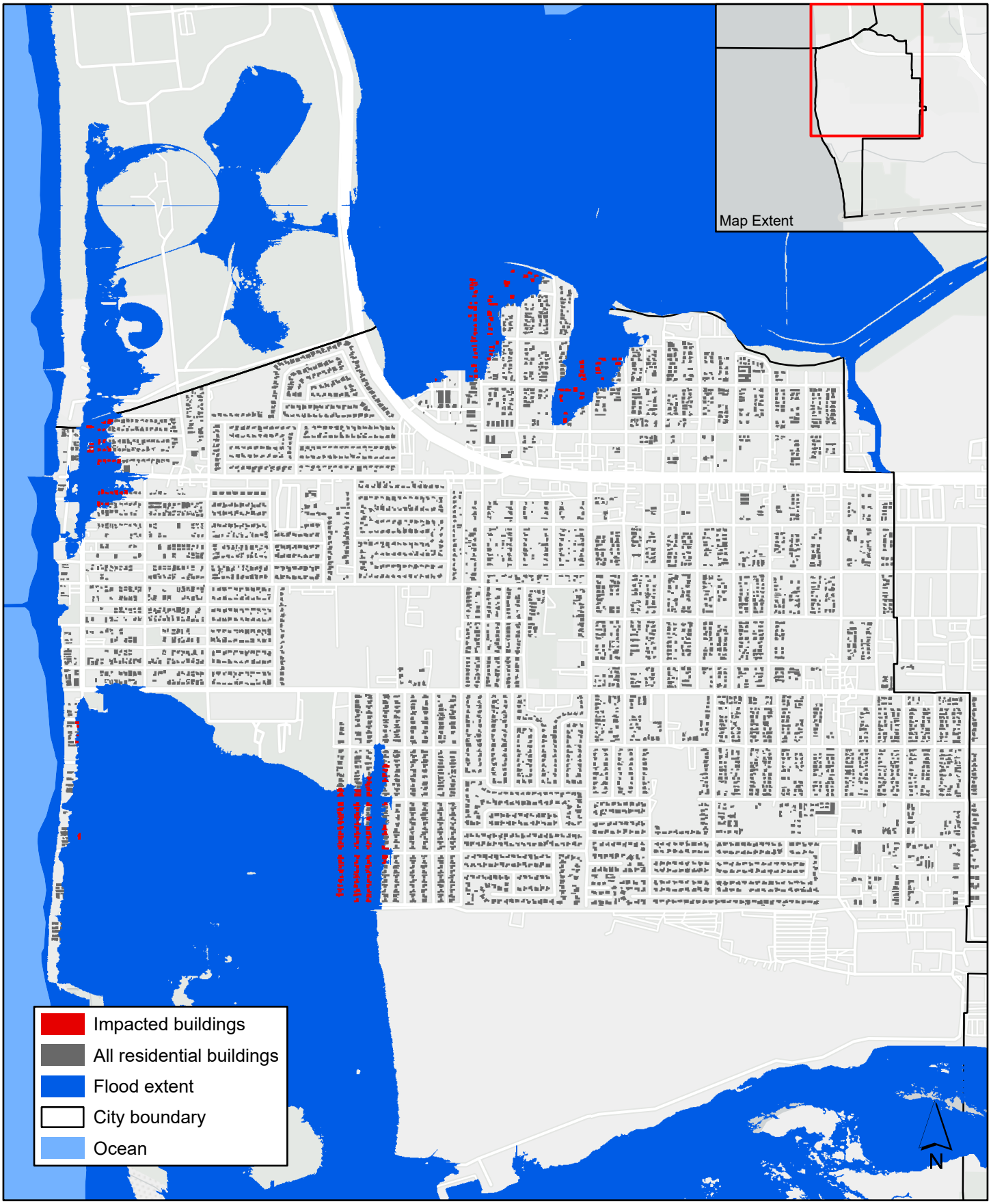
Imperial Beach Area 1

Sea Level Rise 1.5 m - No storm



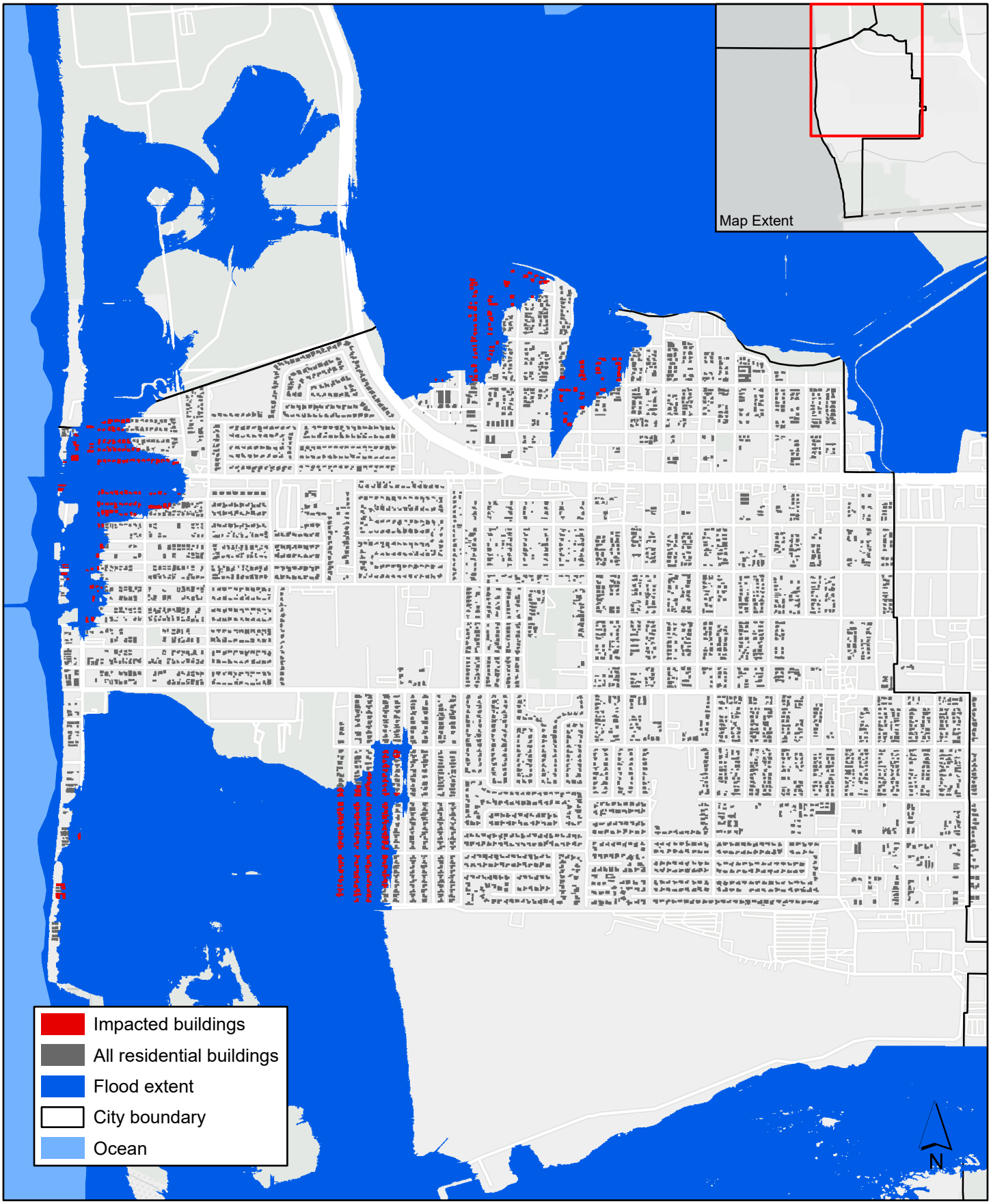
Imperial Beach Area 1

Sea Level Rise 1.5 m - 001 year storm



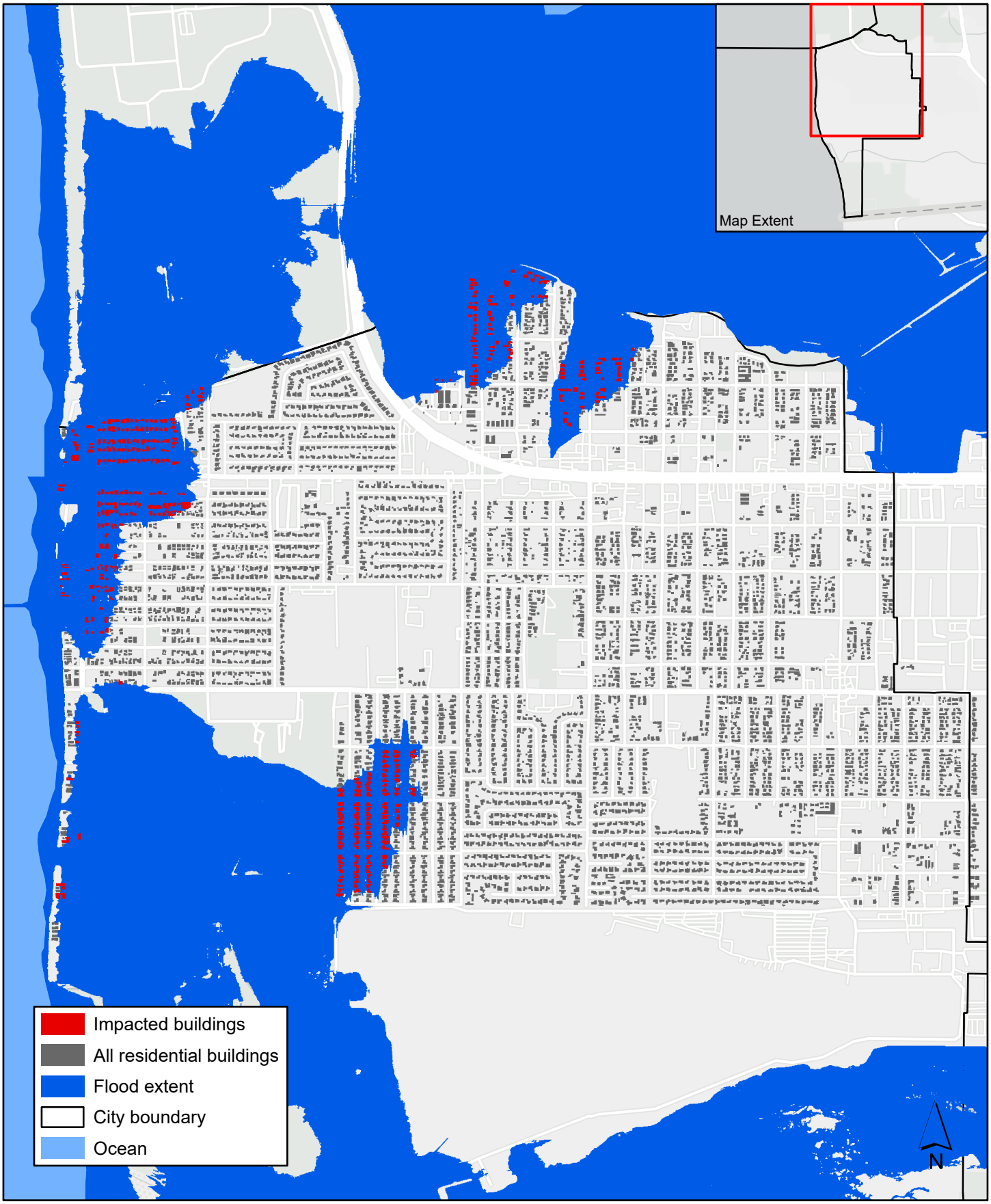
Imperial Beach Area 1

Sea Level Rise 1.5 m - 020 year storm



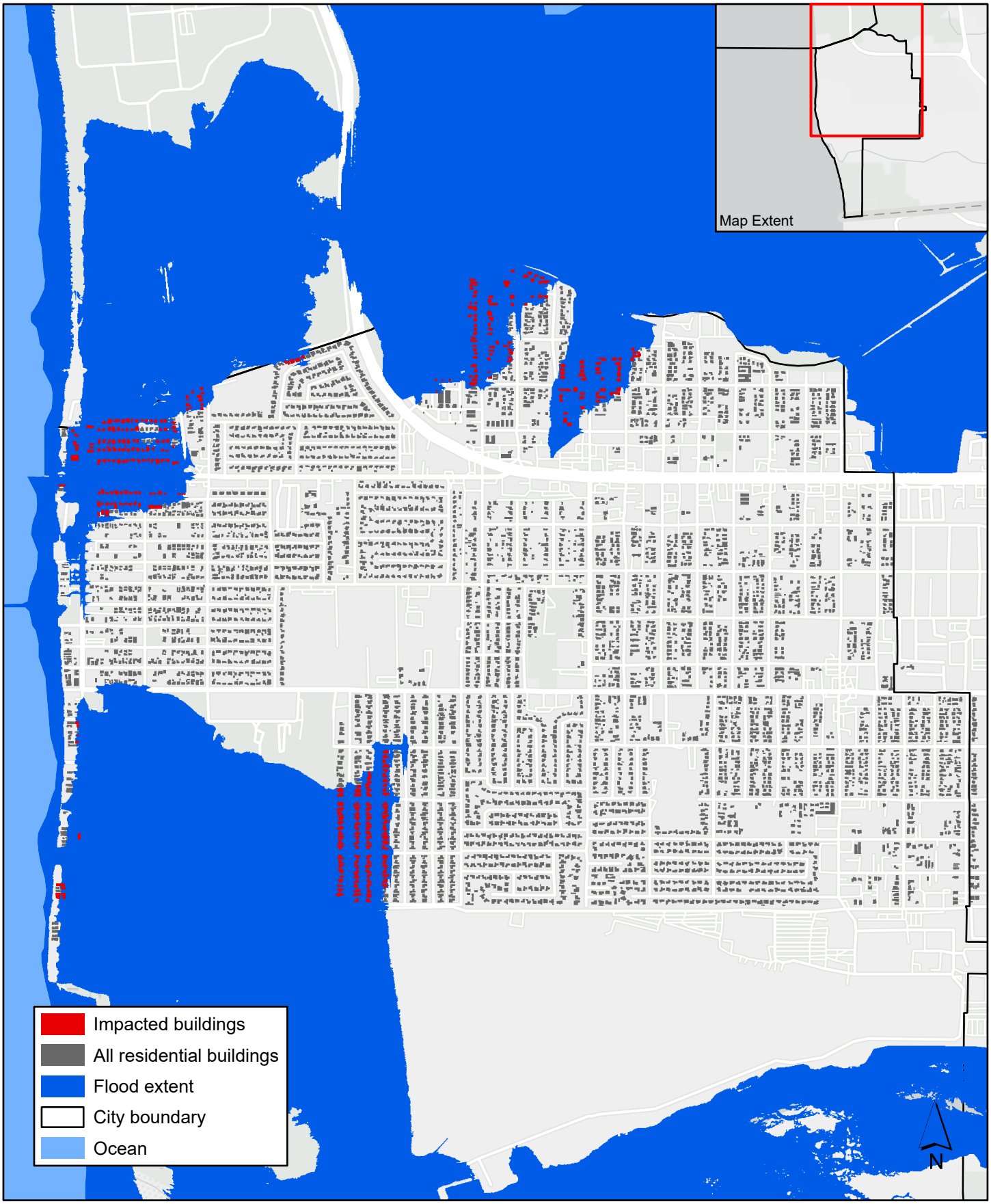
Imperial Beach Area 1

Sea Level Rise 1.5 m - 100 year storm



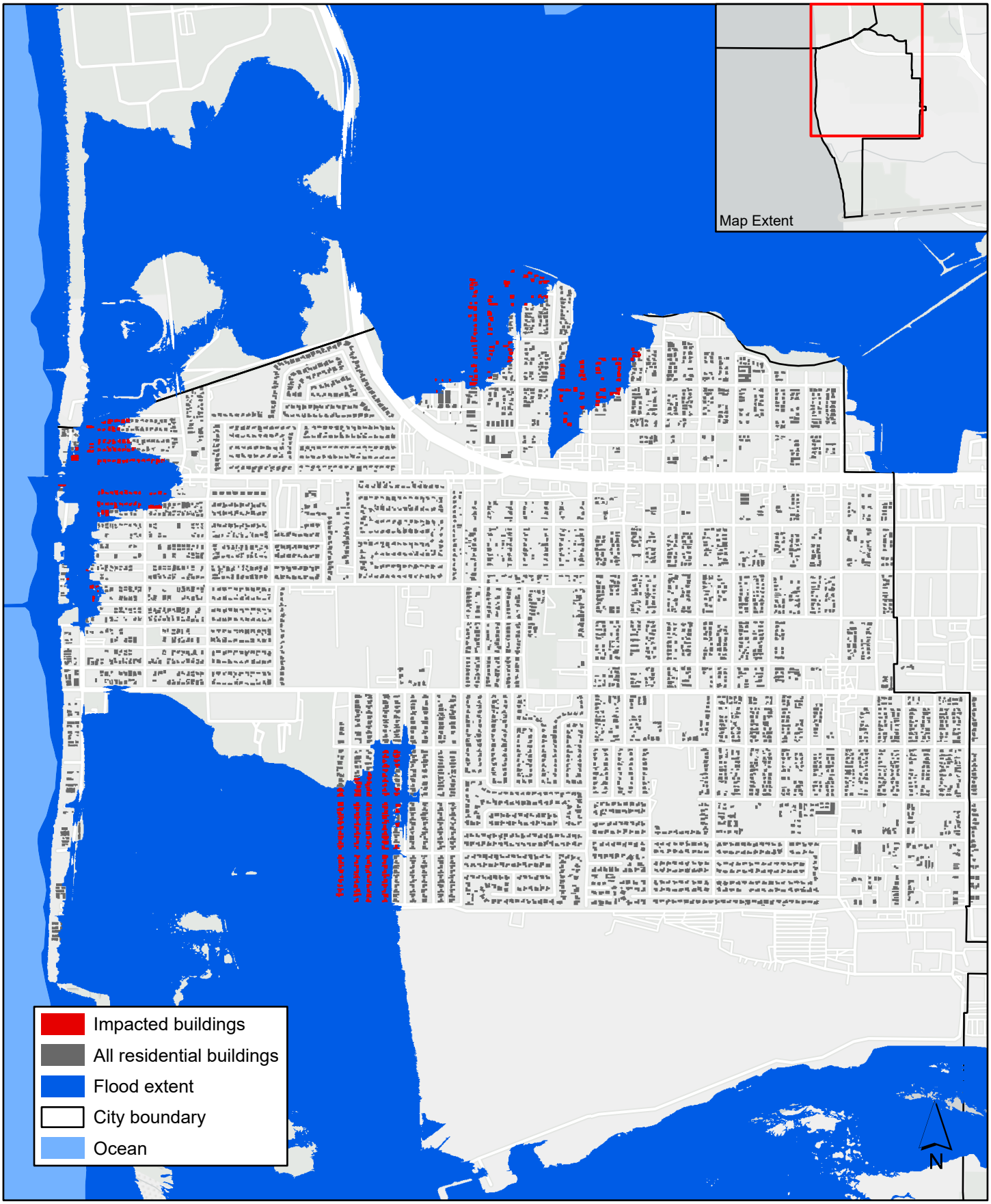
Imperial Beach Area 1

Sea Level Rise 2.0 m - No storm



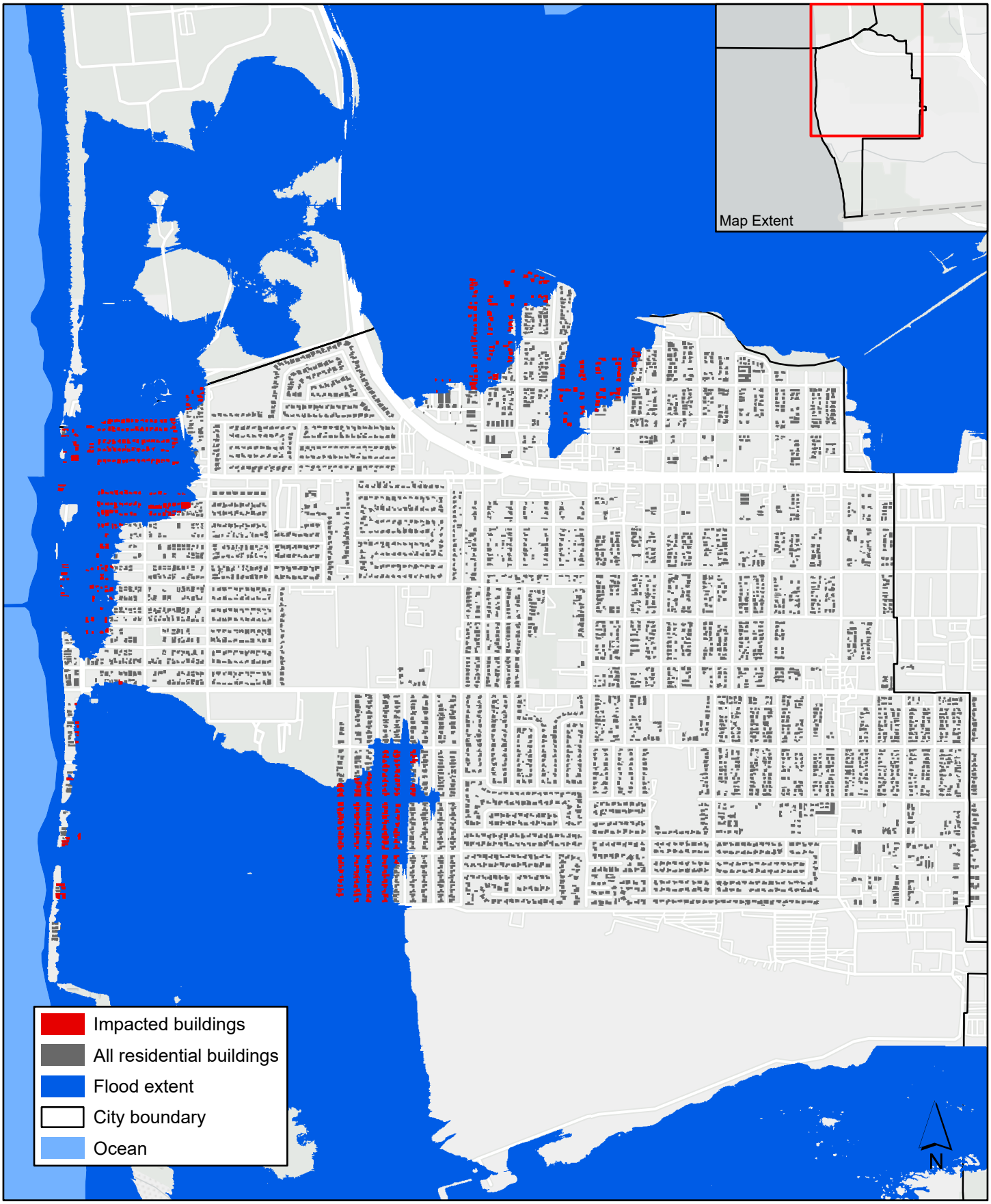
Imperial Beach Area 1

Sea Level Rise 2.0 m - 001 year storm



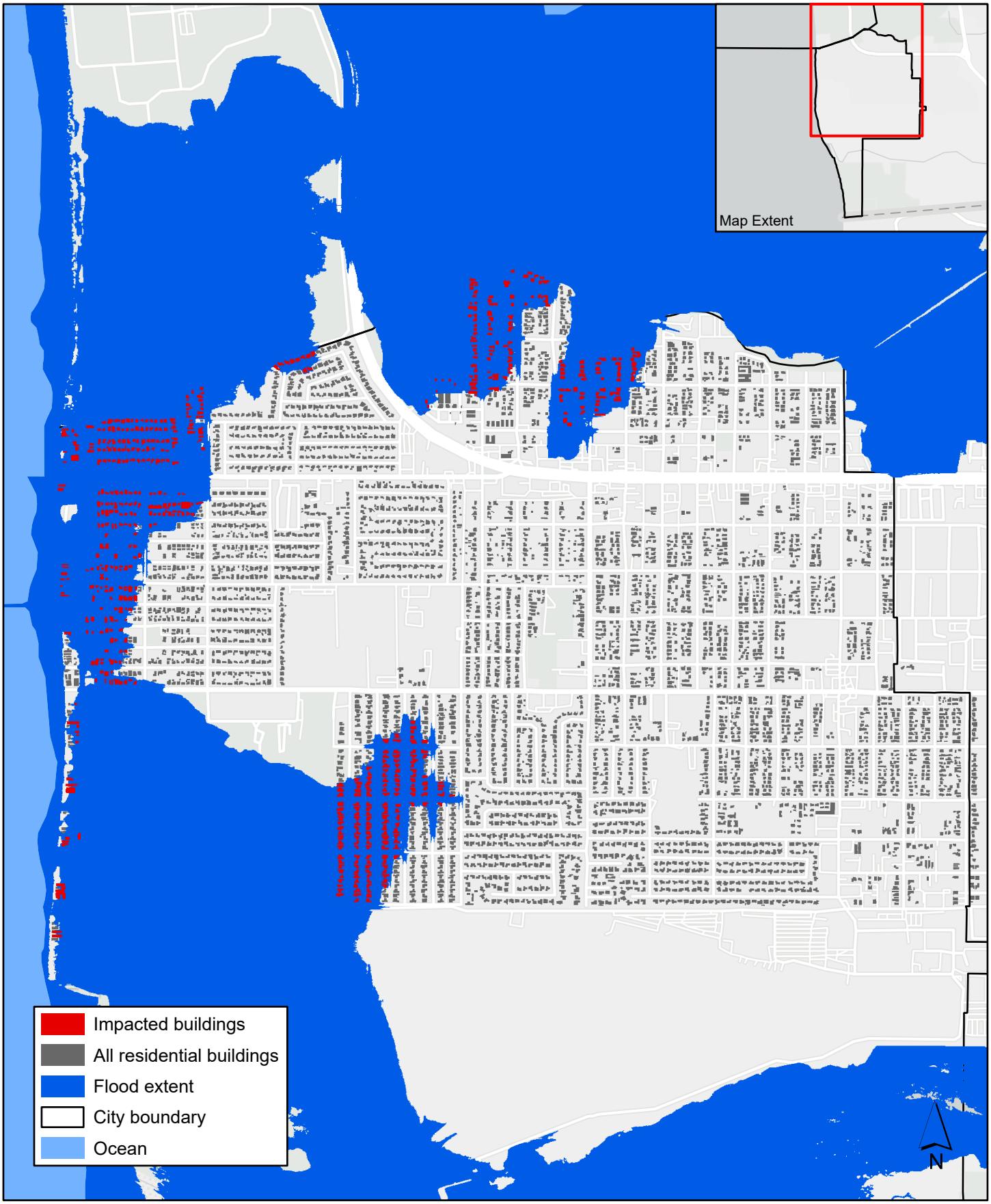
Imperial Beach Area 1

Sea Level Rise 2.0 m - 020 year storm



Imperial Beach Area 1

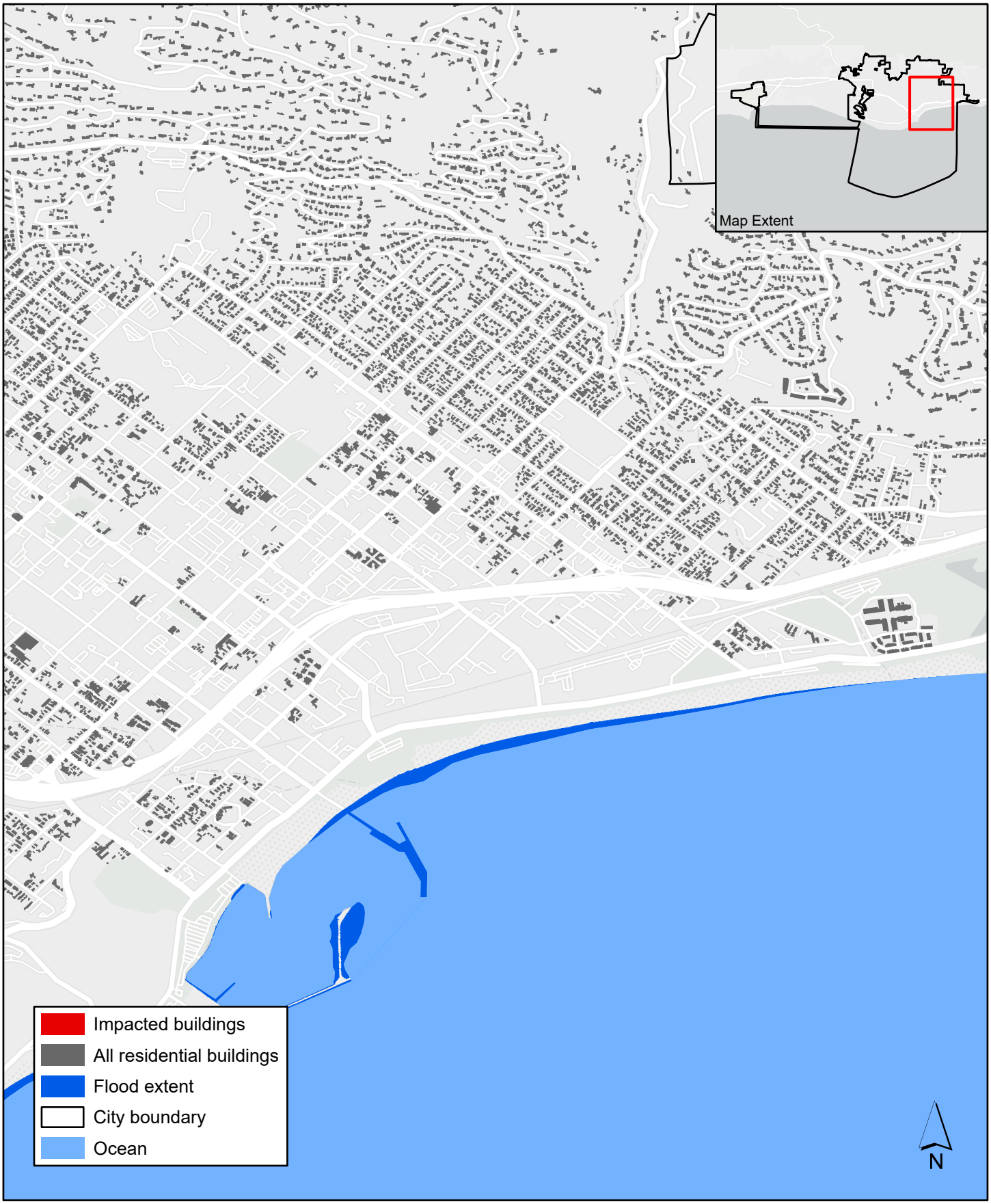
Sea Level Rise 2.0 m - 100 year storm



Appendix D

Santa Barbara Area 1

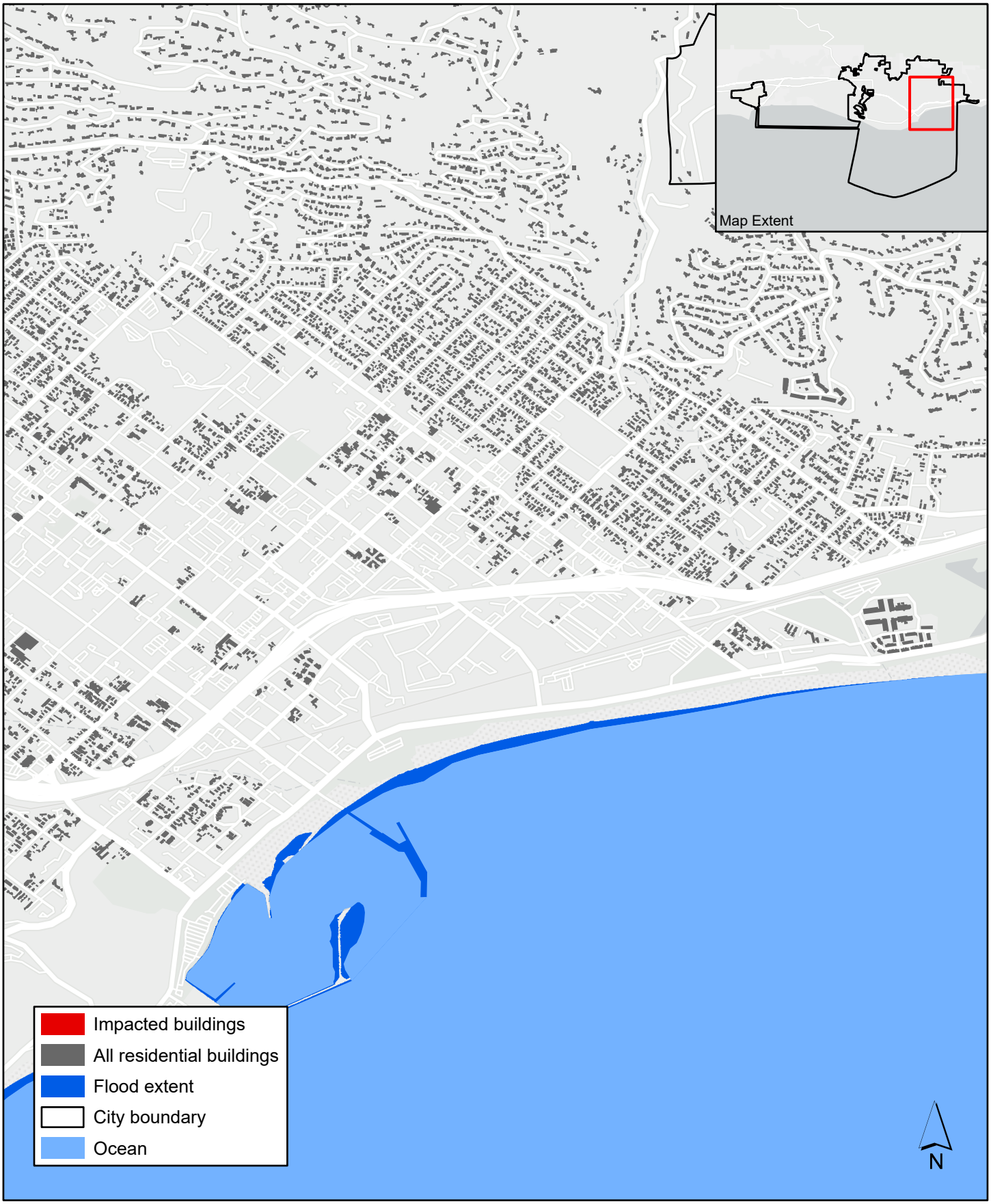
Sea Level Rise 0.0 m - No storm



Appendix D

Santa Barbara Area 1

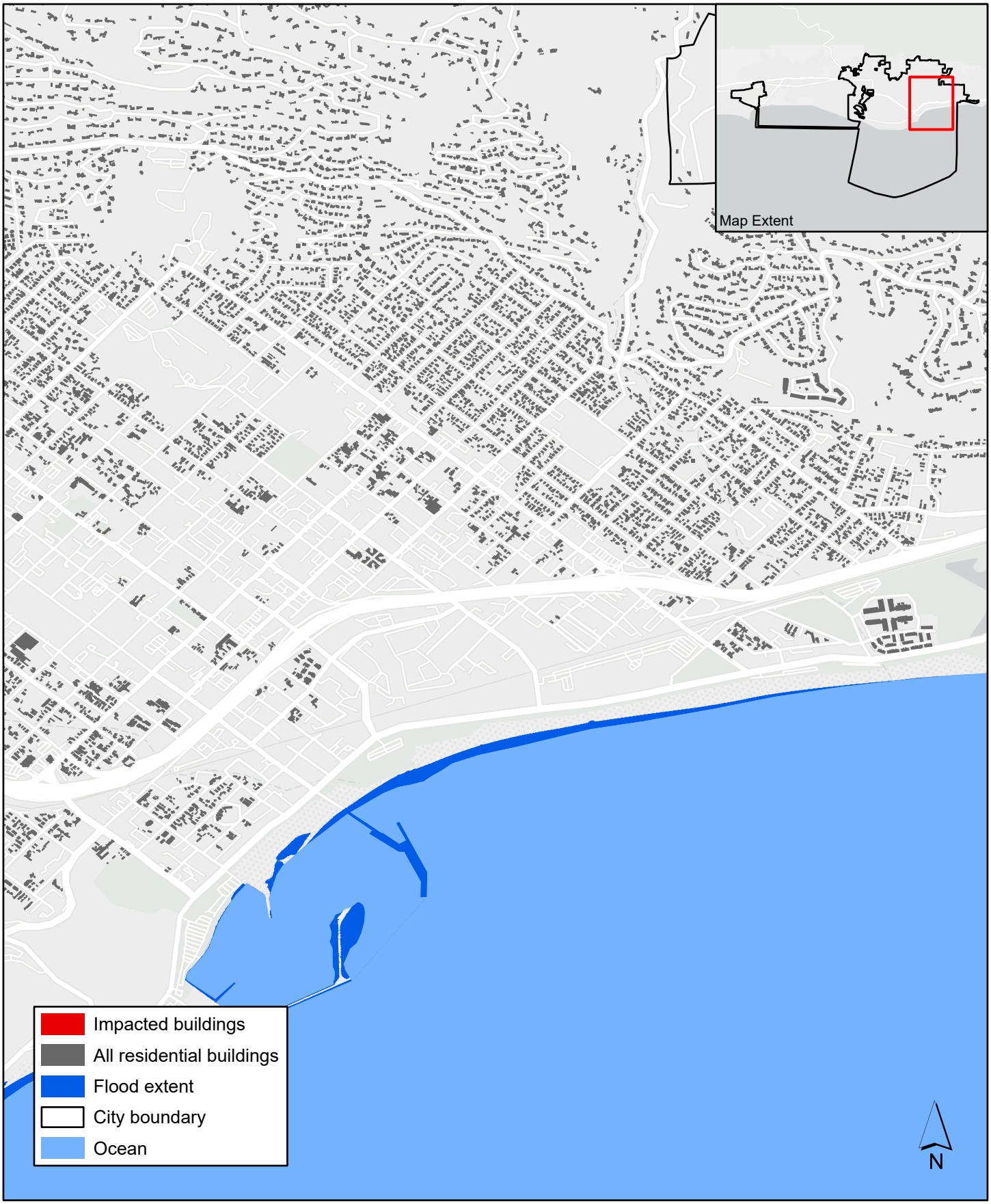
Sea Level Rise 0.0 m - 001 year storm



Appendix D

Santa Barbara Area 1

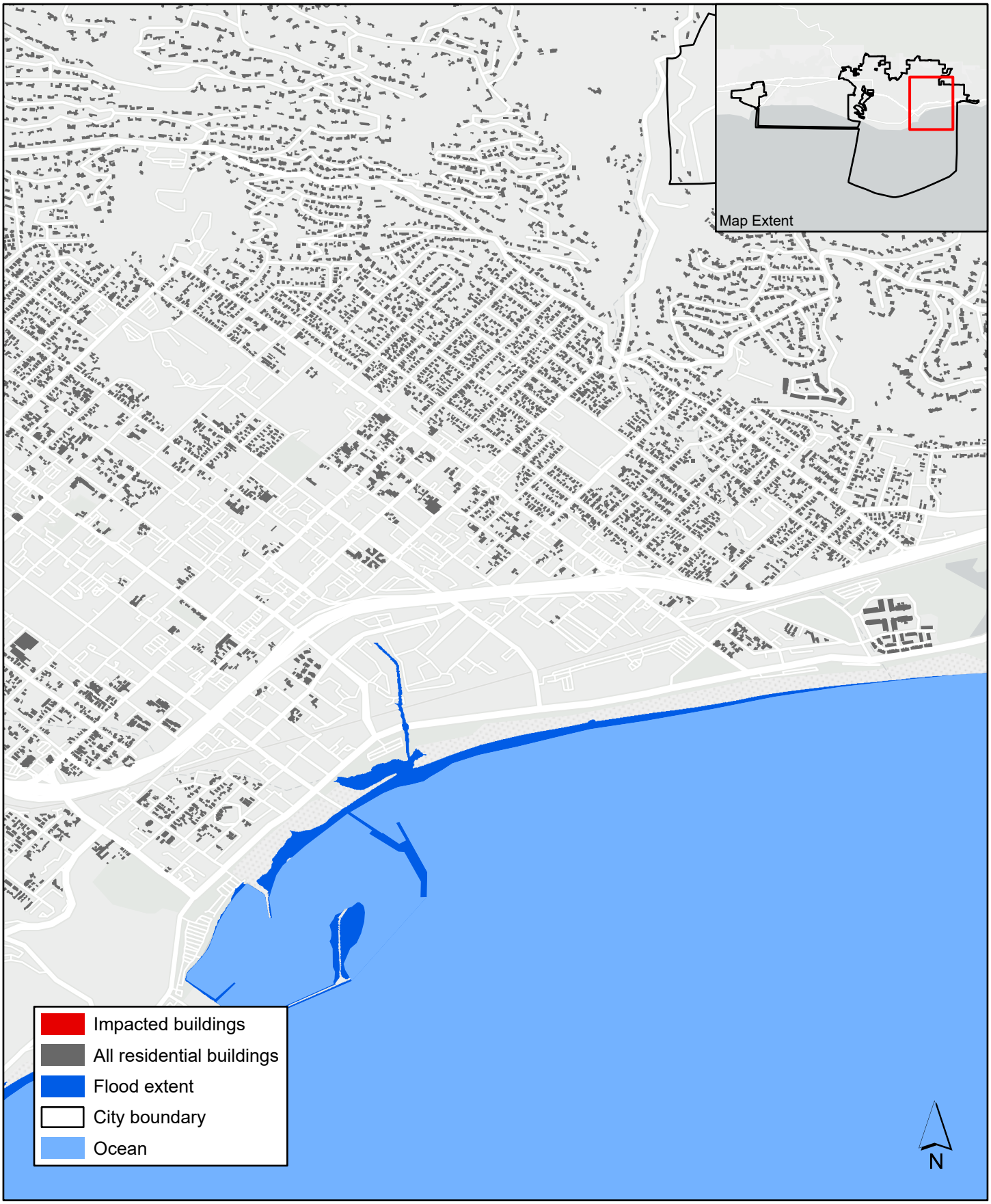
Sea Level Rise 0.0 m - 020 year storm



Appendix D

Santa Barbara Area 1

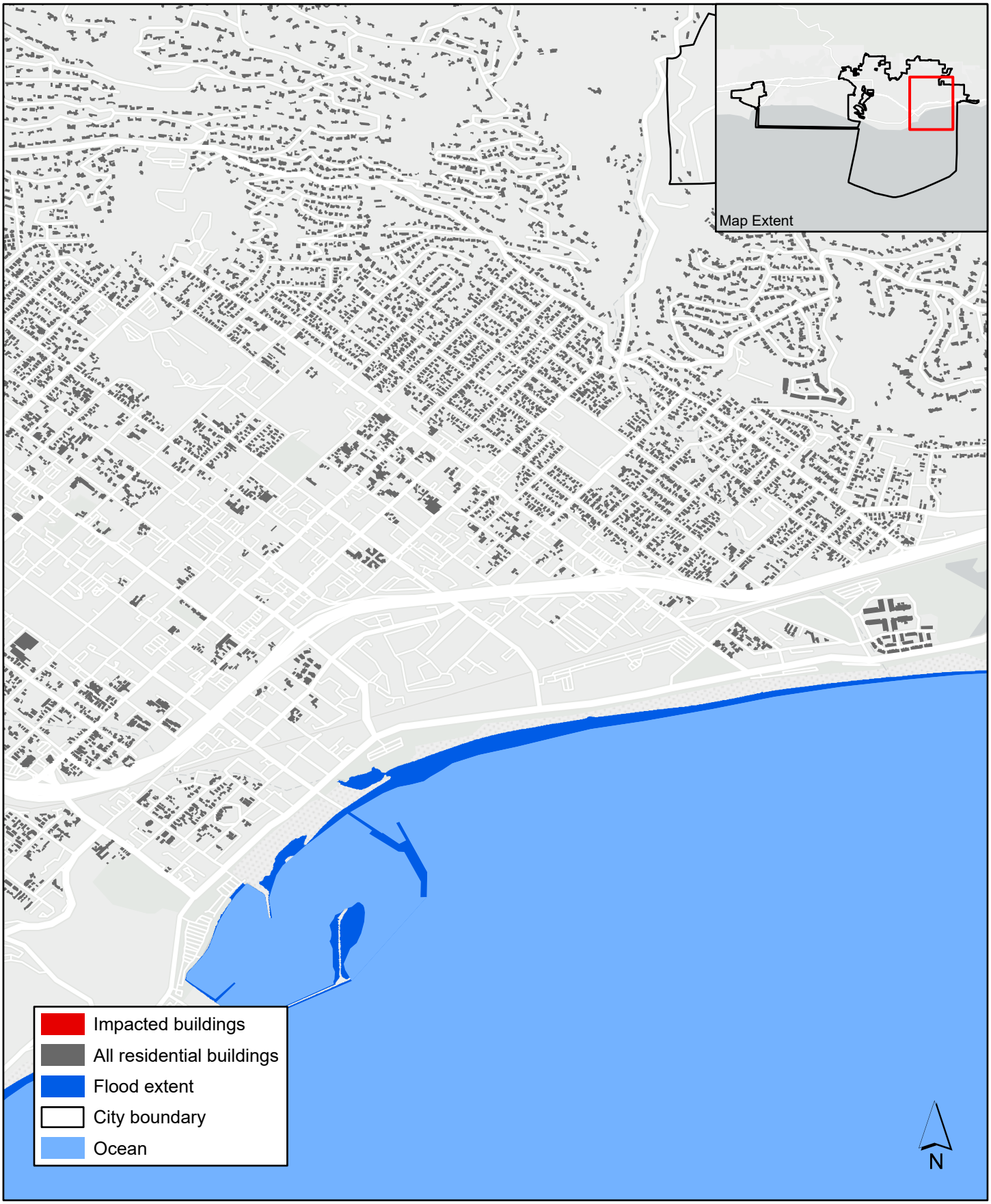
Sea Level Rise 0.0 m - 100 year storm



Appendix D

Santa Barbara Area 1

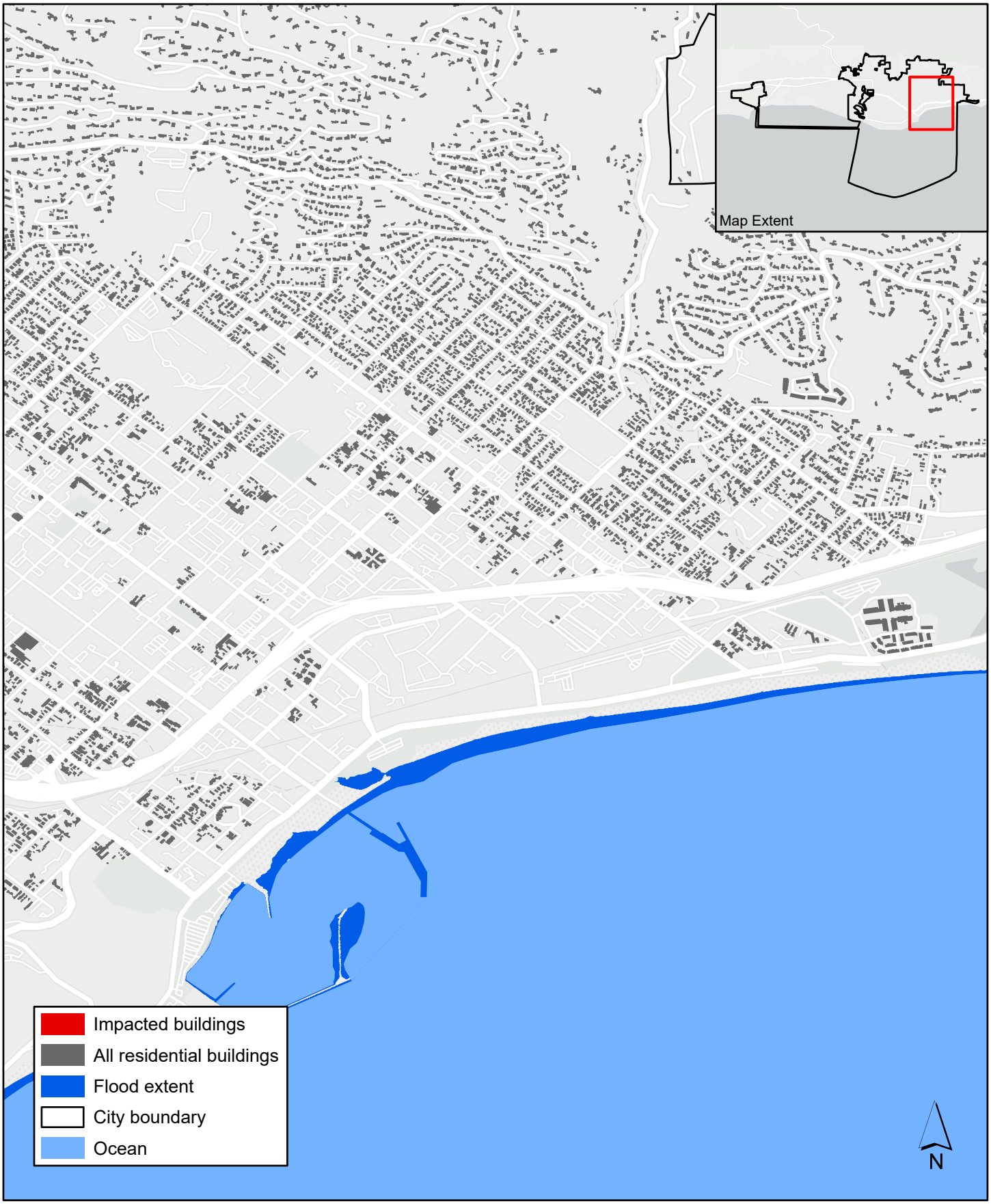
Sea Level Rise 0.25 m - No storm



Appendix D

Santa Barbara Area 1

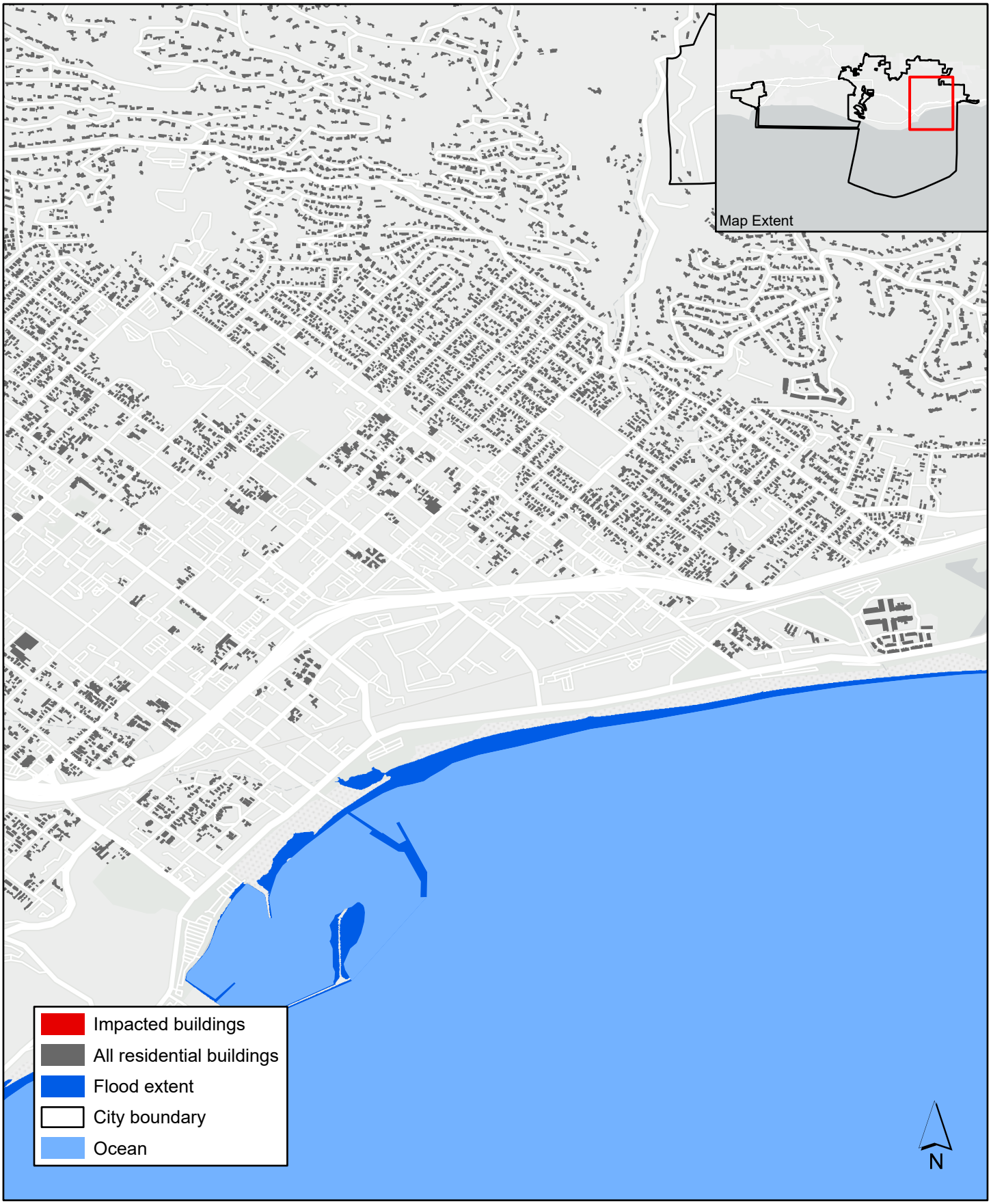
Sea Level Rise 0.25 m - 001 year storm



Appendix D

Santa Barbara Area 1

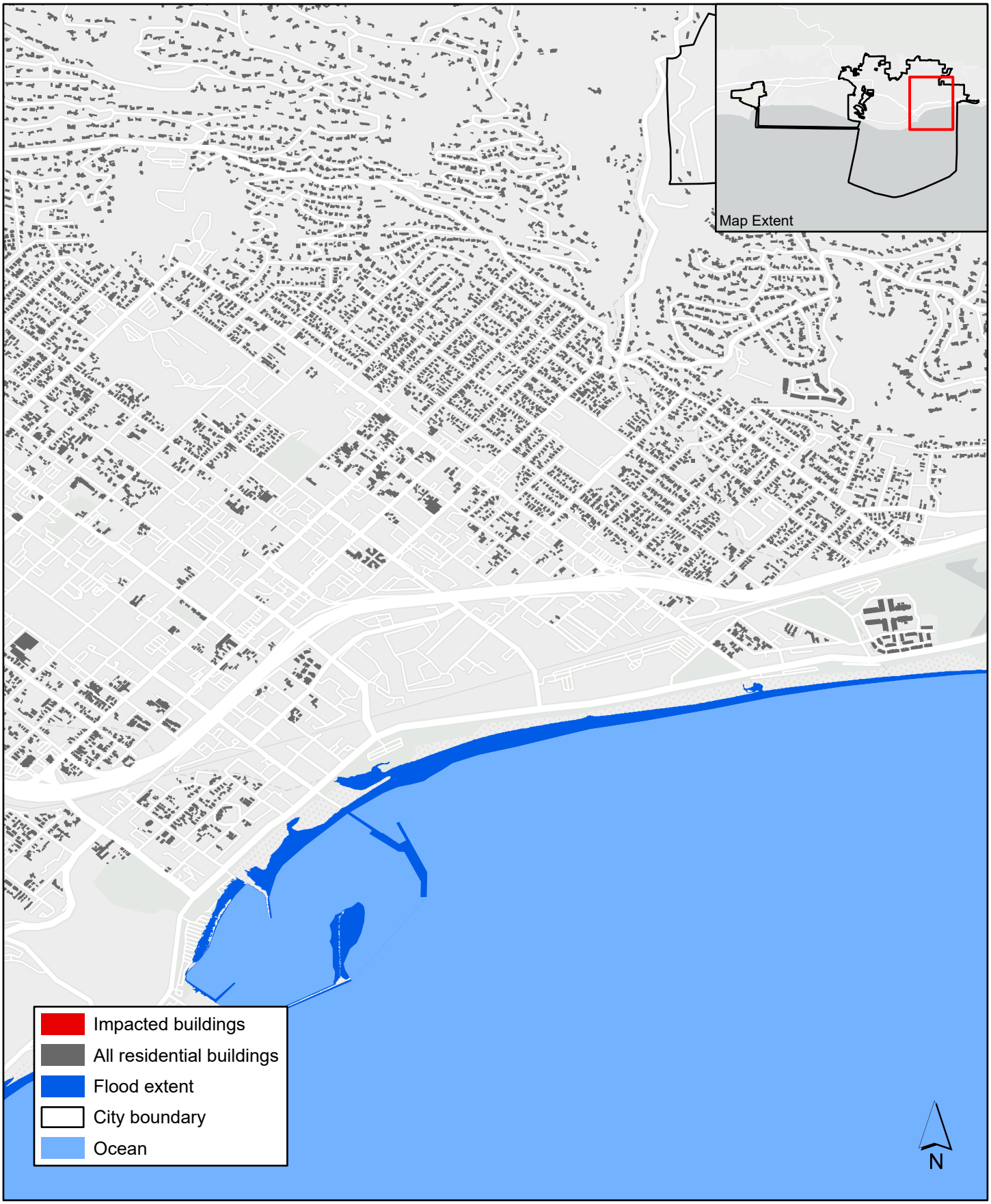
Sea Level Rise 0.25 m - 020 year storm



Appendix D

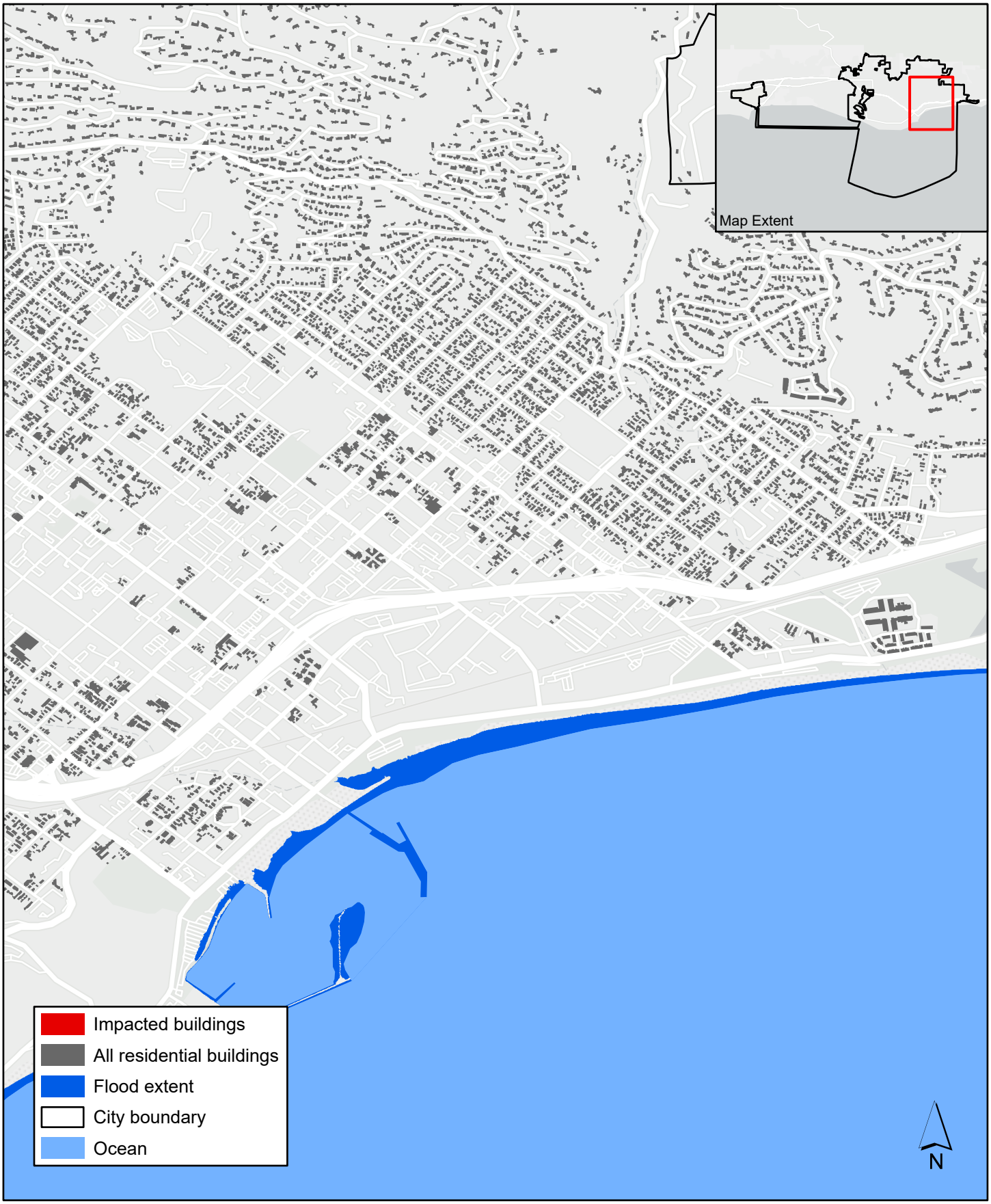
Santa Barbara Area 1

Sea Level Rise 0.25 m - 100 year storm



Santa Barbara Area 1

Sea Level Rise 0.5 m - No storm



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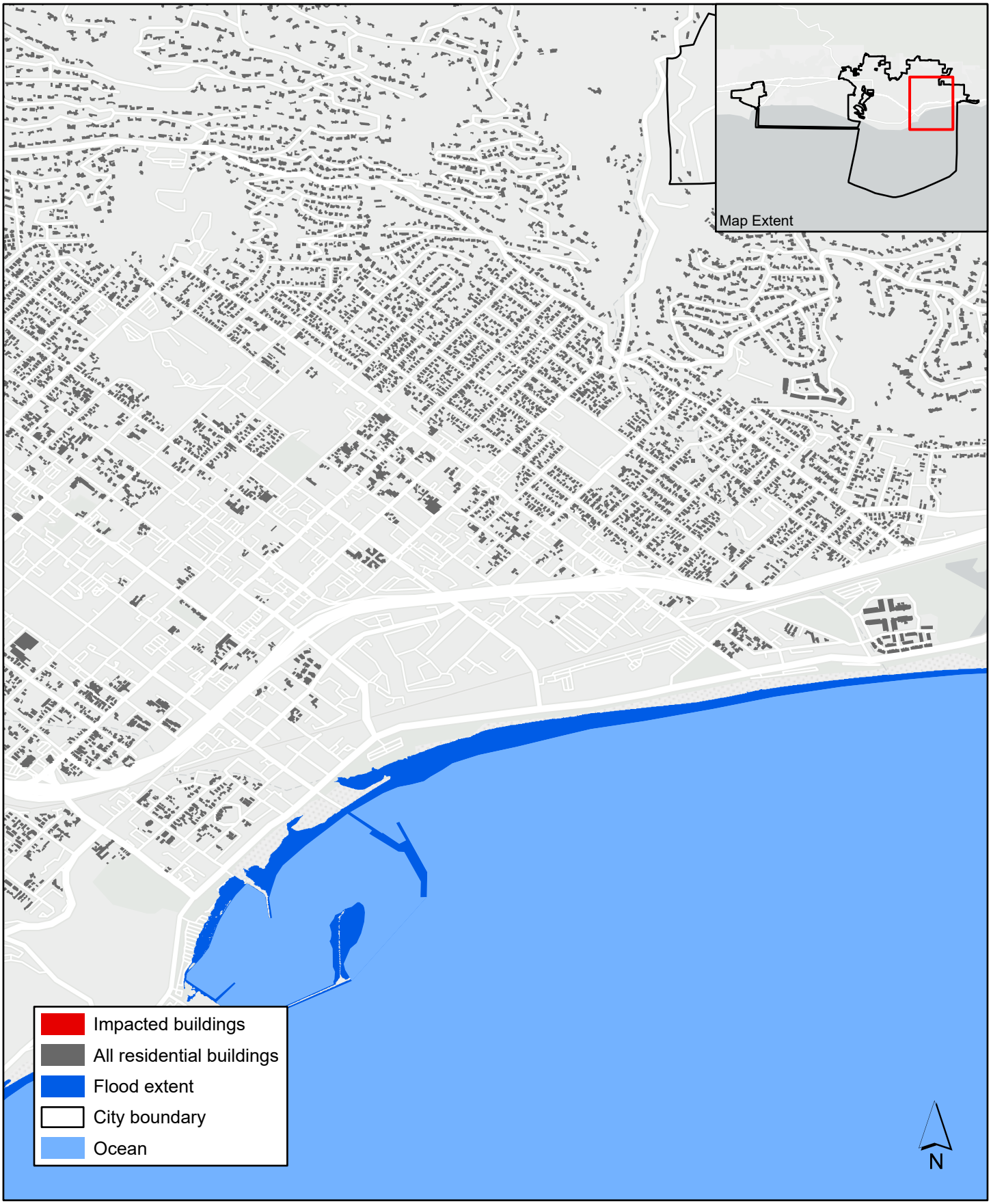
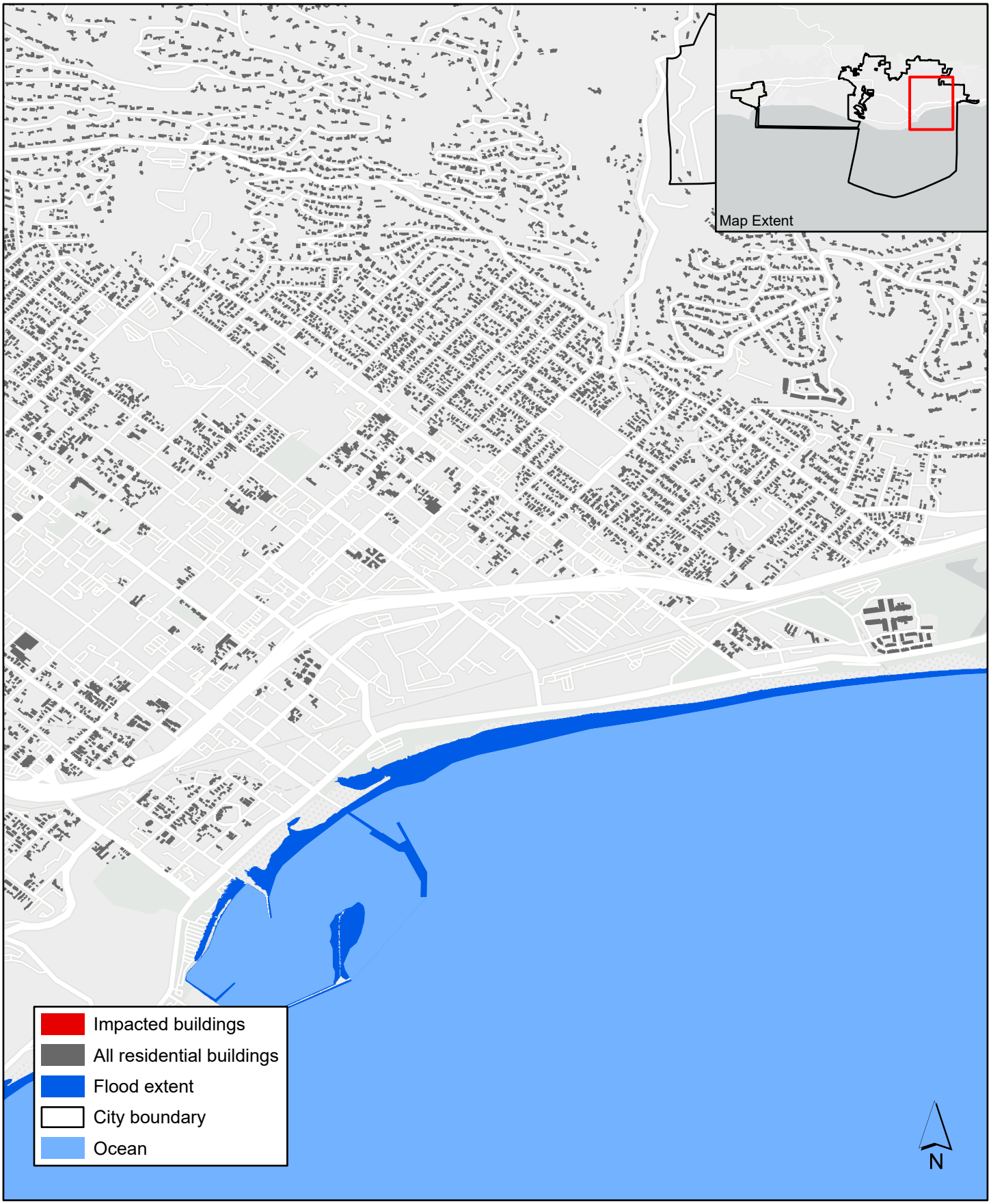
Santa Barbara Area 1

Sea Level Rise 0.5 m - 001 year storm



Santa Barbara Area 1

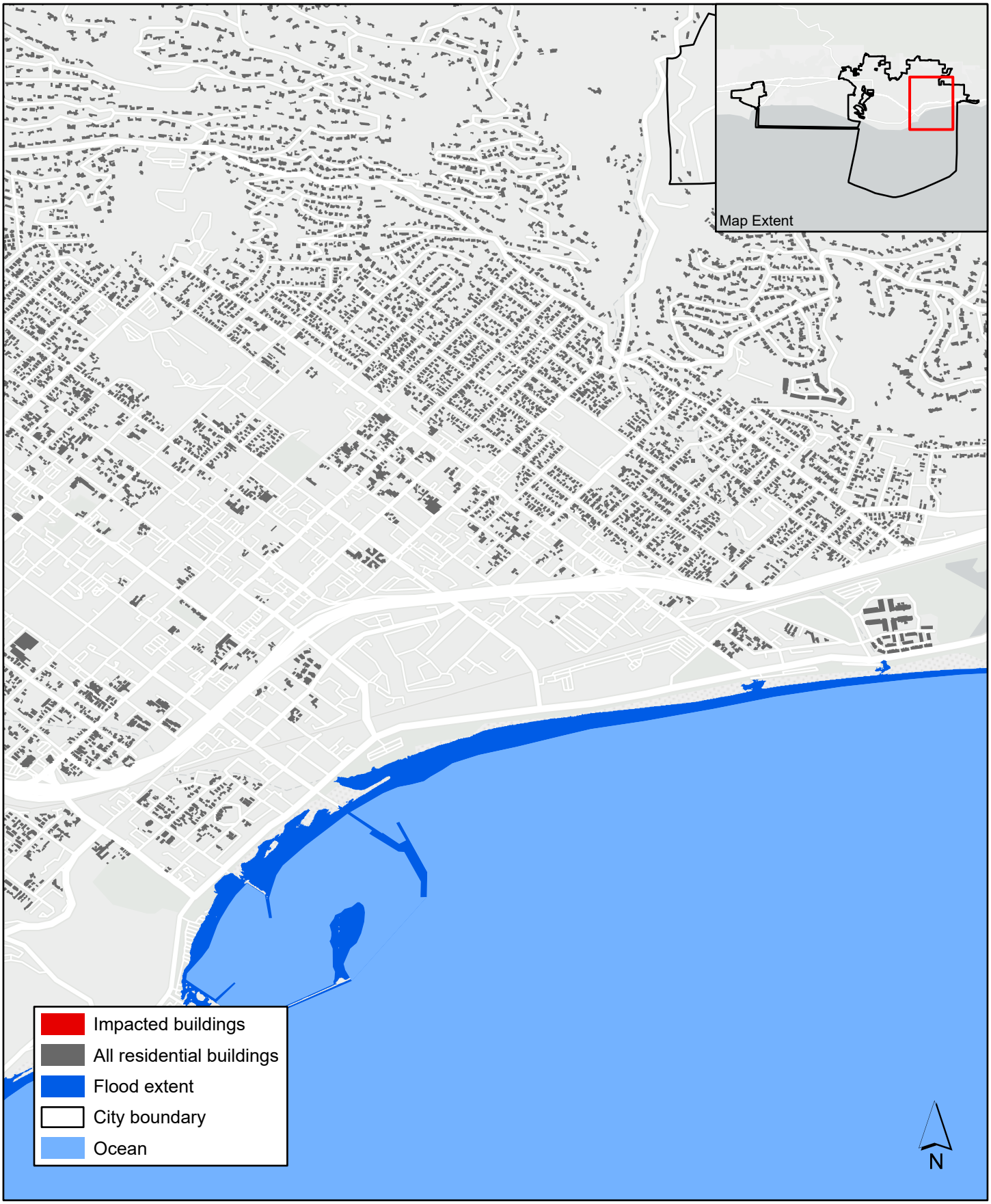
Sea Level Rise 0.5 m - 020 year storm



Appendix D

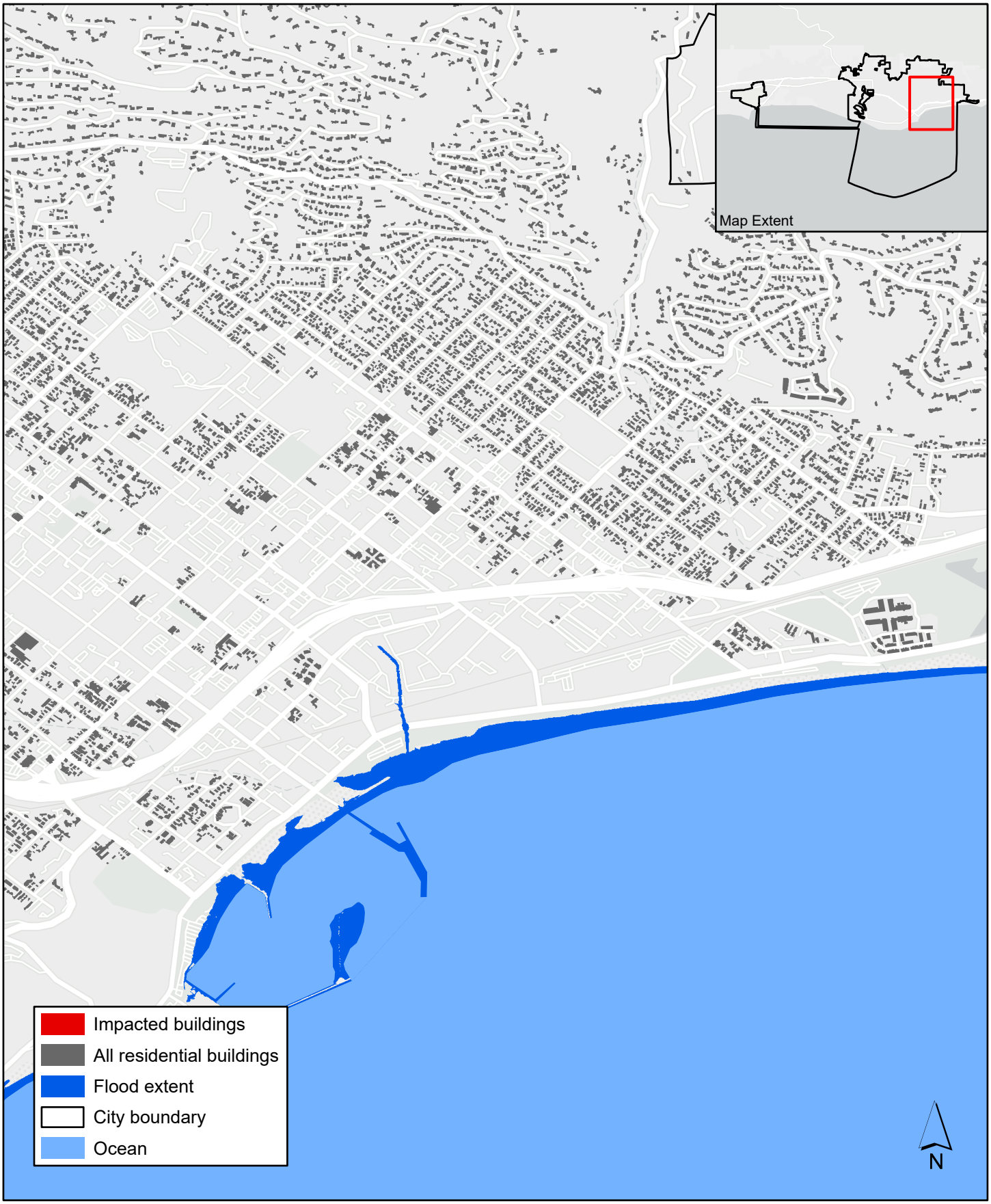
Santa Barbara Area 1

Sea Level Rise 0.5 m - 100 year storm



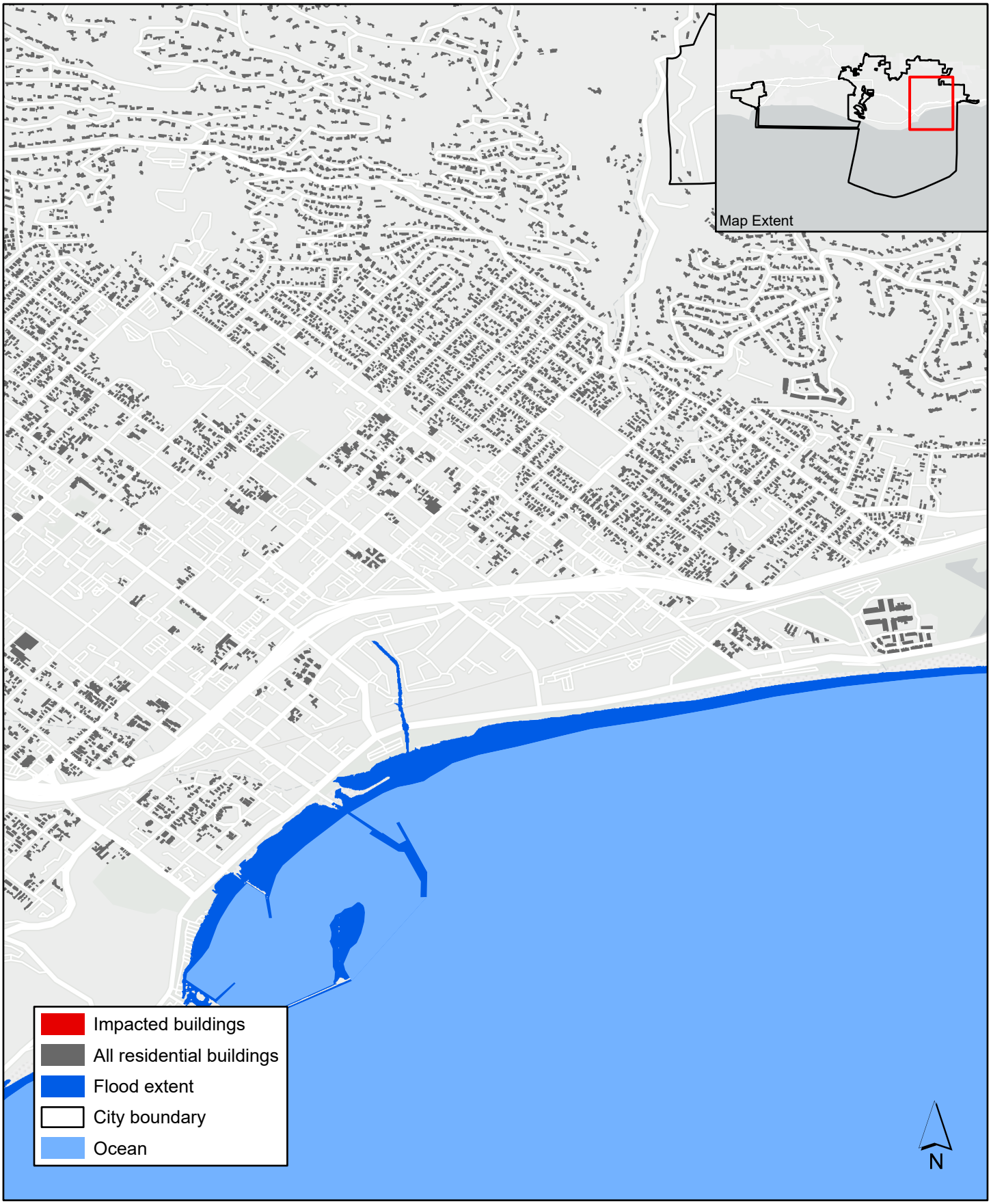
Santa Barbara Area 1

Sea Level Rise 0.75 m - No storm



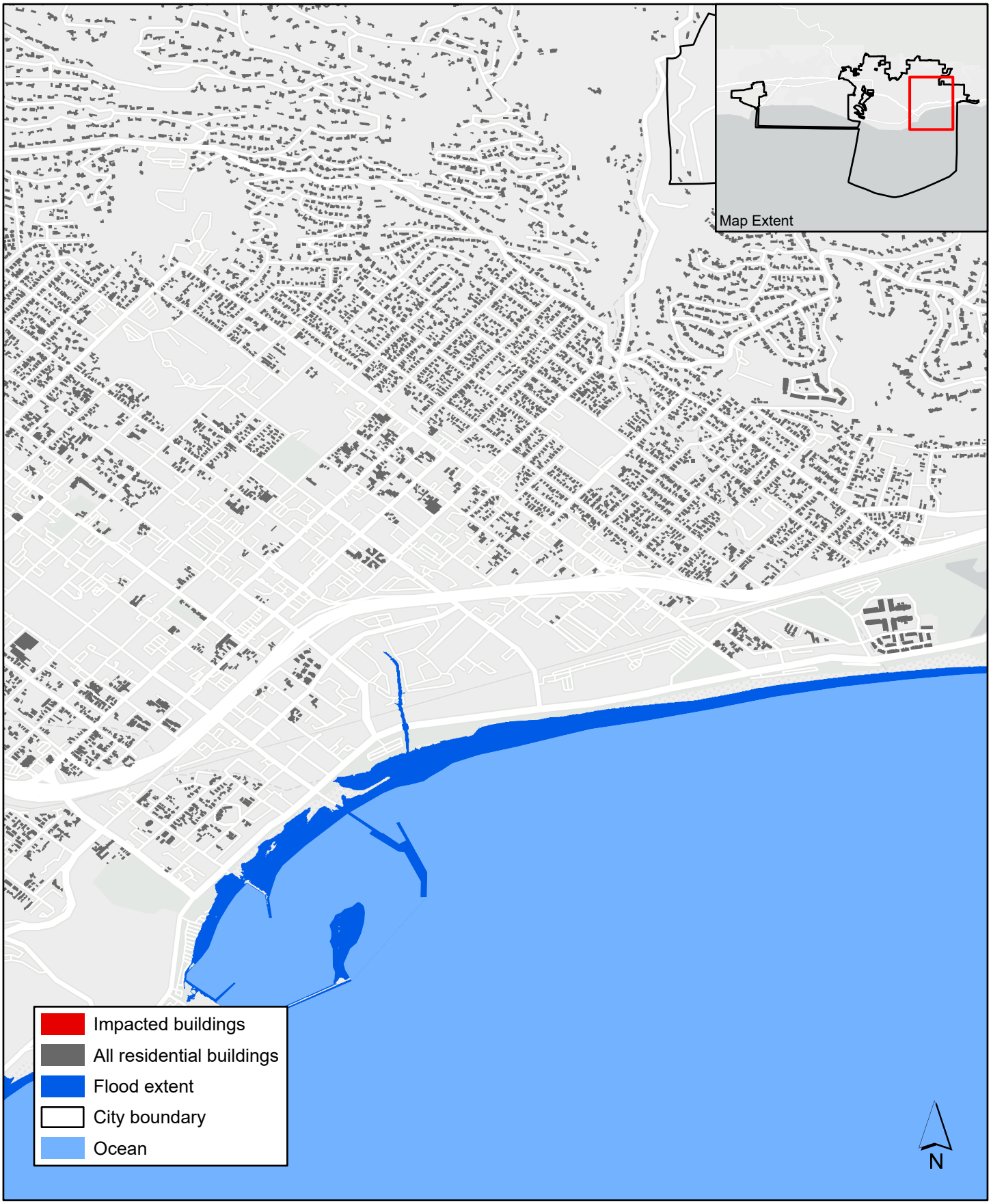
Santa Barbara Area 1

Sea Level Rise 0.75 m - 001 year storm



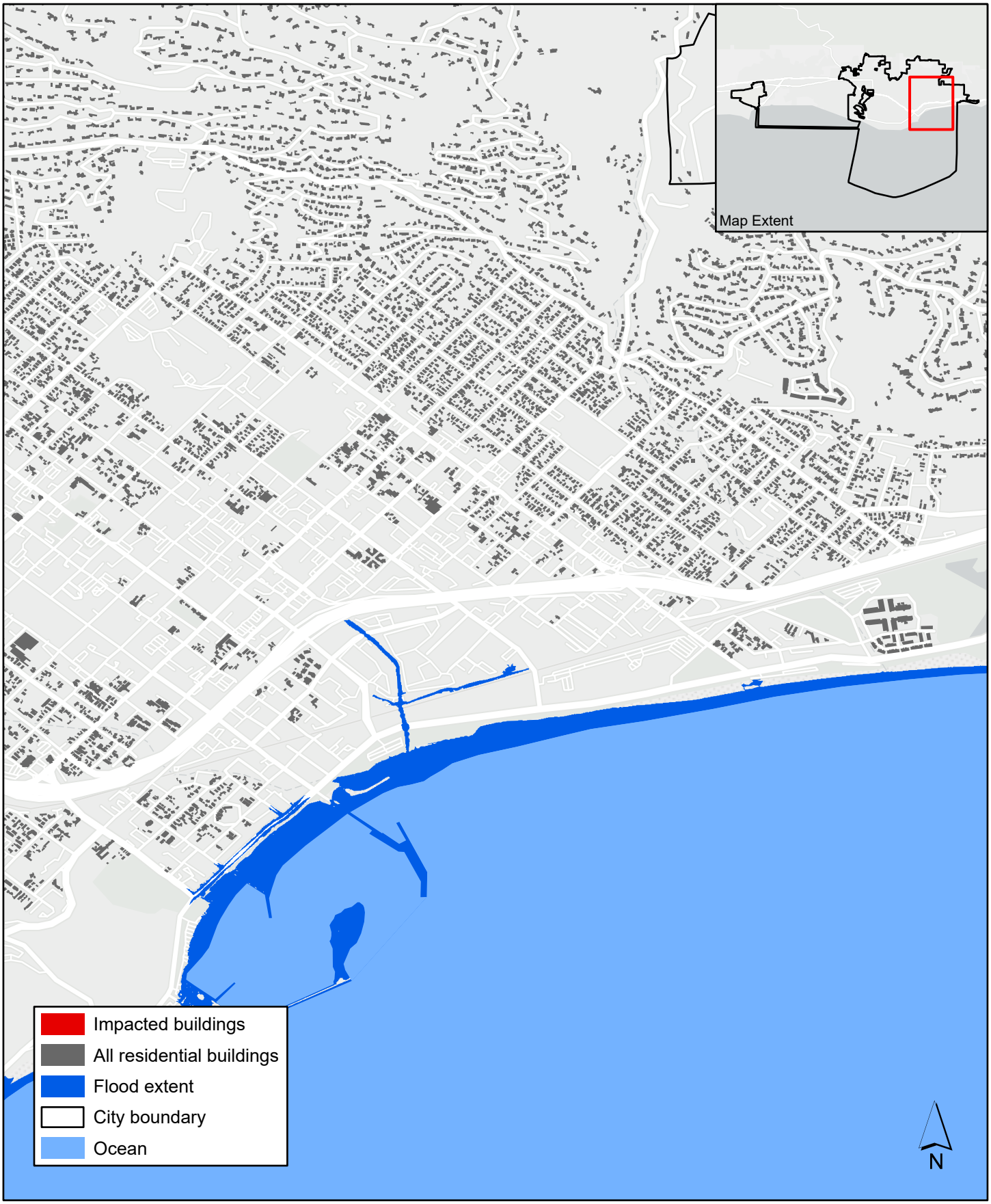
Santa Barbara Area 1

Sea Level Rise 0.75 m - 020 year storm



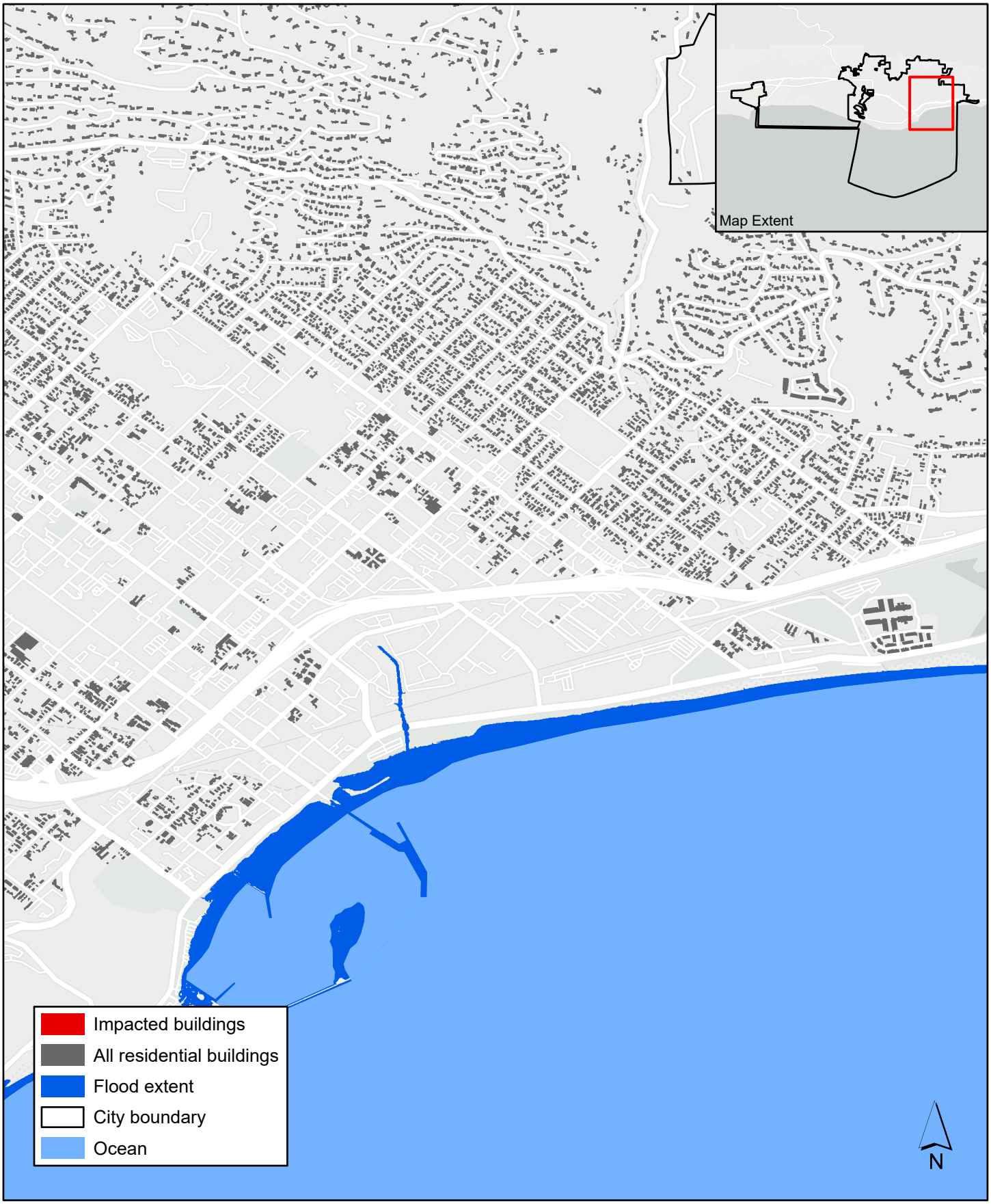
Santa Barbara Area 1

Sea Level Rise 0.75 m - 100 year storm



Santa Barbara Area 1

Sea Level Rise 1.0 m - No storm



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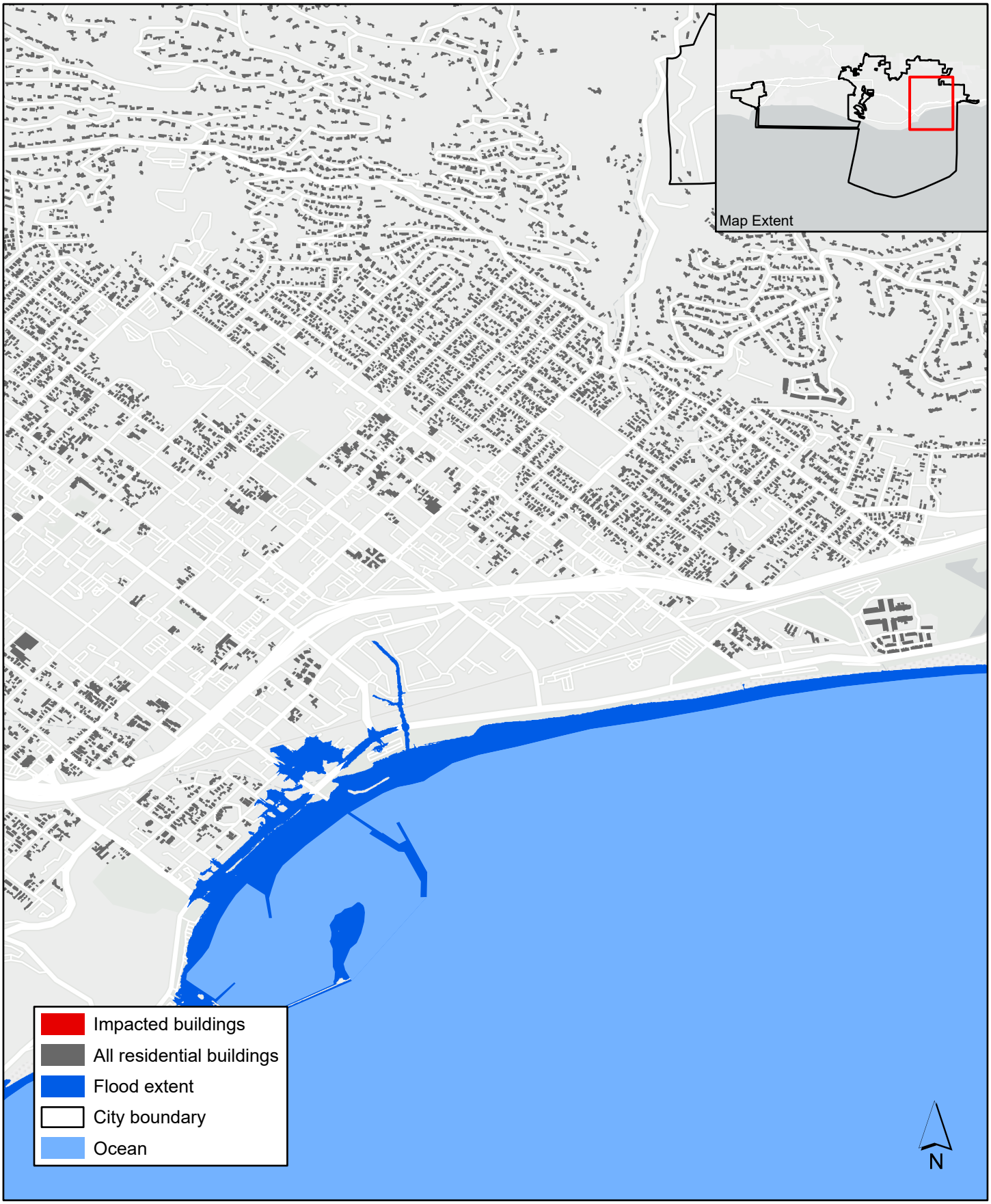
Santa Barbara Area 1

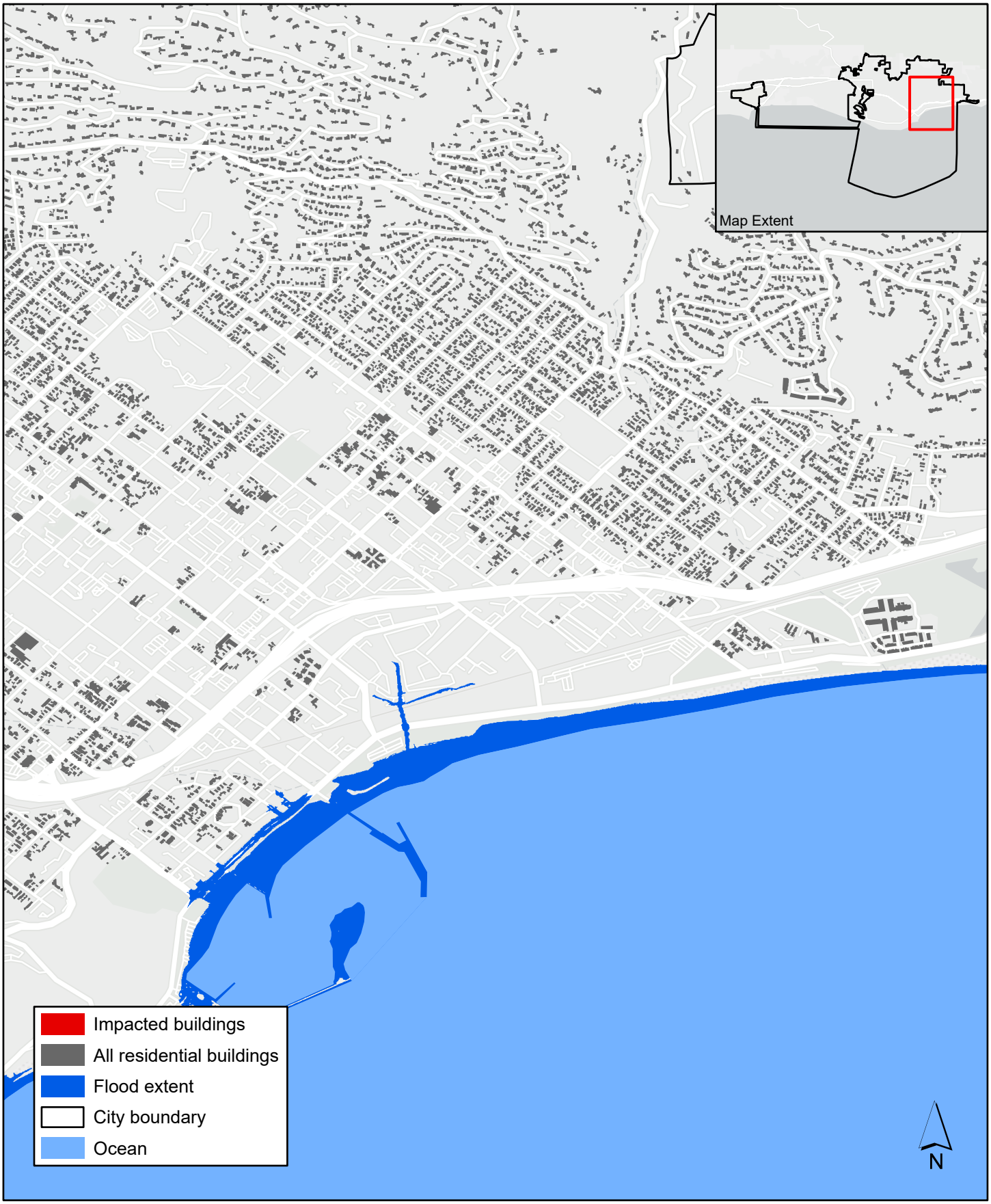
Sea Level Rise 1.0 m - 001 year storm



Appendix D

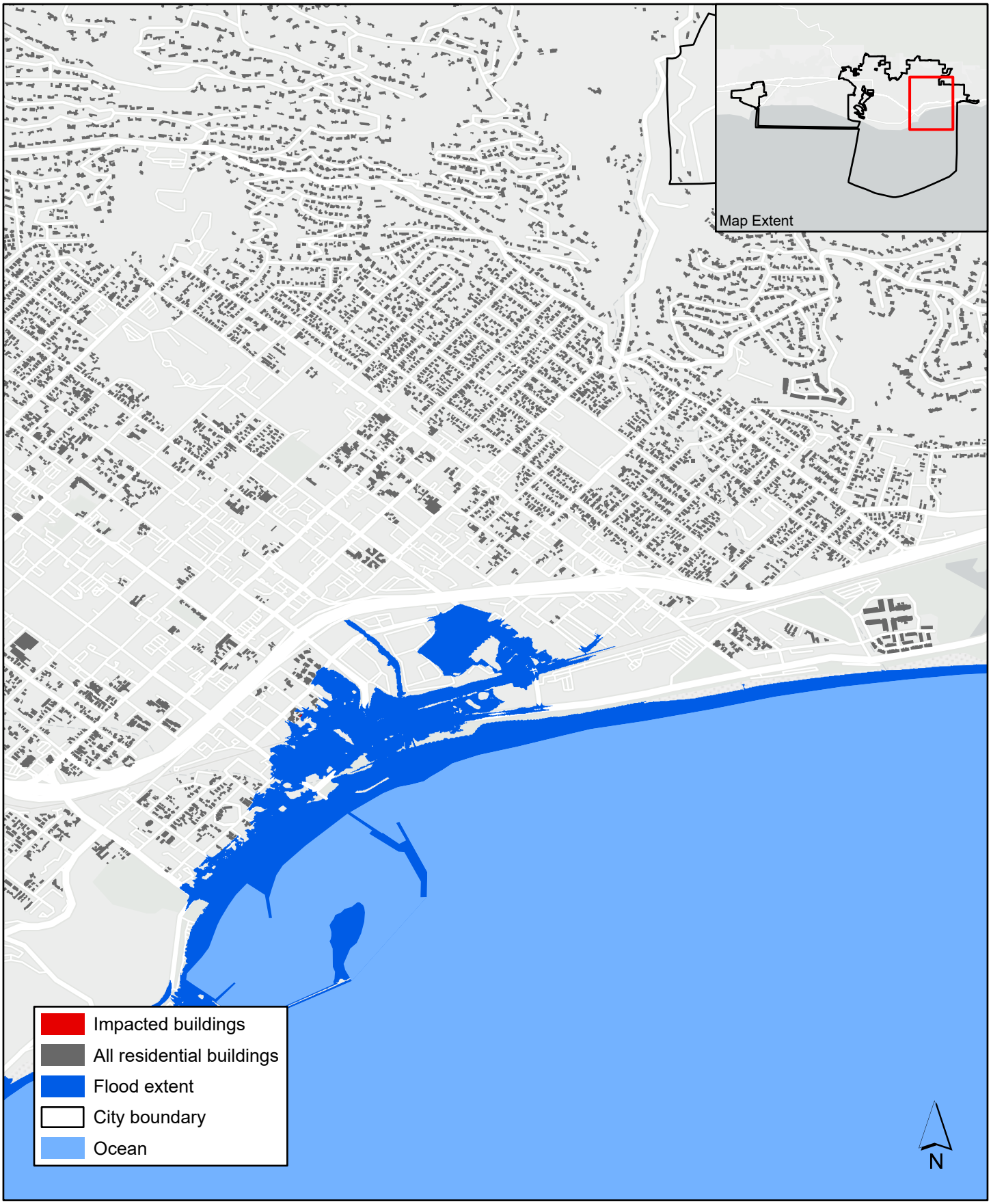
Santa Barbara Area 1

Sea Level Rise 1.0 m - 020 year storm



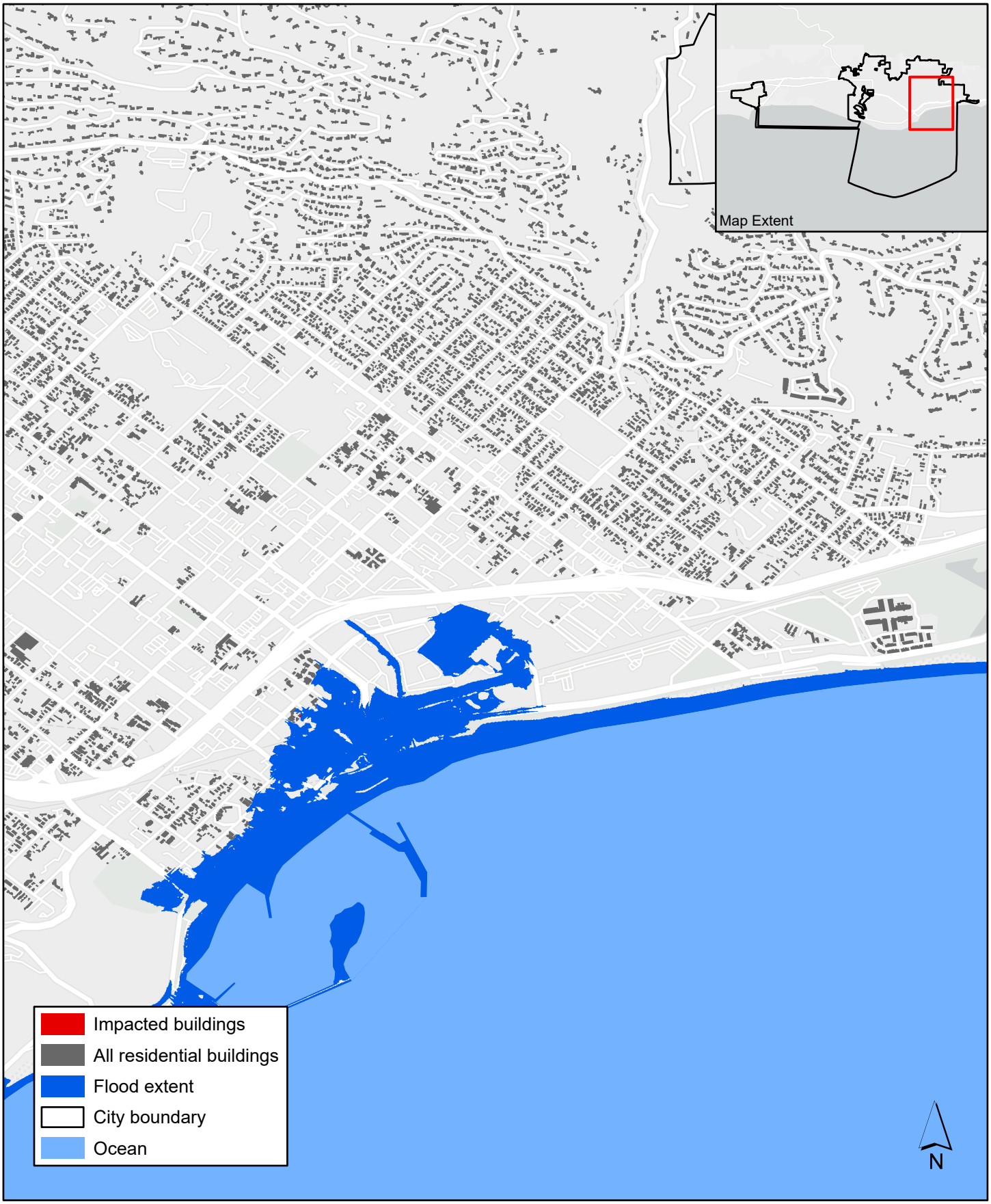
Santa Barbara Area 1

Sea Level Rise 1.0 m - 100 year storm



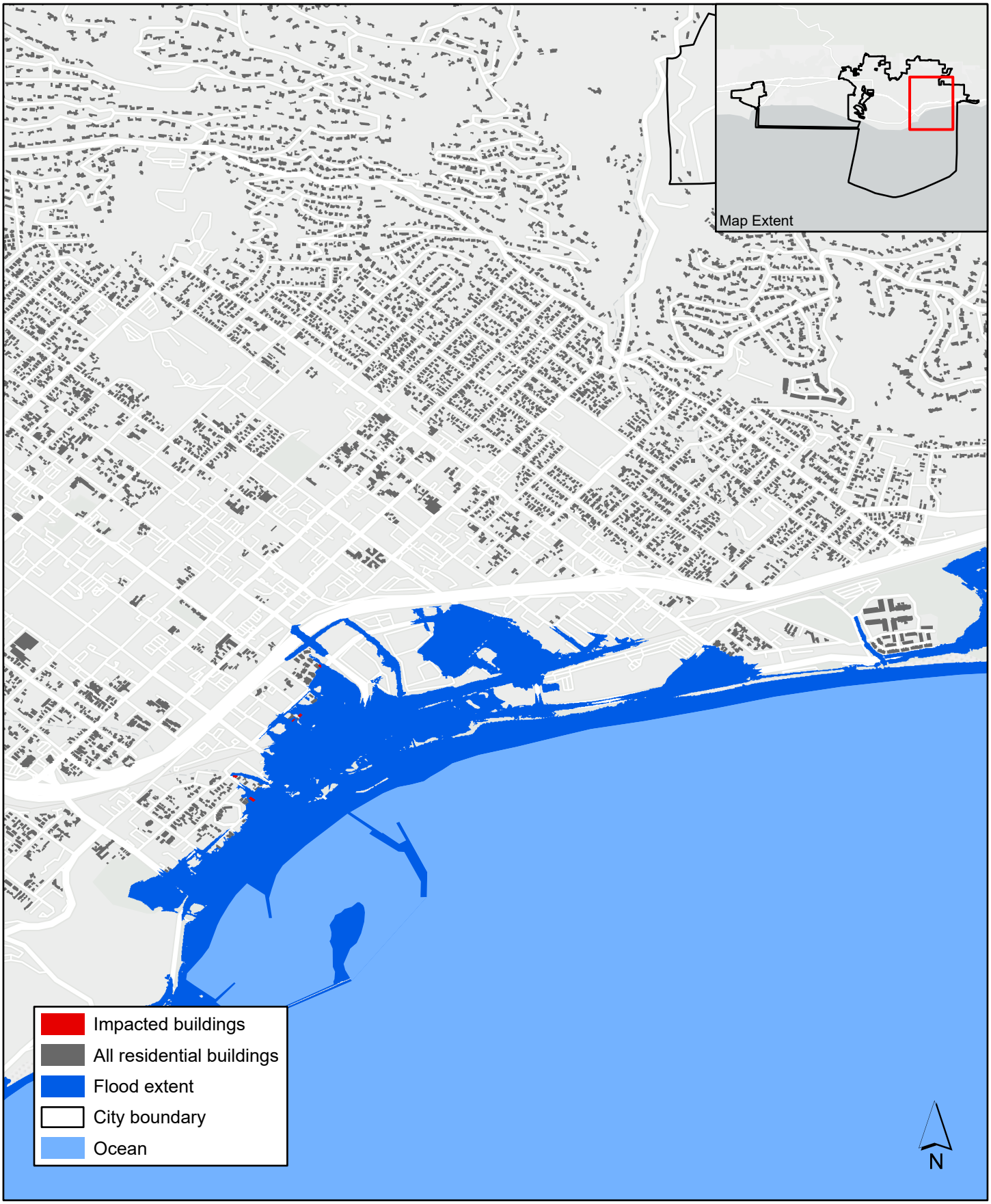
Santa Barbara Area 1

Sea Level Rise 1.5 m - No storm



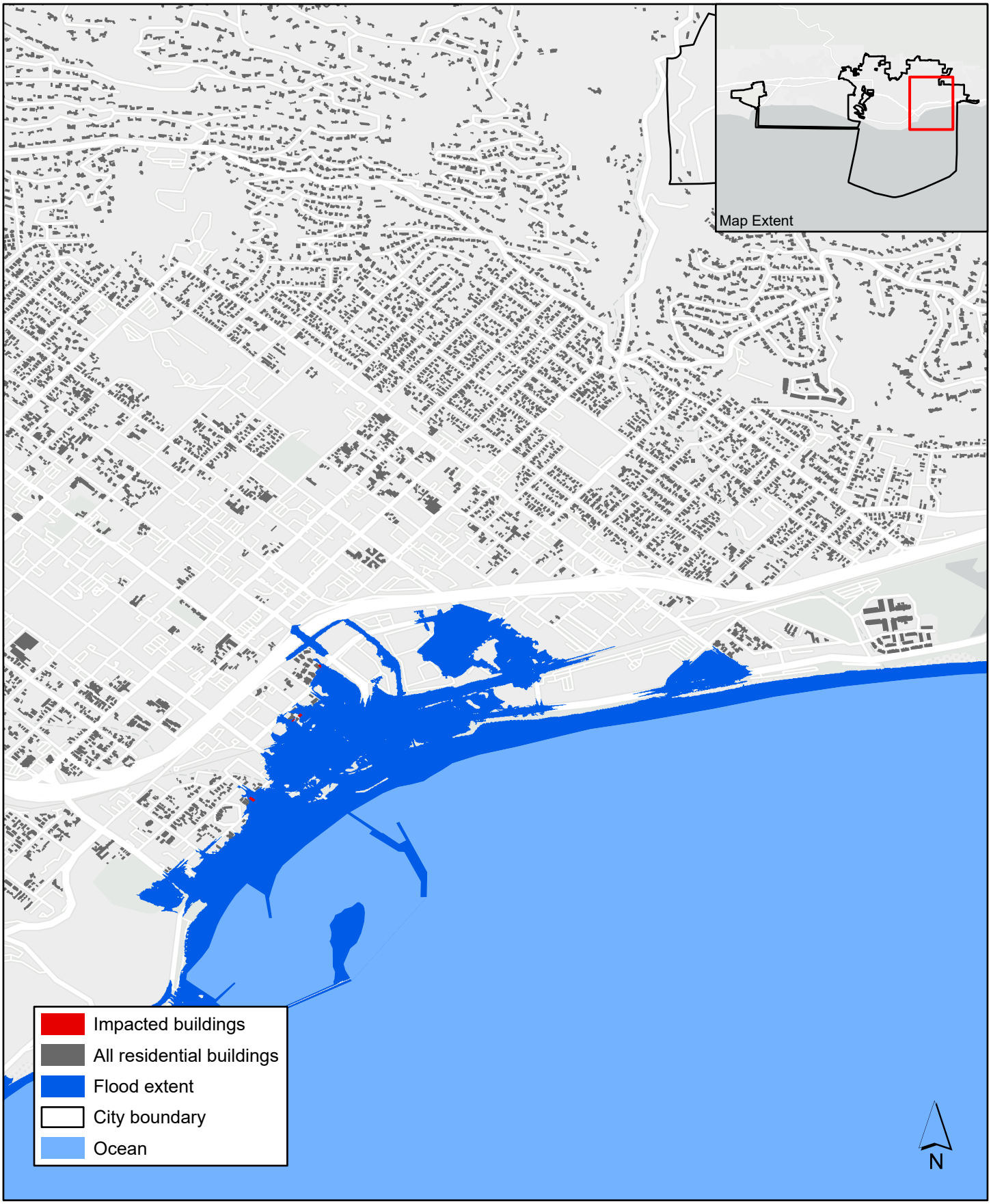
Santa Barbara Area 1

Sea Level Rise 1.5 m - 001 year storm



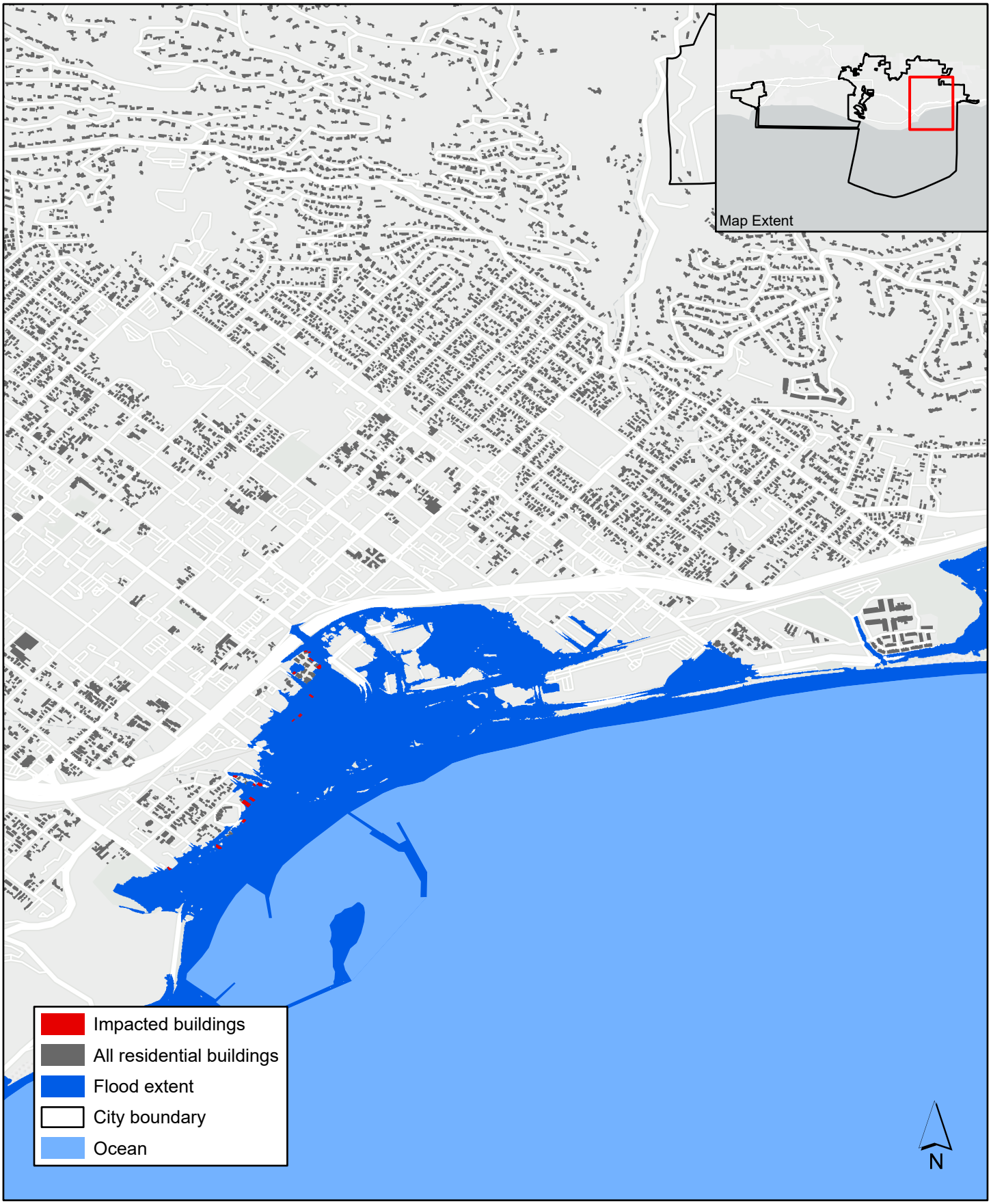
Santa Barbara Area 1

Sea Level Rise 1.5 m - 020 year storm



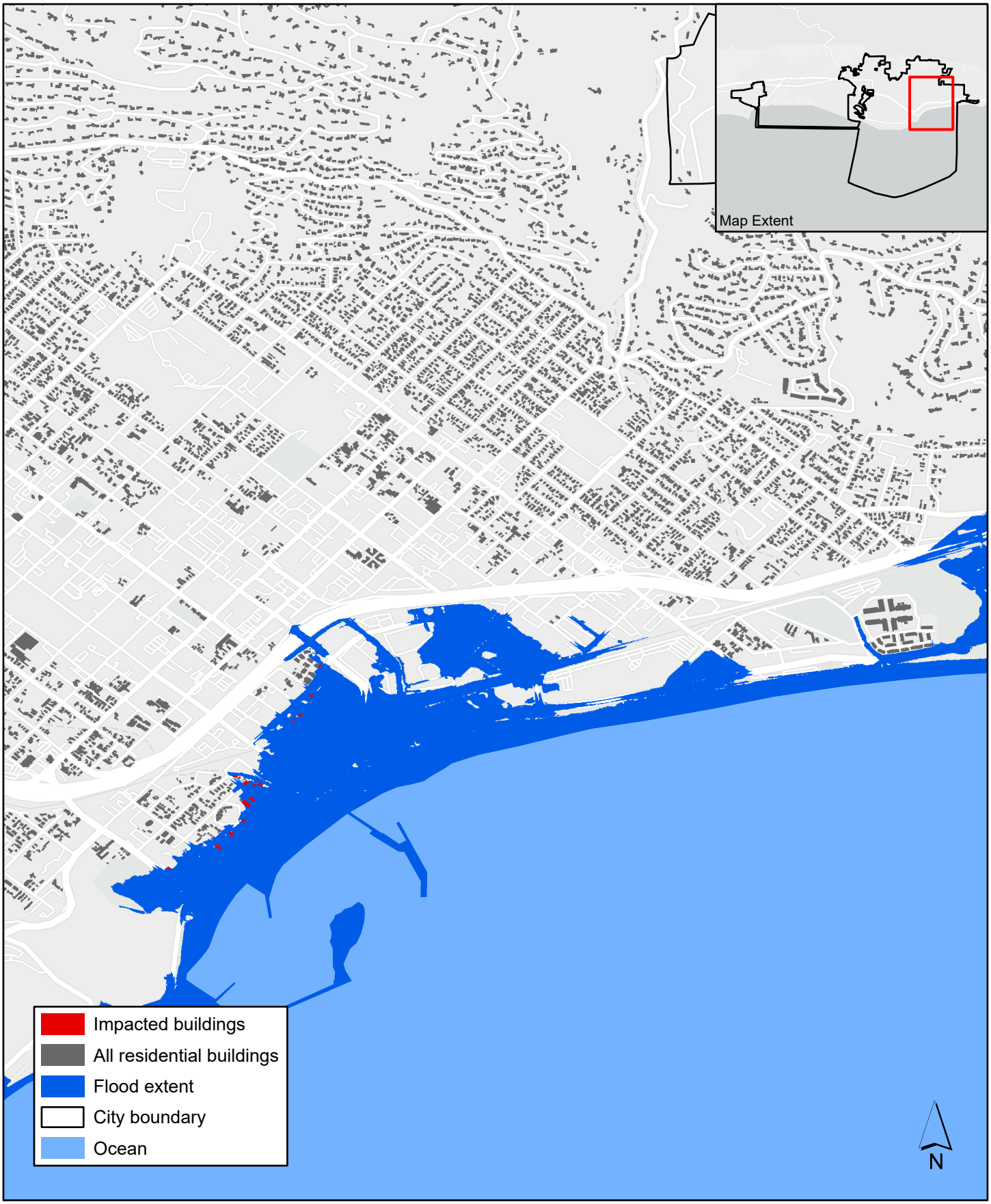
Santa Barbara Area 1

Sea Level Rise 1.5 m - 100 year storm



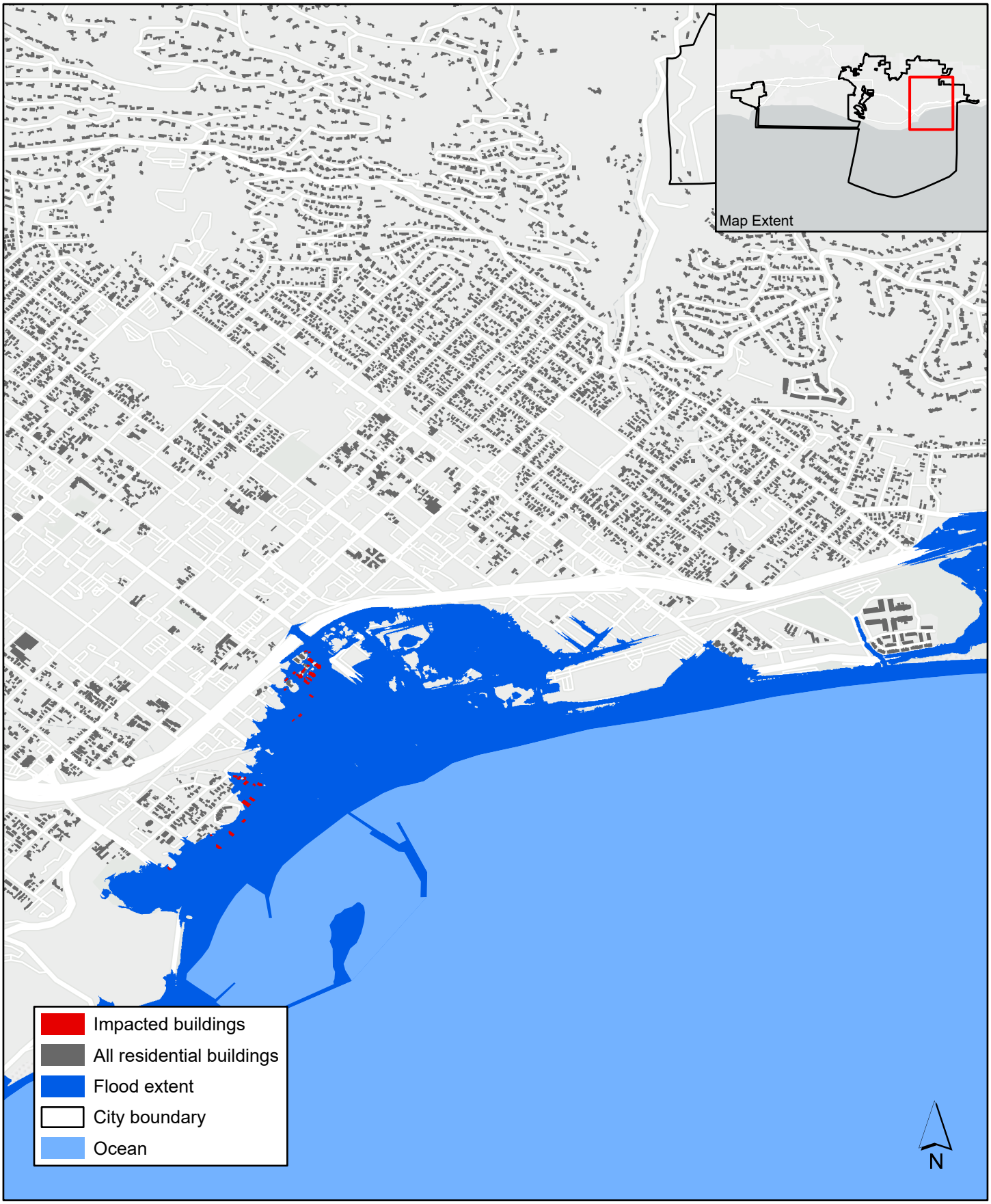
Santa Barbara Area 1

Sea Level Rise 2.0 m - No storm



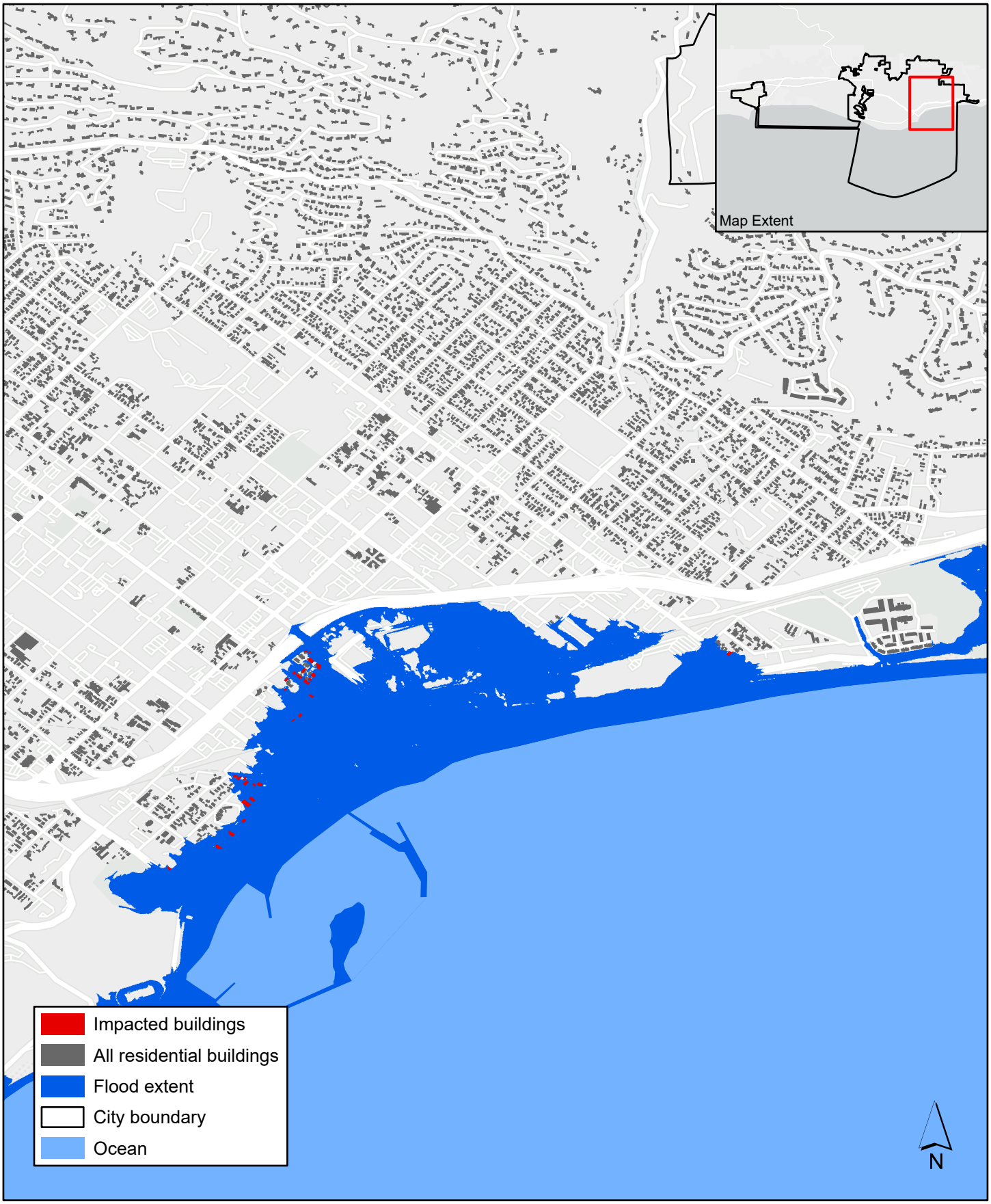
Santa Barbara Area 1

Sea Level Rise 2.0 m - 001 year storm



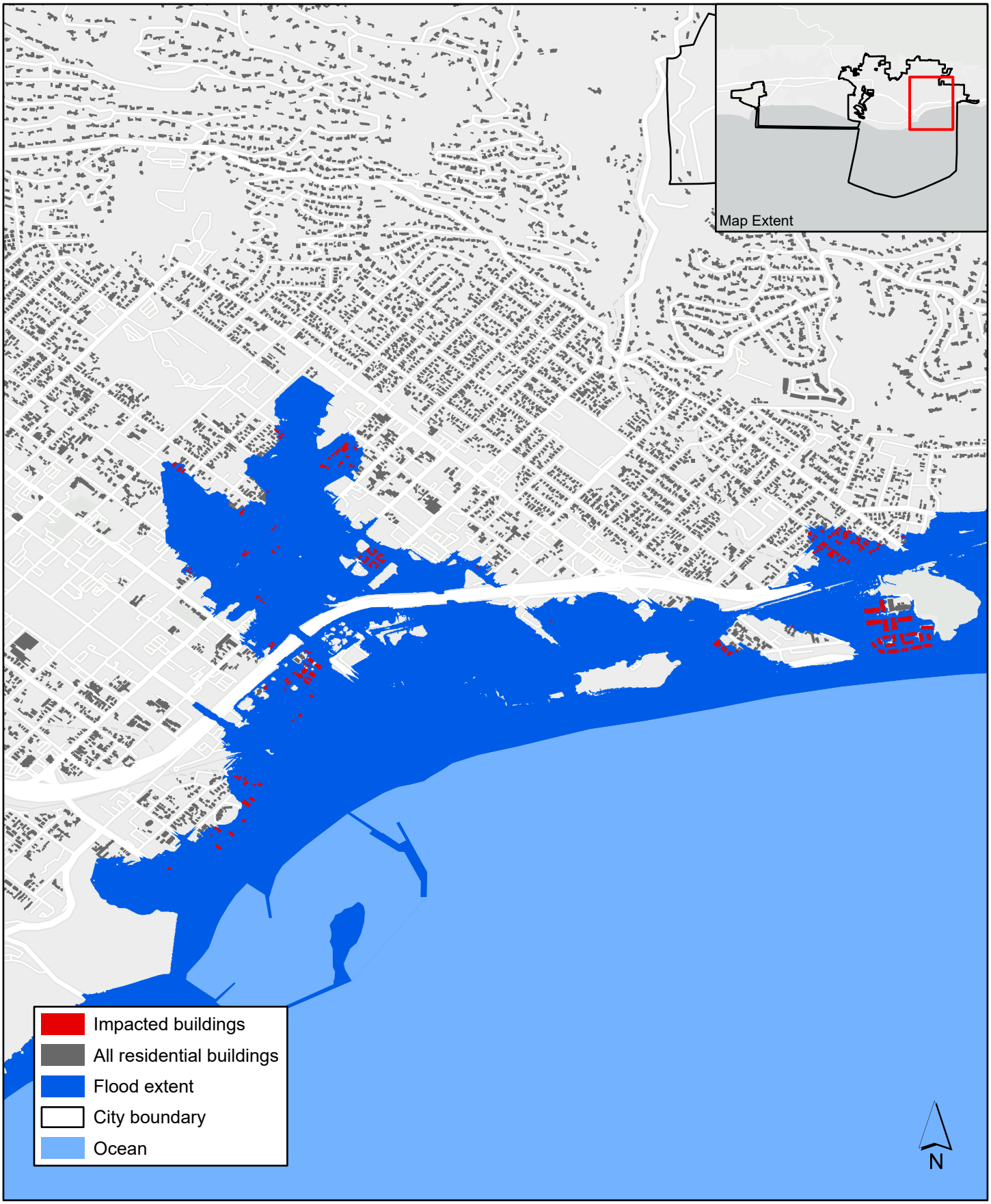
Santa Barbara Area 1

Sea Level Rise 2.0 m - 020 year storm



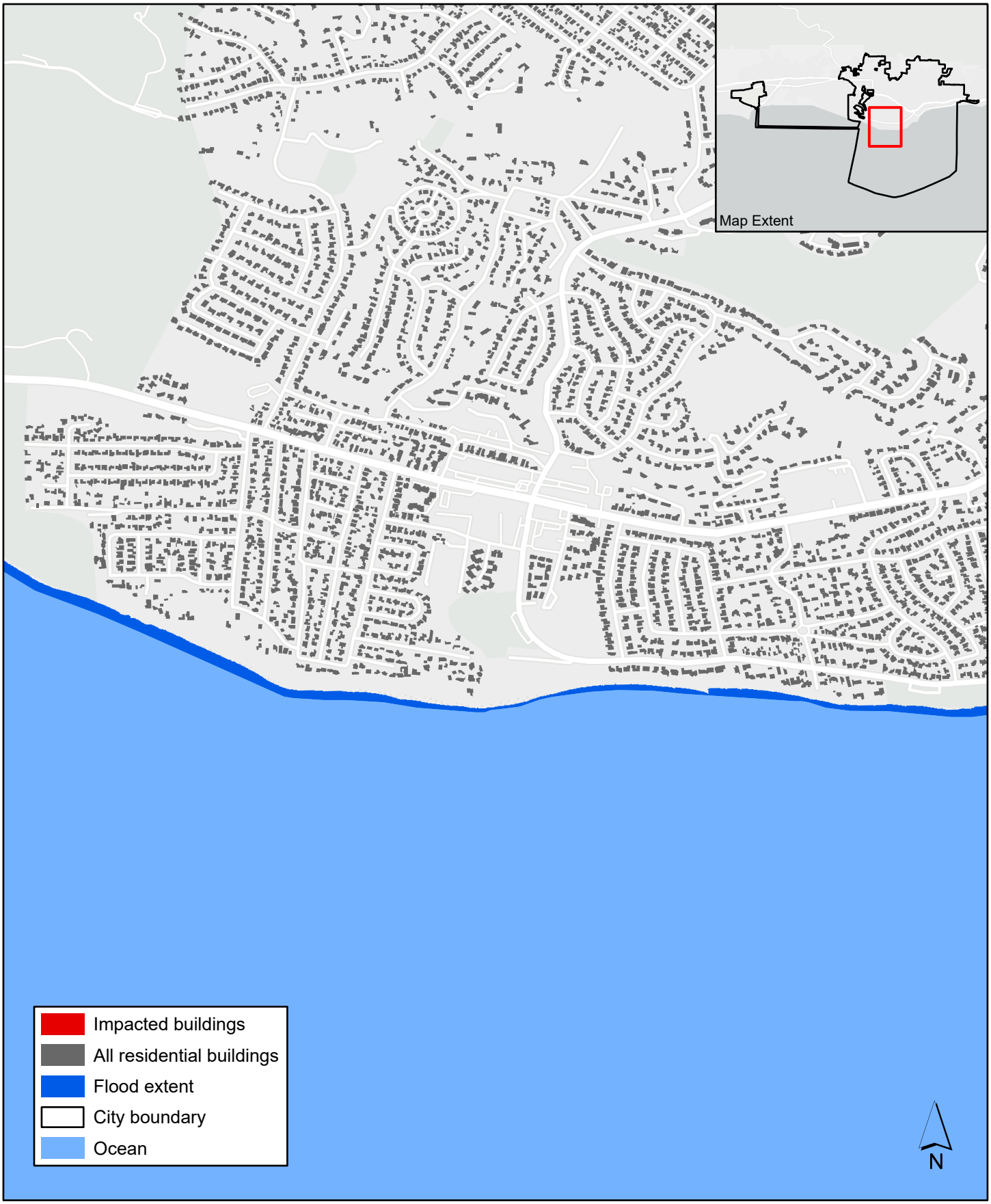
Santa Barbara Area 1

Sea Level Rise 2.0 m - 100 year storm



Santa Barbara Area 2

Sea Level Rise 0.0 m - No storm



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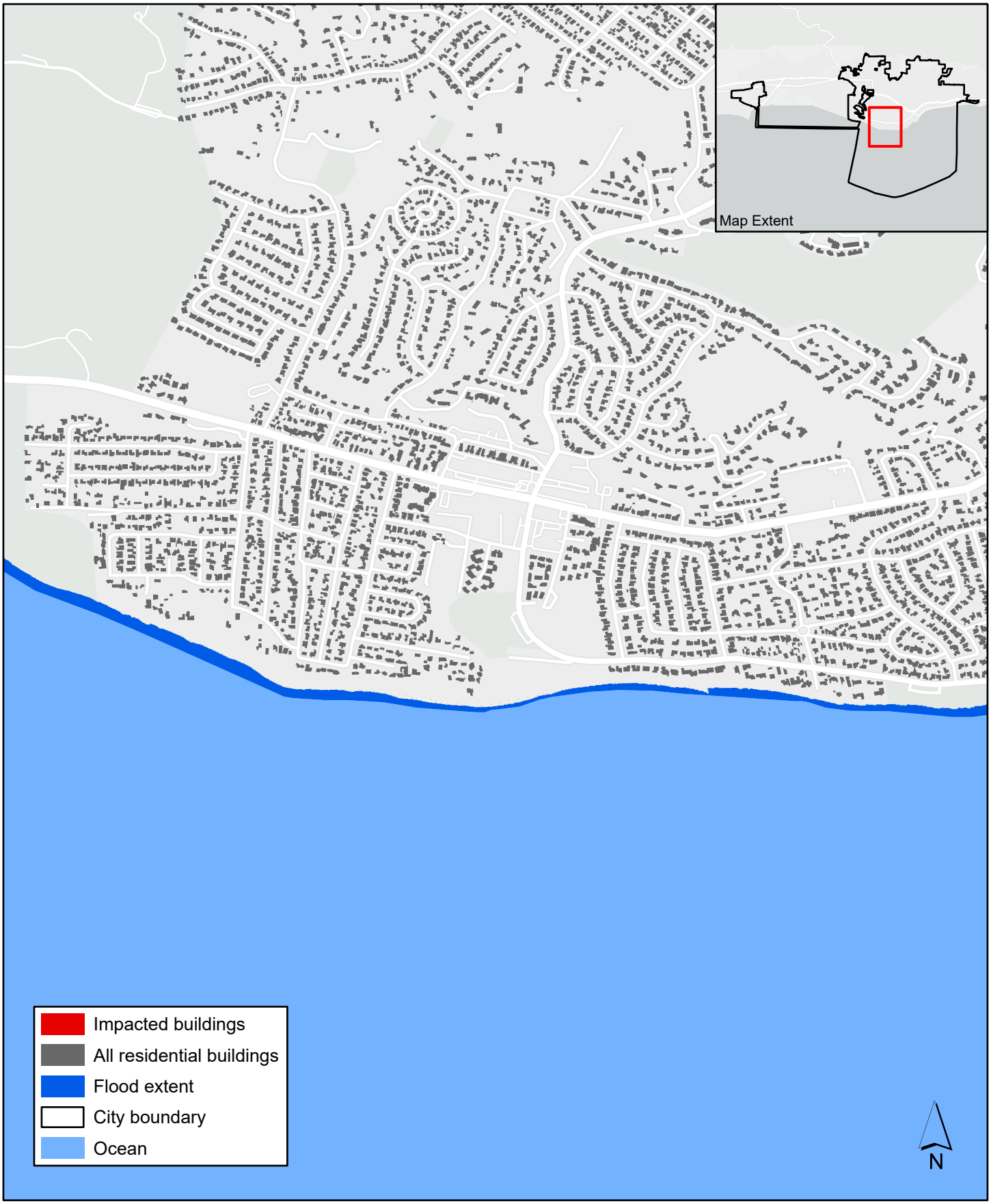
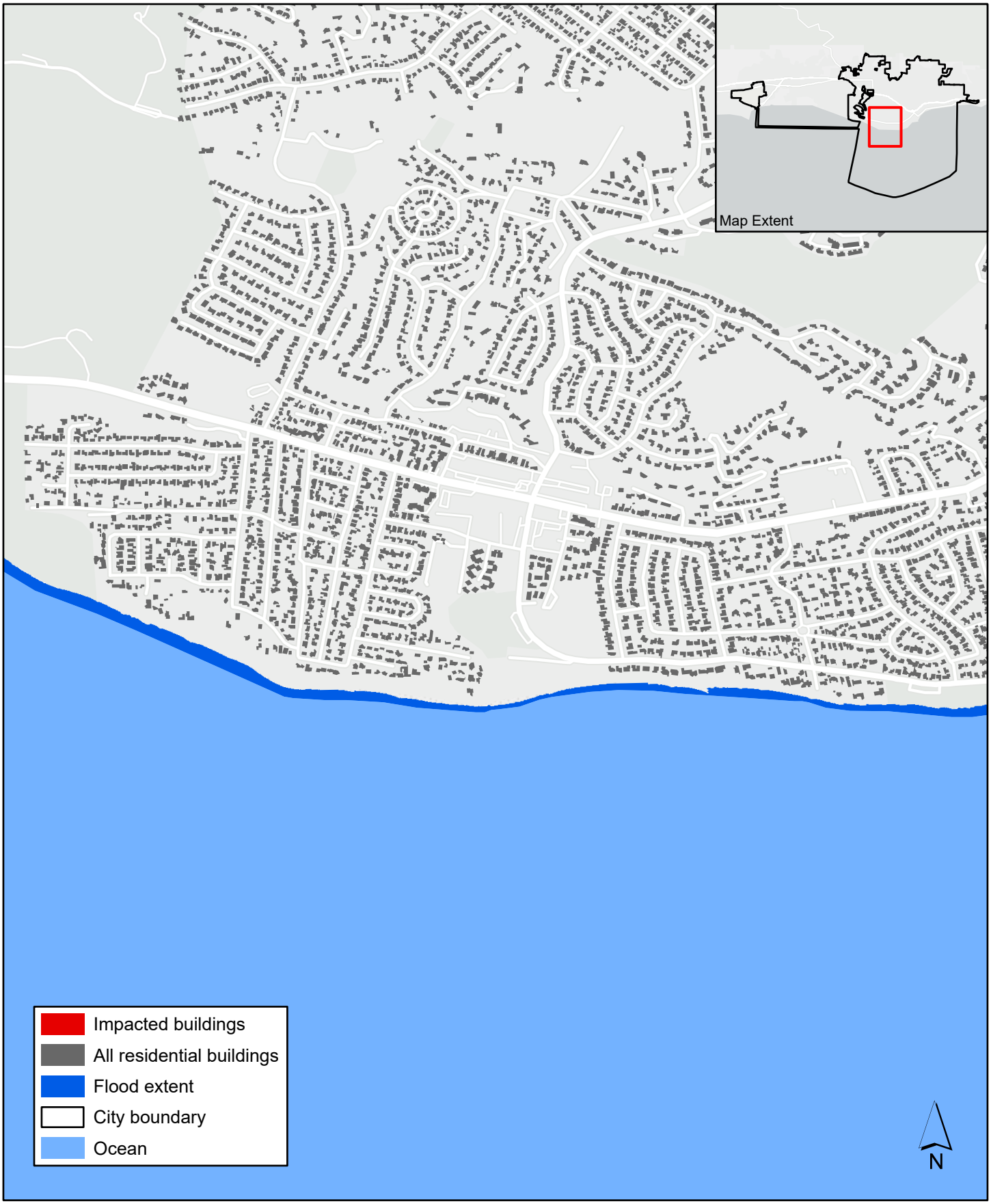
Santa Barbara Area 2

Sea Level Rise 0.0 m - 001 year storm



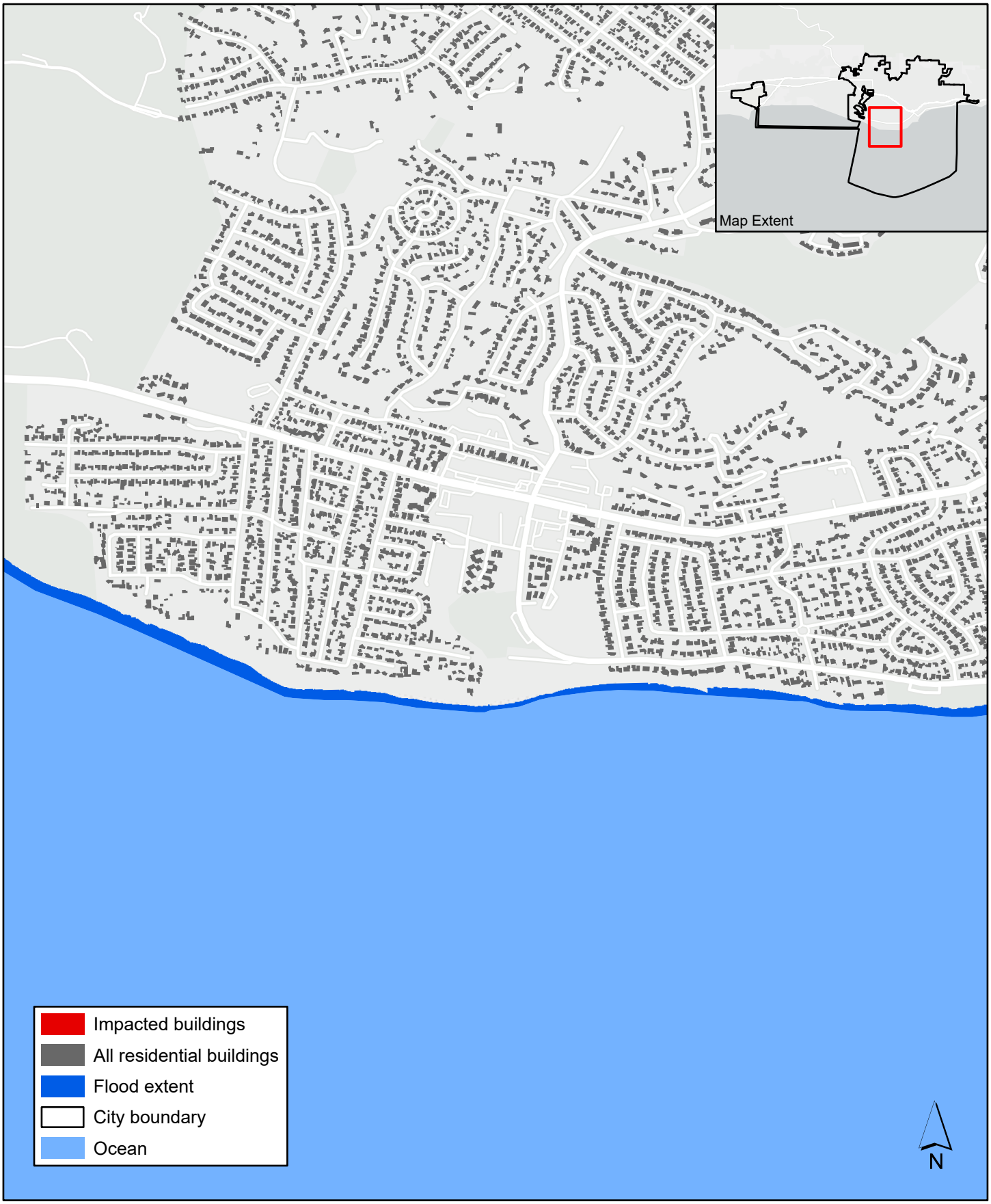
Santa Barbara Area 2

Sea Level Rise 0.0 m - 020 year storm



Santa Barbara Area 2

Sea Level Rise 0.0 m - 100 year storm



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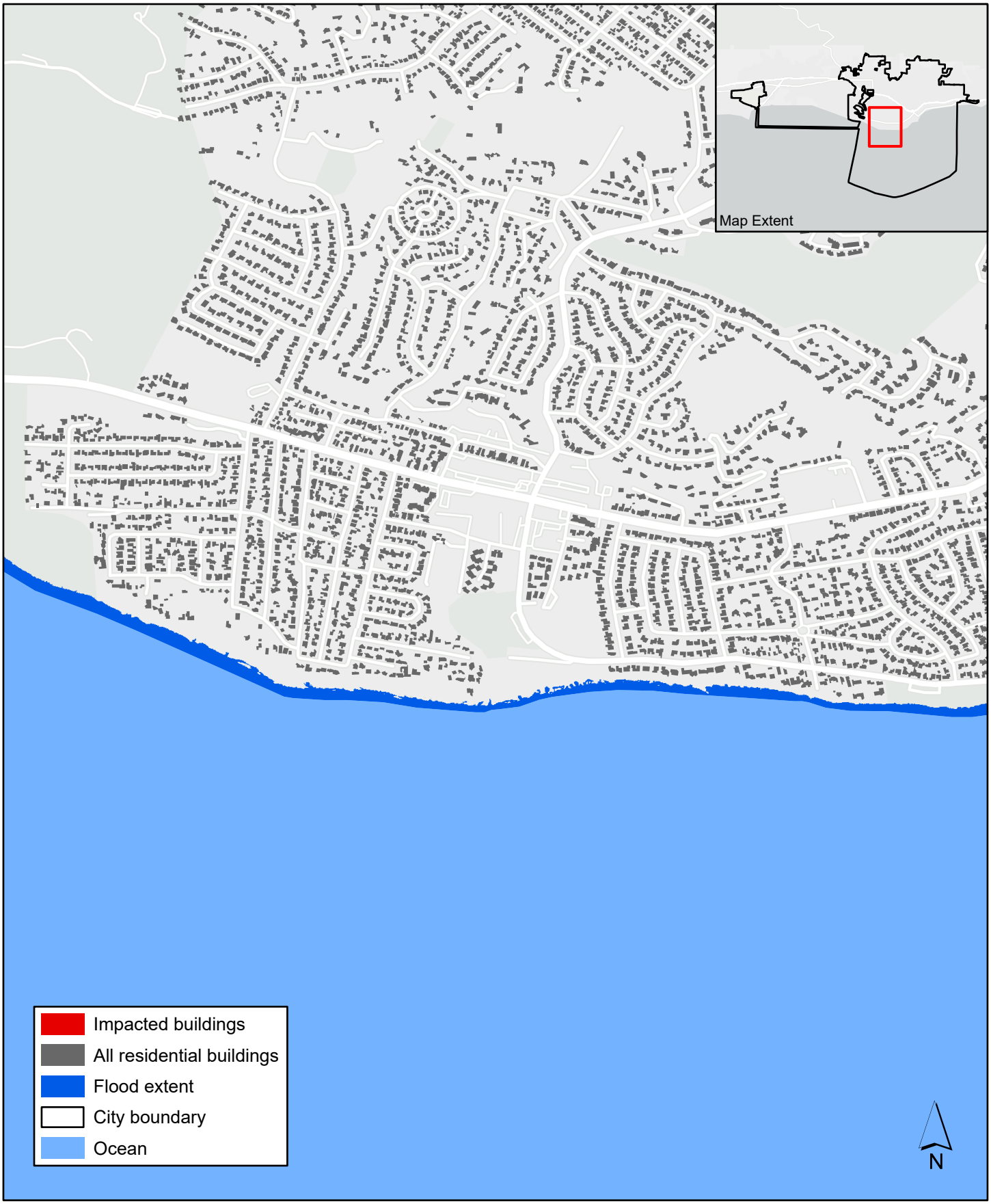
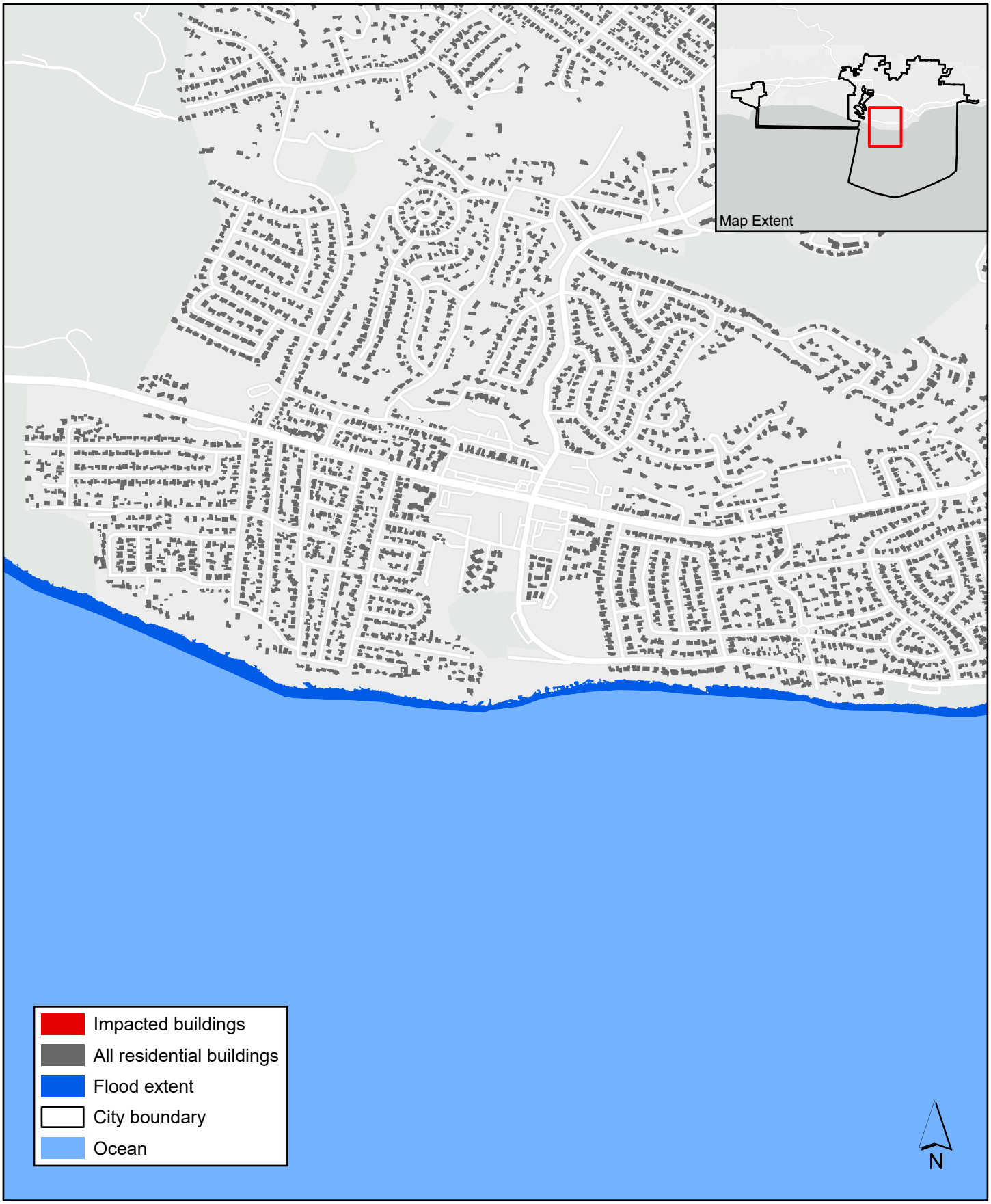
Santa Barbara Area 2

Sea Level Rise 0.25 m - No storm



Santa Barbara Area 2

Sea Level Rise 0.25 m - 001 year storm



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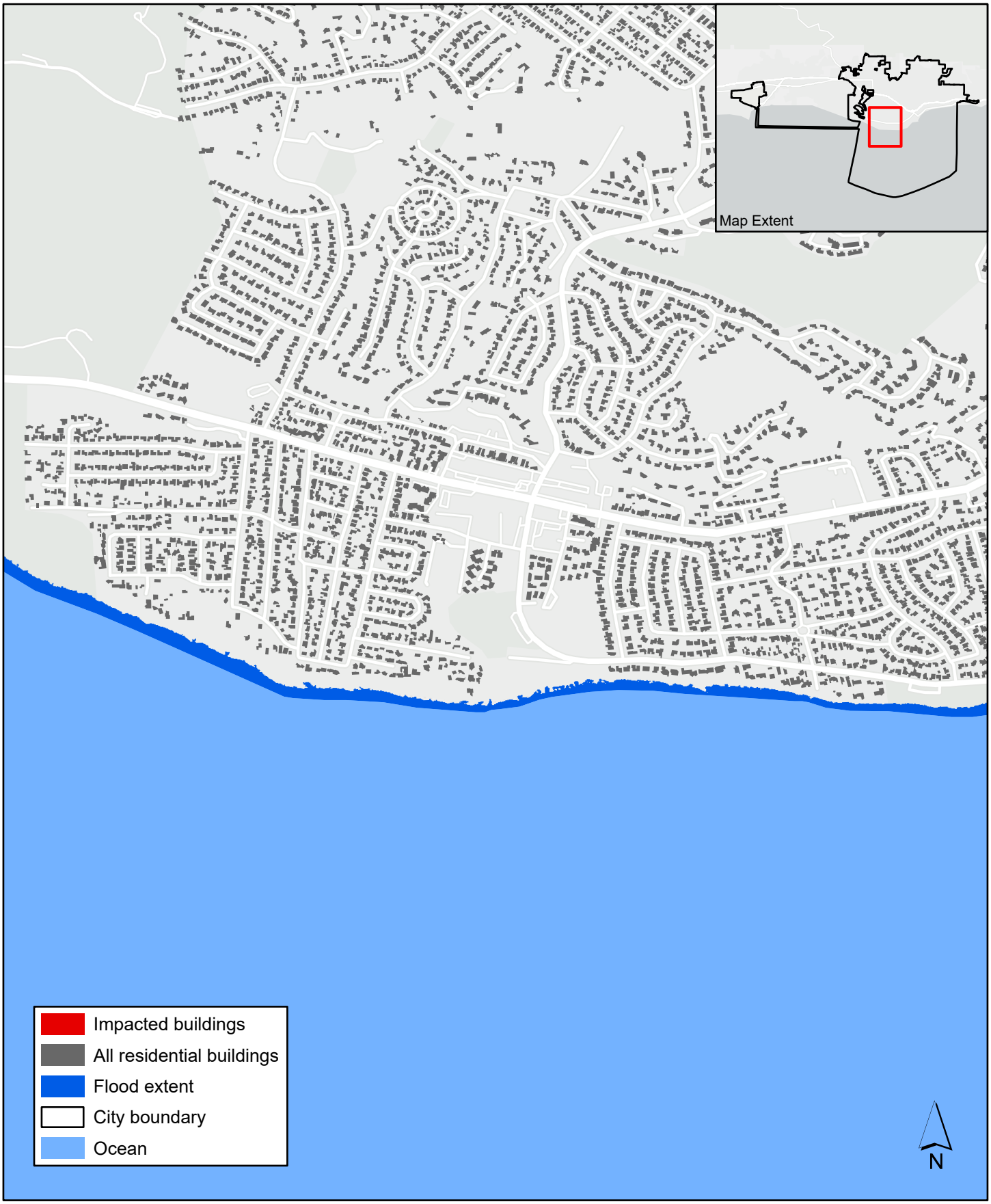
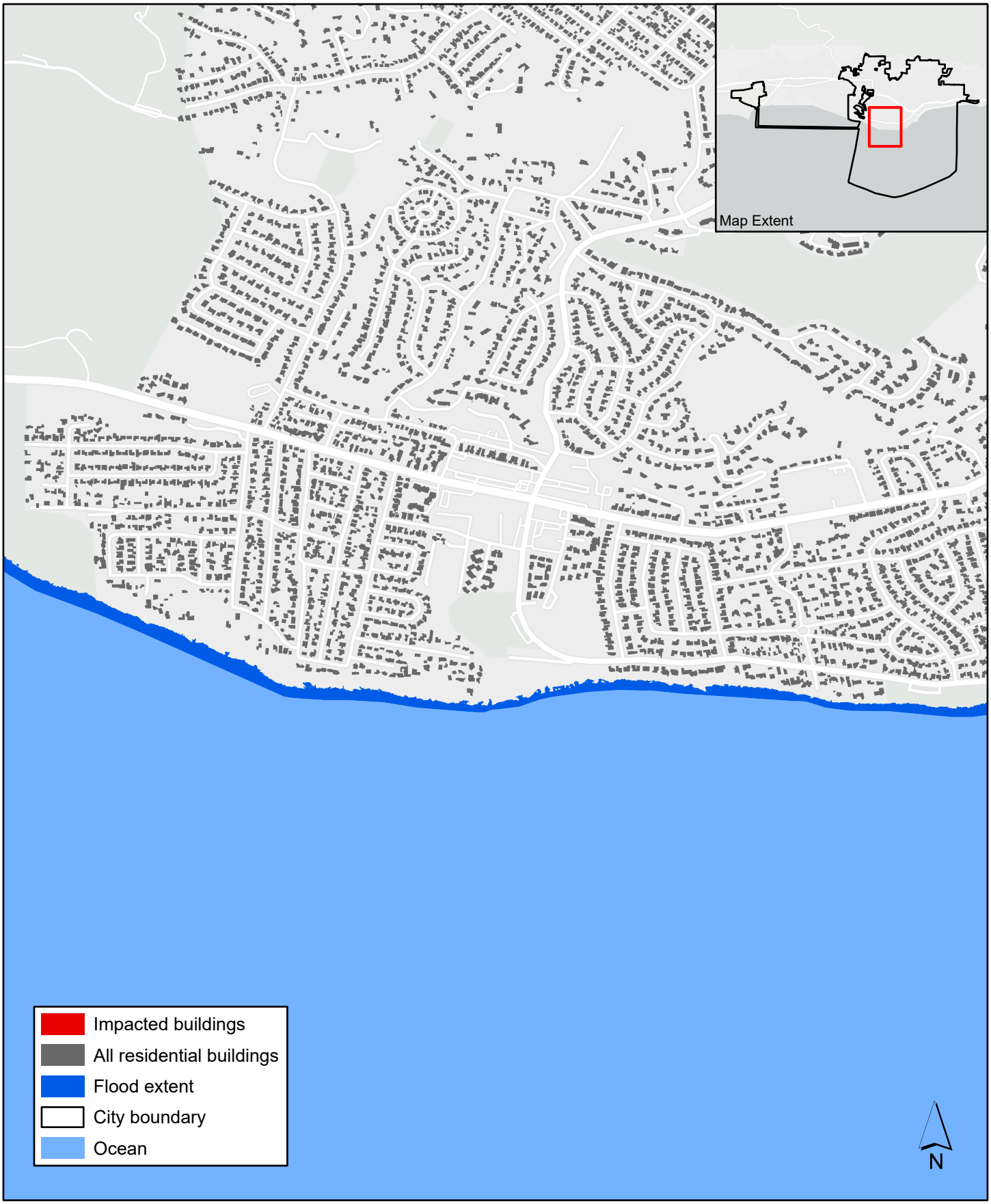
Santa Barbara Area 2

Sea Level Rise 0.25 m - 020 year storm



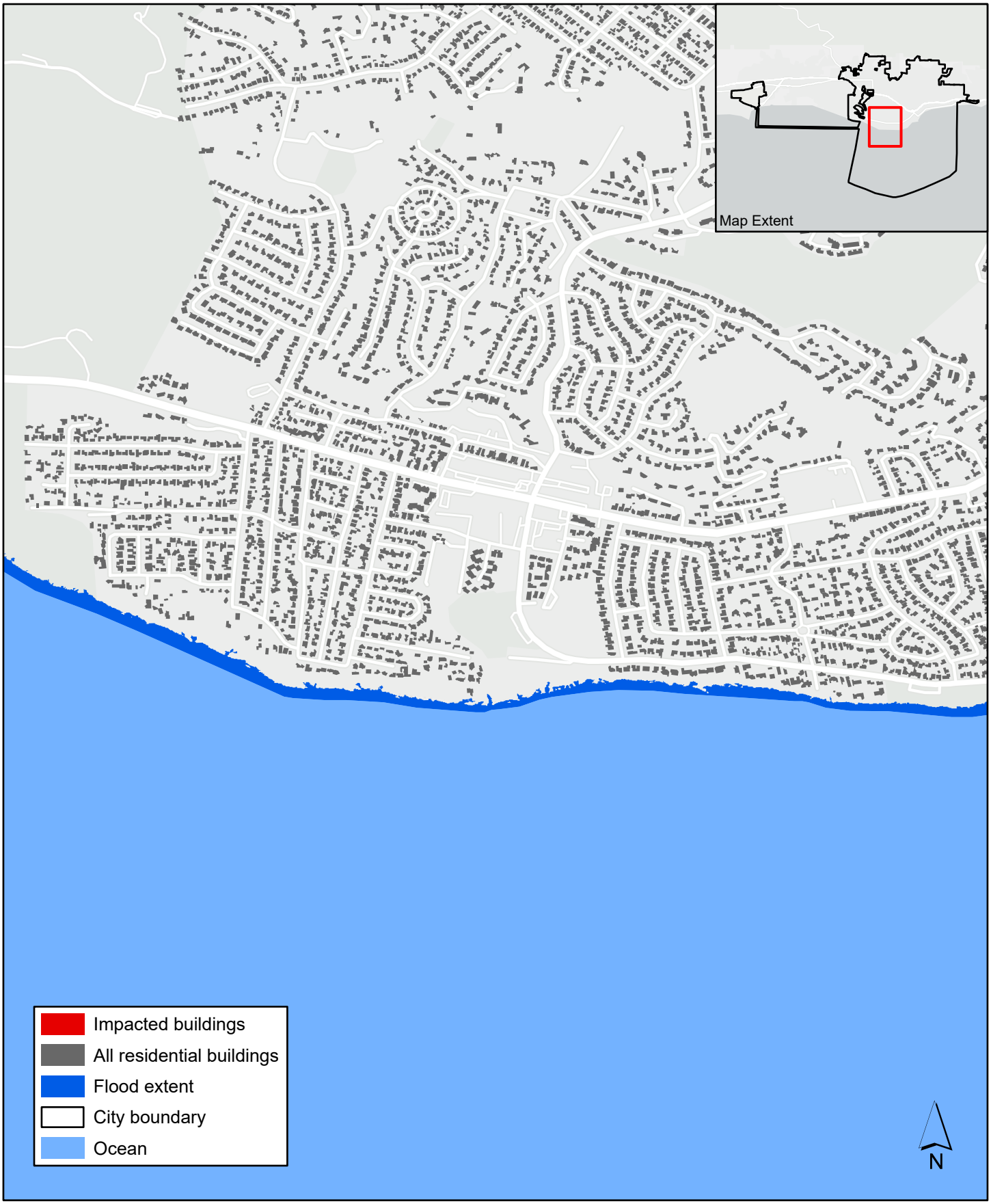
Santa Barbara Area 2

Sea Level Rise 0.25 m - 100 year storm



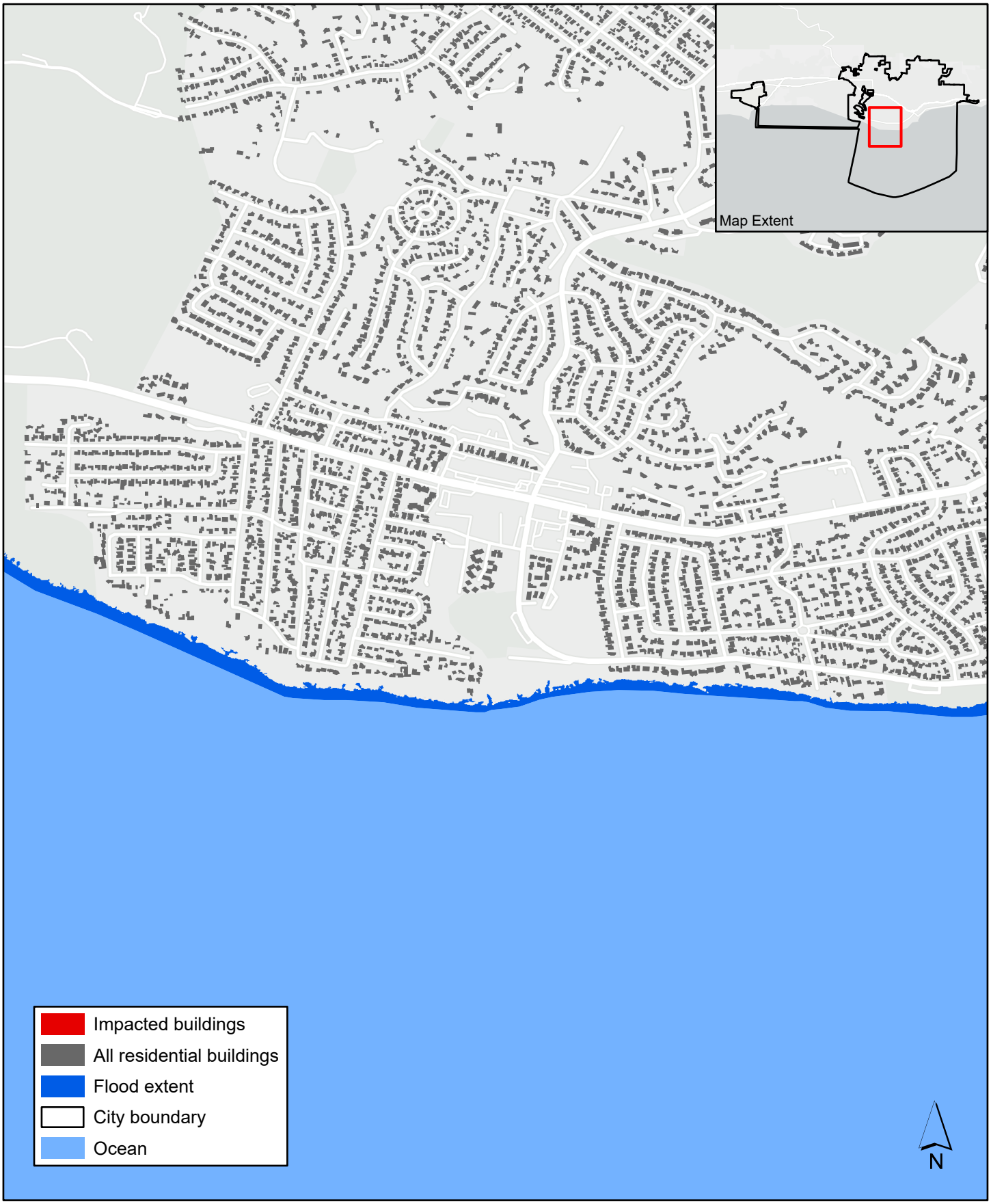
Santa Barbara Area 2

Sea Level Rise 0.5 m - No storm



Santa Barbara Area 2

Sea Level Rise 0.5 m - 001 year storm



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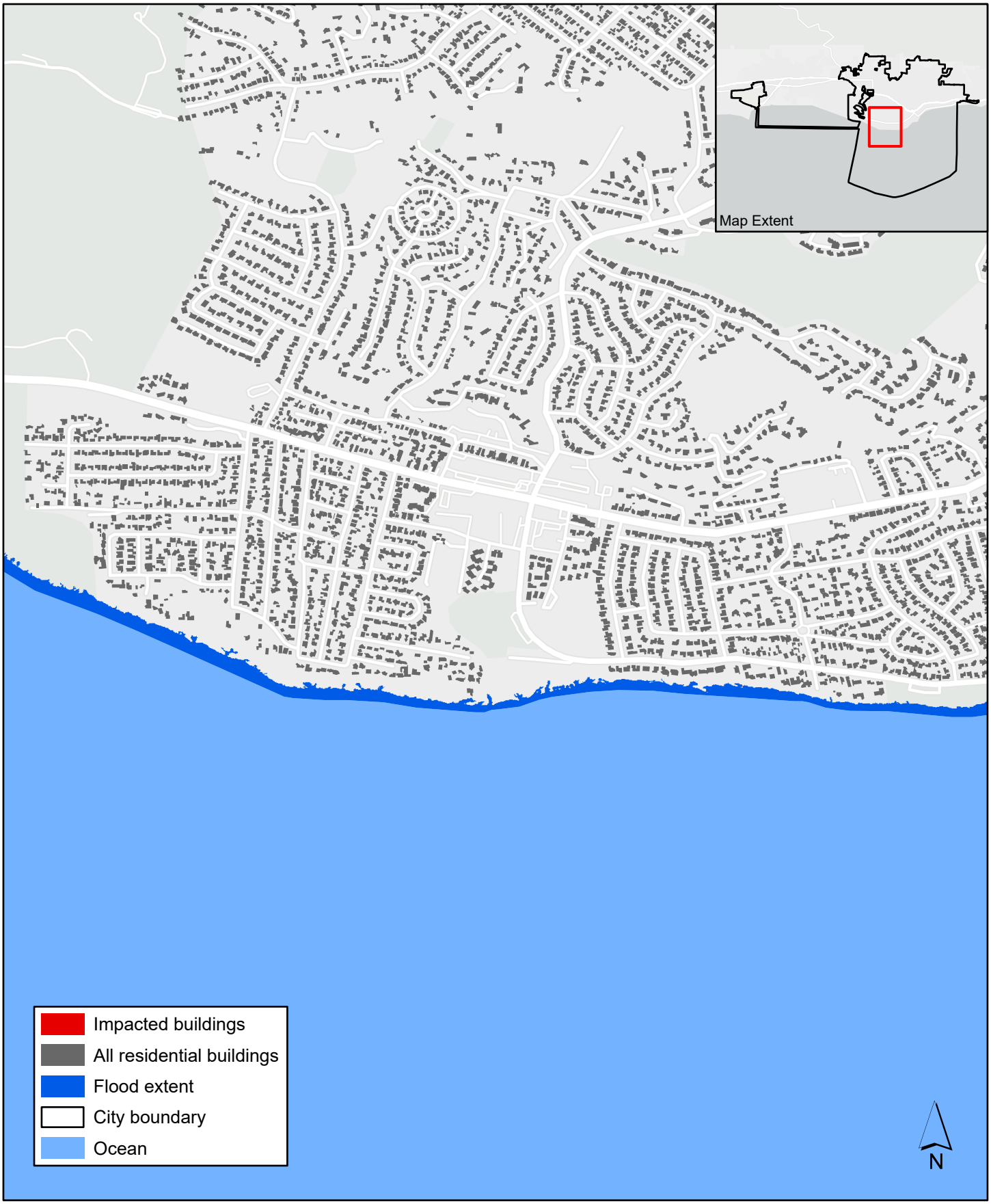
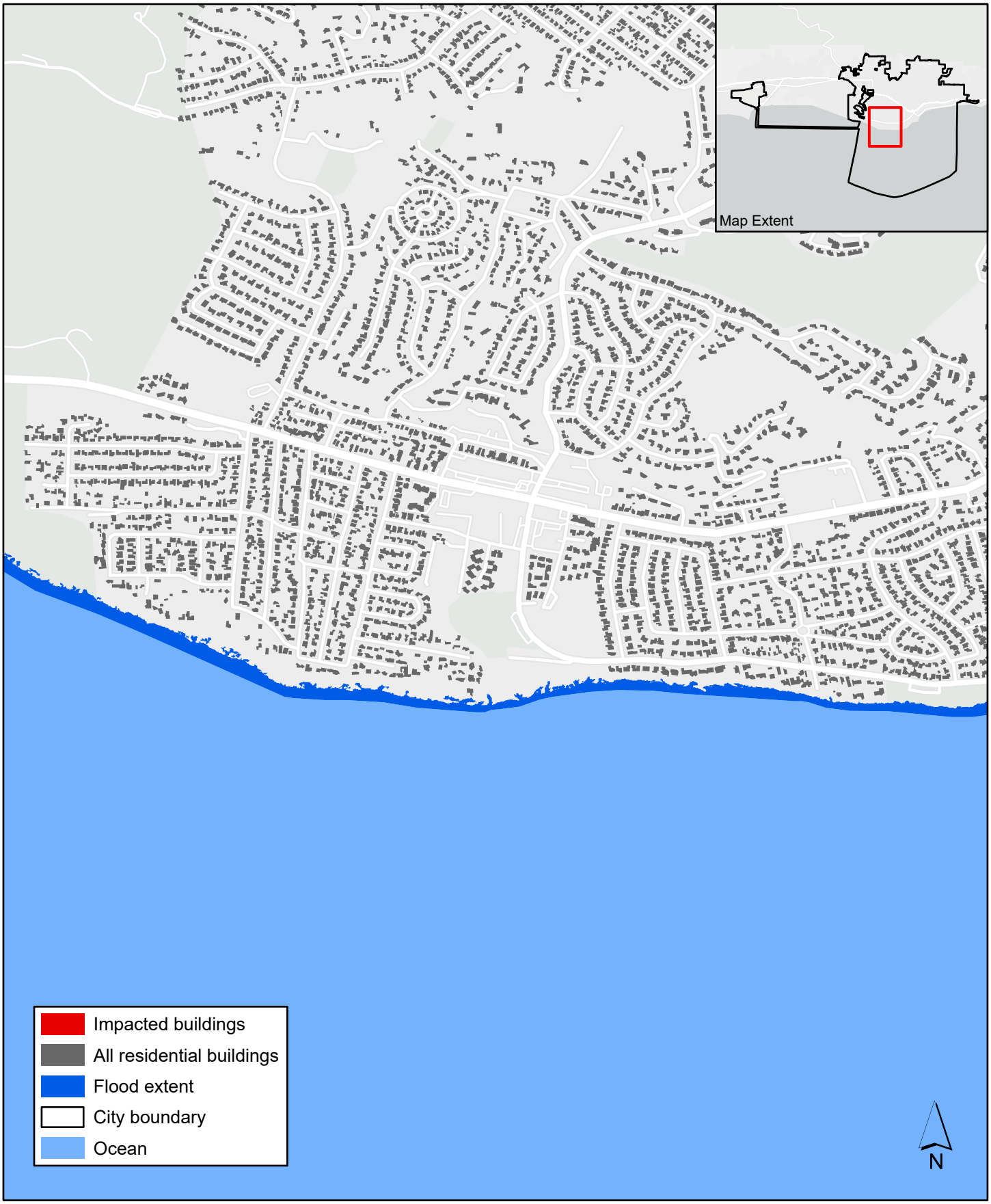
Santa Barbara Area 2

Sea Level Rise 0.5 m - 020 year storm



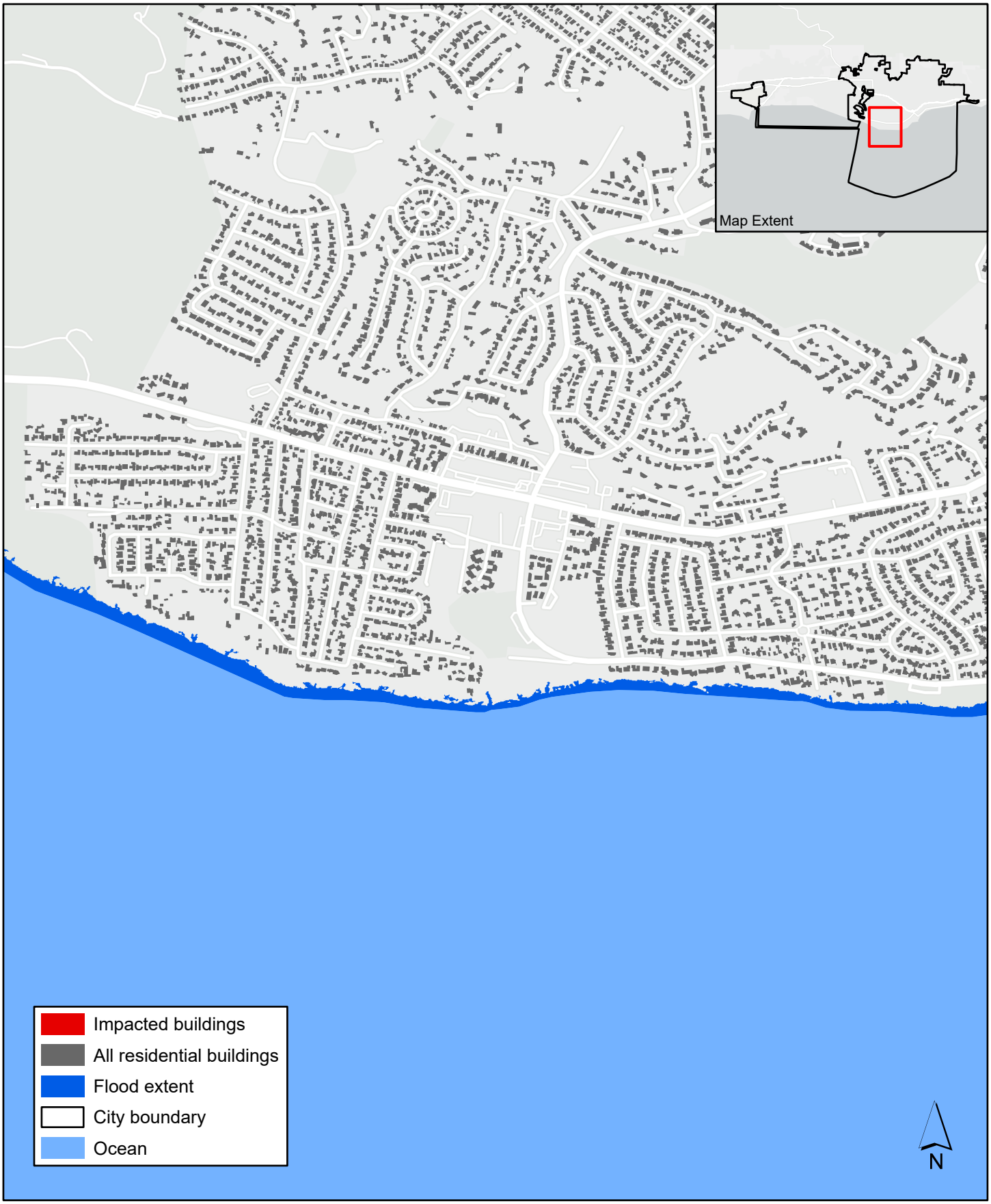
Santa Barbara Area 2

Sea Level Rise 0.5 m - 100 year storm



Santa Barbara Area 2

Sea Level Rise 0.75 m - No storm



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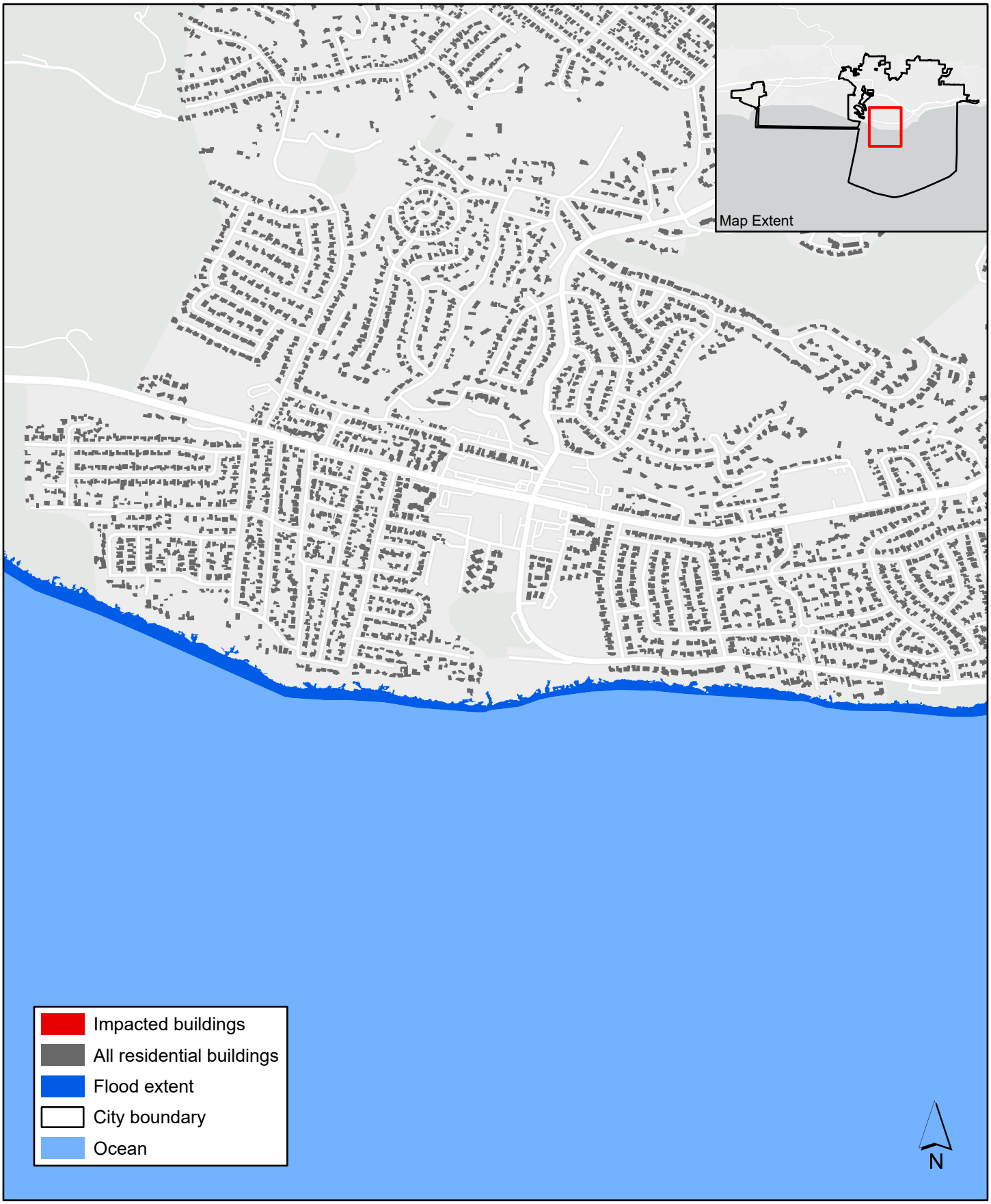
Santa Barbara Area 2

Sea Level Rise 0.75 m - 001 year storm



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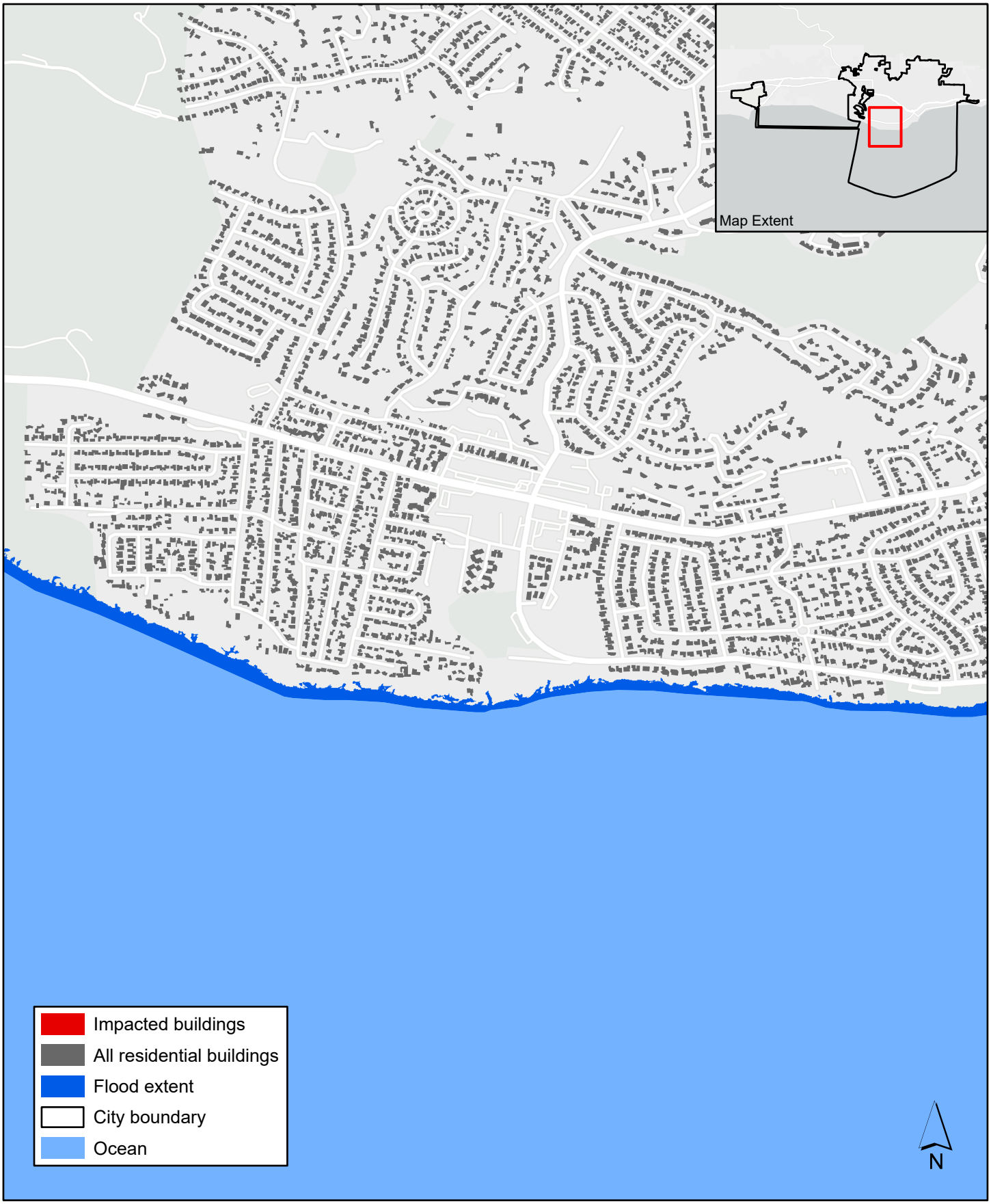
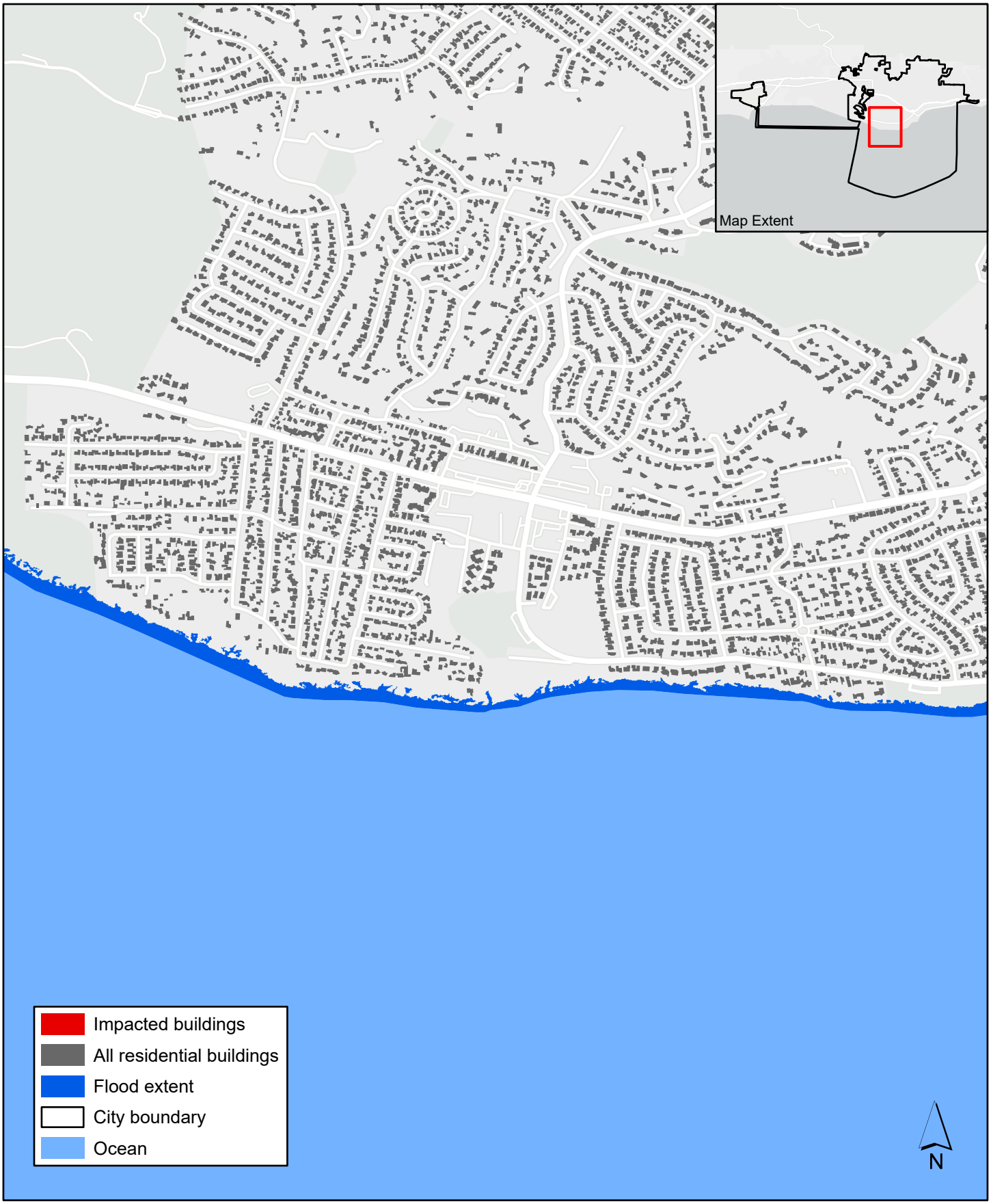
Santa Barbara Area 2

Sea Level Rise 0.75 m - 020 year storm



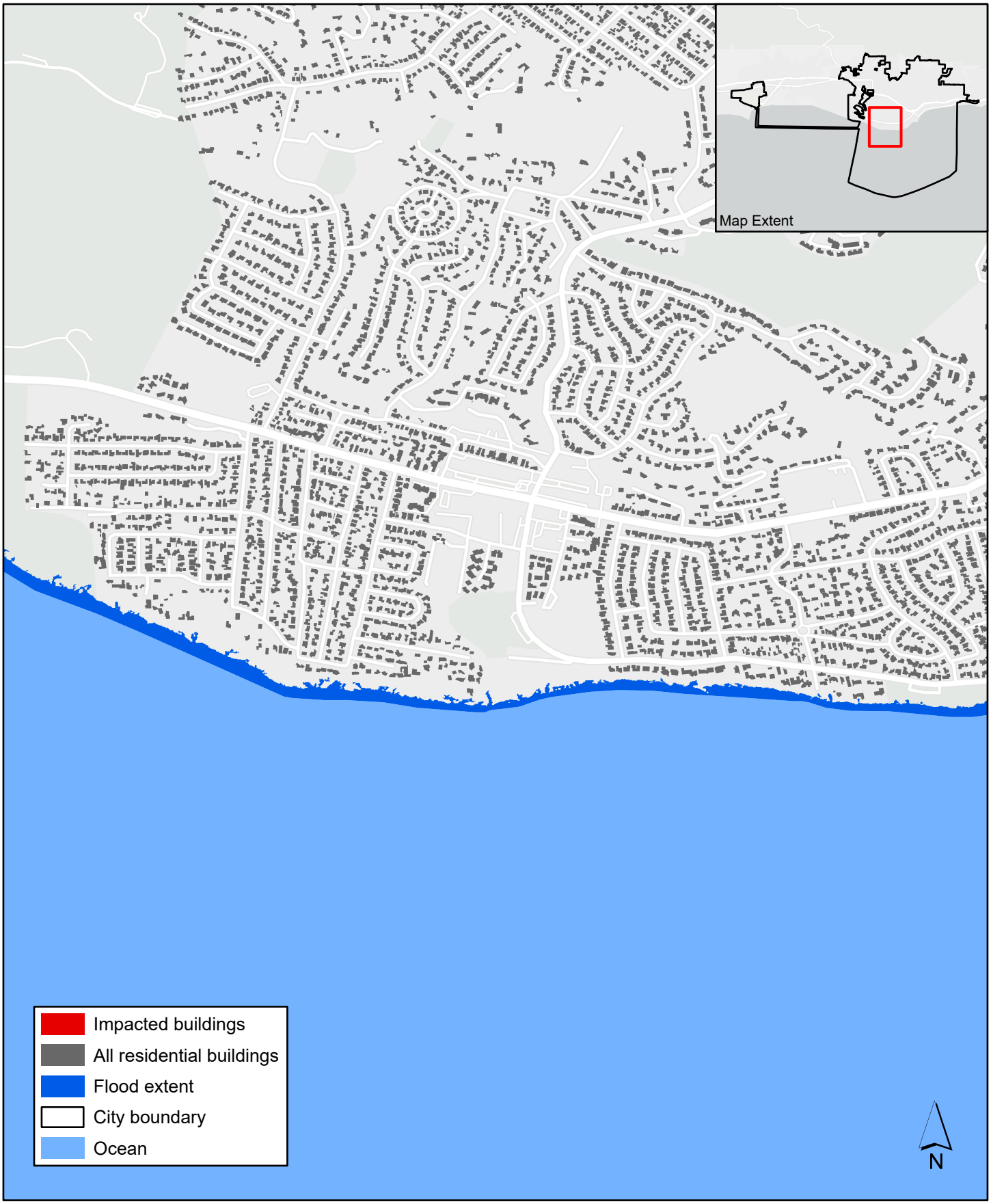
Santa Barbara Area 2

Sea Level Rise 0.75 m - 100 year storm



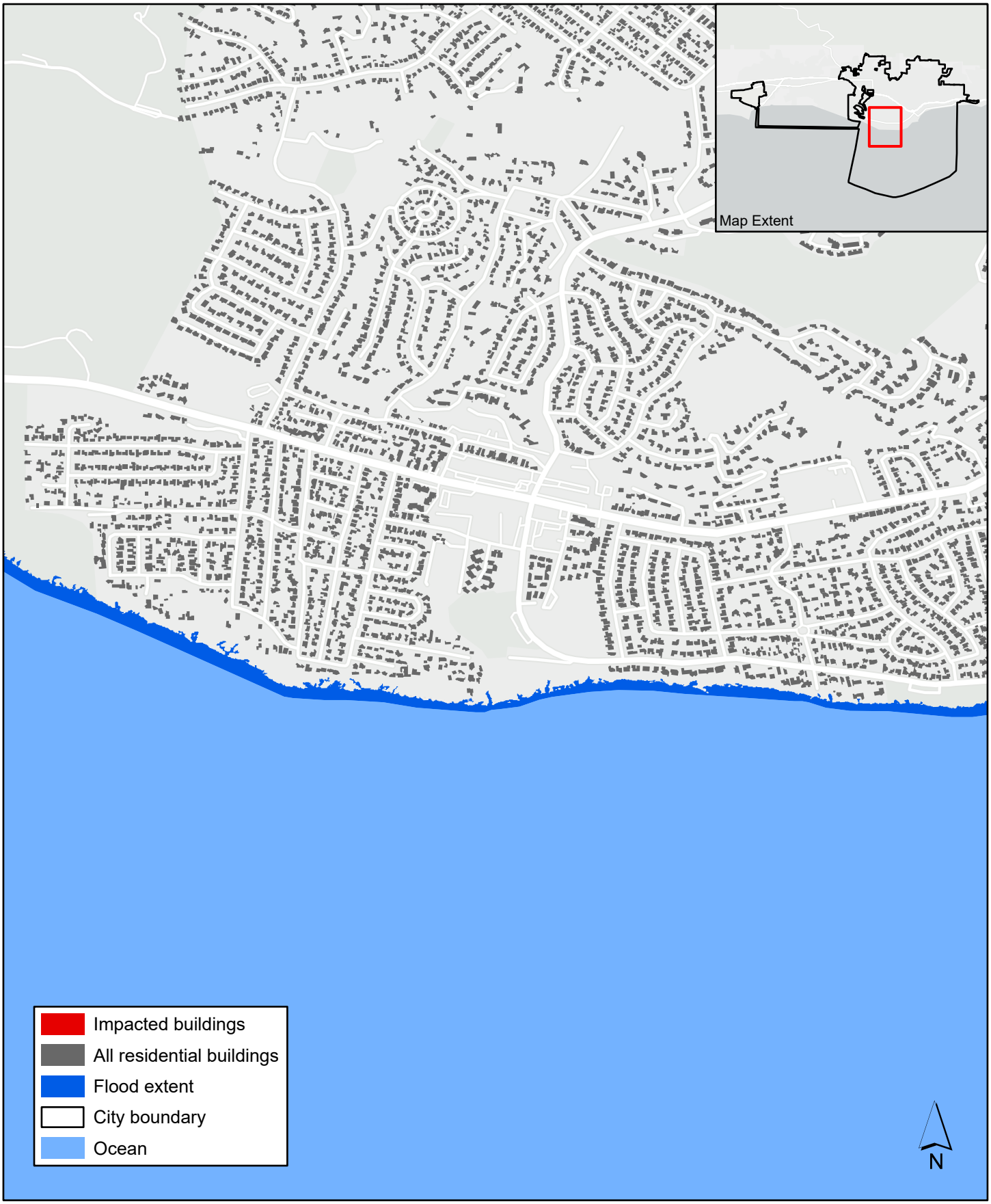
Santa Barbara Area 2

Sea Level Rise 1.0 m - No storm



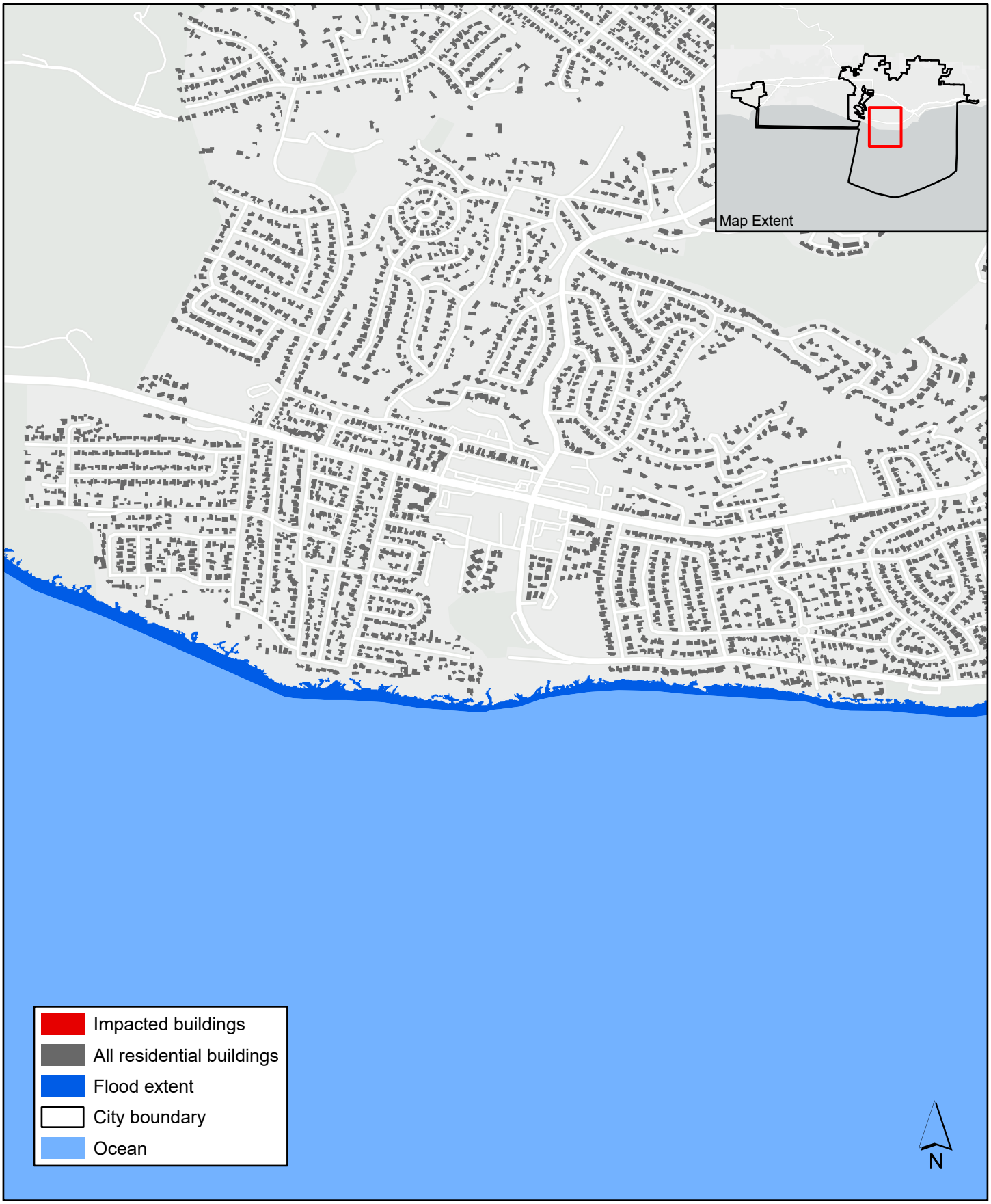
Santa Barbara Area 2

Sea Level Rise 1.0 m - 001 year storm



Santa Barbara Area 2

Sea Level Rise 1.0 m - 020 year storm



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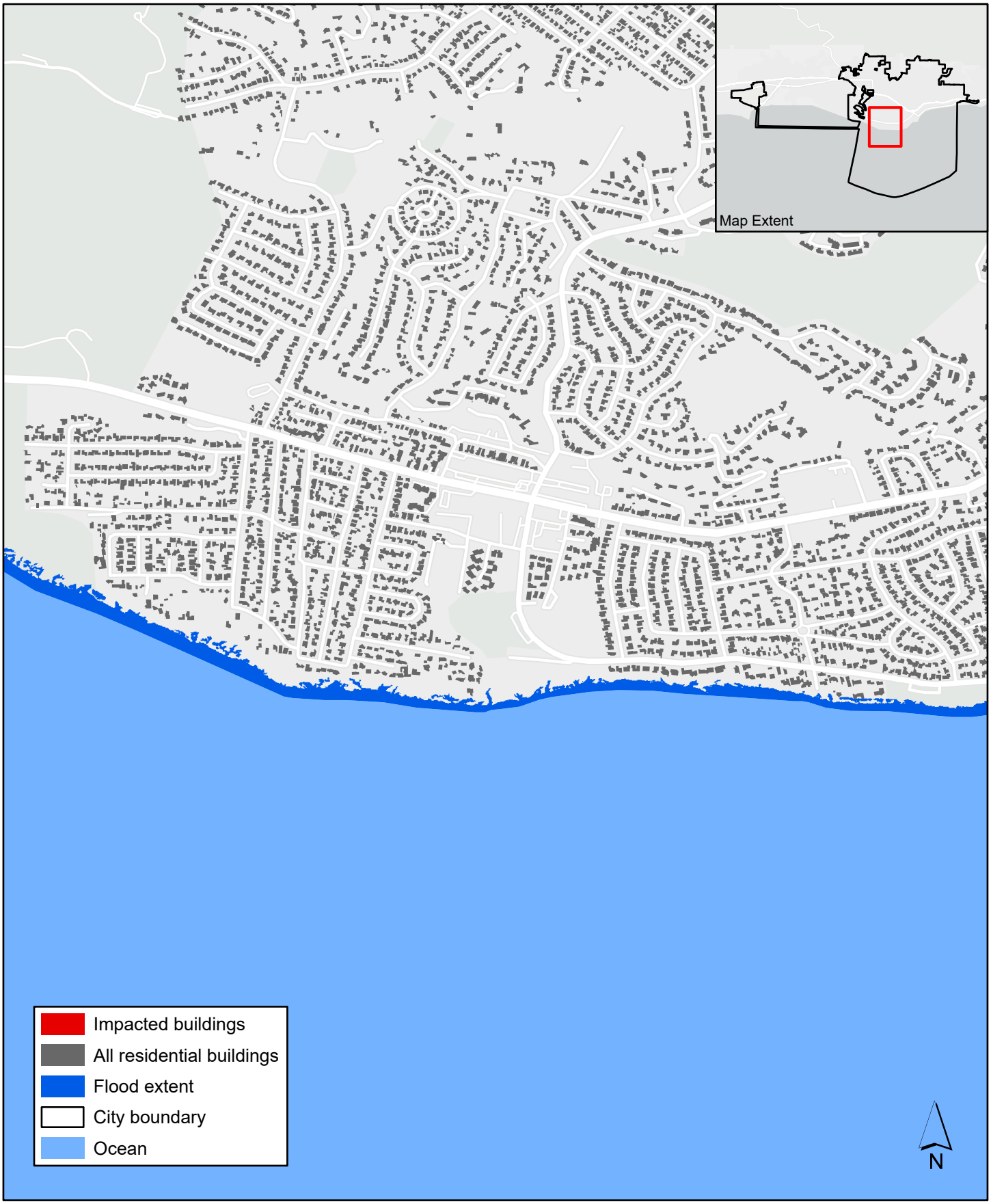
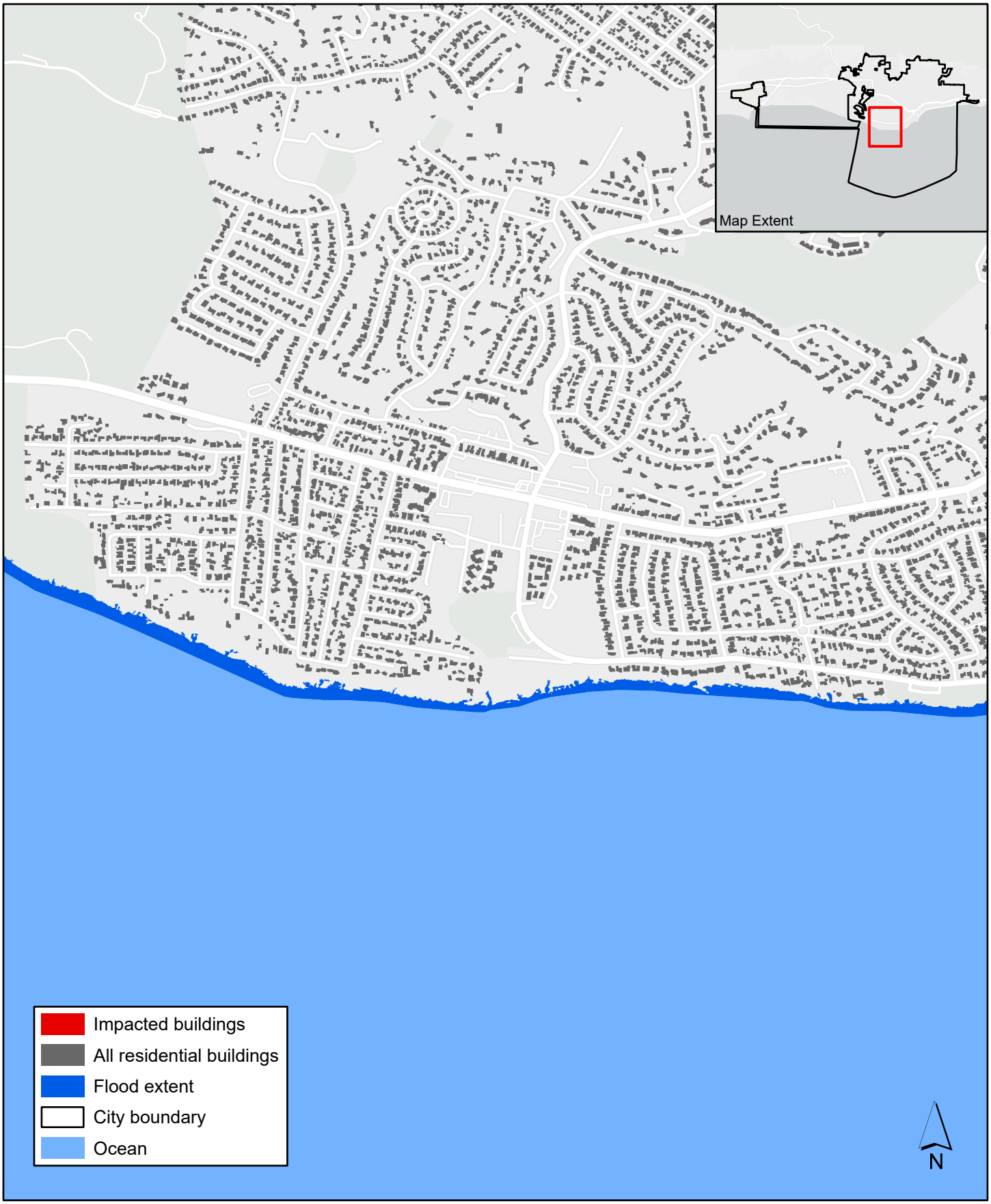
Santa Barbara Area 2

Sea Level Rise 1.0 m - 100 year storm



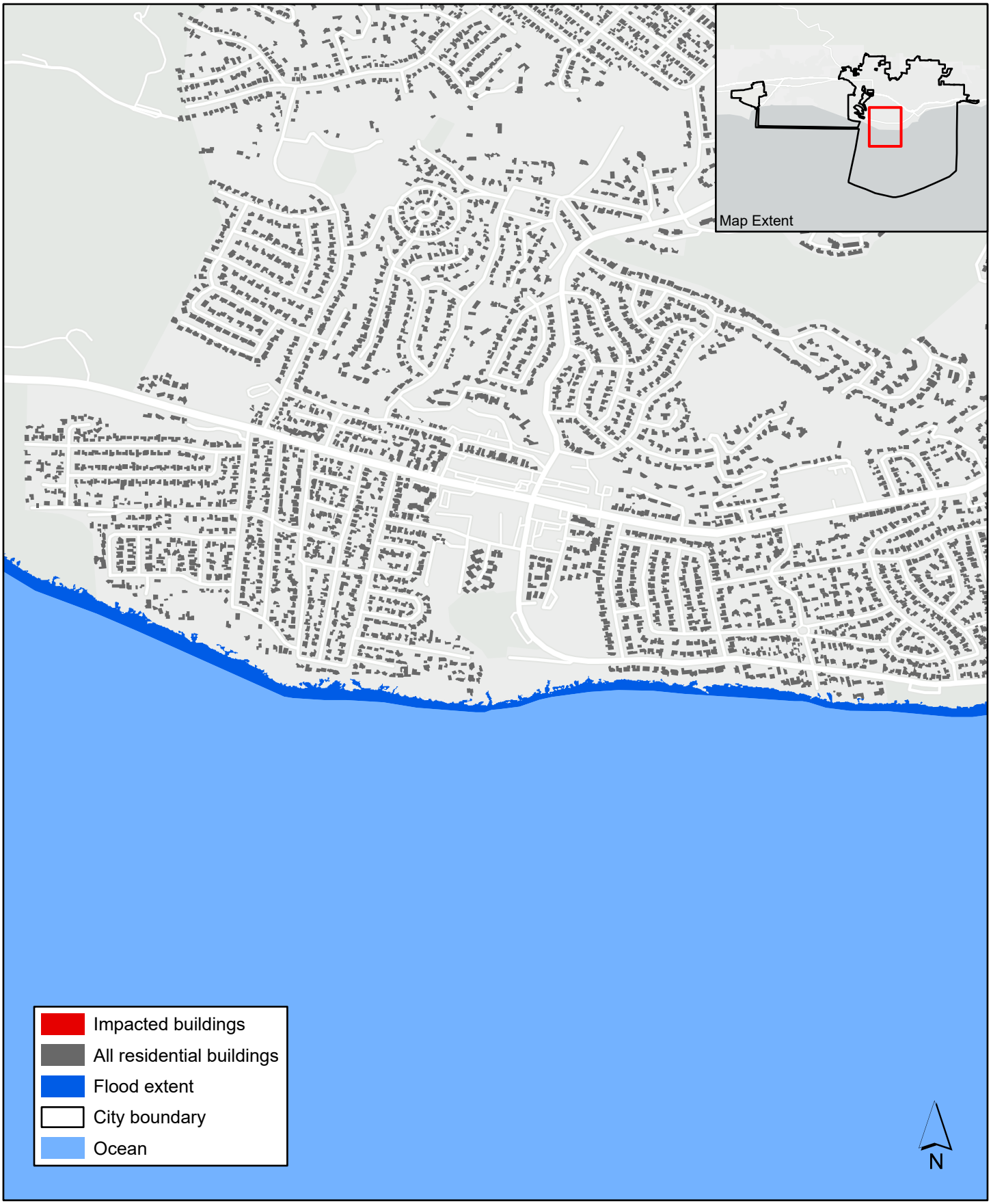
Santa Barbara Area 2

Sea Level Rise 1.5 m - No storm



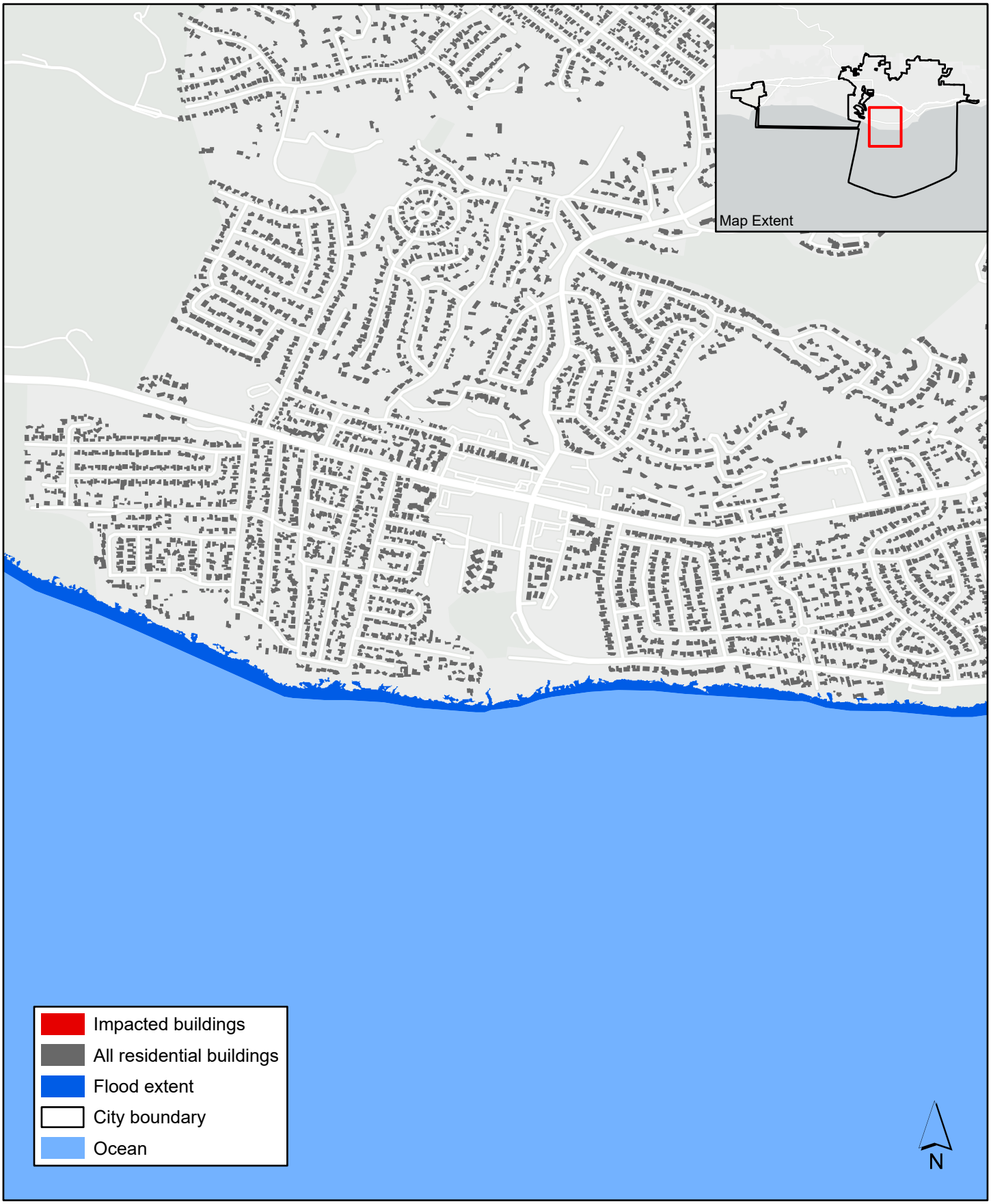
Santa Barbara Area 2

Sea Level Rise 1.5 m - 001 year storm



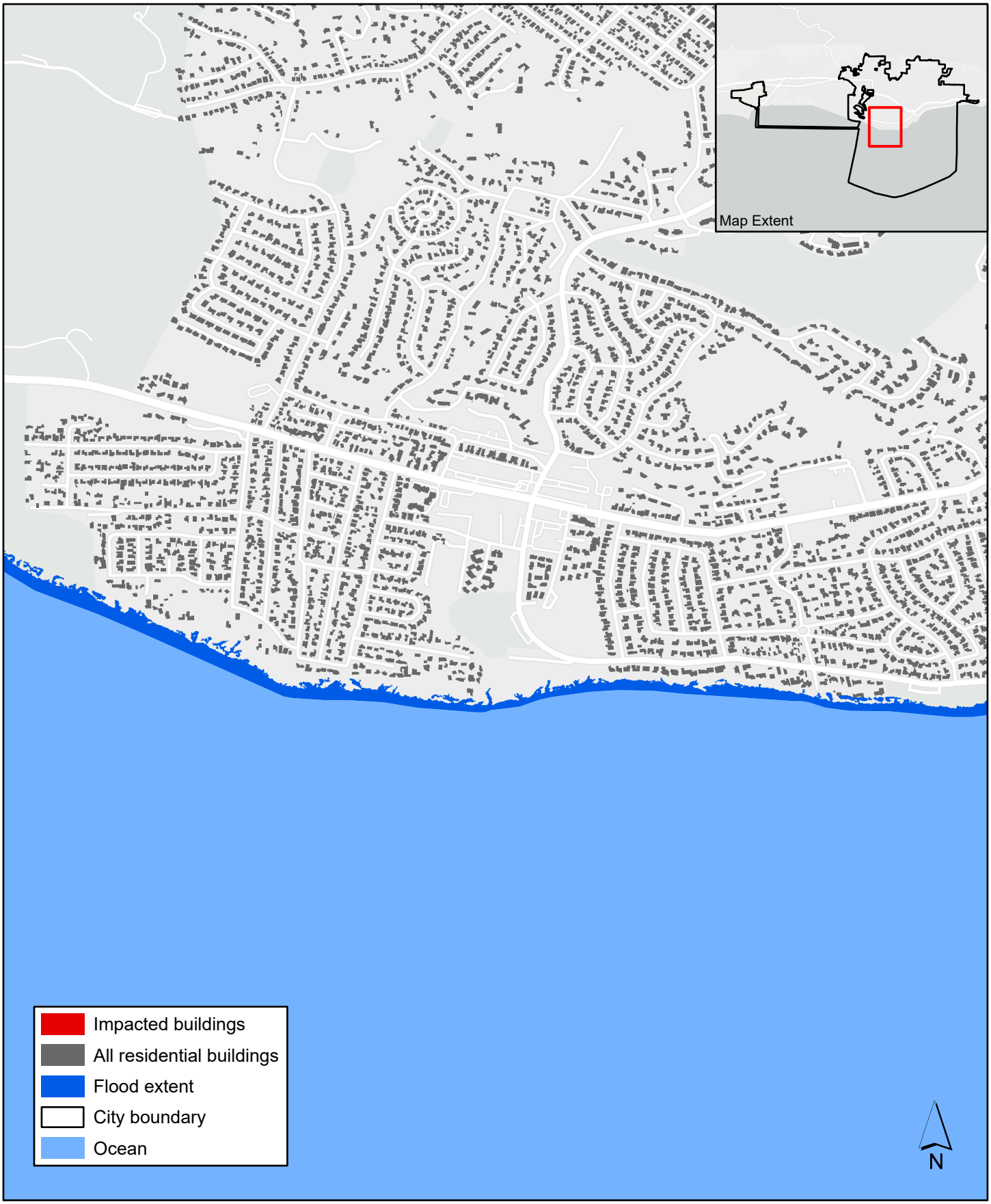
Santa Barbara Area 2

Sea Level Rise 1.5 m - 020 year storm



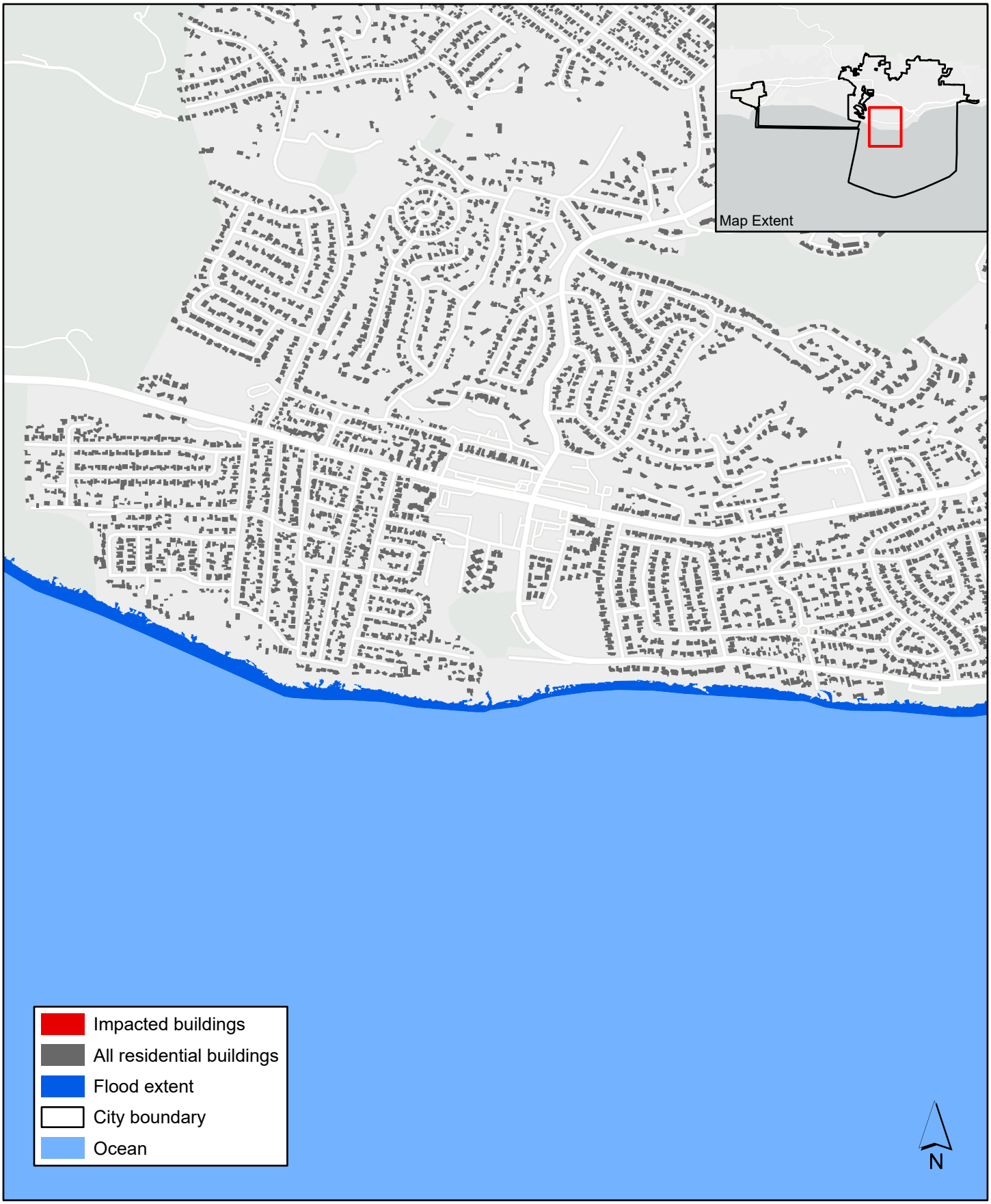
Santa Barbara Area 2

Sea Level Rise 1.5 m - 100 year storm



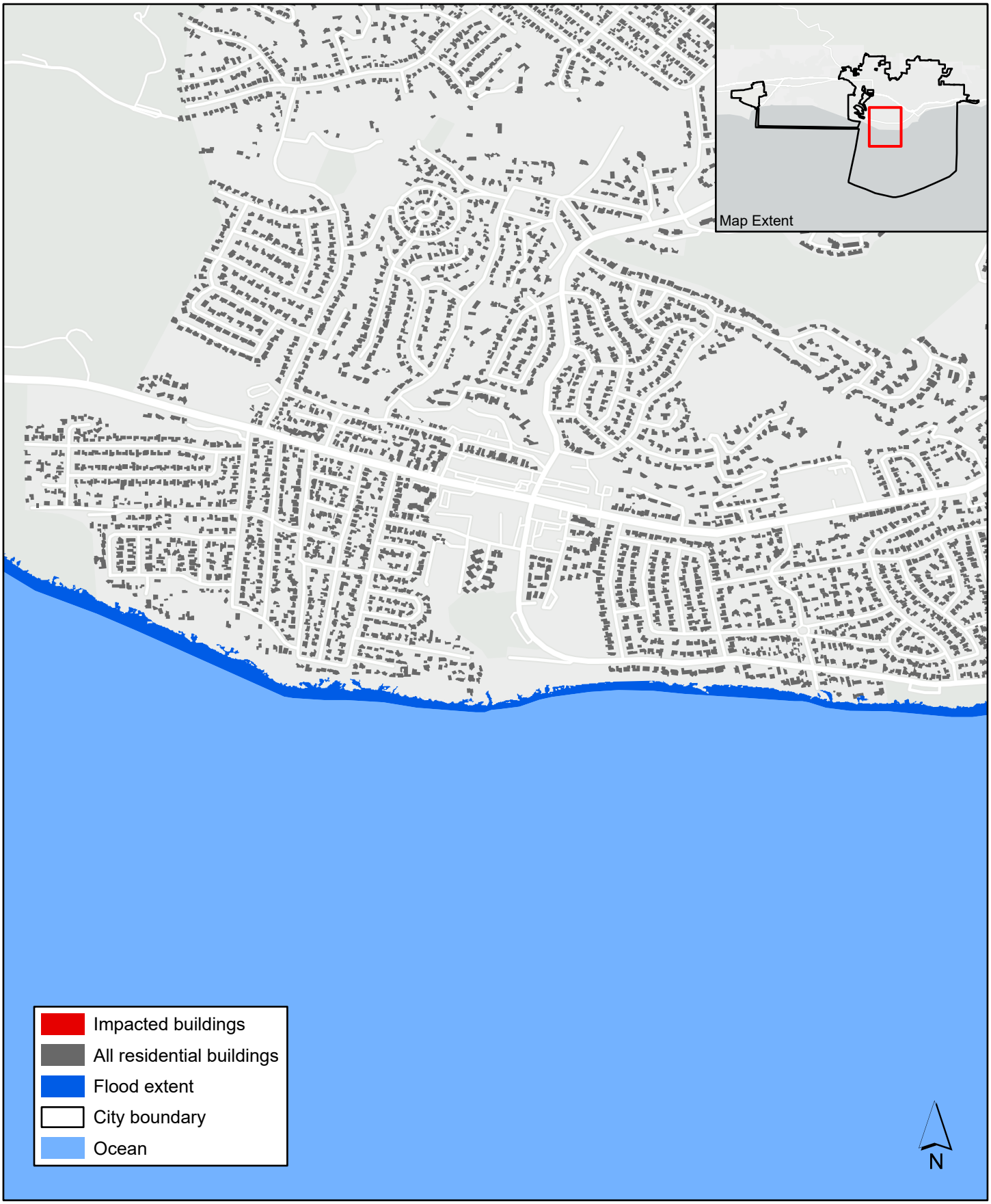
Santa Barbara Area 2

Sea Level Rise 2.0 m - No storm



Santa Barbara Area 2

Sea Level Rise 2.0 m - 001 year storm



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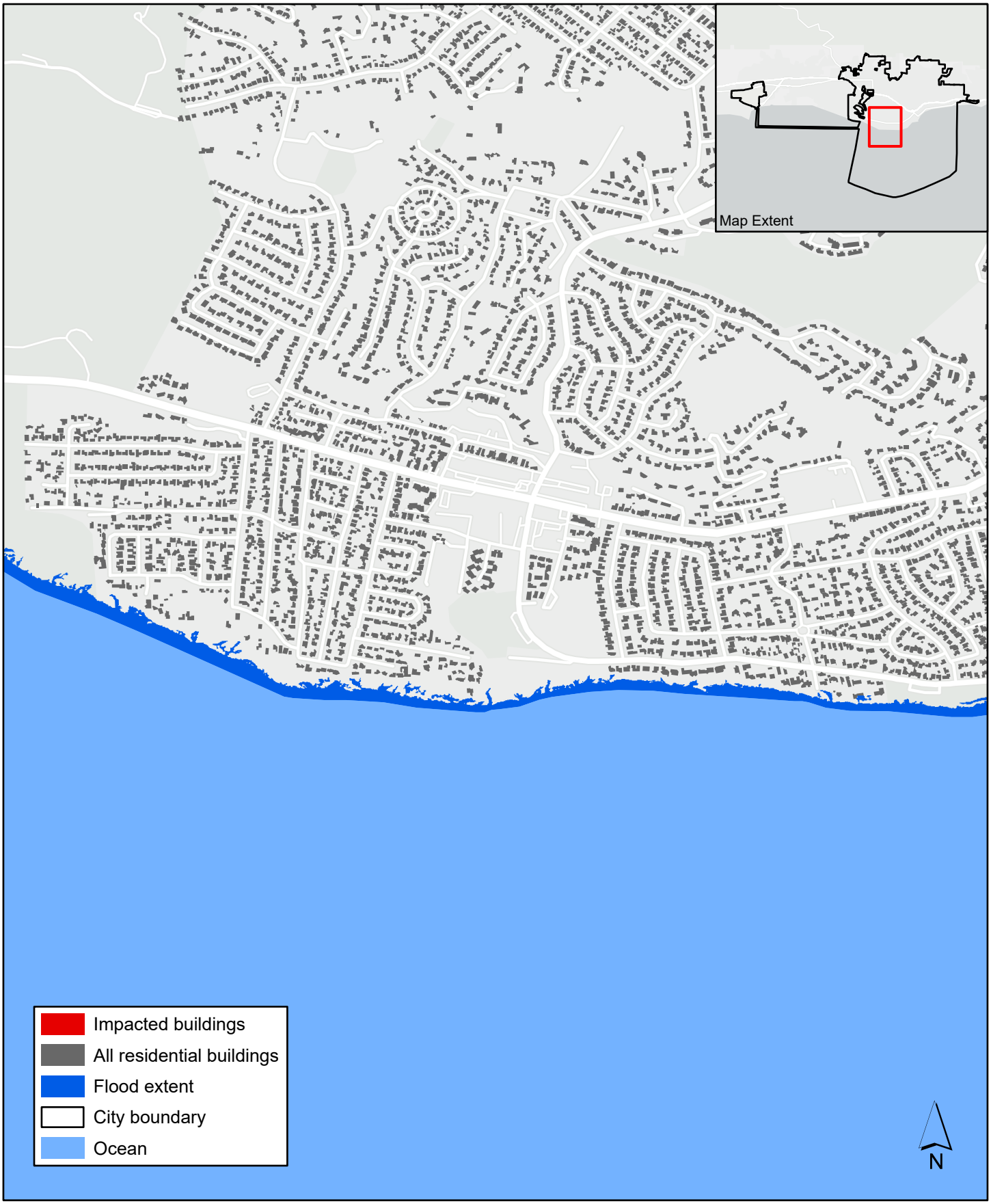
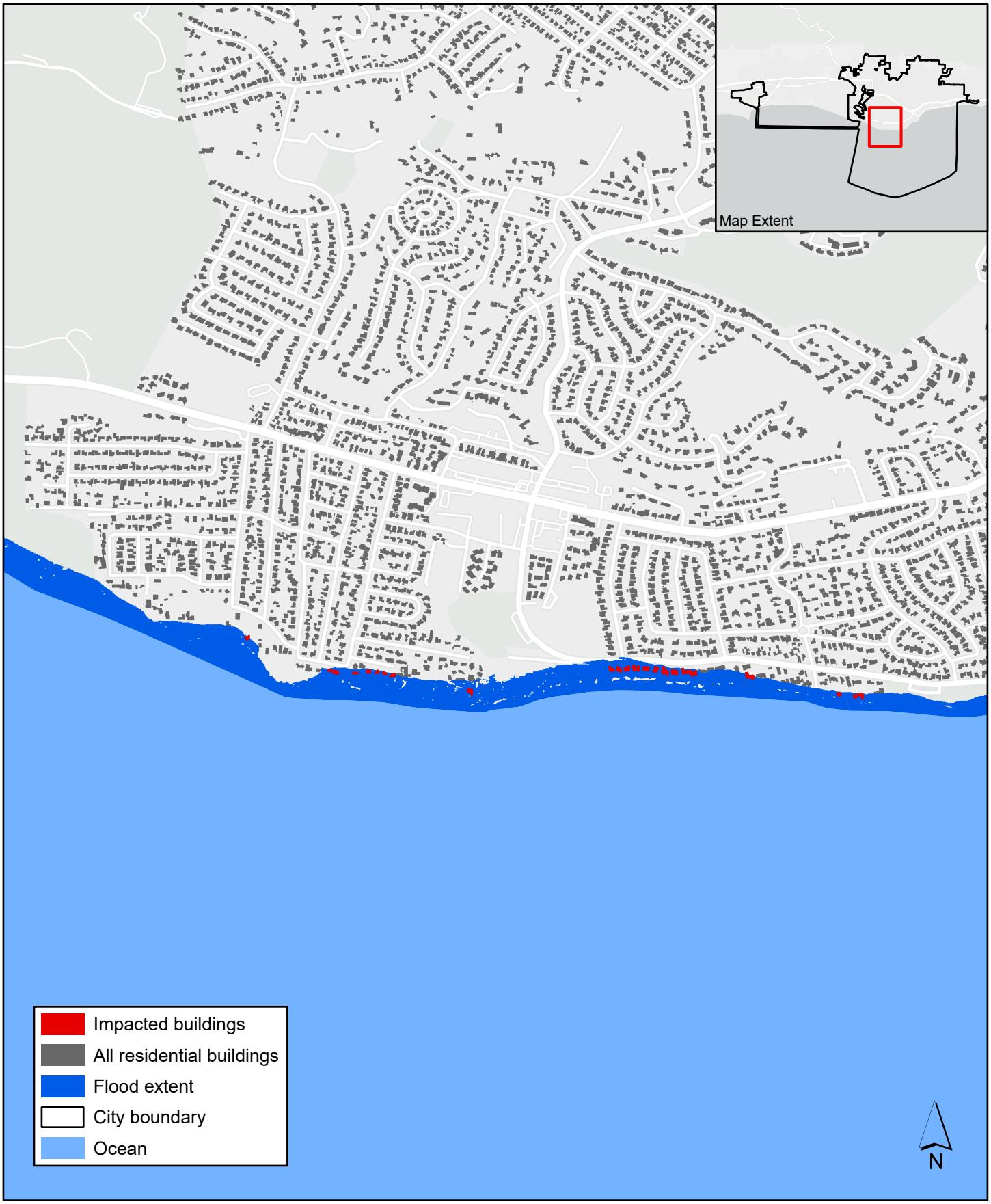
Santa Barbara Area 2

Sea Level Rise 2.0 m - 020 year storm



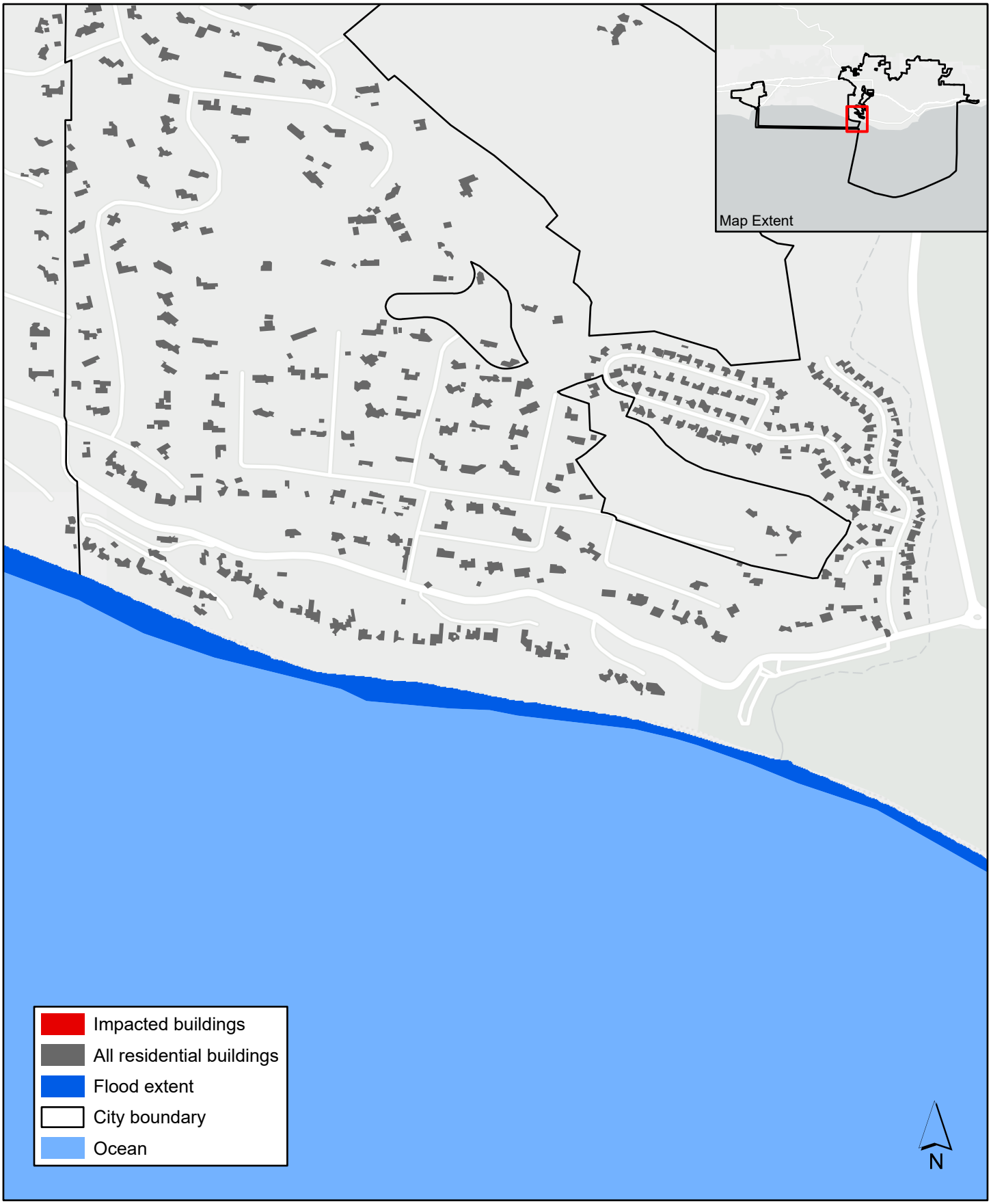
Santa Barbara Area 2

Sea Level Rise 2.0 m - 100 year storm



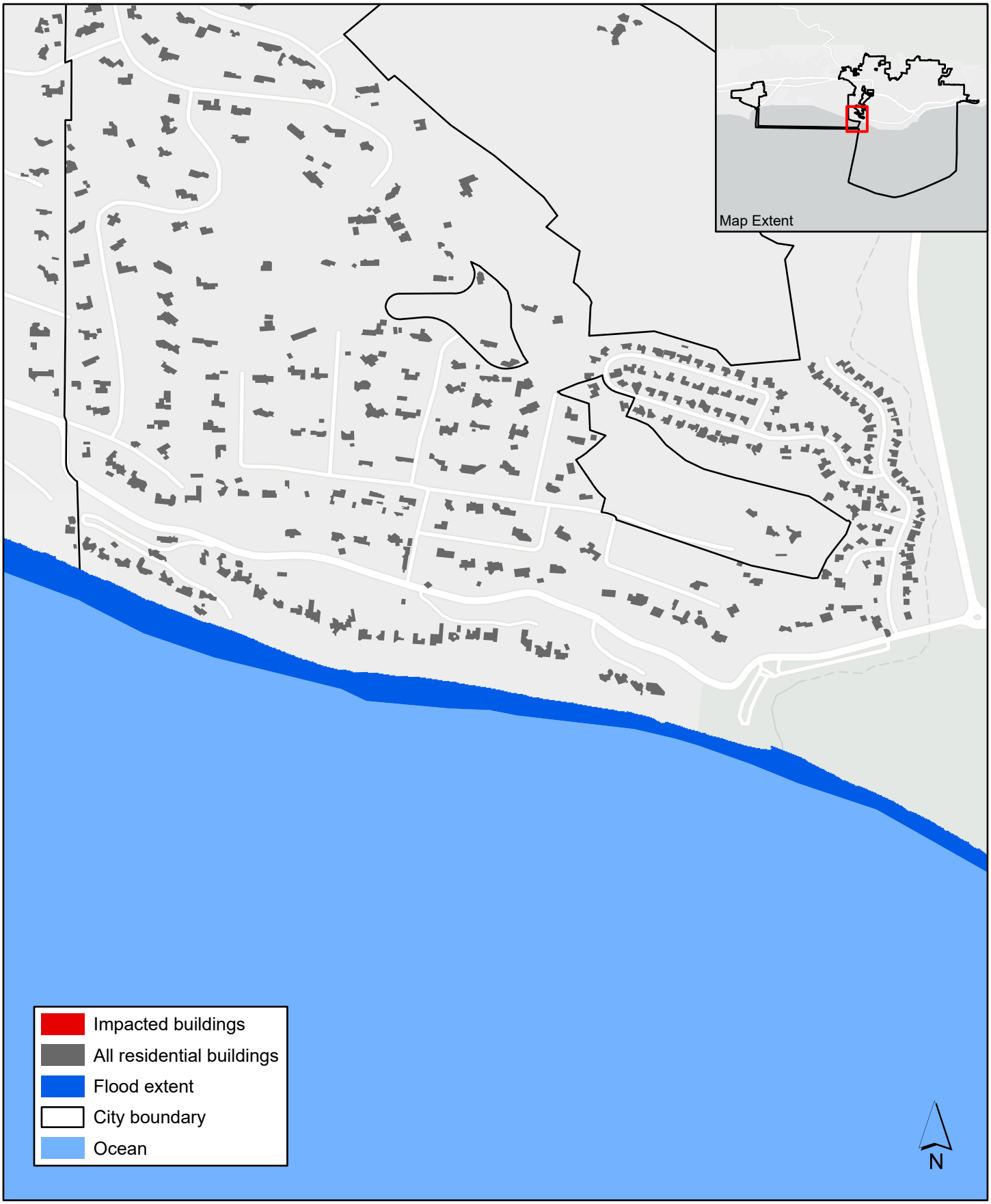
Santa Barbara Area 3

Sea Level Rise 0.0 m - No storm



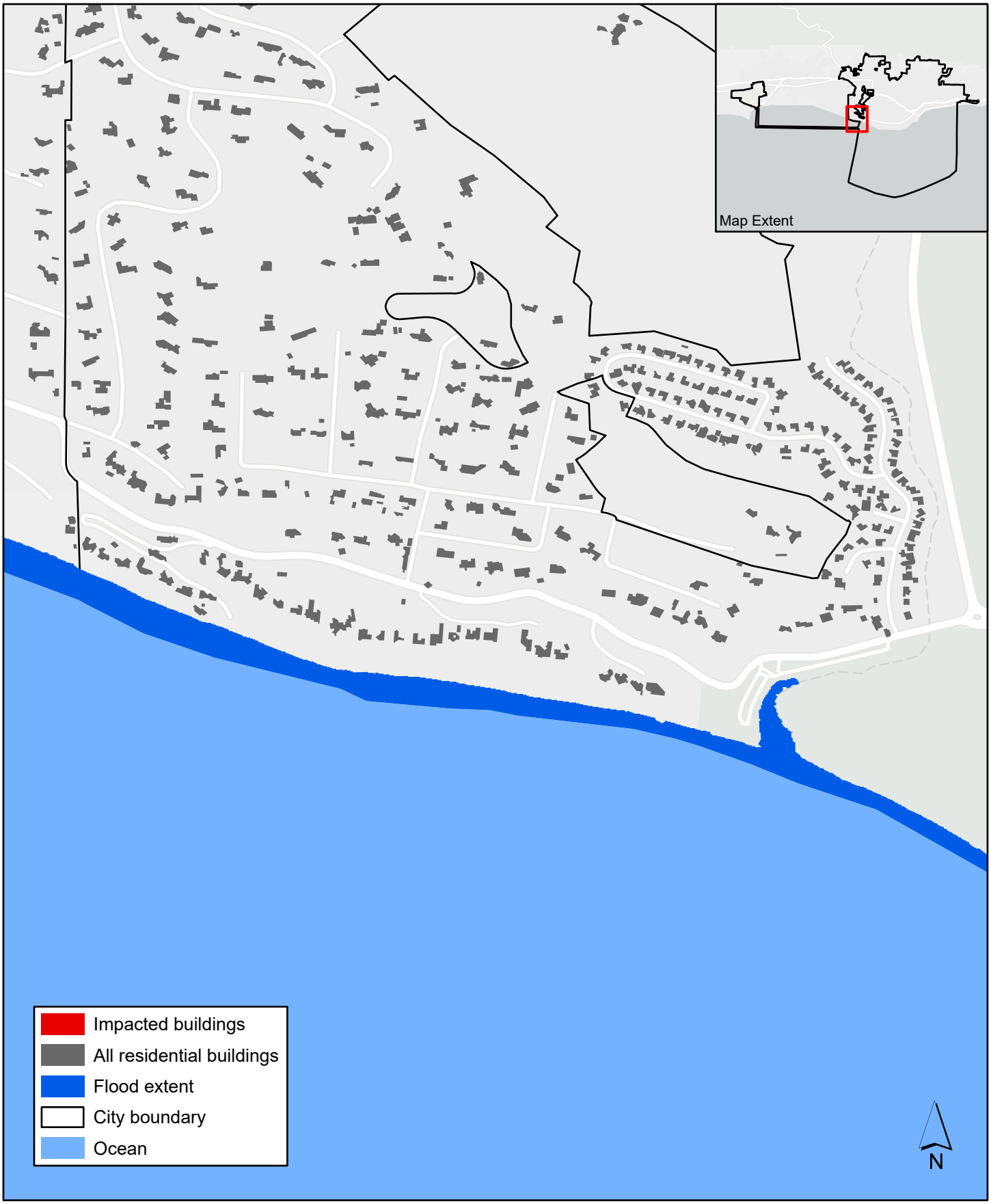
Santa Barbara Area 3

Sea Level Rise 0.0 m - 001 year storm



Santa Barbara Area 3

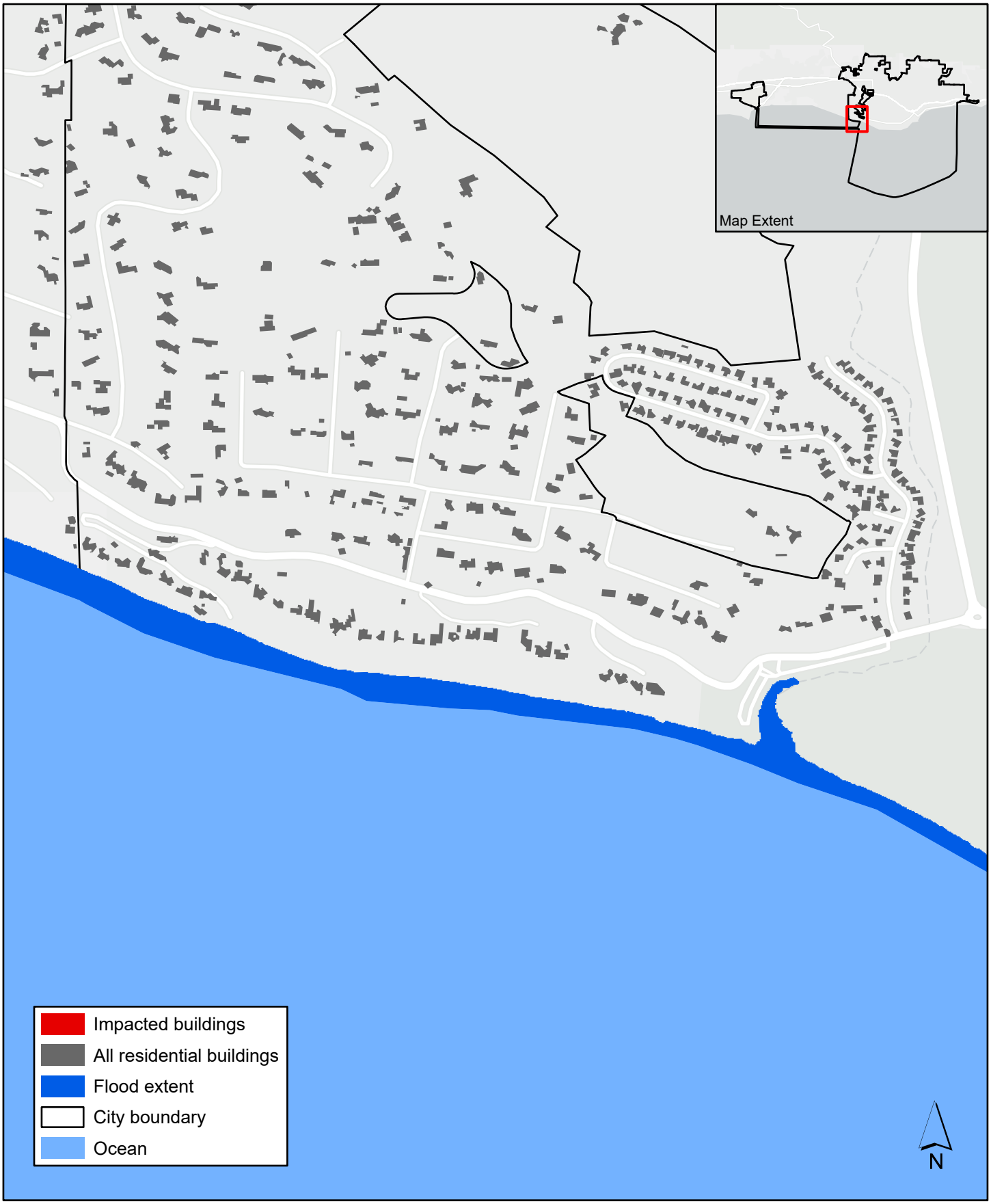
Sea Level Rise 0.0 m - 020 year storm



Appendix D

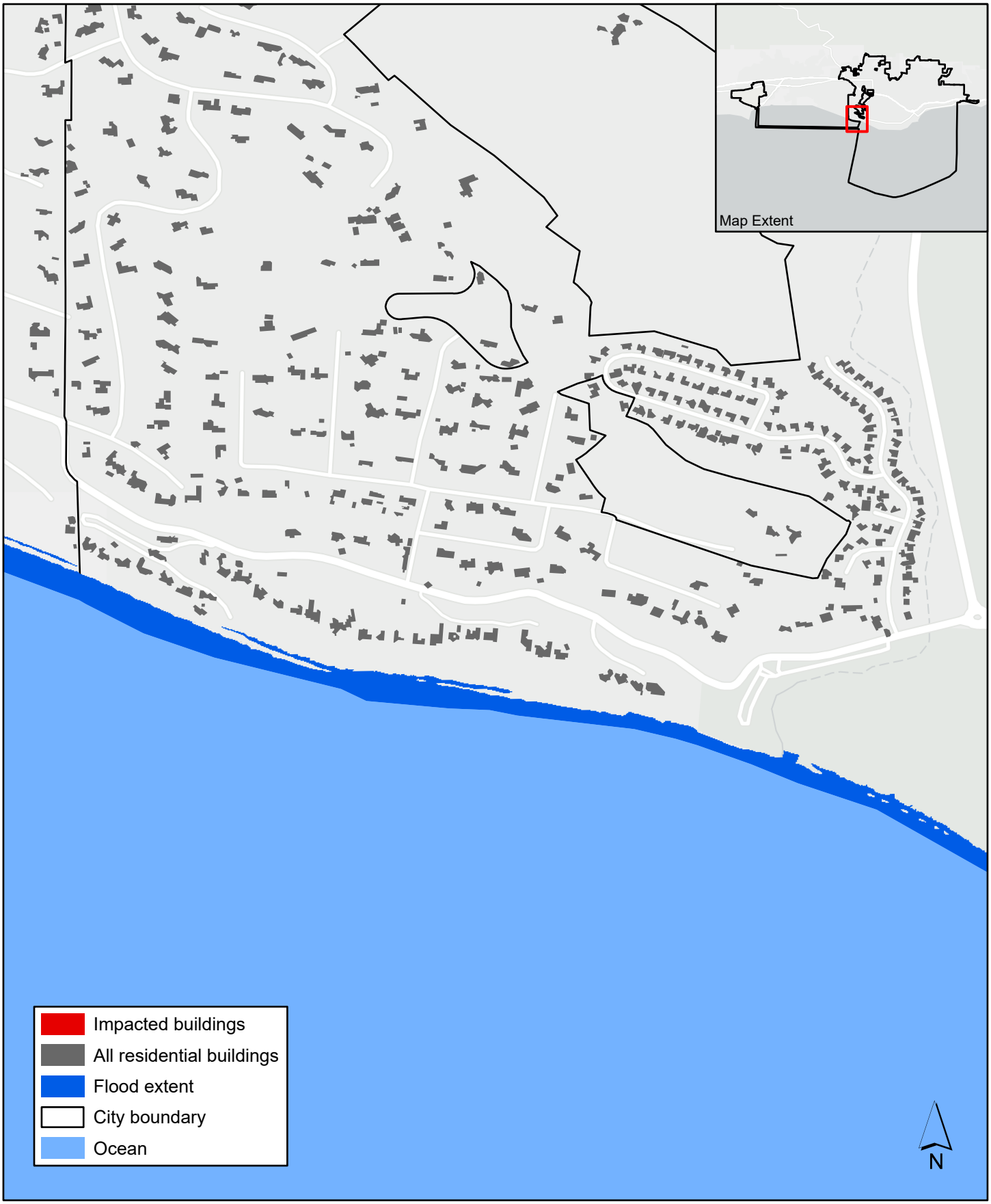
Santa Barbara Area 3

Sea Level Rise 0.0 m - 100 year storm



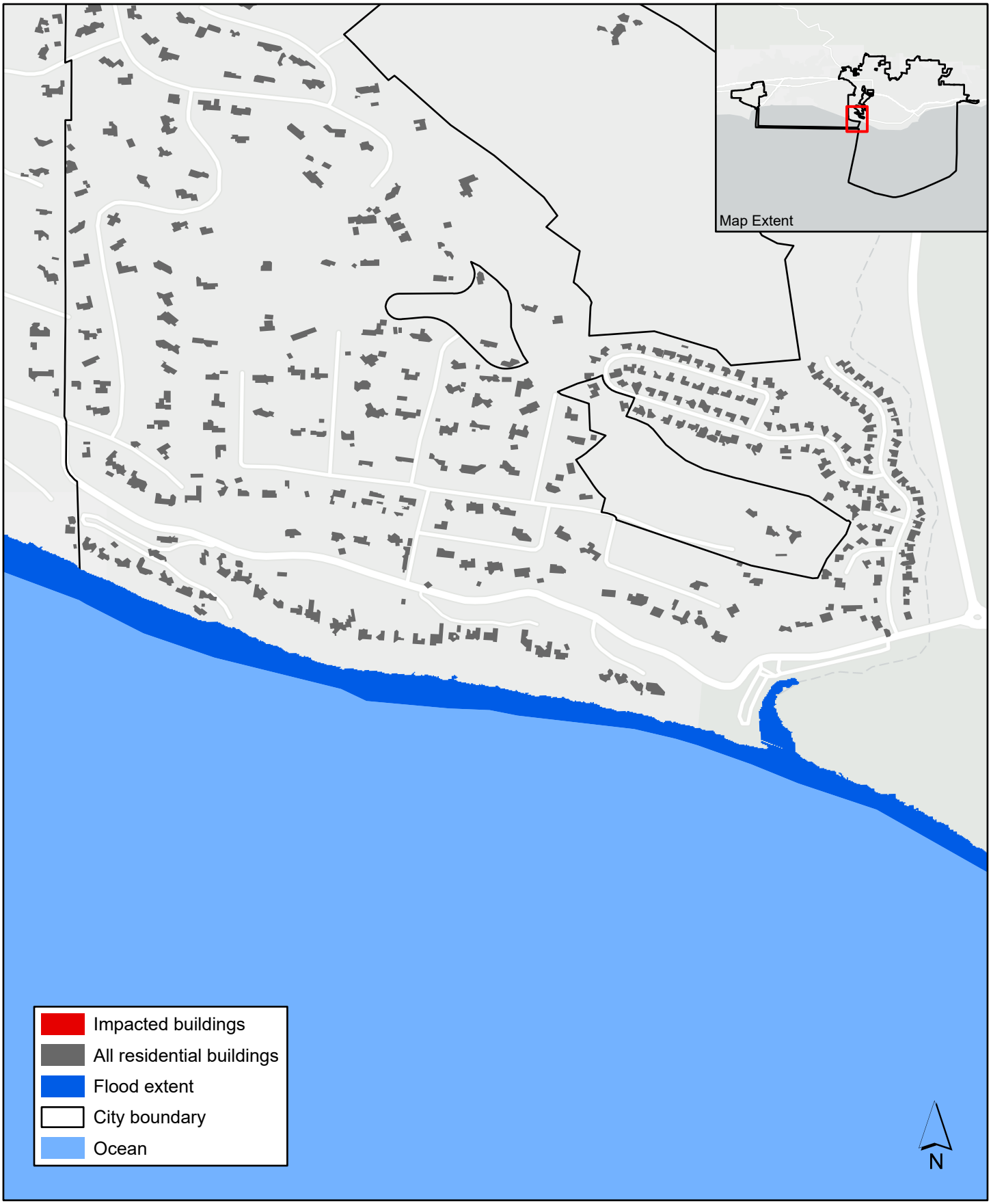
Santa Barbara Area 3

Sea Level Rise 0.25 m - No storm



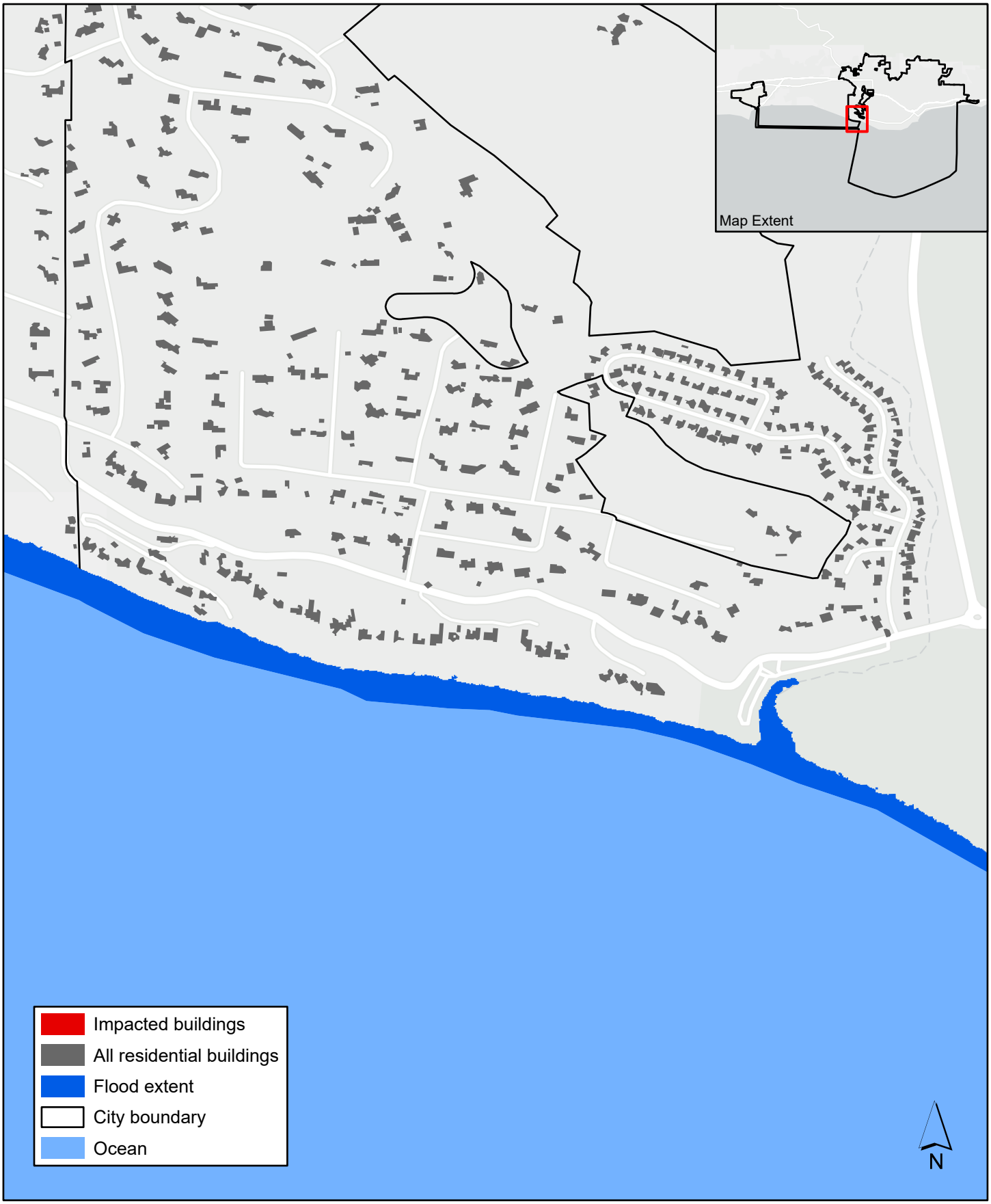
Santa Barbara Area 3

Sea Level Rise 0.25 m - 001 year storm



Santa Barbara Area 3

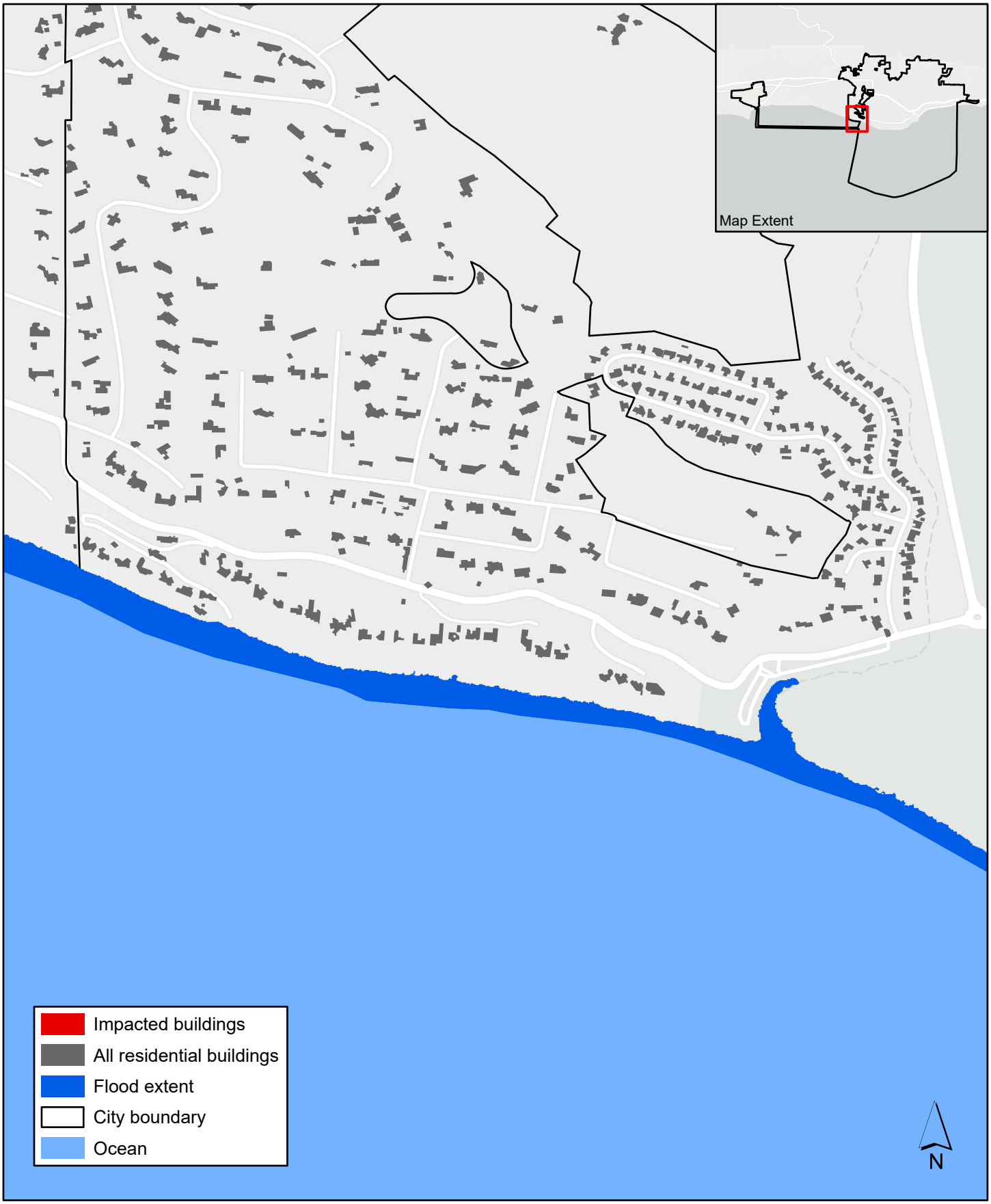
Sea Level Rise 0.25 m - 020 year storm



Appendix D

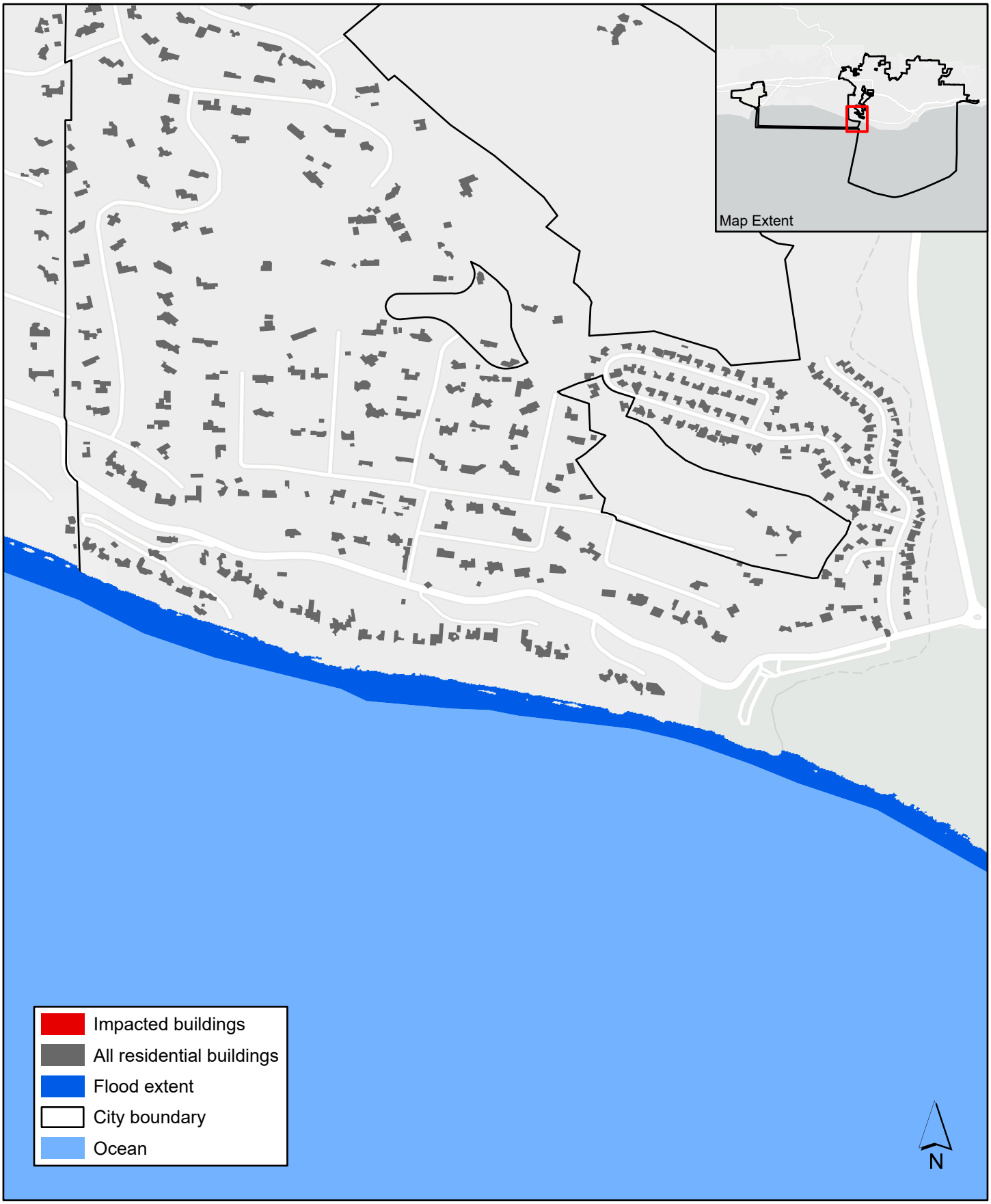
Santa Barbara Area 3

Sea Level Rise 0.25 m - 100 year storm



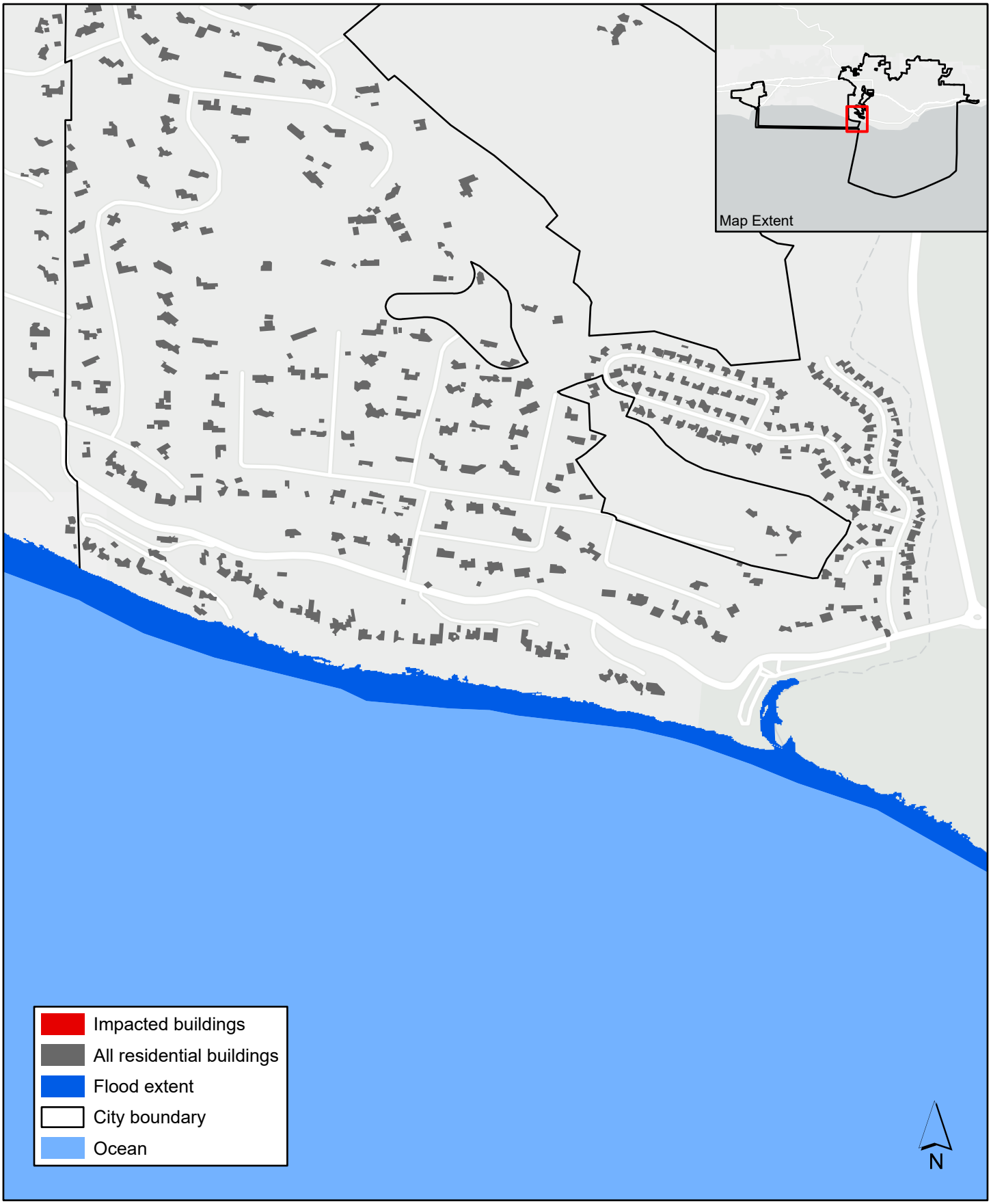
Santa Barbara Area 3

Sea Level Rise 0.5 m - No storm



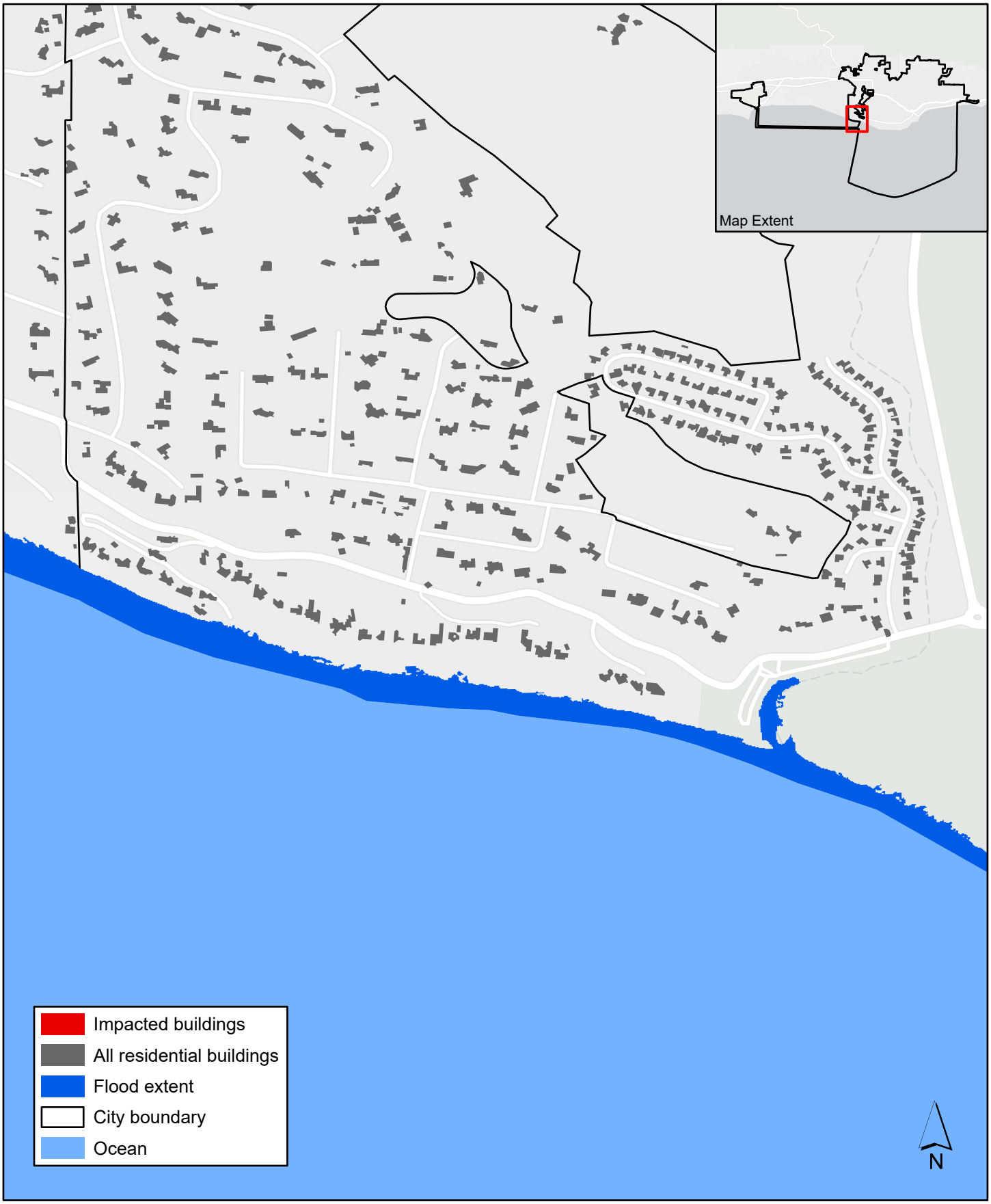
Santa Barbara Area 3

Sea Level Rise 0.5 m - 001 year storm



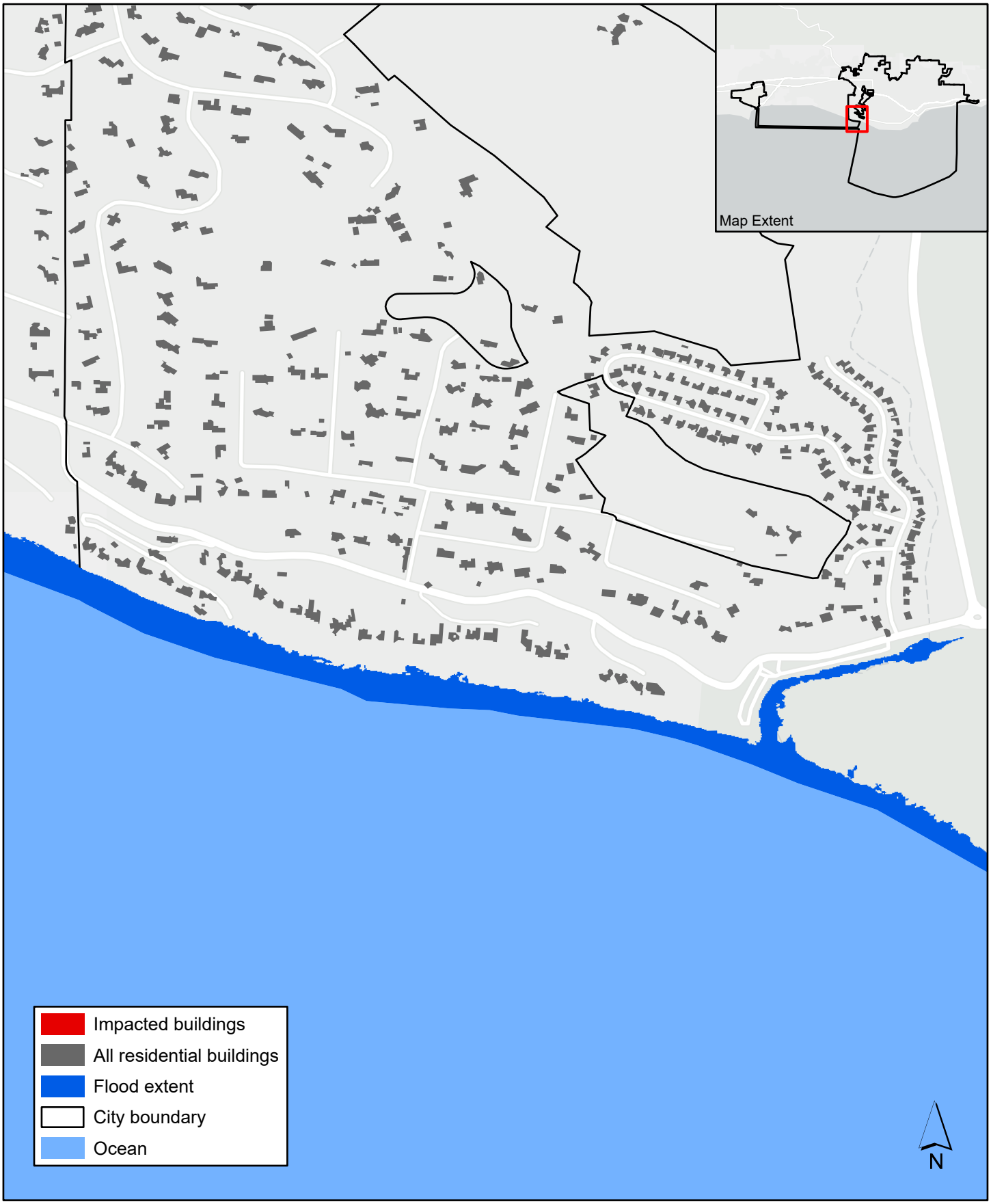
Santa Barbara Area 3

Sea Level Rise 0.5 m - 020 year storm



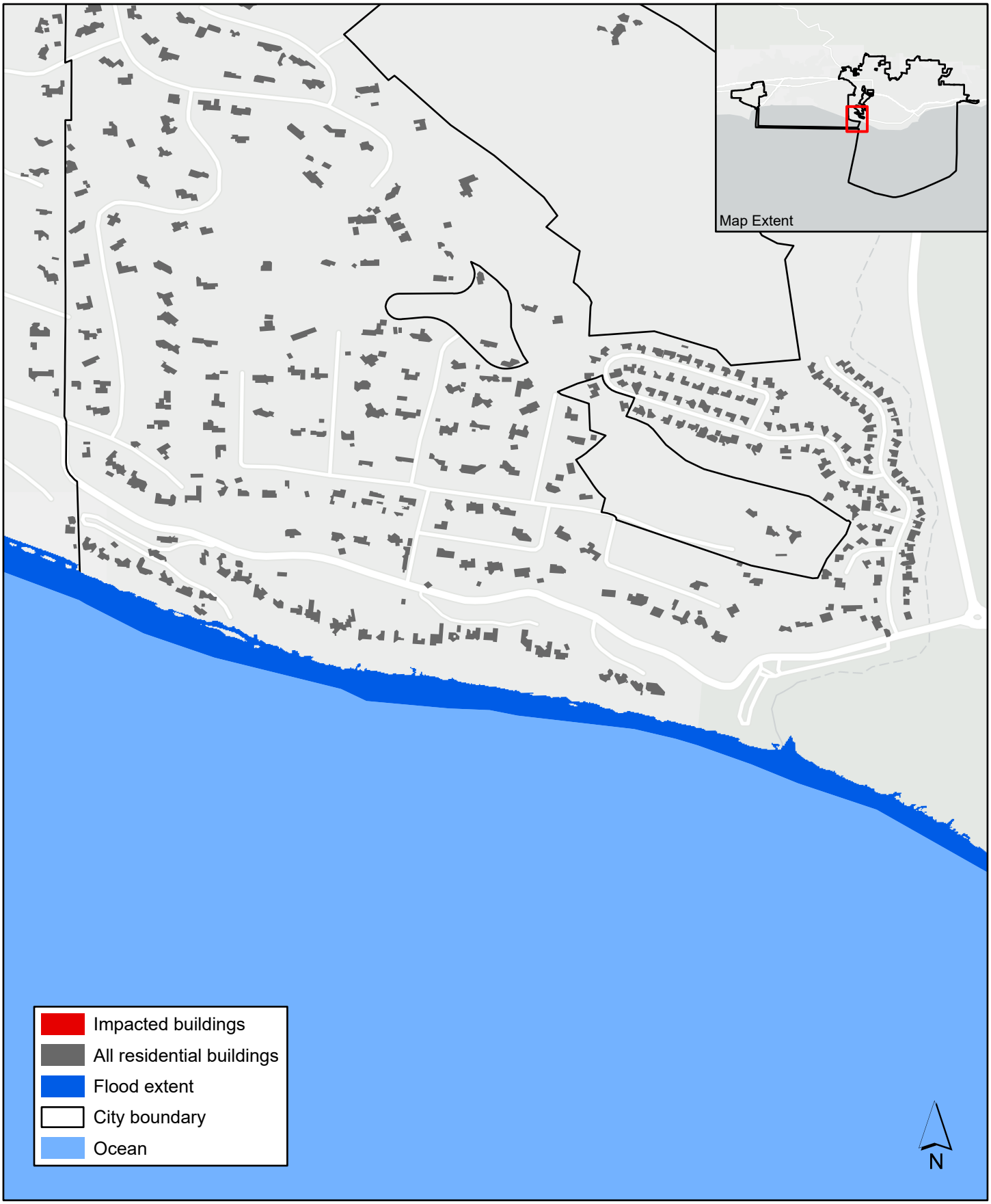
Santa Barbara Area 3

Sea Level Rise 0.5 m - 100 year storm



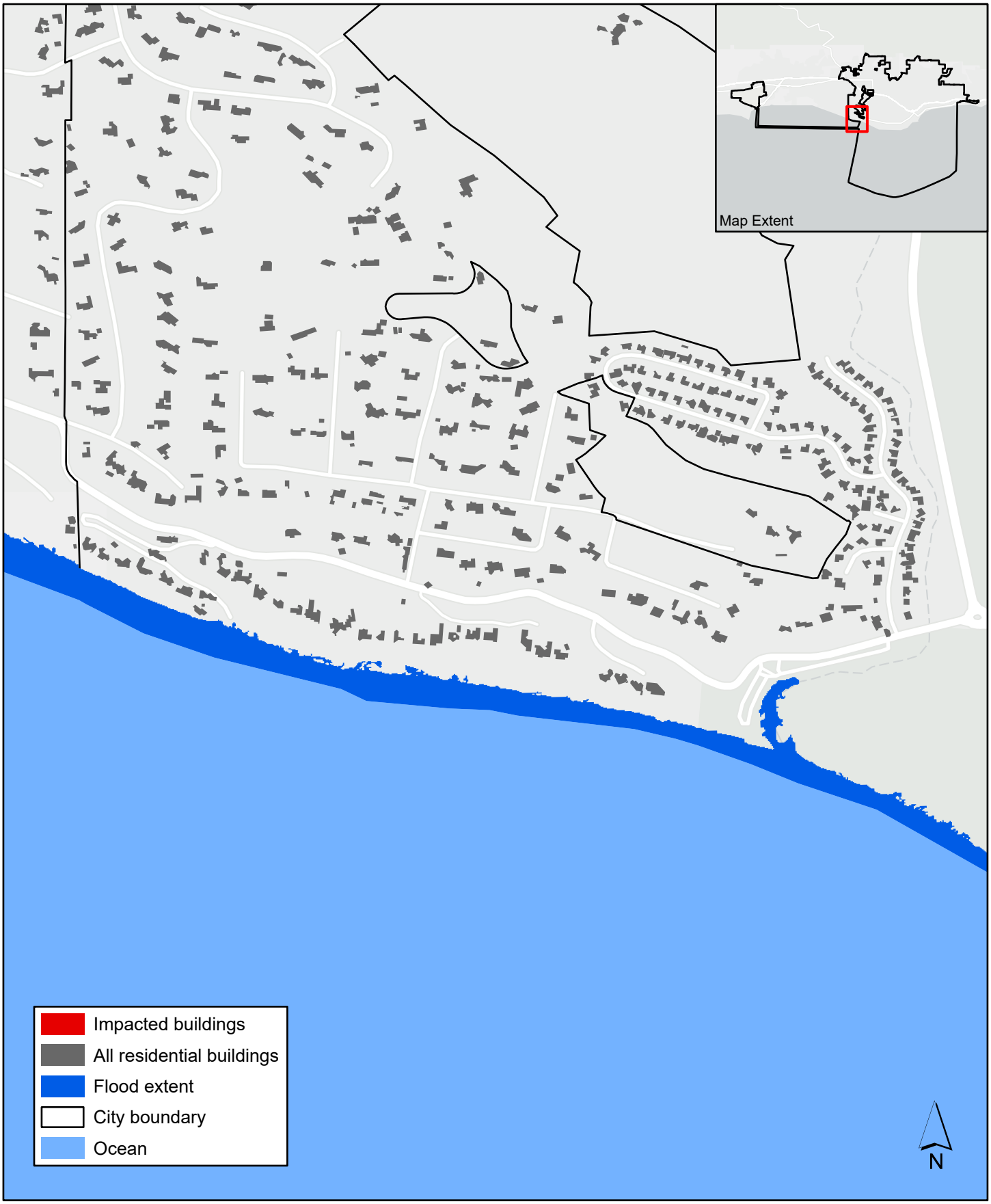
Santa Barbara Area 3

Sea Level Rise 0.75 m - No storm



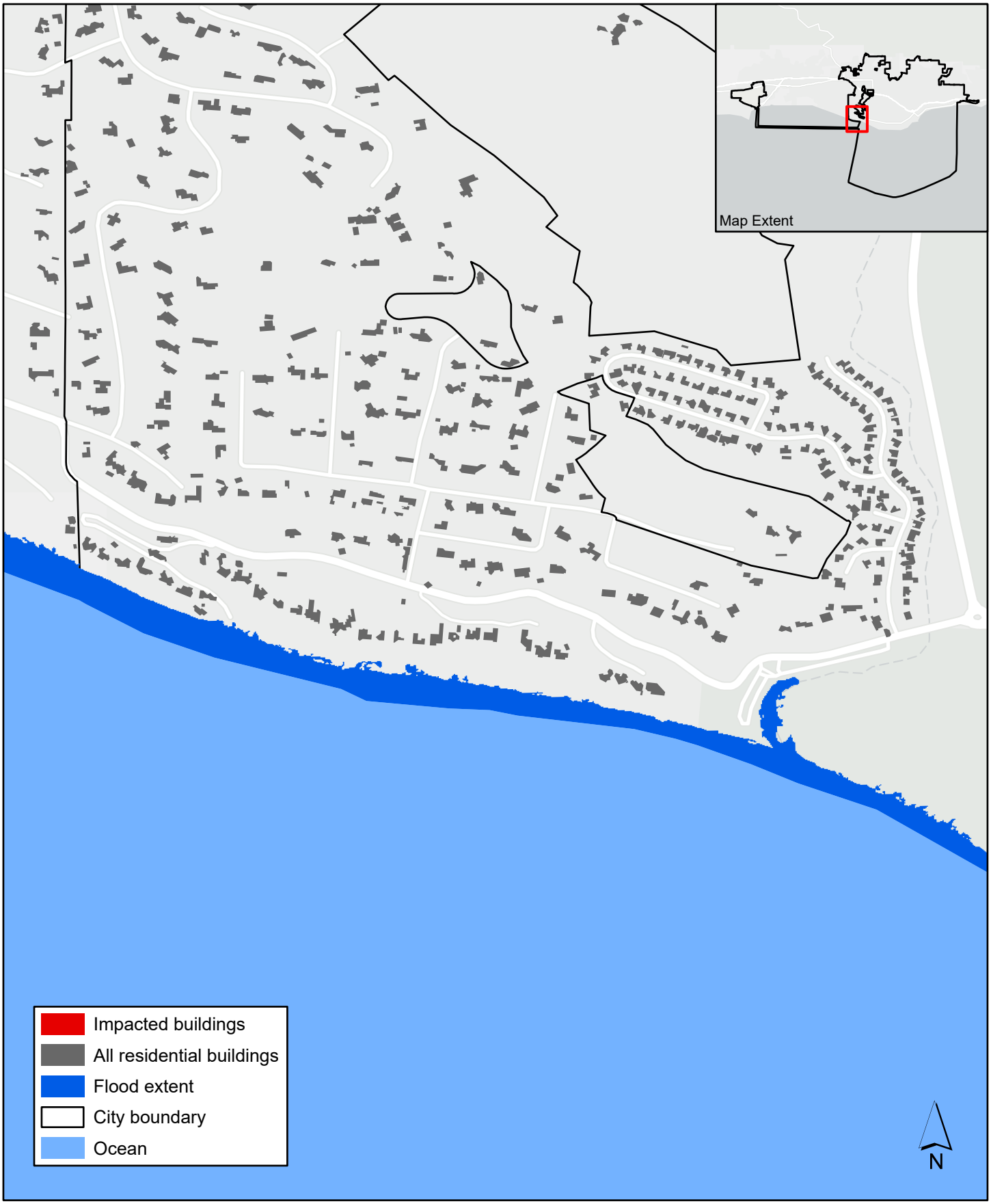
Santa Barbara Area 3

Sea Level Rise 0.75 m - 001 year storm



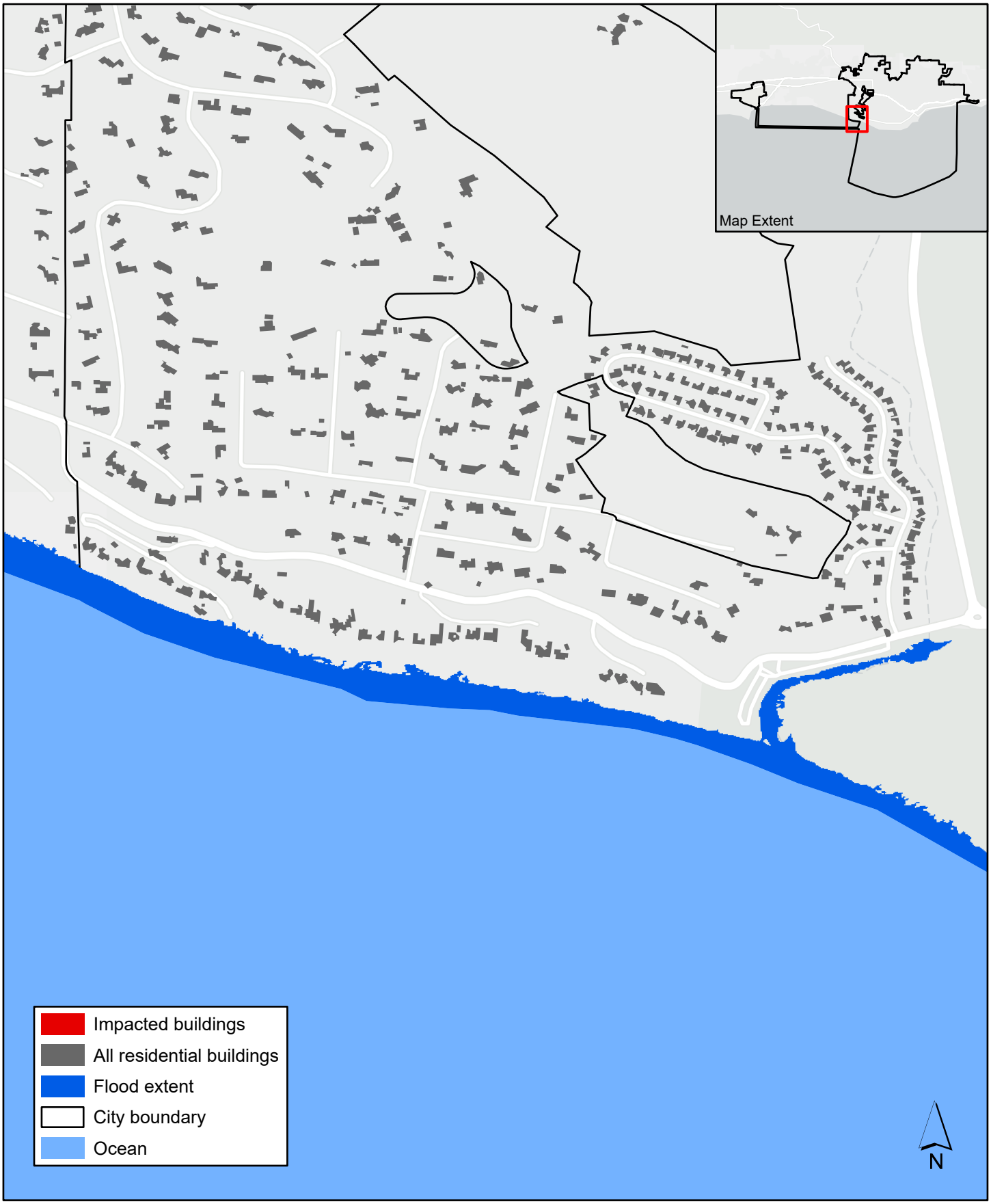
Santa Barbara Area 3

Sea Level Rise 0.75 m - 020 year storm



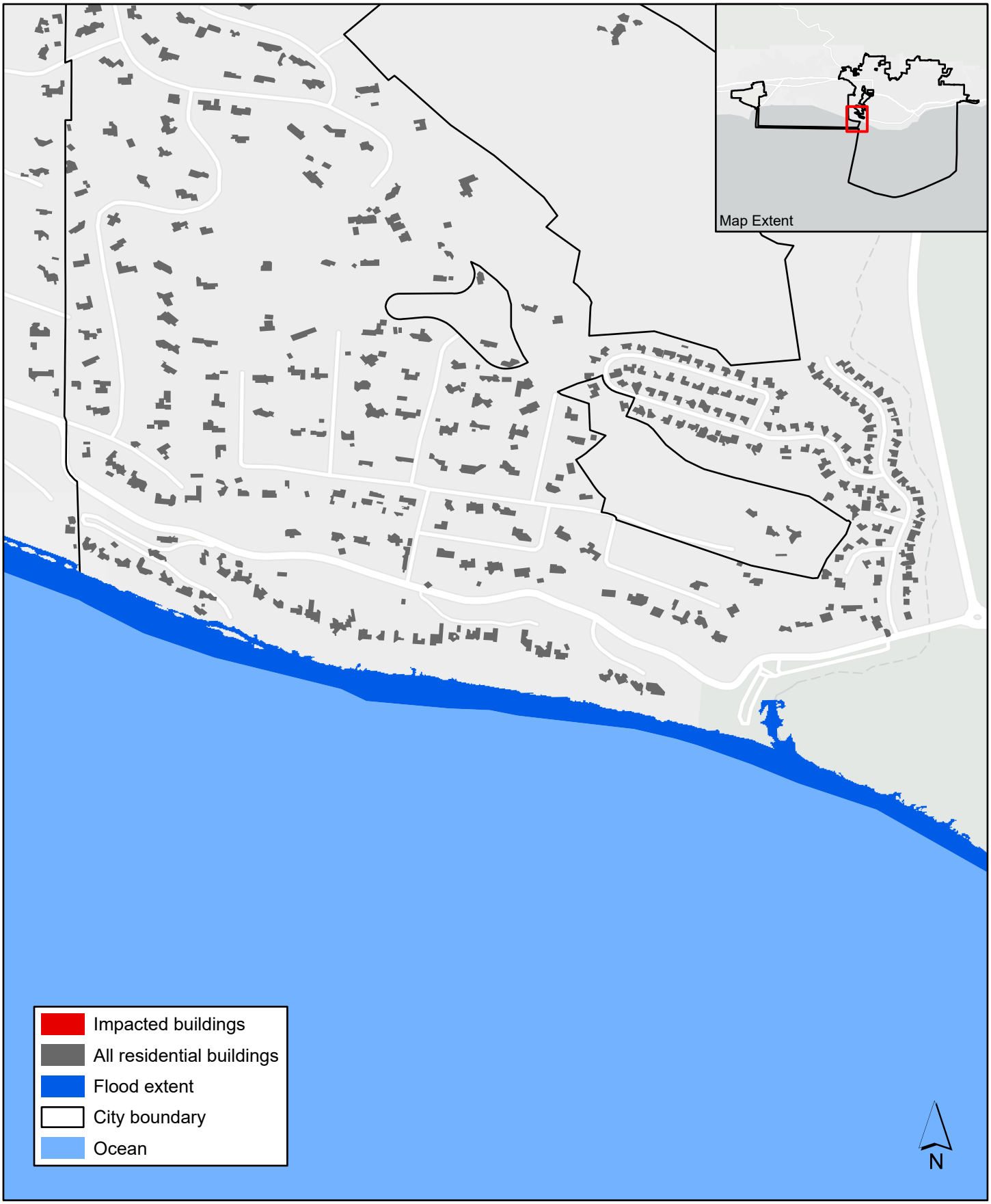
Santa Barbara Area 3

Sea Level Rise 0.75 m - 100 year storm



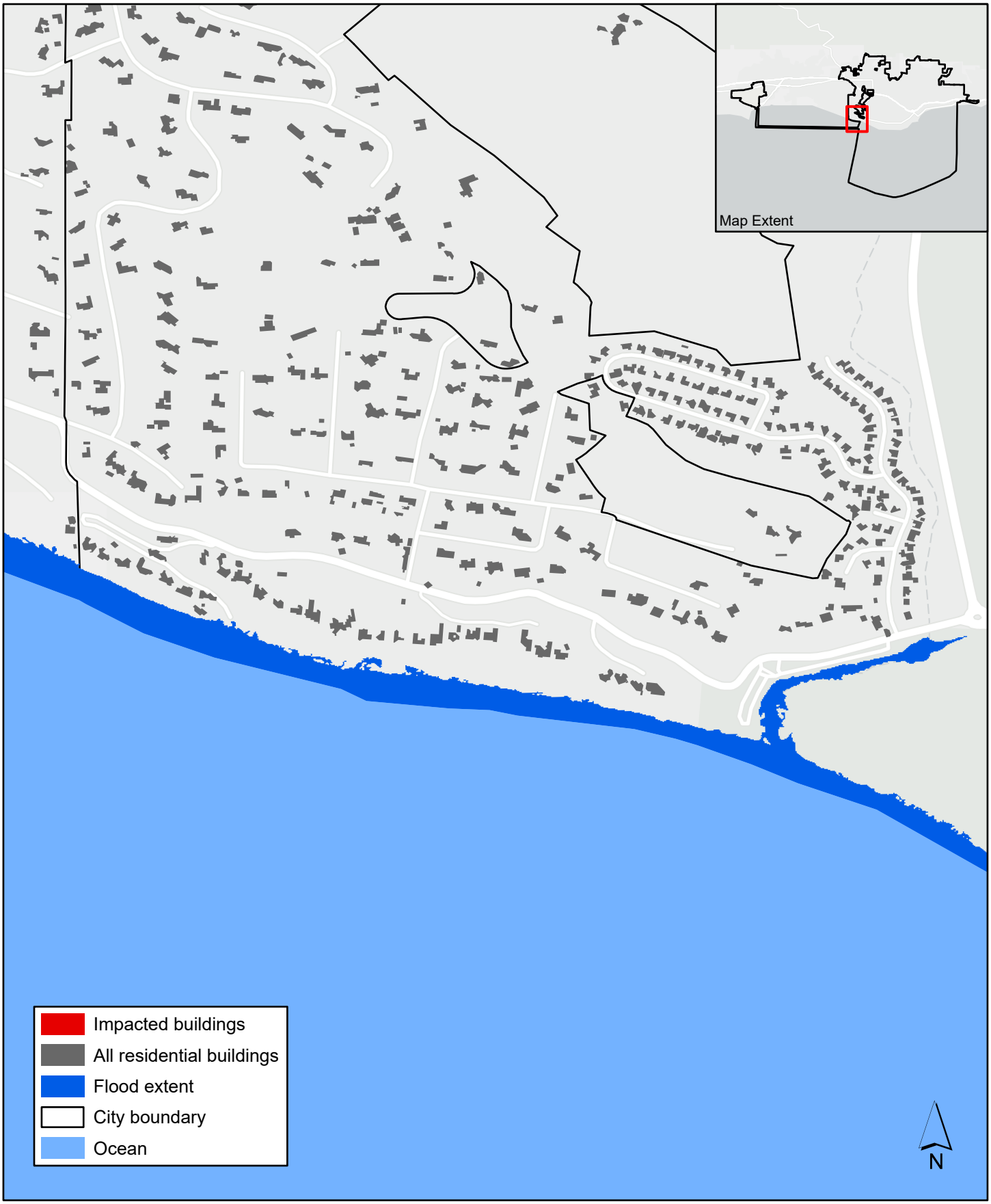
Santa Barbara Area 3

Sea Level Rise 1.0 m - No storm



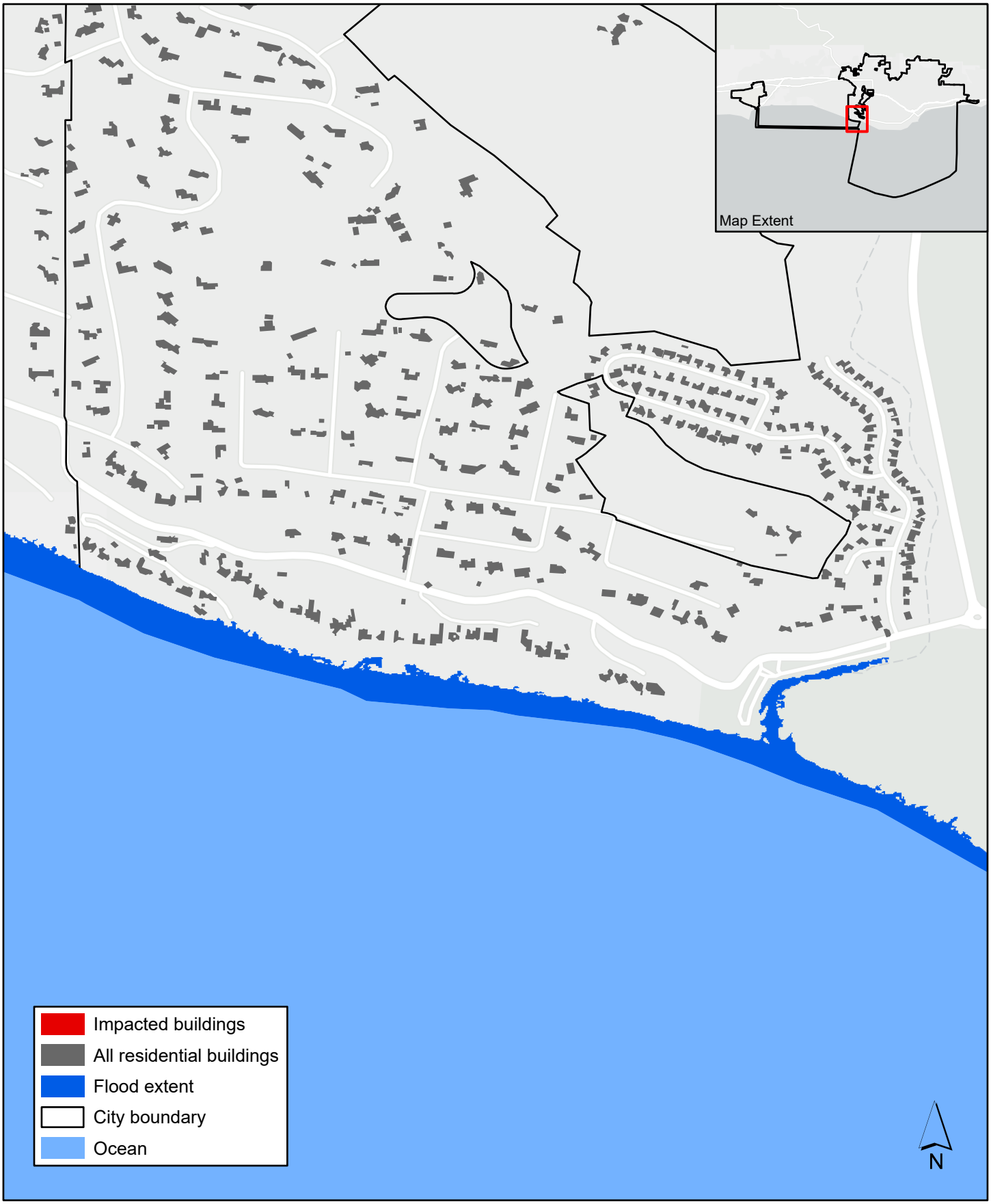
Santa Barbara Area 3

Sea Level Rise 1.0 m - 001 year storm



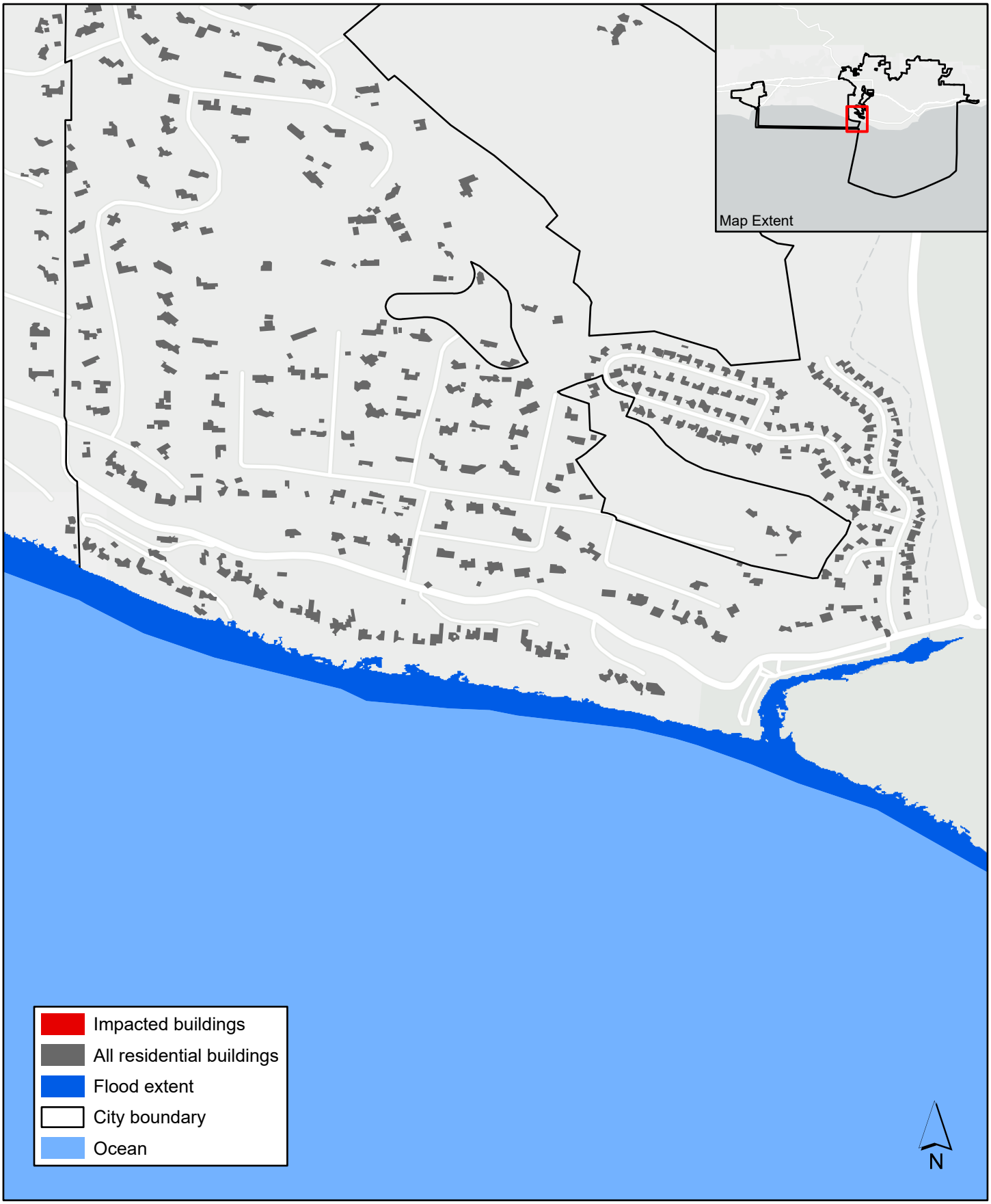
Santa Barbara Area 3

Sea Level Rise 1.0 m - 020 year storm



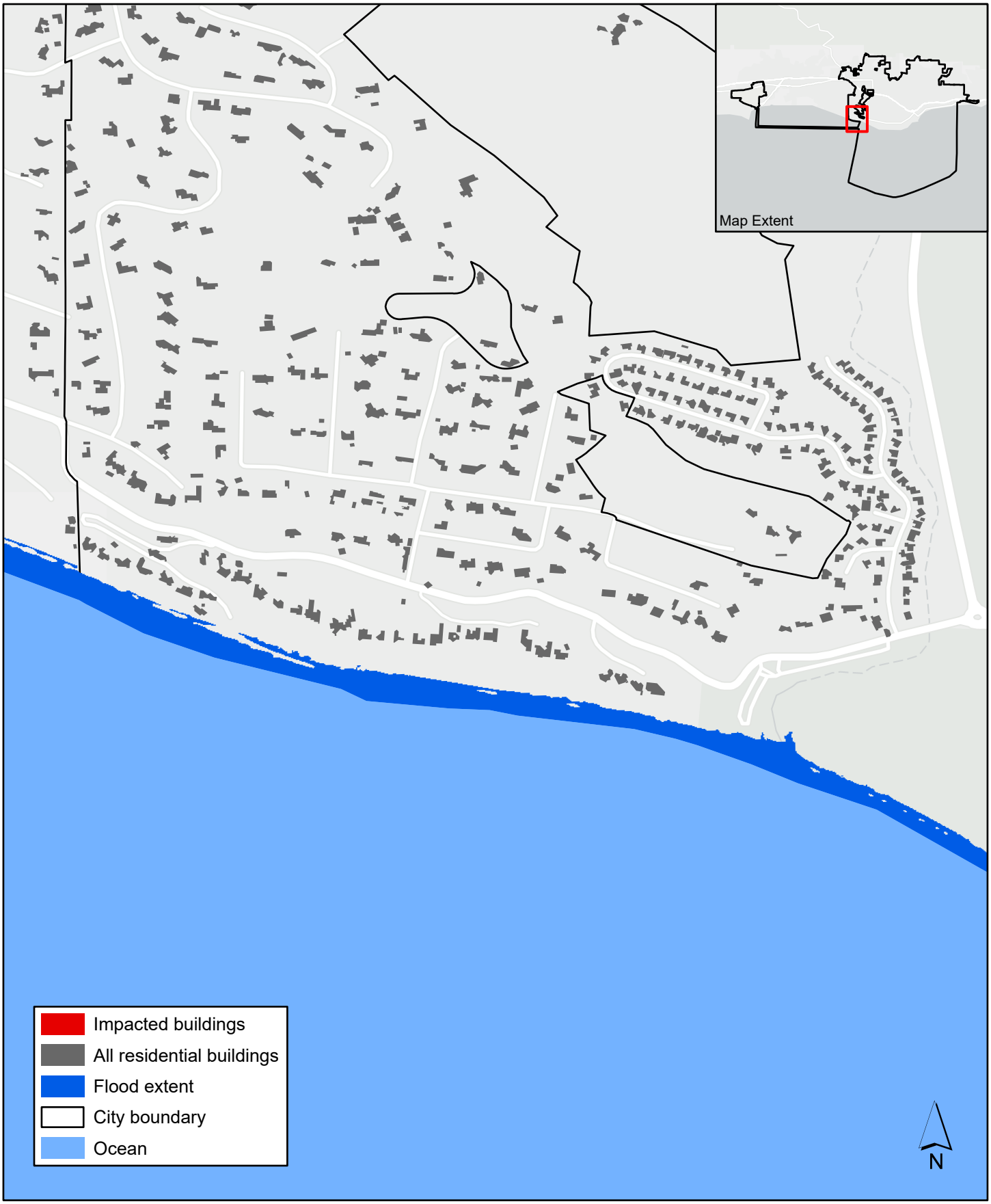
Santa Barbara Area 3

Sea Level Rise 1.0 m - 100 year storm



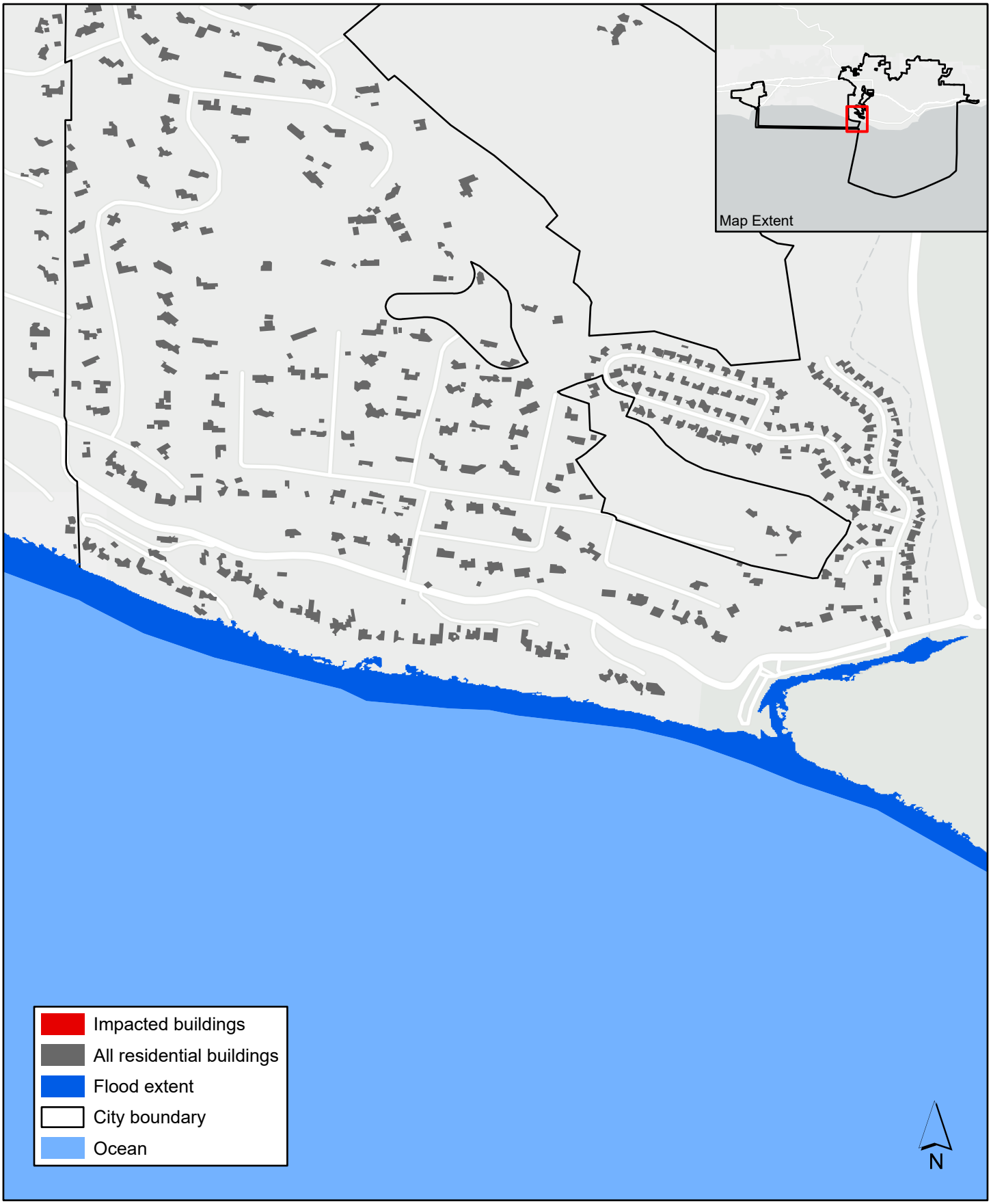
Santa Barbara Area 3

Sea Level Rise 1.5 m - No storm



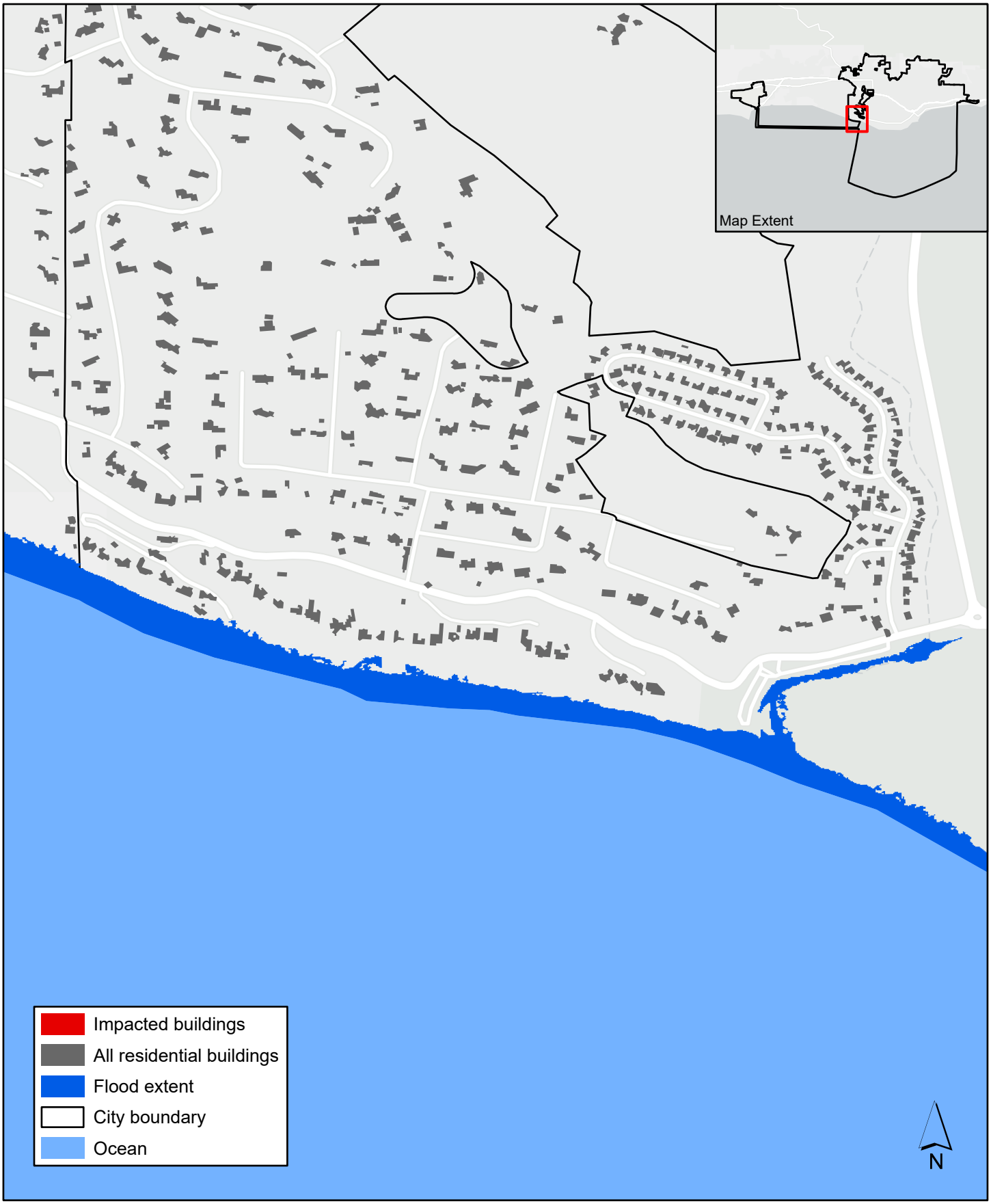
Santa Barbara Area 3

Sea Level Rise 1.5 m - 001 year storm



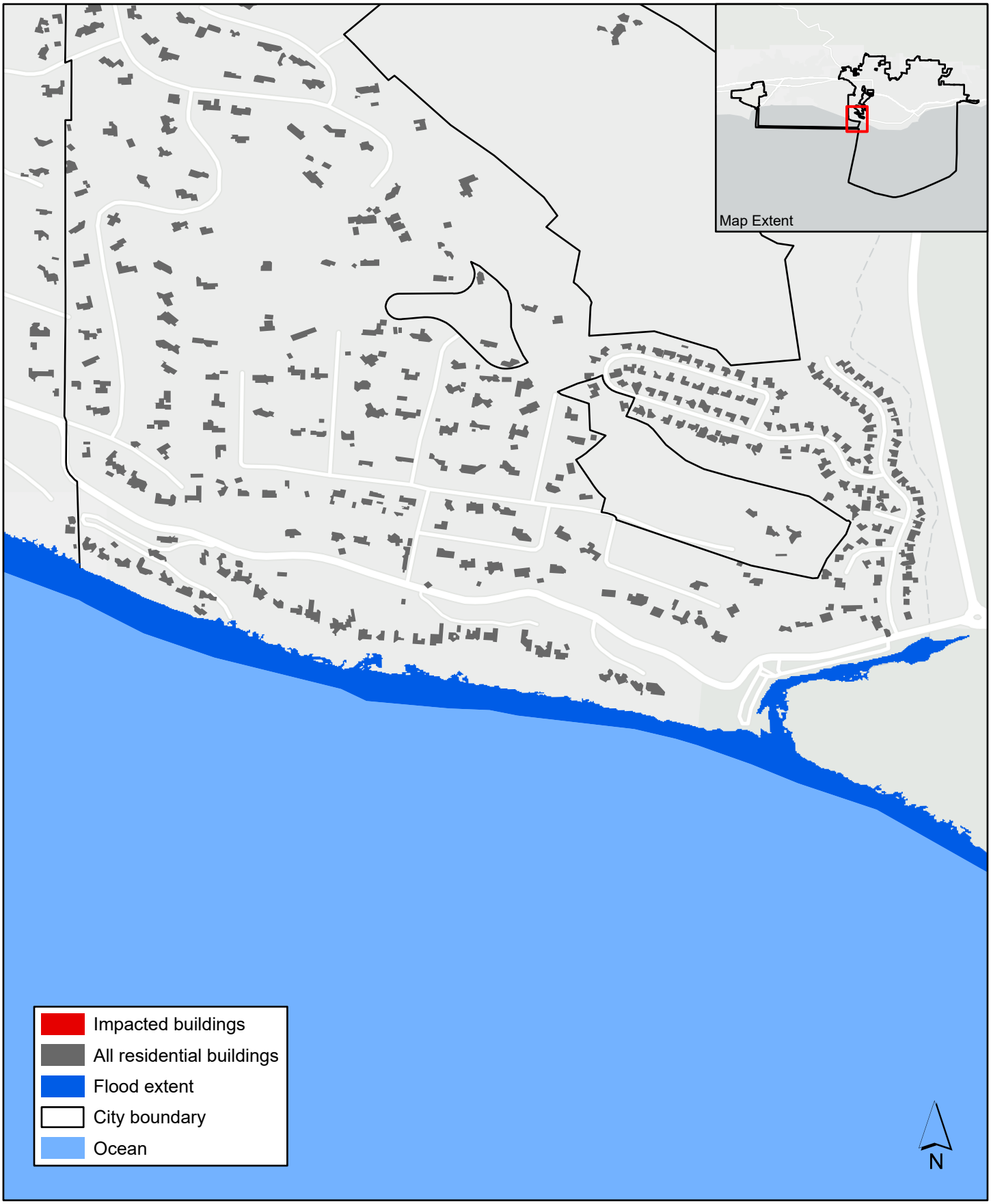
Santa Barbara Area 3

Sea Level Rise 1.5 m - 020 year storm



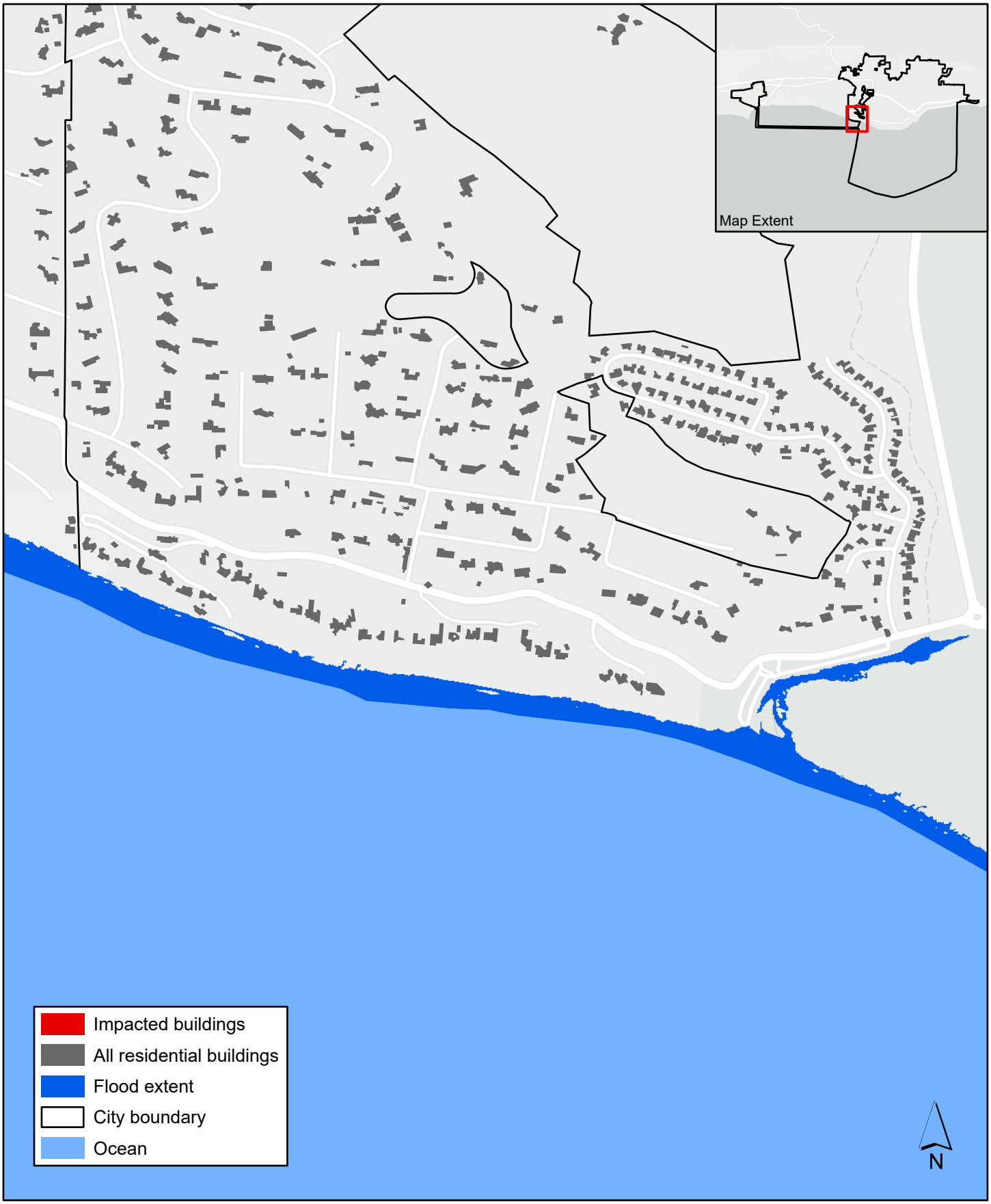
Santa Barbara Area 3

Sea Level Rise 1.5 m - 100 year storm



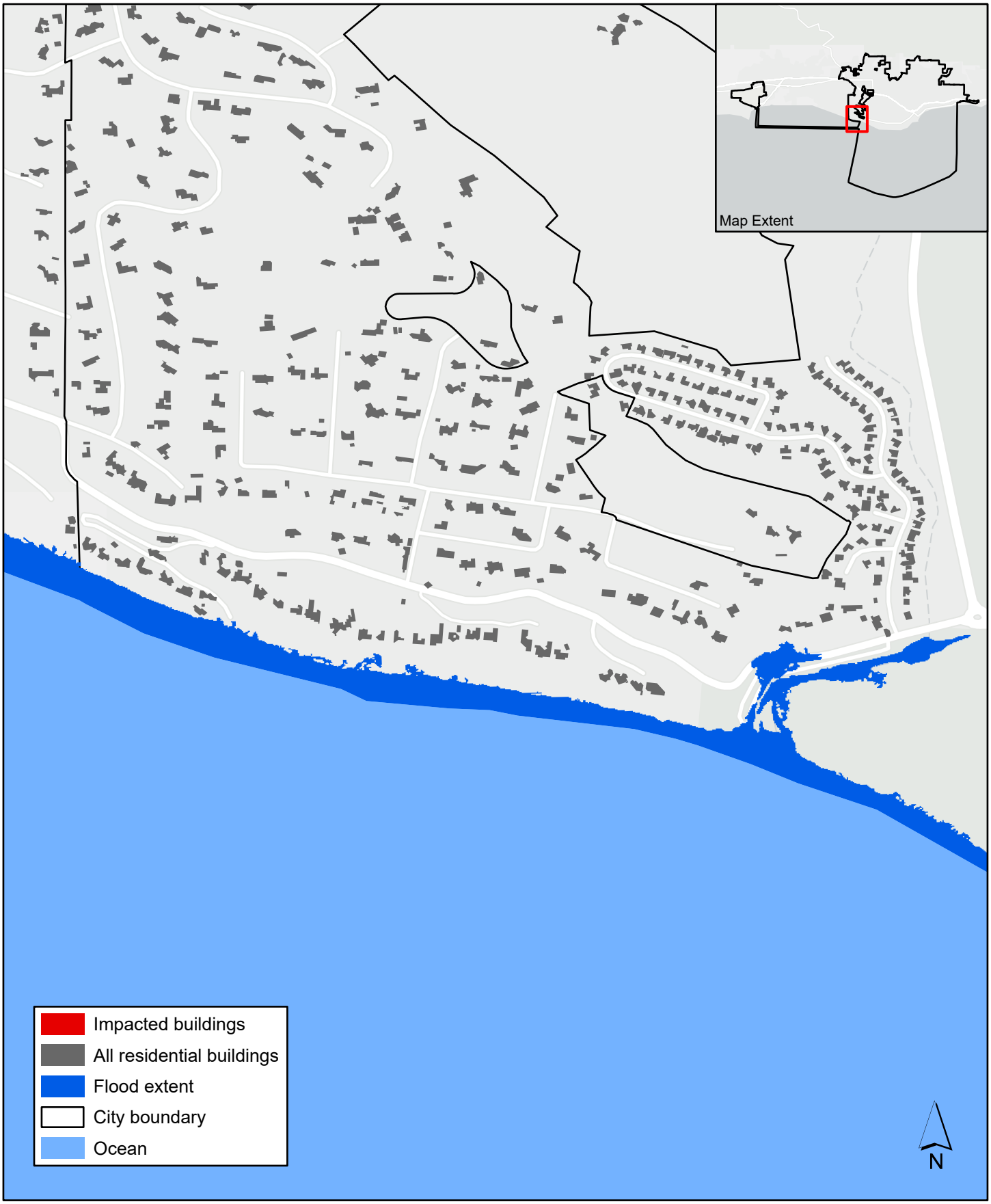
Santa Barbara Area 3

Sea Level Rise 2.0 m - No storm



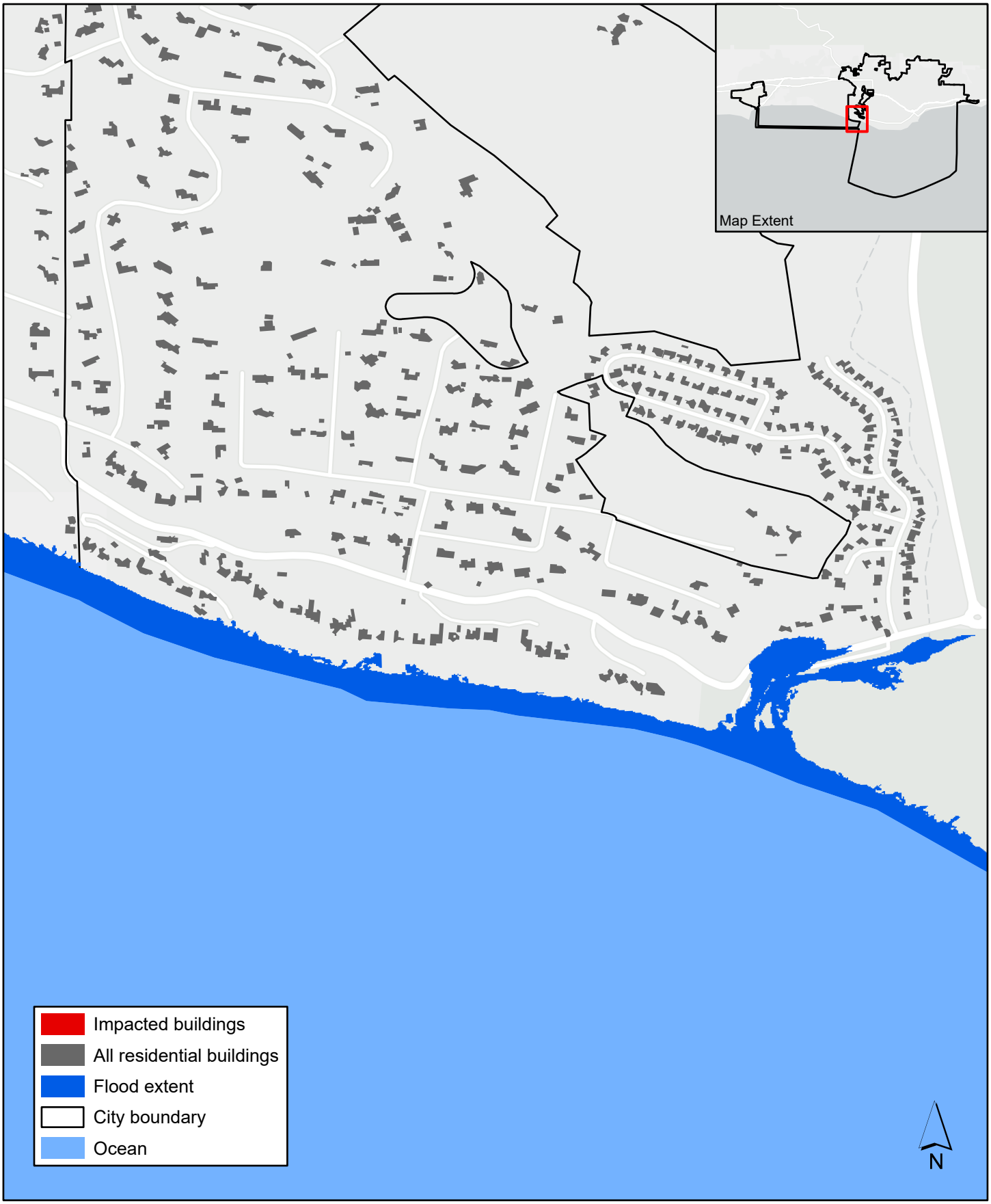
Santa Barbara Area 3

Sea Level Rise 2.0 m - 001 year storm



Santa Barbara Area 3

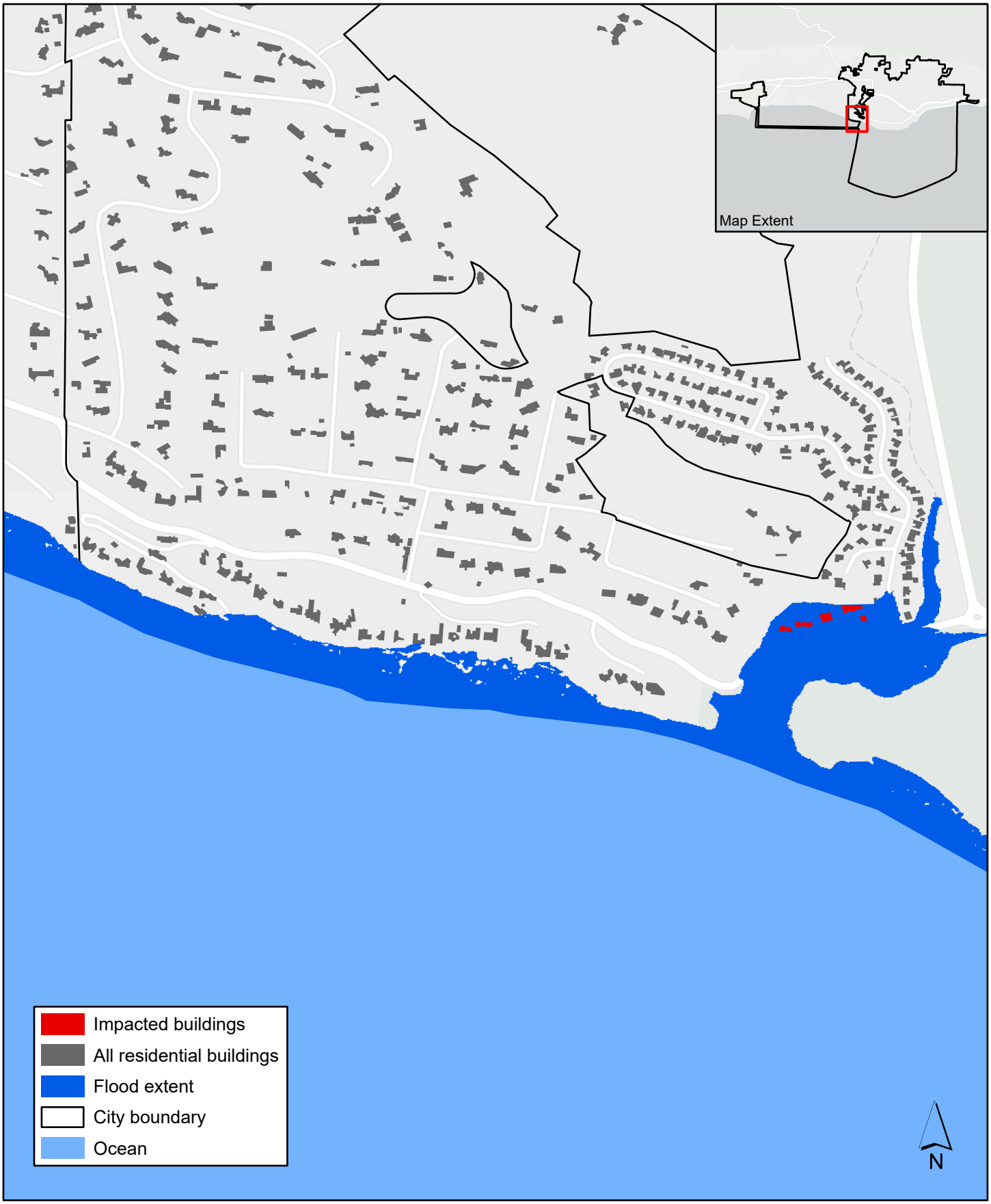
Sea Level Rise 2.0 m - 020 year storm



Appendix D

Santa Barbara Area 3

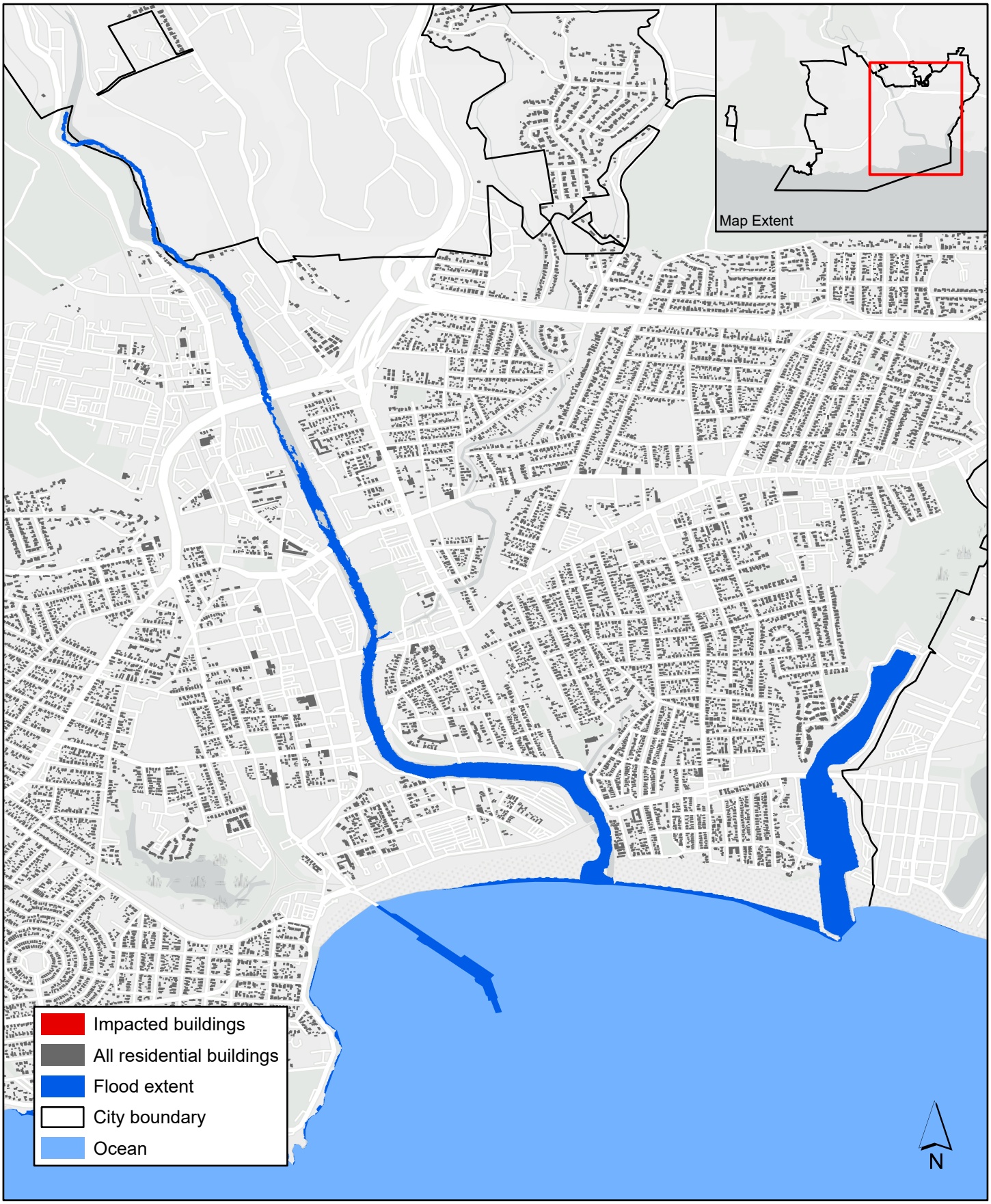
Sea Level Rise 2.0 m - 100 year storm



Appendix E

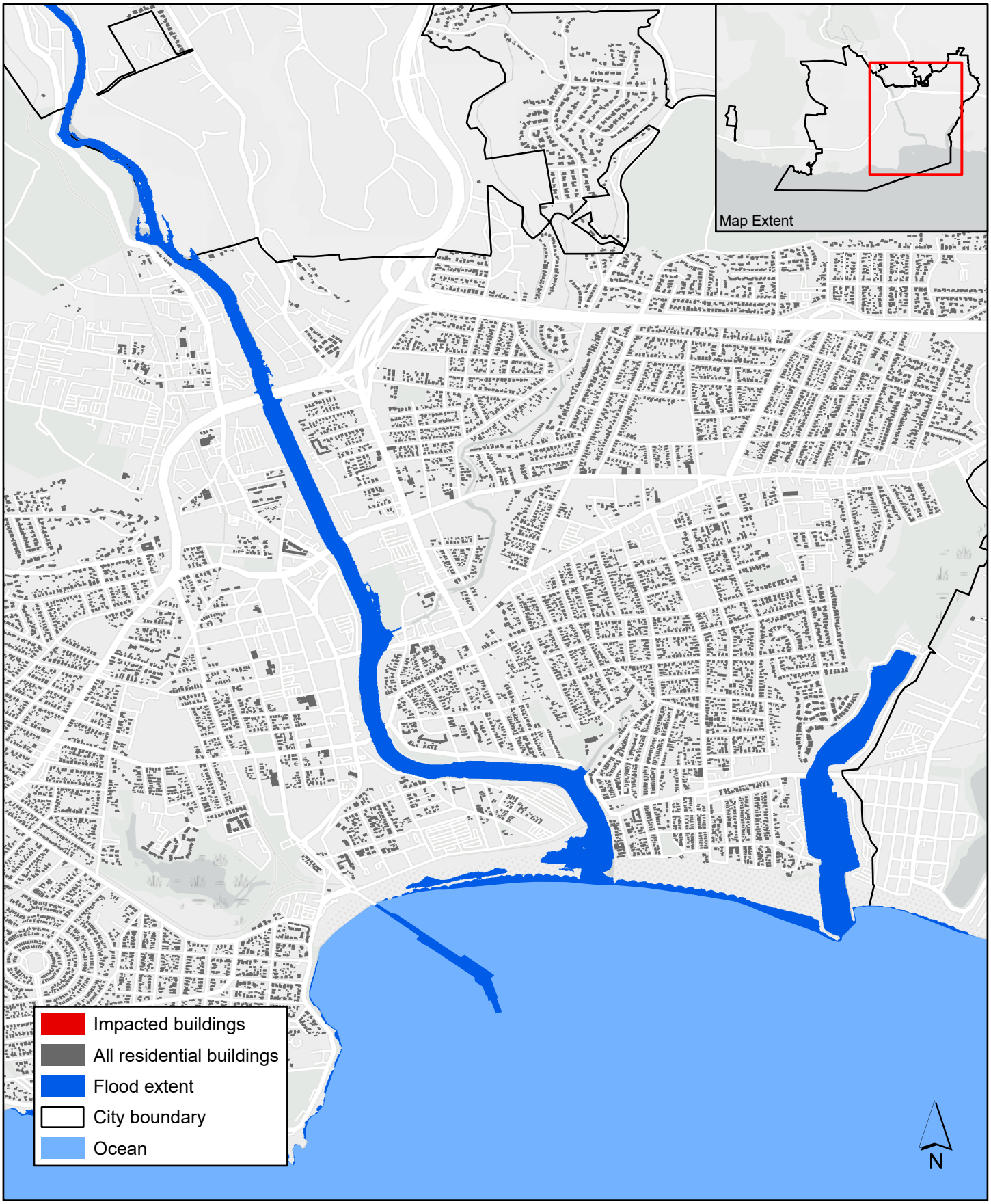
Santa Cruz Area 1

Sea Level Rise 0.0 m - No storm



Santa Cruz Area 1

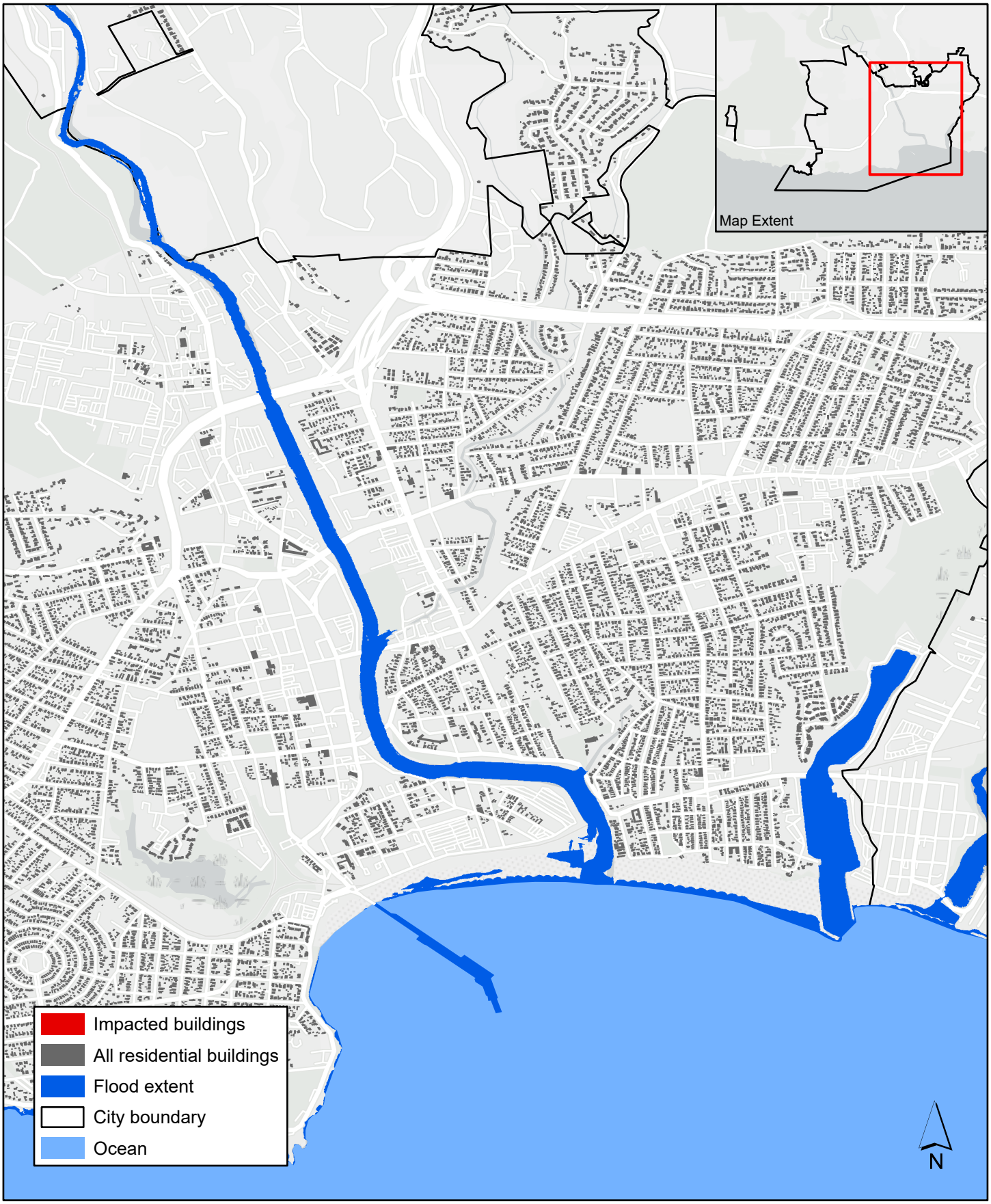
Sea Level Rise 0.0 m - 001 year storm



Appendix E

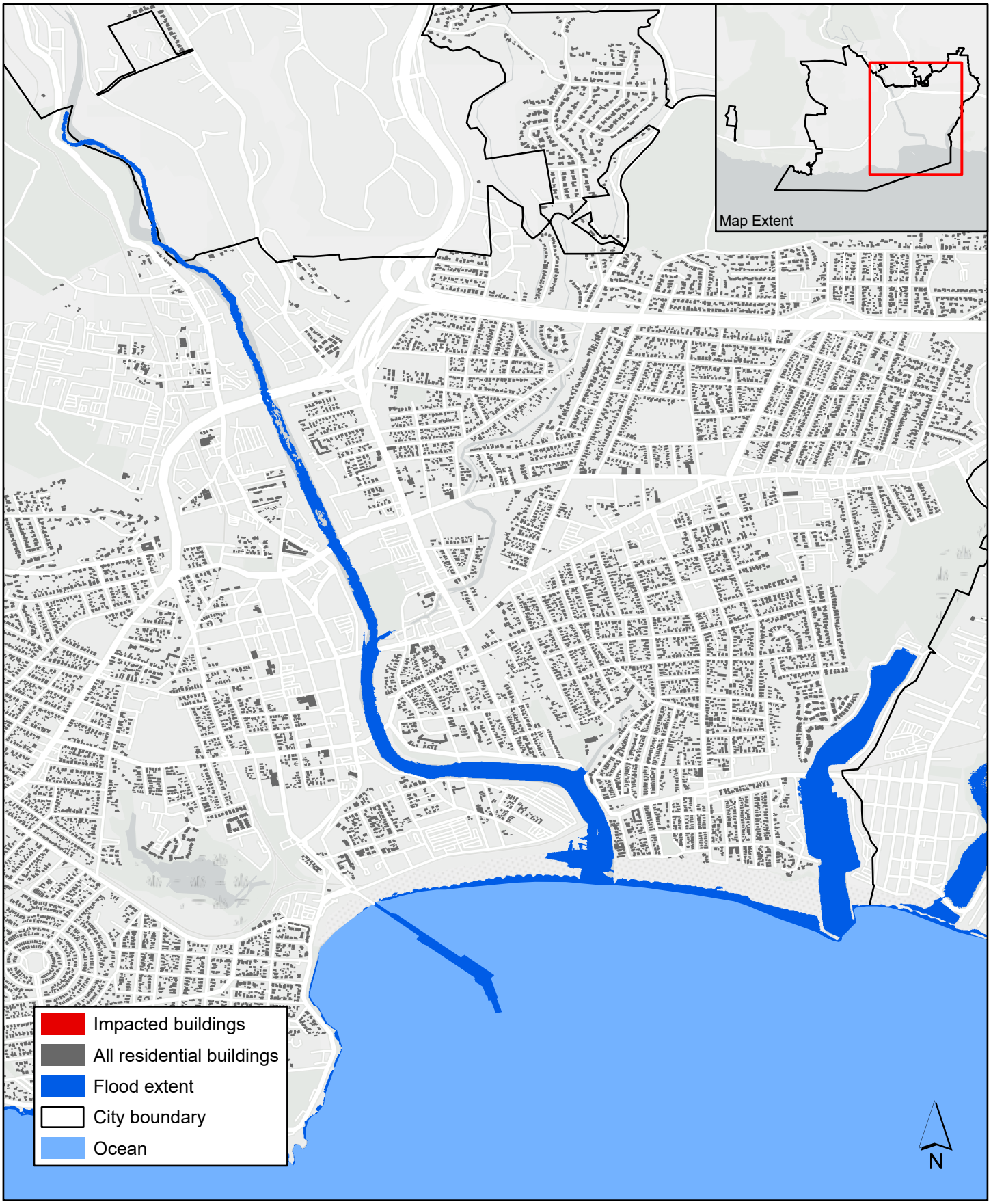
Santa Cruz Area 1

Sea Level Rise 0.0 m - 020 year storm



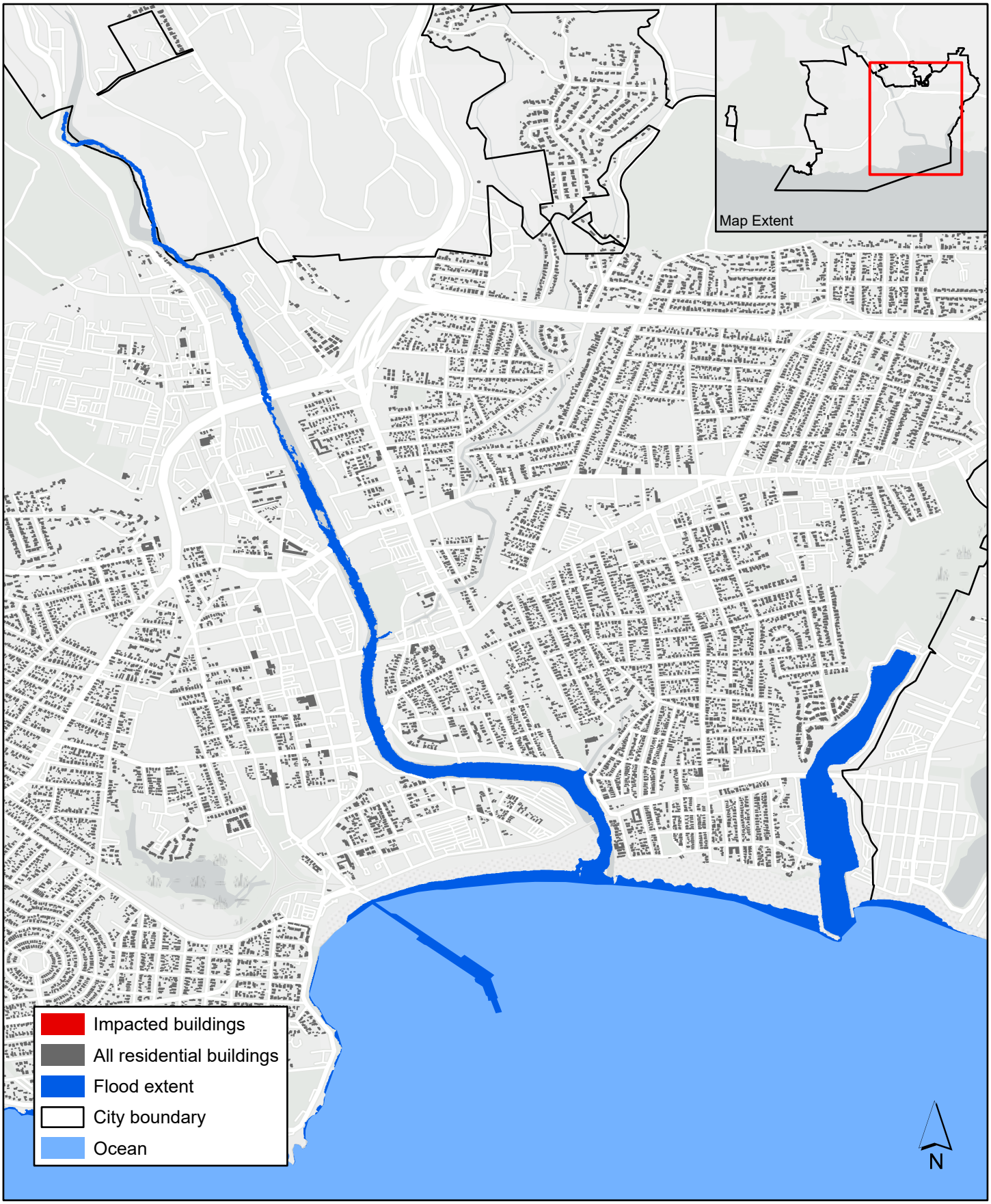
Santa Cruz Area 1

Sea Level Rise 0.0 m - 100 year storm



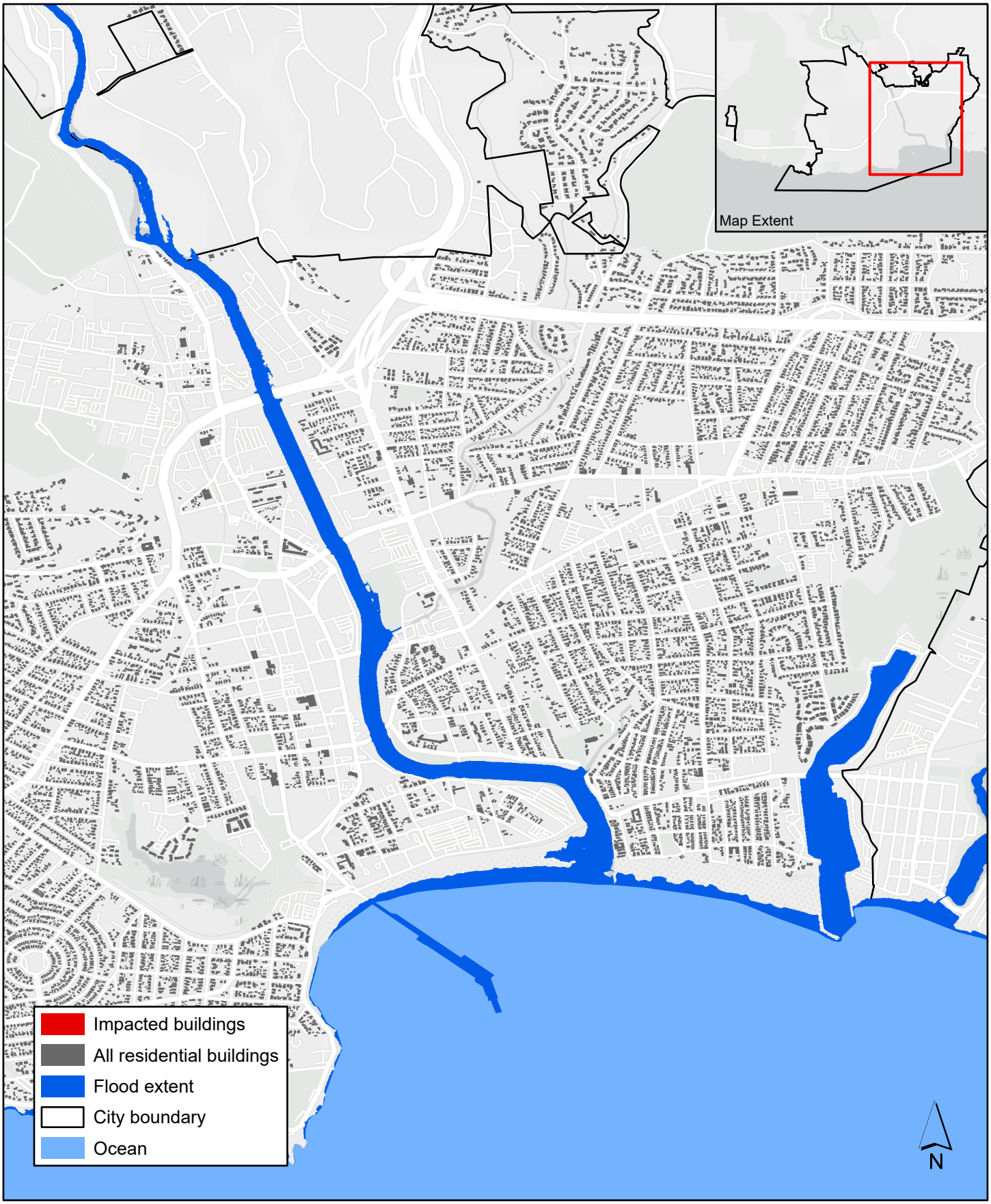
Santa Cruz Area 1

Sea Level Rise 0.25 m - No storm



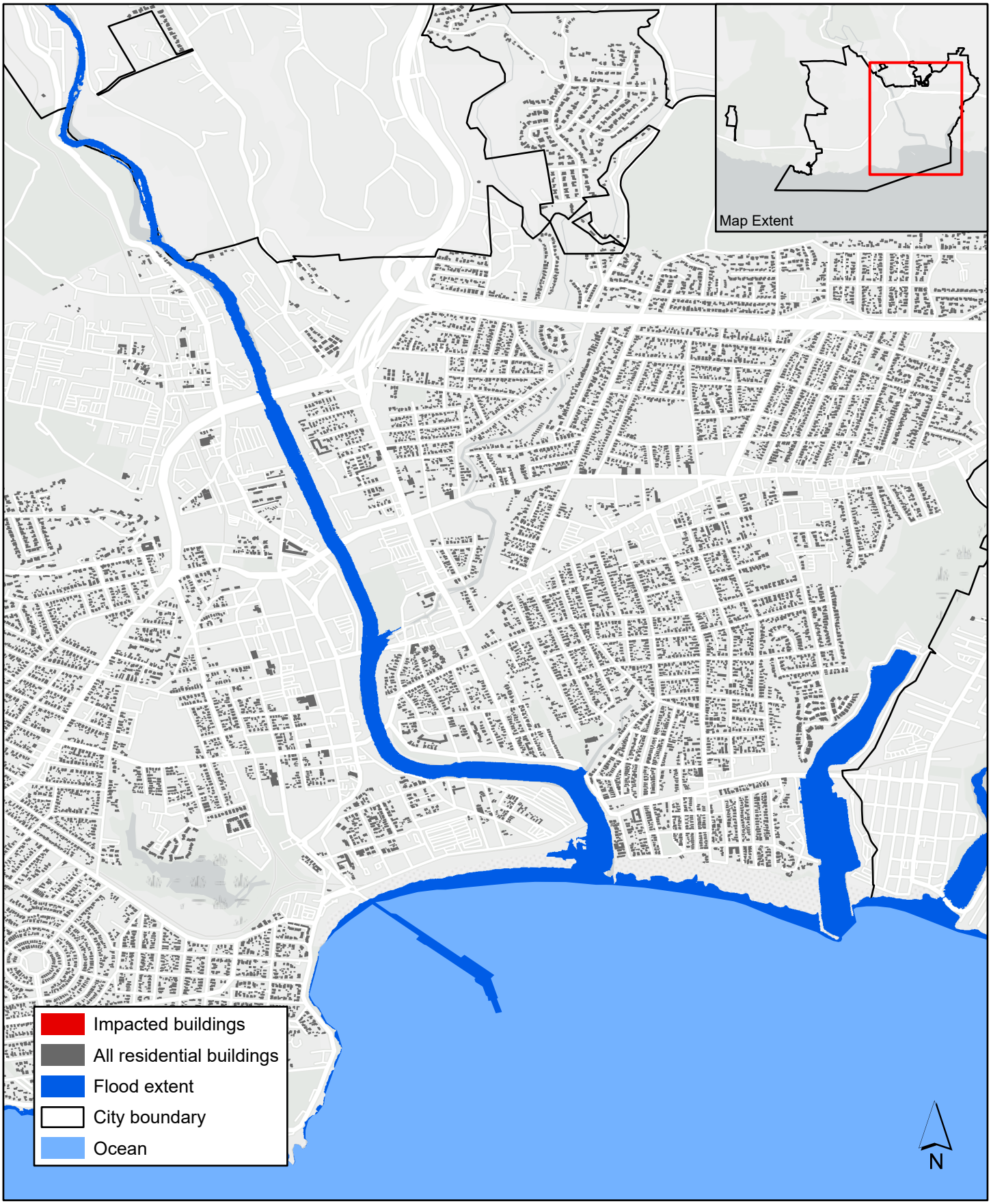
Santa Cruz Area 1

Sea Level Rise 0.25 m - 001 year storm



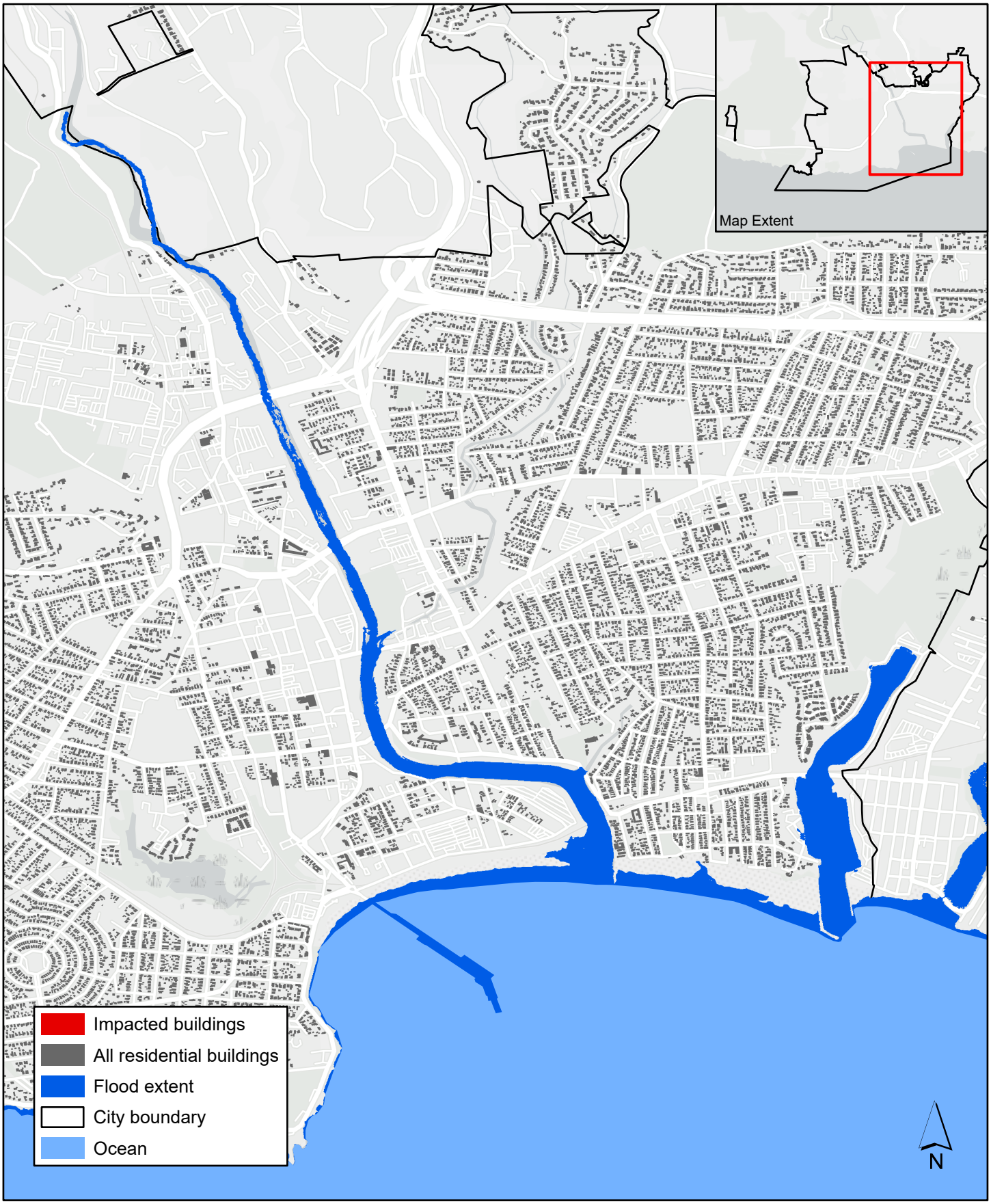
Santa Cruz Area 1

Sea Level Rise 0.25 m - 020 year storm



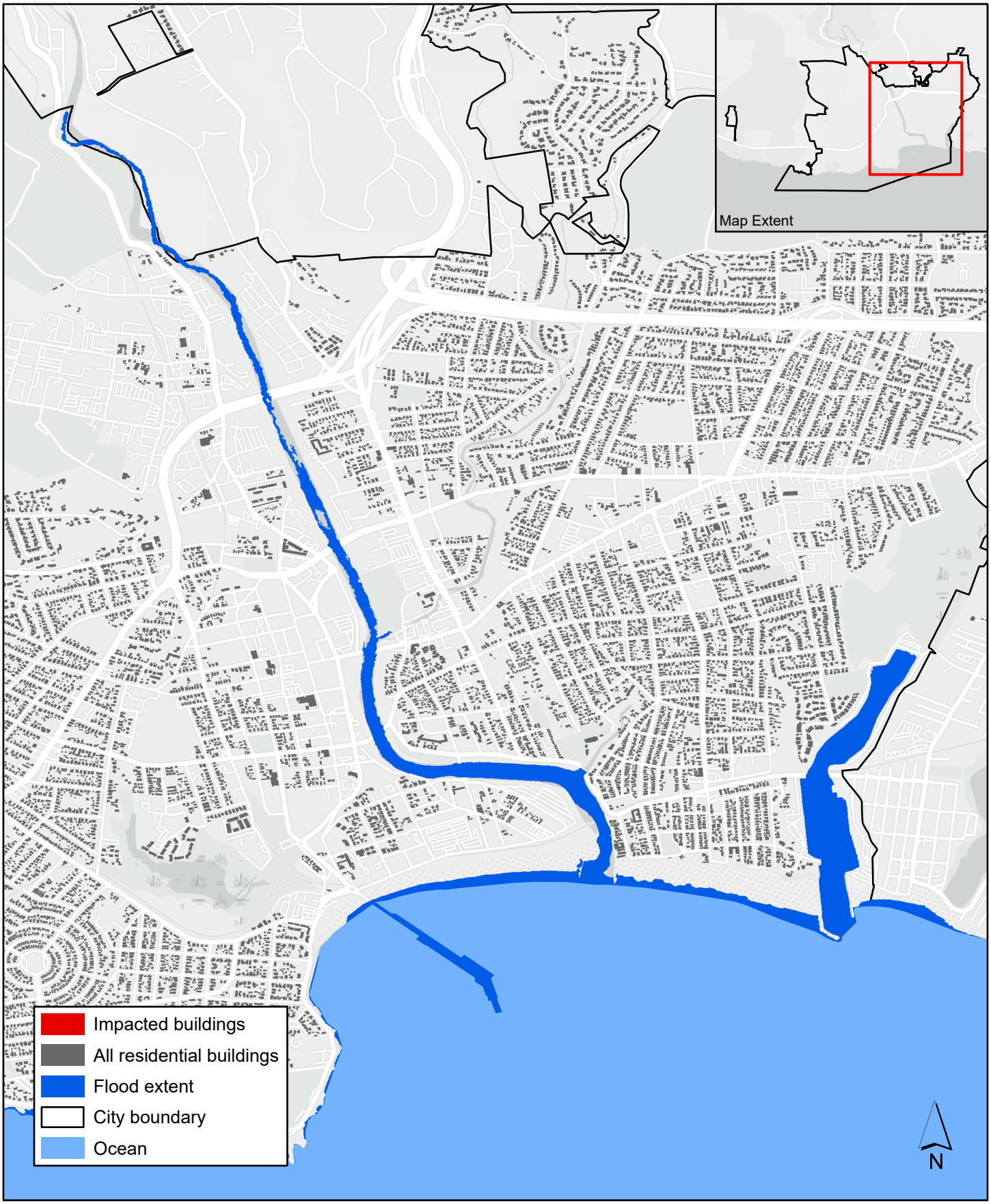
Santa Cruz Area 1

Sea Level Rise 0.25 m - 100 year storm



Santa Cruz Area 1

Sea Level Rise 0.5 m - No storm

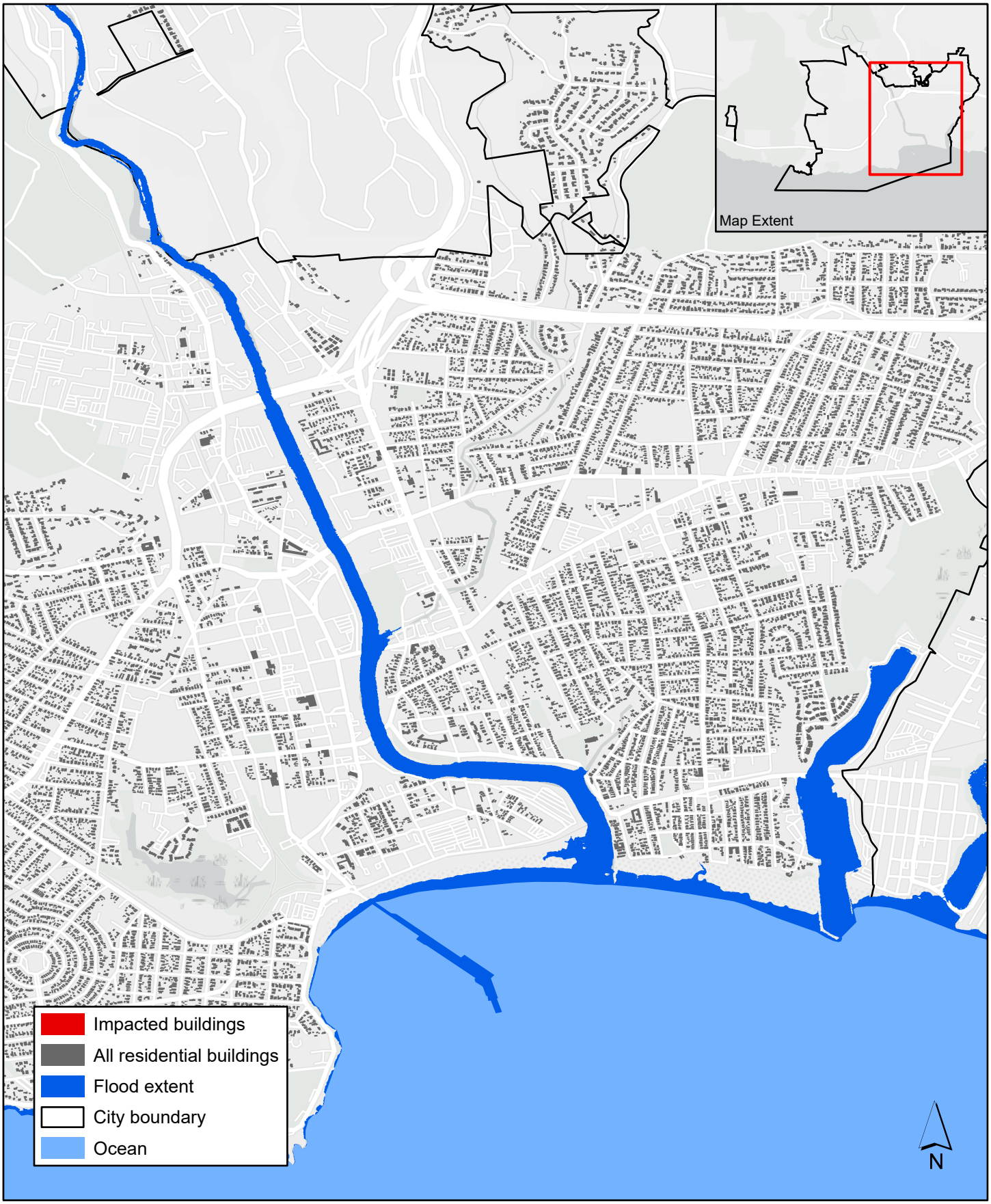


Santa Cruz Area 1

Sea Level Rise 0.5 m - 001 year storm

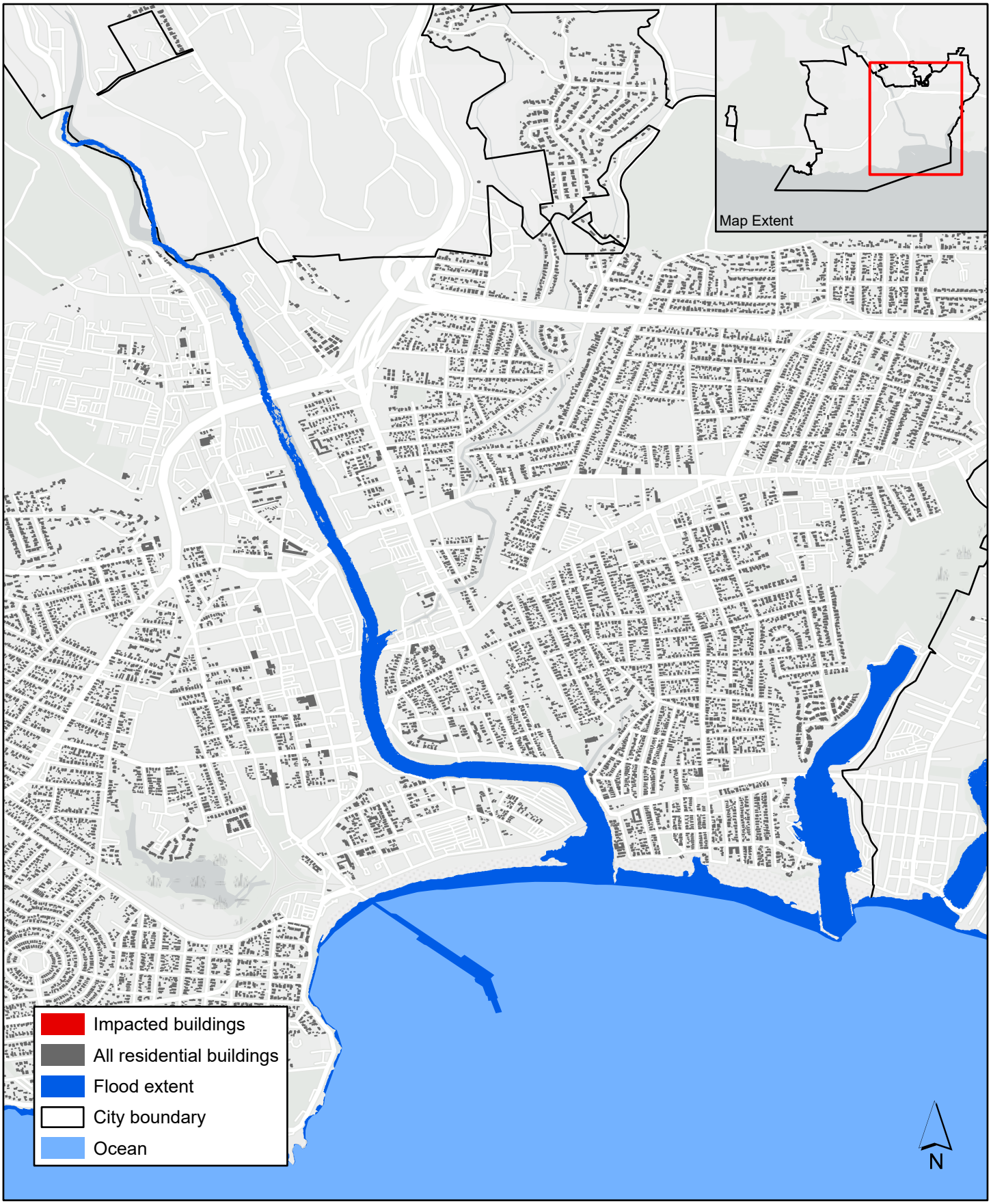
Santa Cruz Area 1

Sea Level Rise 0.5 m - 020 year storm



Santa Cruz Area 1

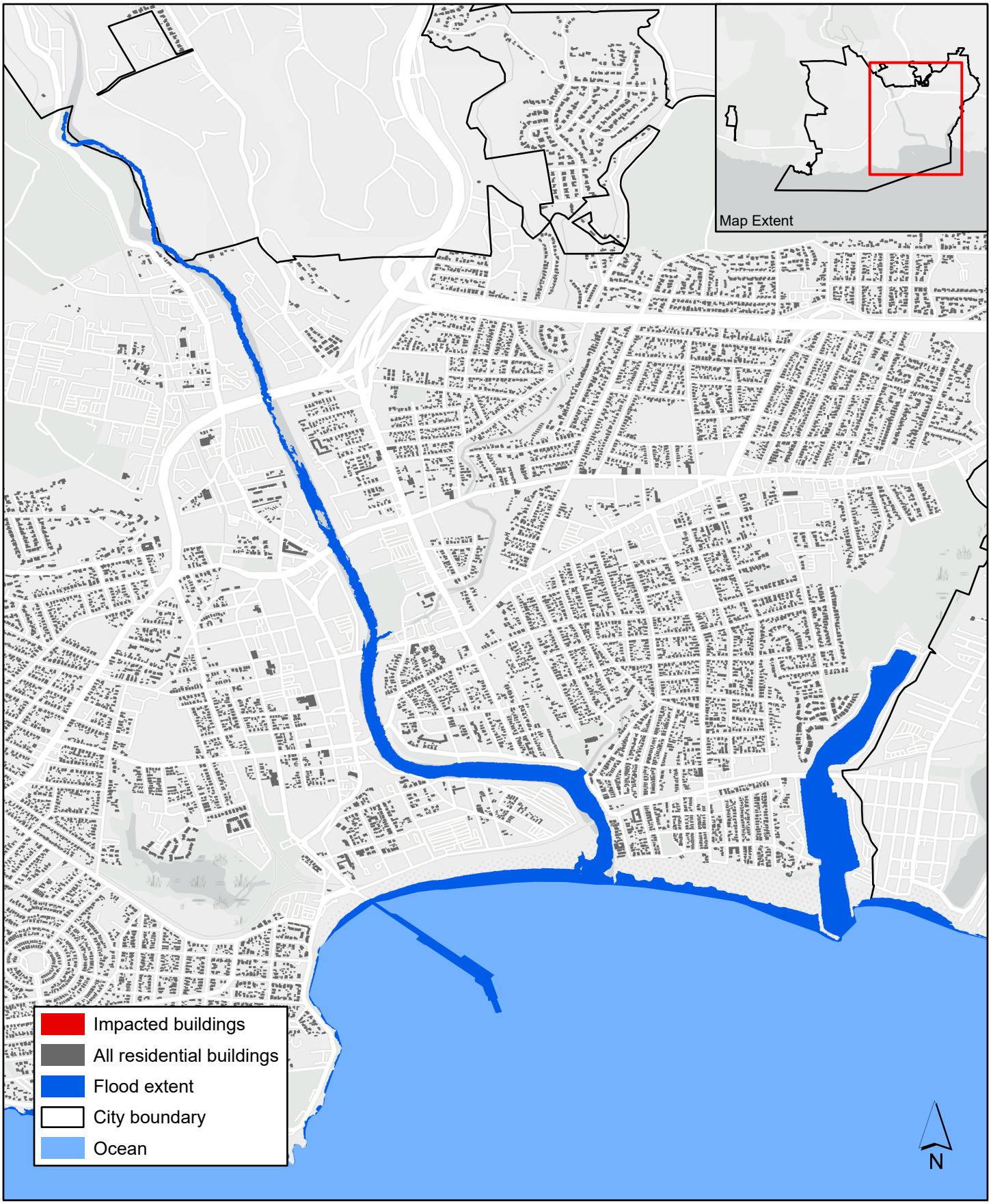
Sea Level Rise 0.5 m - 100 year storm



Appendix E

Santa Cruz Area 1

Sea Level Rise 0.75 m - No storm

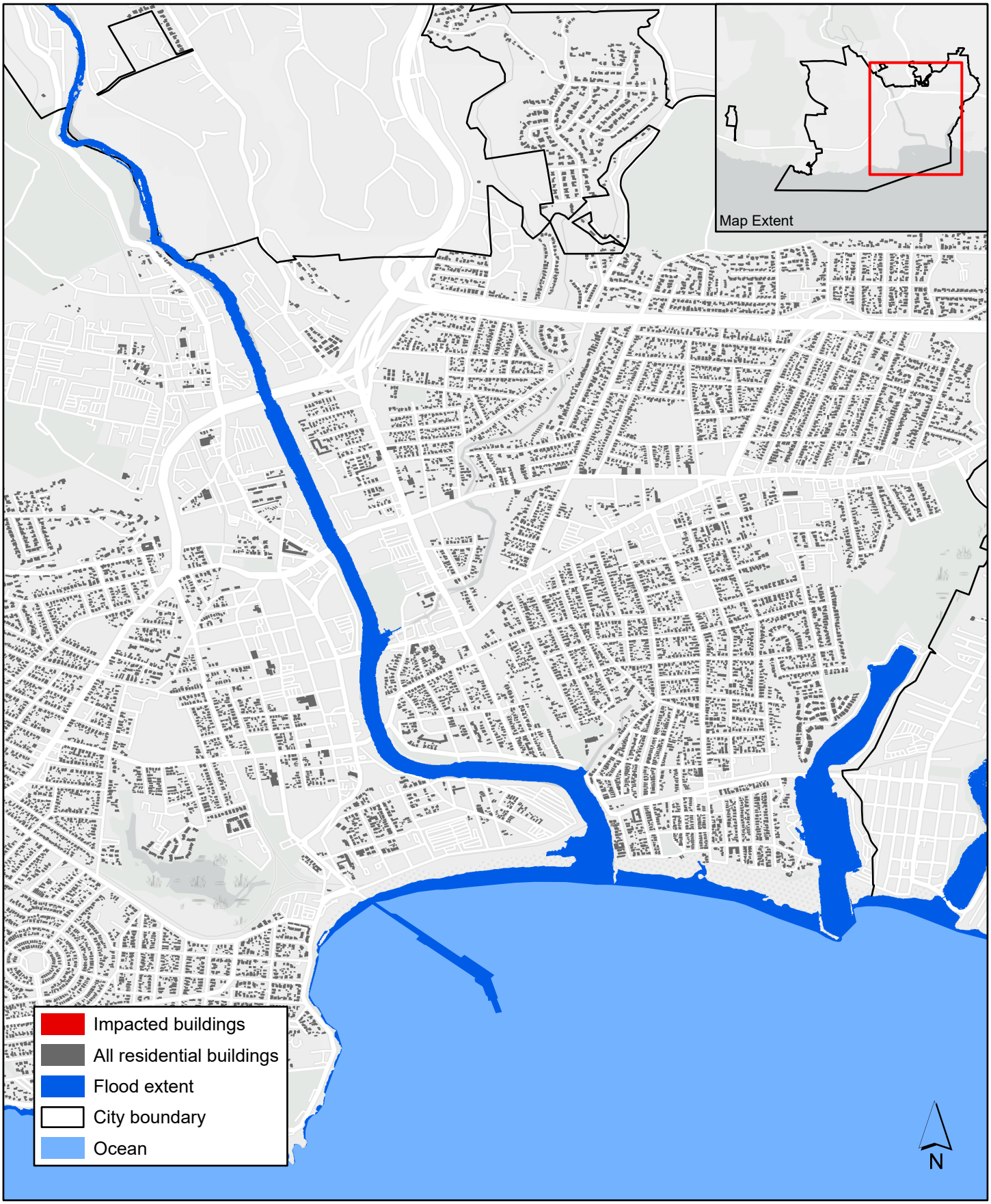


Santa Cruz Area 1

Sea Level Rise 0.75 m - 001 year storm

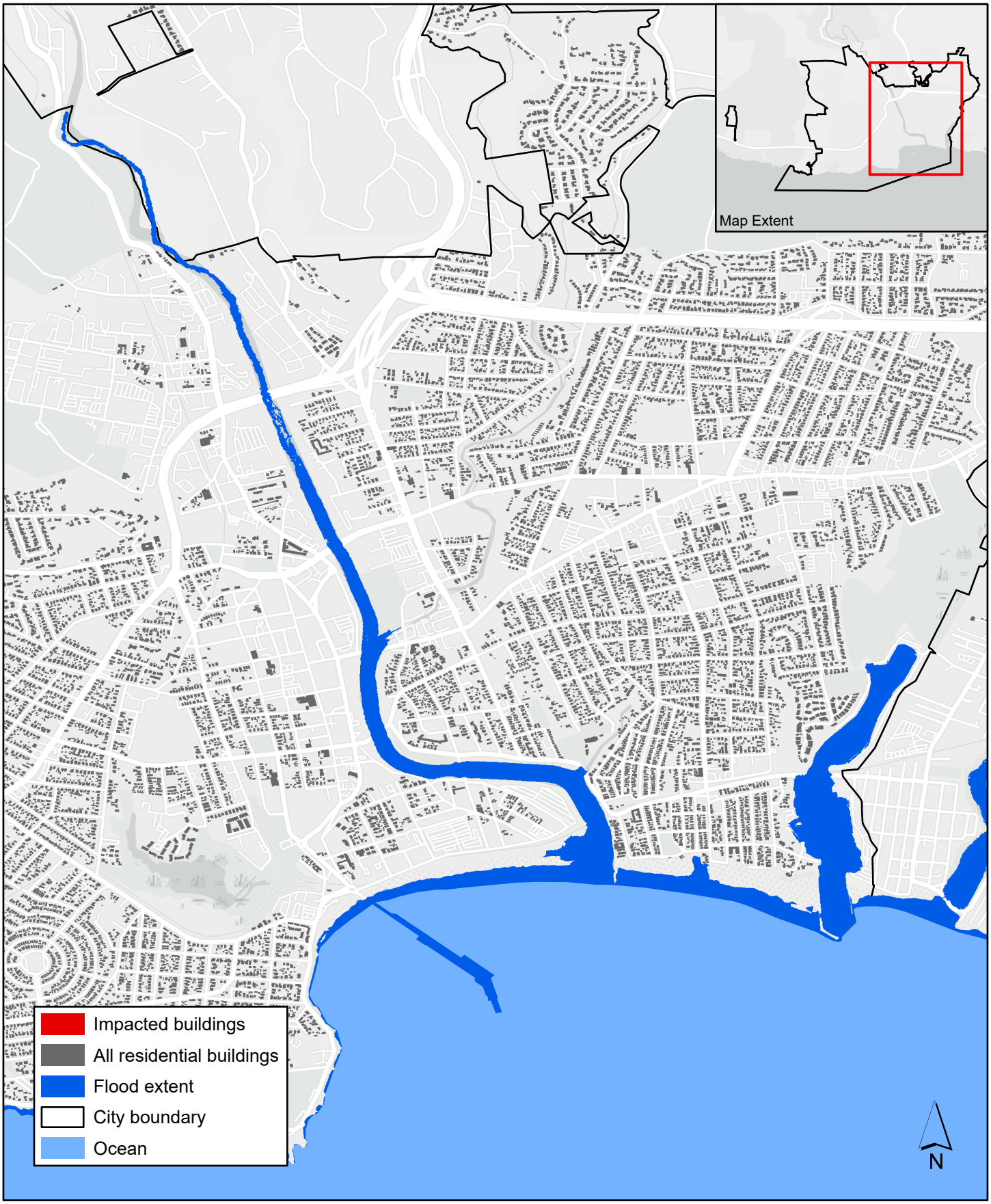
Santa Cruz Area 1

Sea Level Rise 0.75 m - 020 year storm



Santa Cruz Area 1

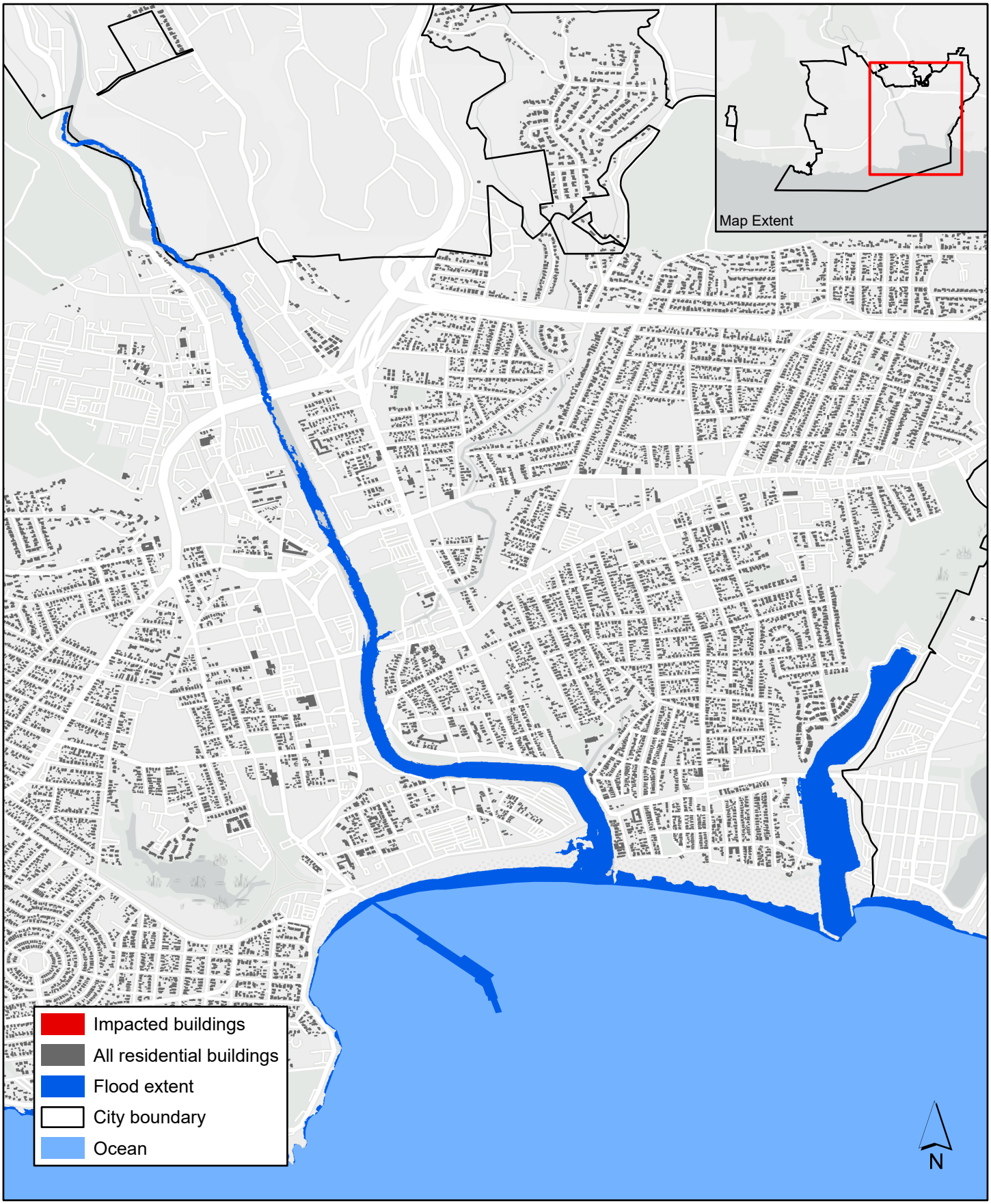
Sea Level Rise 0.75 m - 100 year storm



Appendix E

Santa Cruz Area 1

Sea Level Rise 1.0 m - No storm

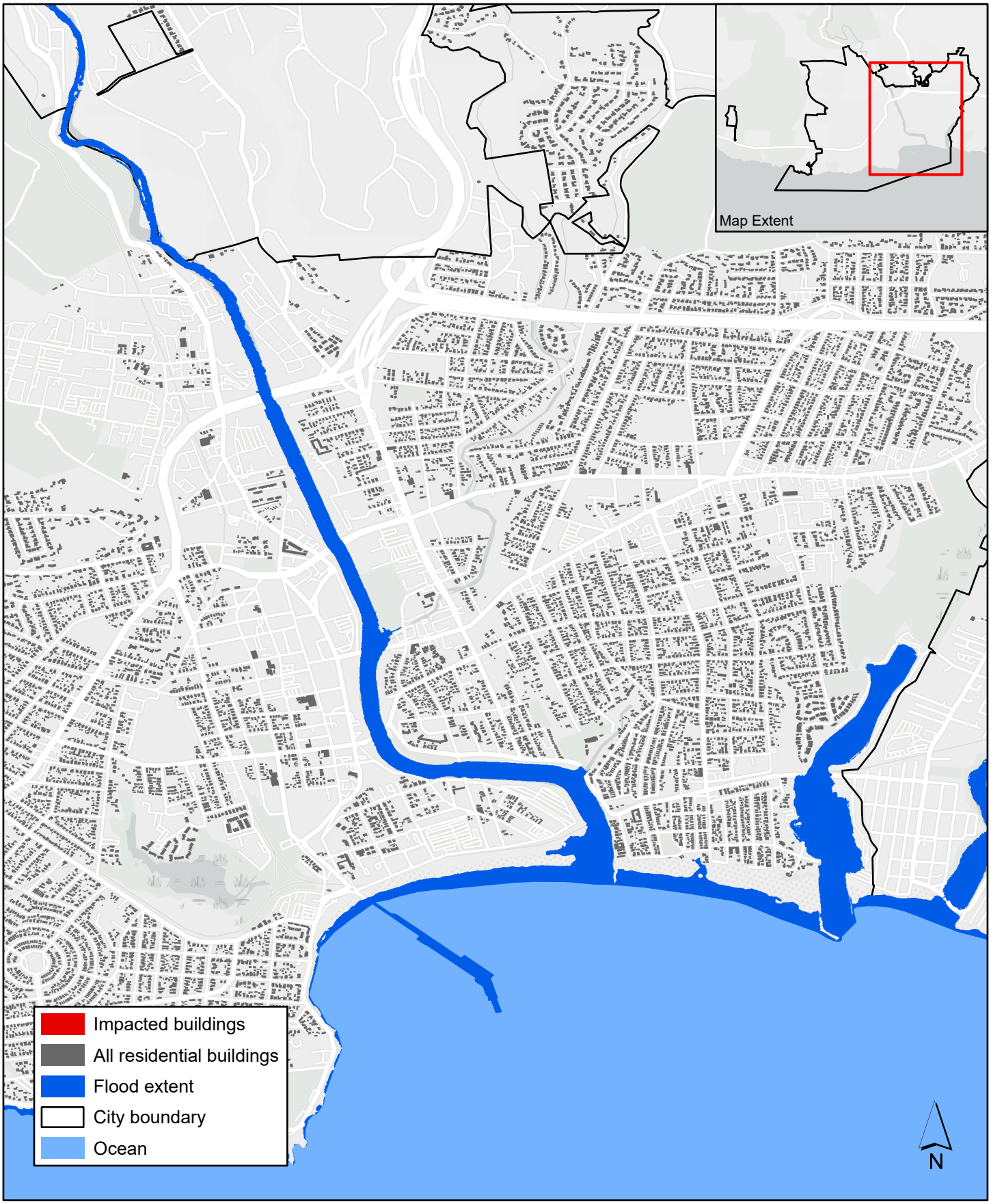


Santa Cruz Area 1

Sea Level Rise 1.0 m - 001 year storm

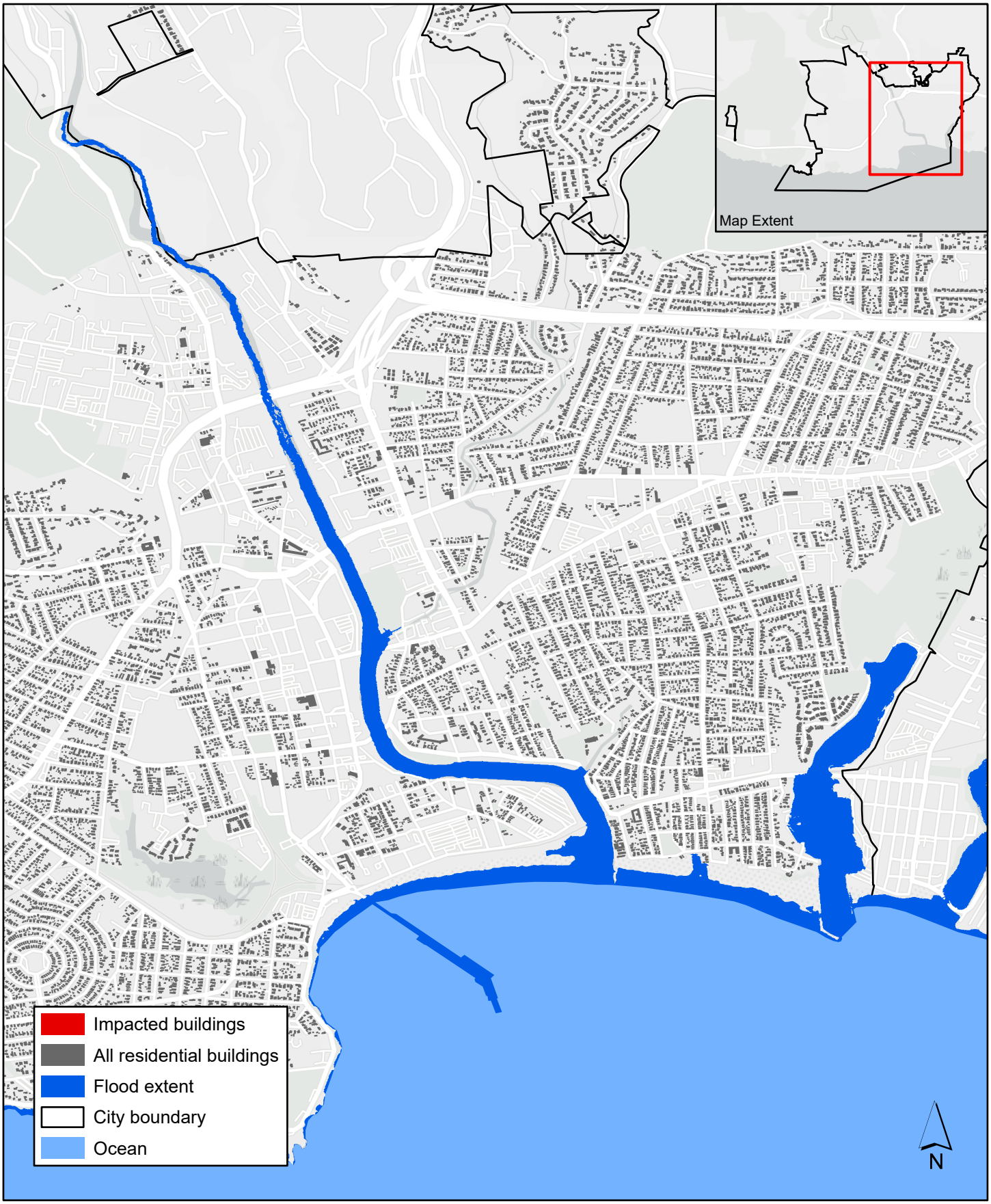
Santa Cruz Area 1

Sea Level Rise 1.0 m - 020 year storm



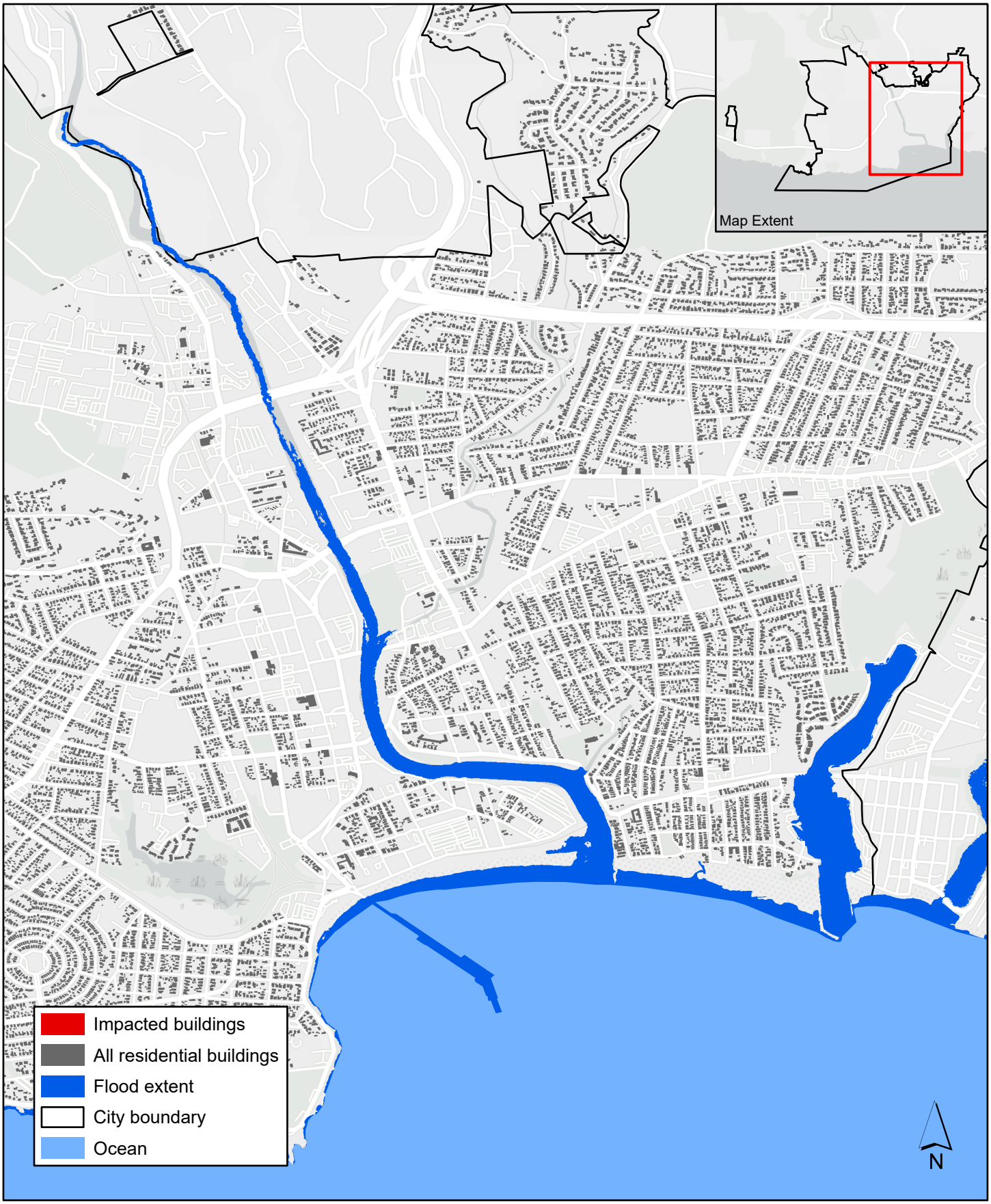
Santa Cruz Area 1

Sea Level Rise 1.0 m - 100 year storm



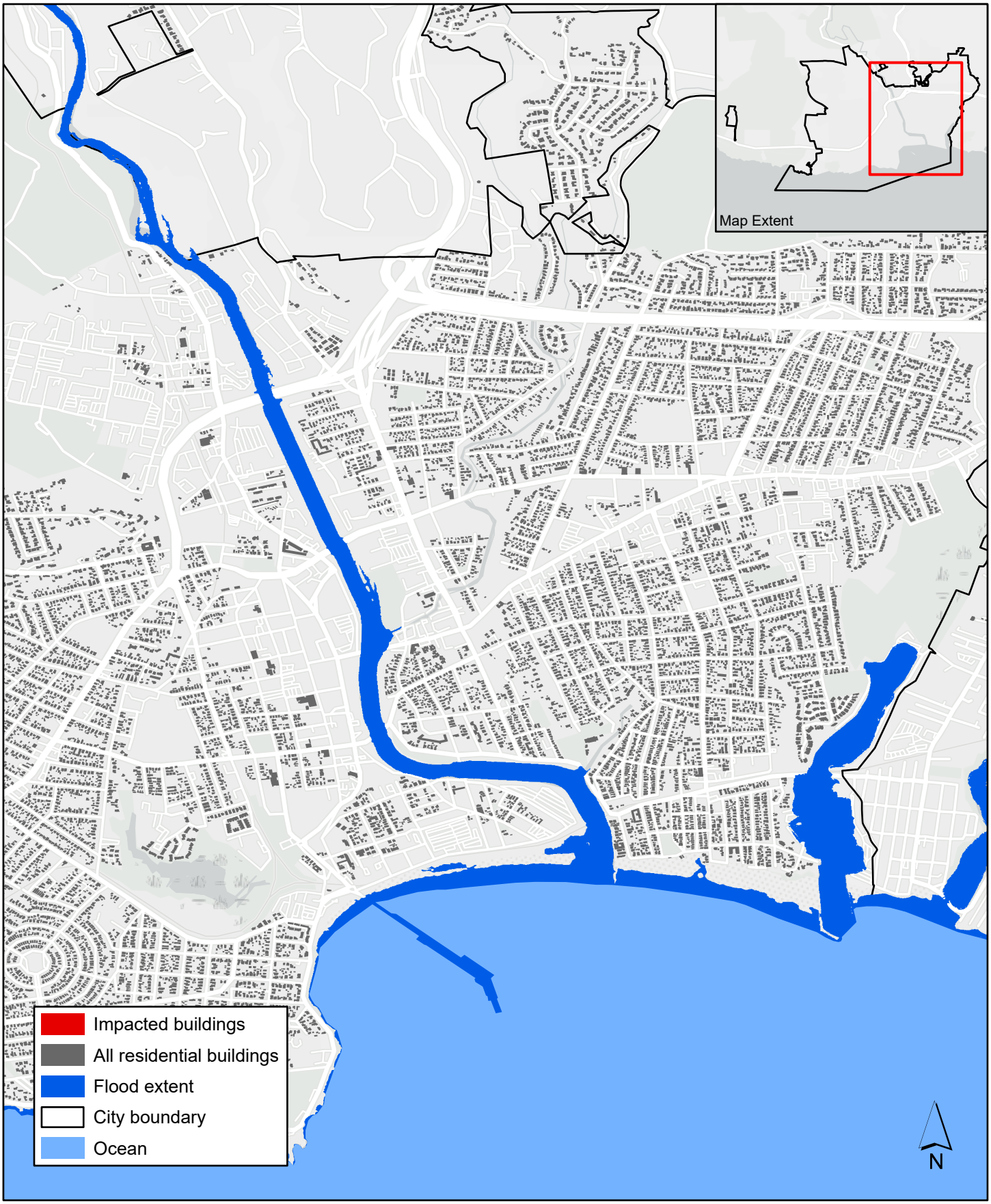
Santa Cruz Area 1

Sea Level Rise 1.5 m - No storm



Santa Cruz Area 1

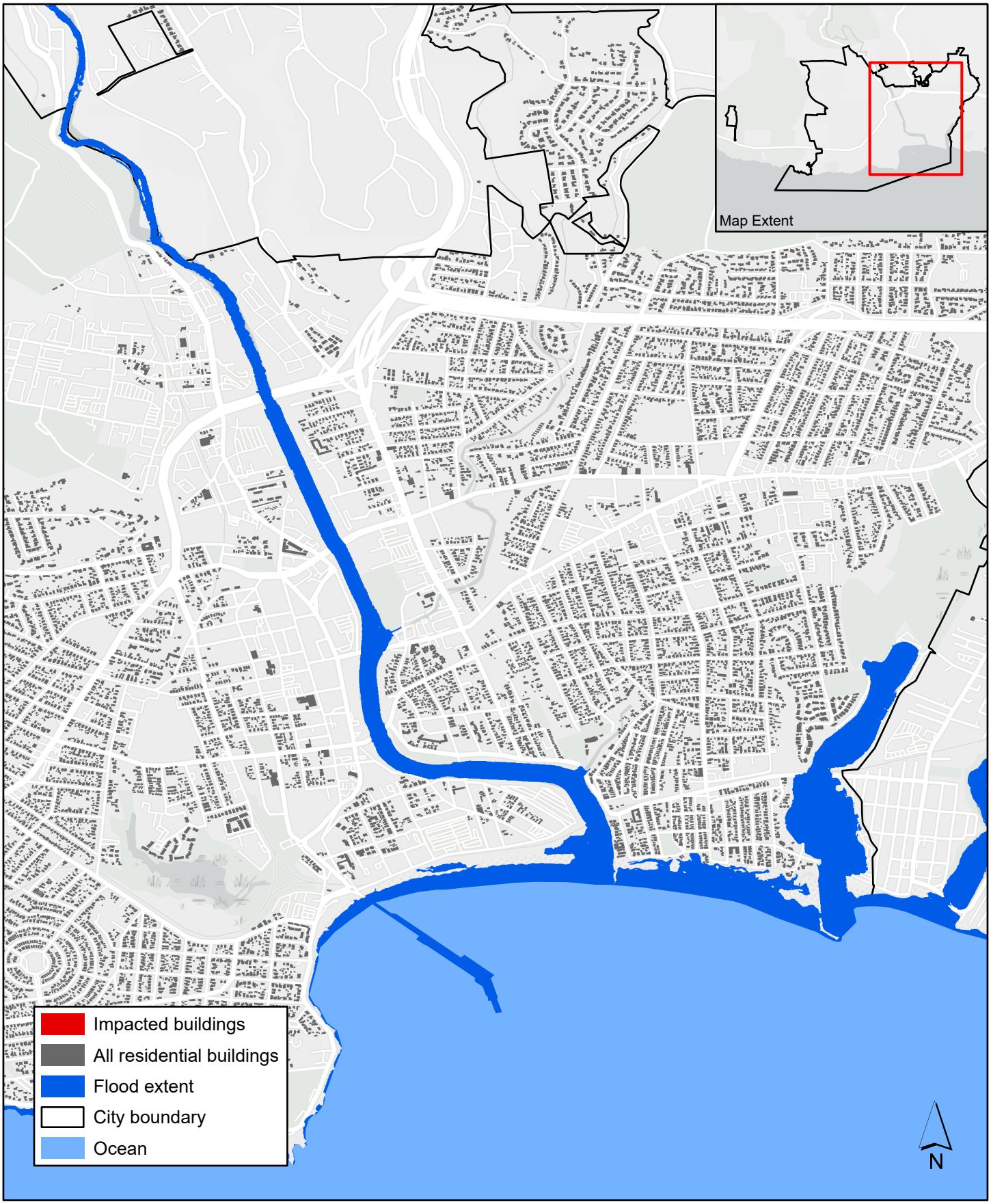
Sea Level Rise 1.5 m - 001 year storm



Appendix E

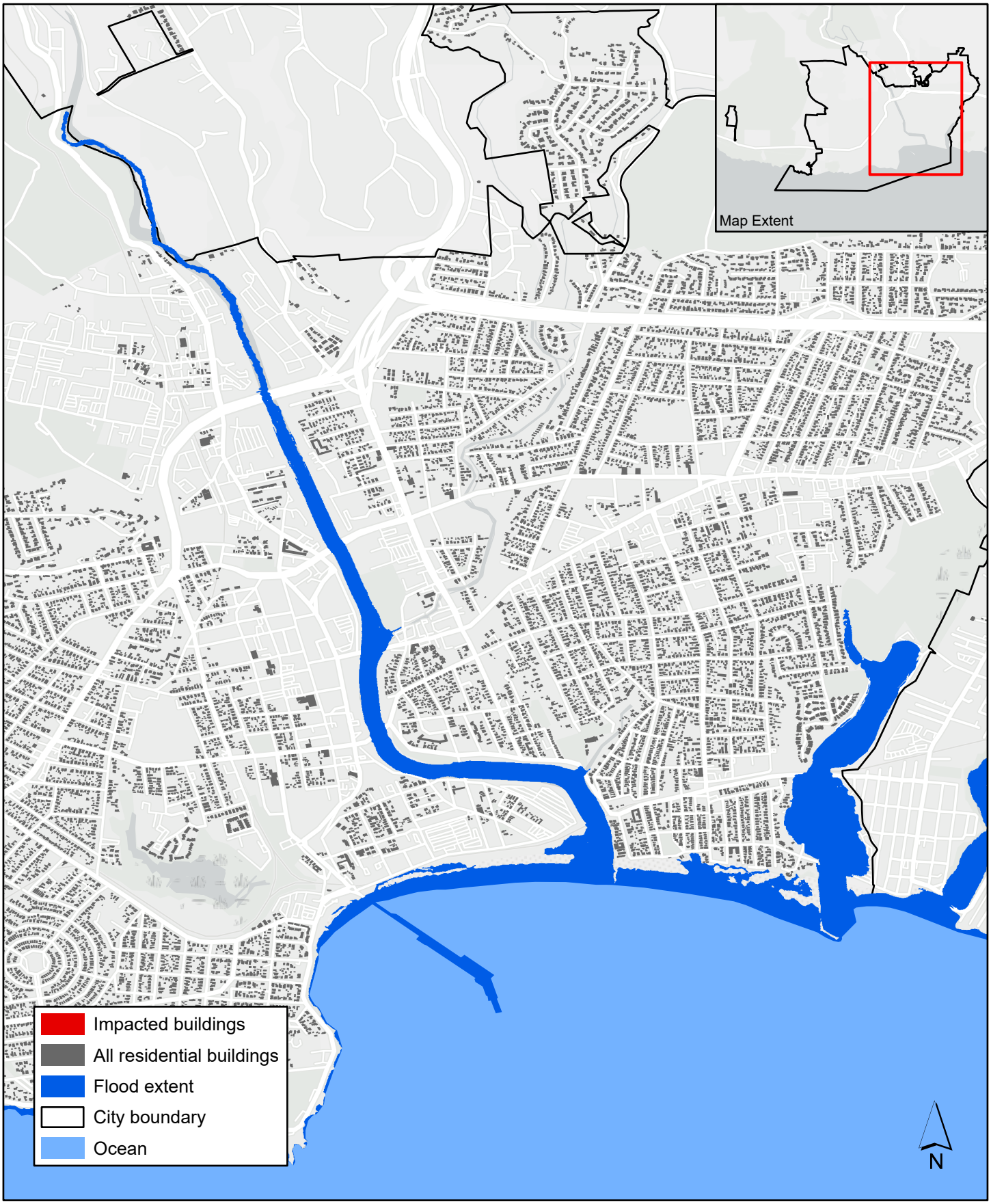
Santa Cruz Area 1

Sea Level Rise 1.5 m - 020 year storm



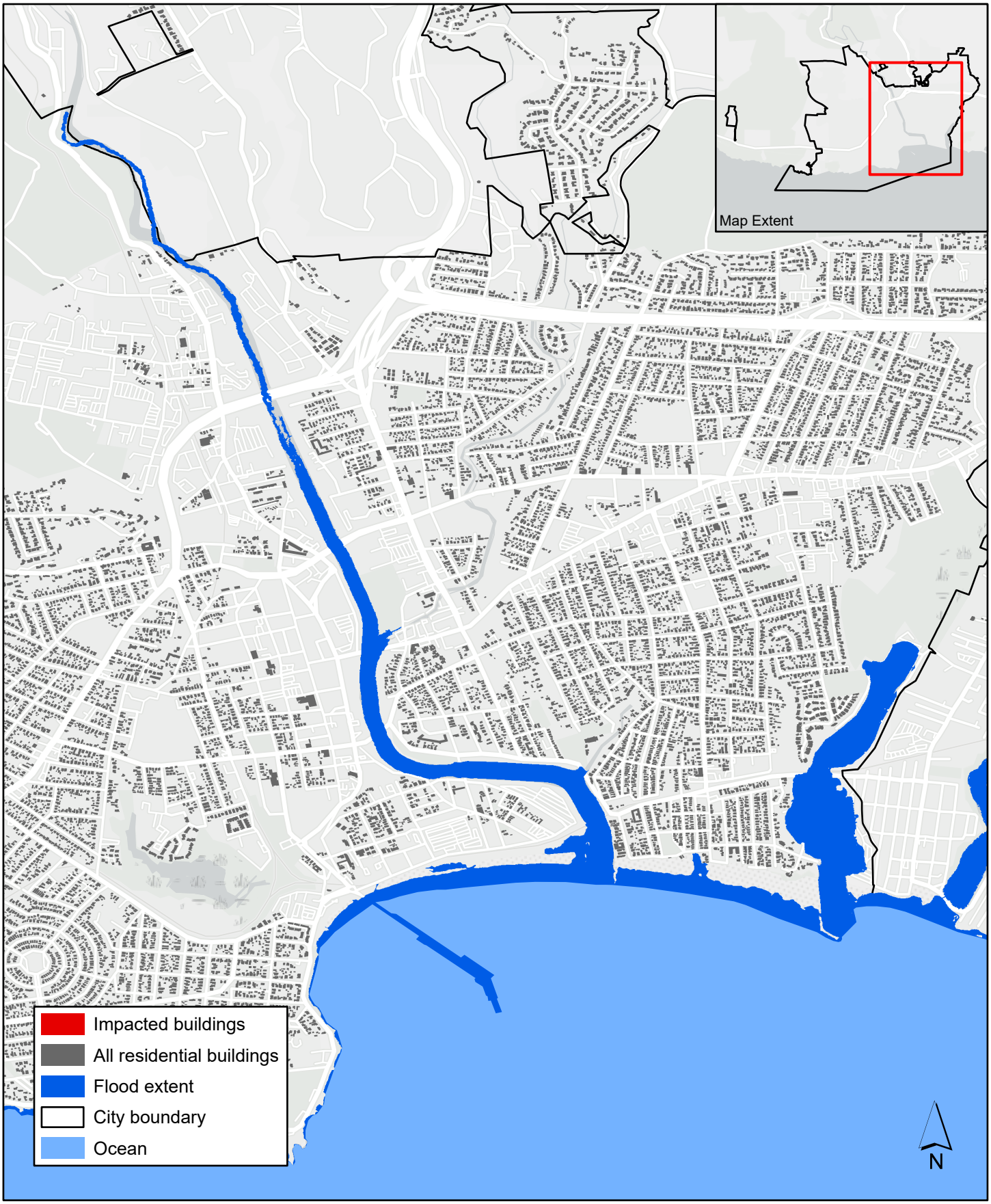
Santa Cruz Area 1

Sea Level Rise 1.5 m - 100 year storm



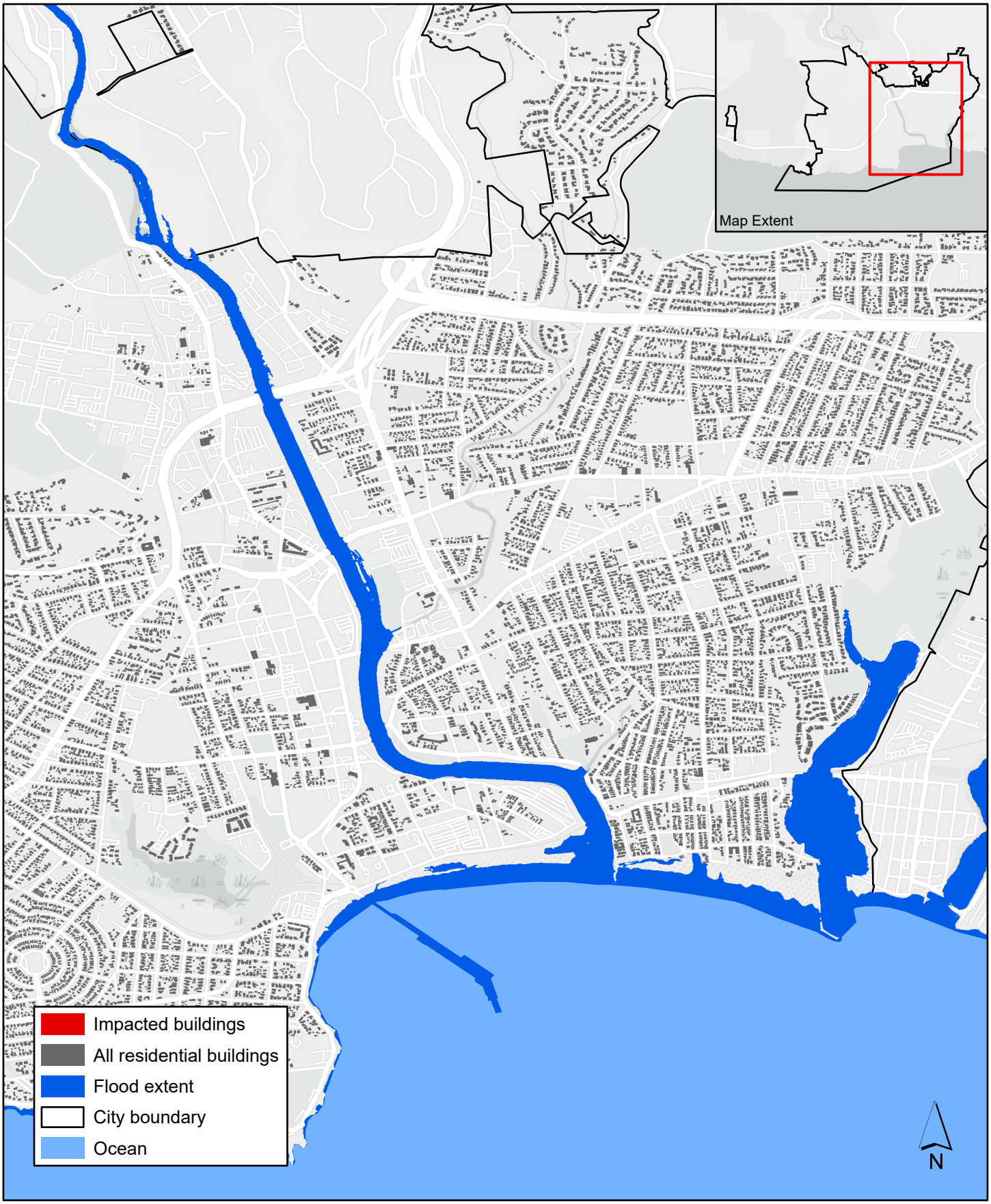
Santa Cruz Area 1

Sea Level Rise 2.0 m - No storm



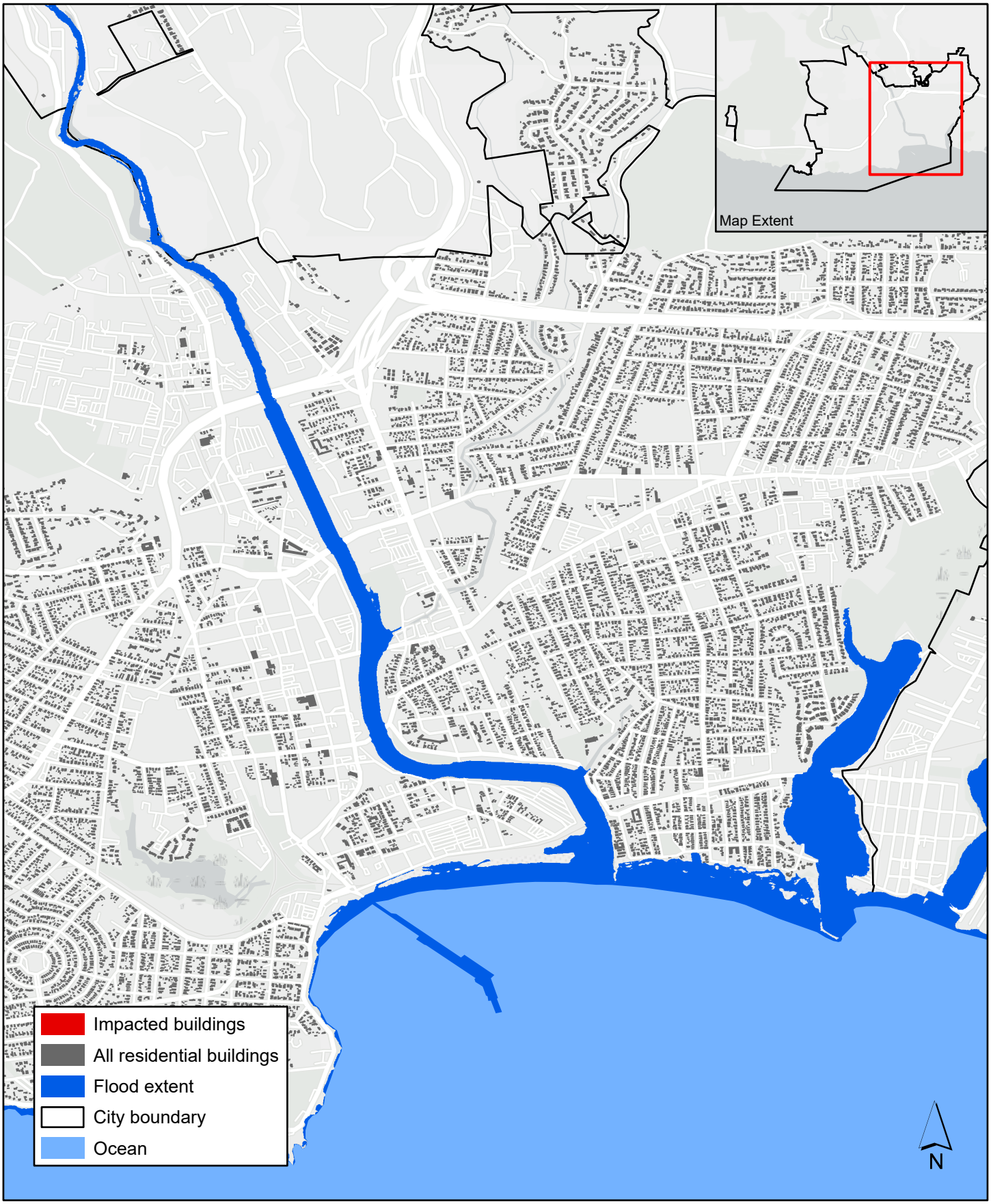
Santa Cruz Area 1

Sea Level Rise 2.0 m - 001 year storm



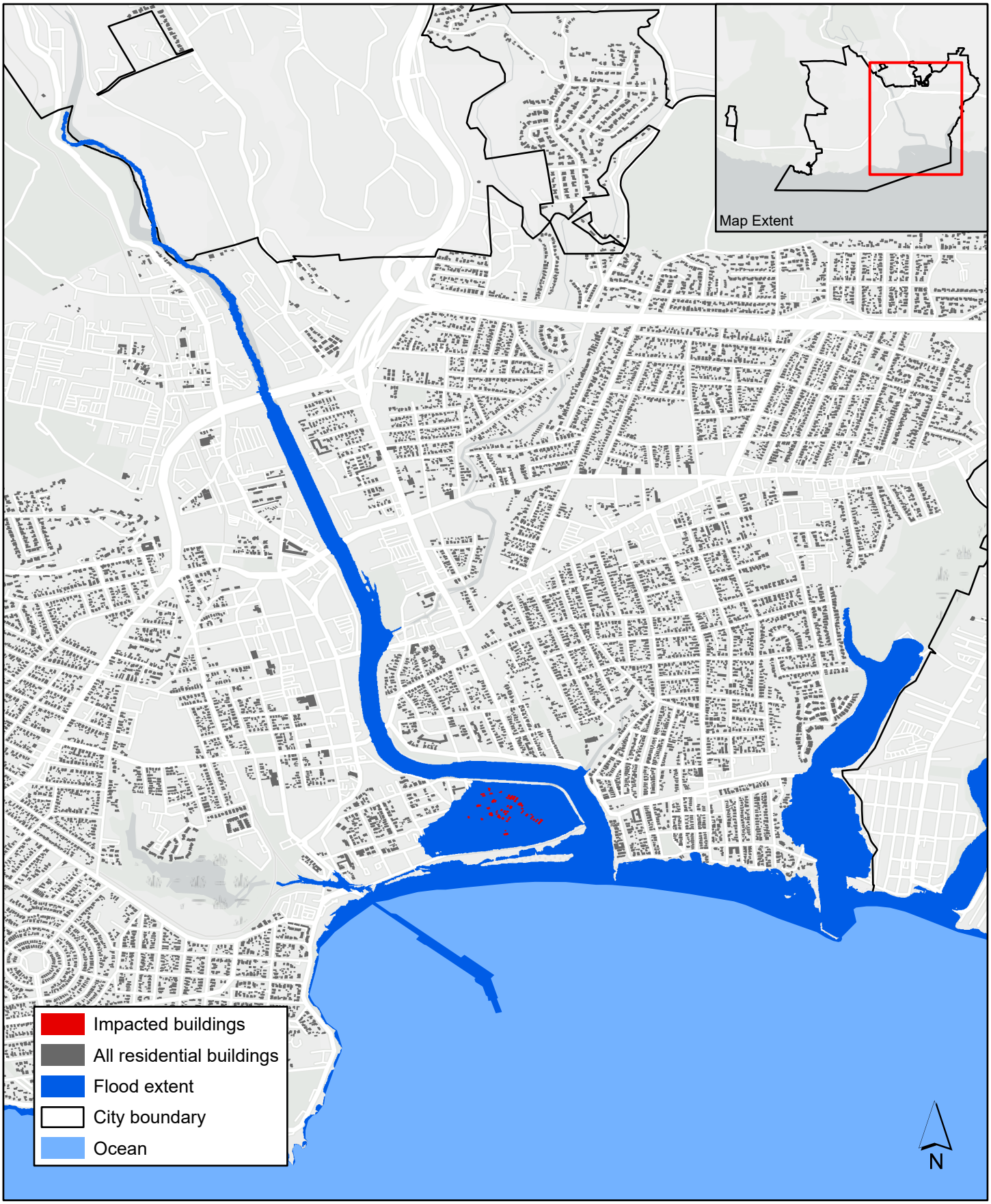
Santa Cruz Area 1

Sea Level Rise 2.0 m - 020 year storm



Santa Cruz Area 1

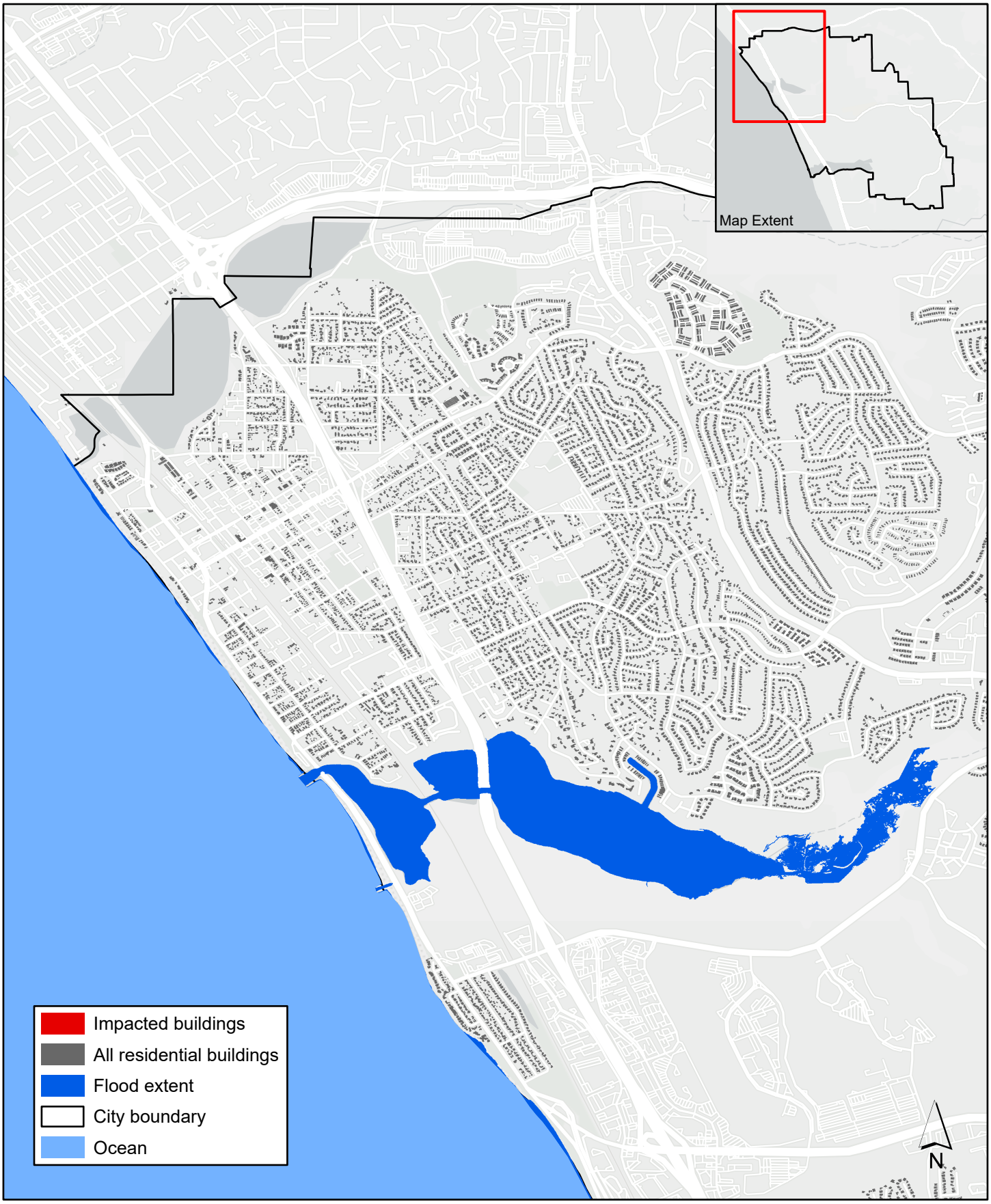
Sea Level Rise 2.0 m - 100 year storm



Appendix F

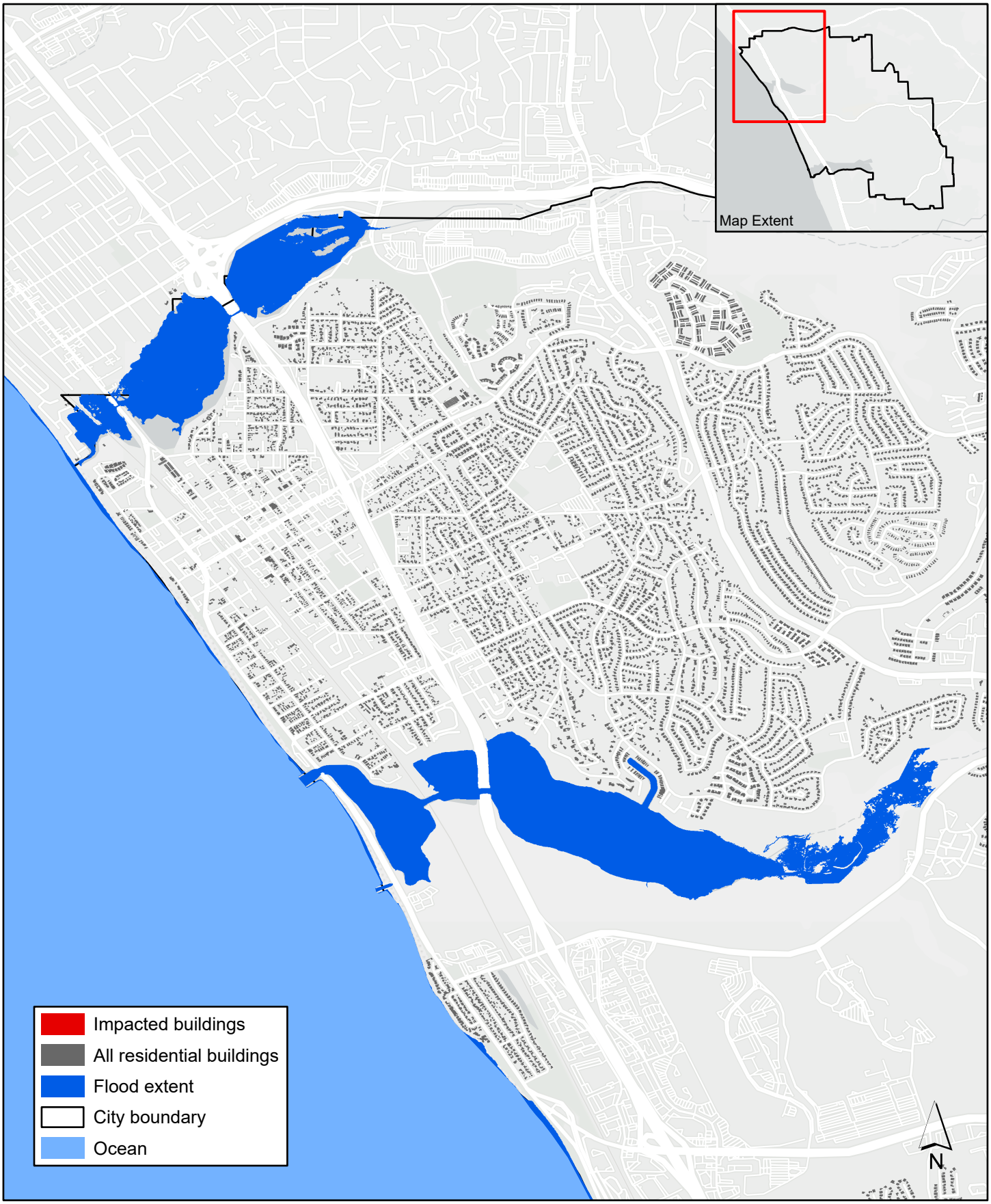
Carlsbad Area 1

Sea Level Rise 0.0 m - No storm



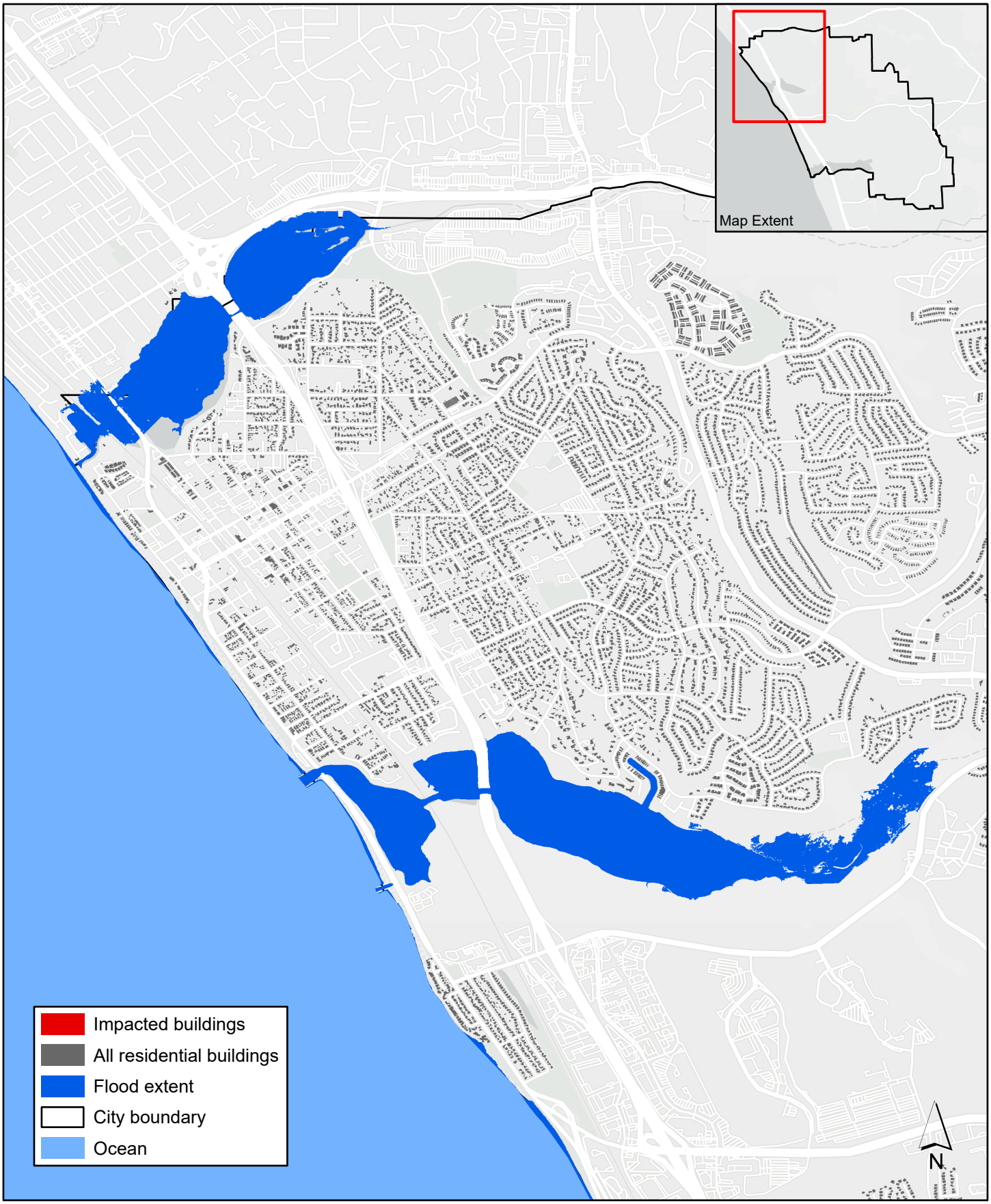
Carlsbad Area 1

Sea Level Rise 0.0 m - 001 year storm



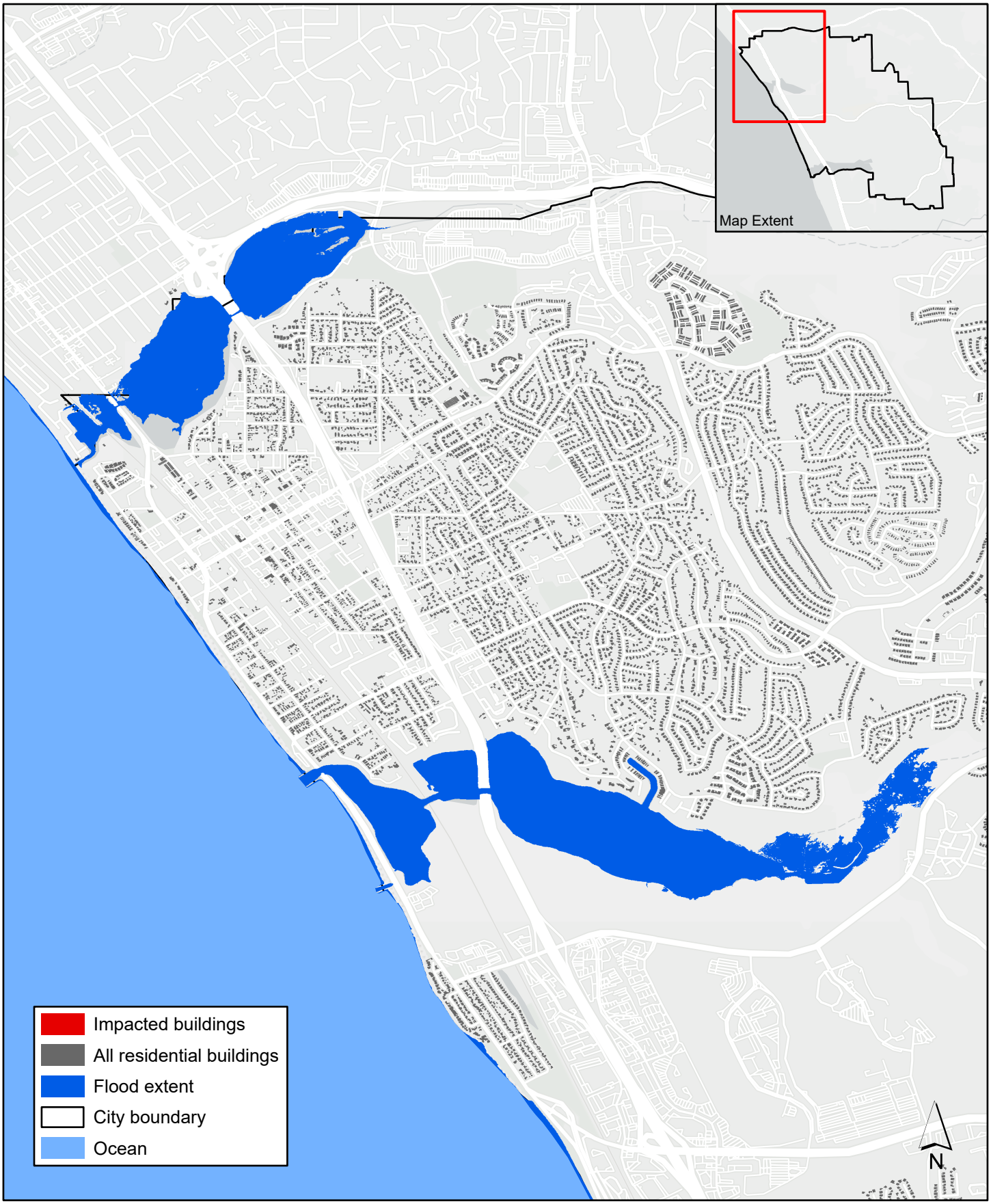
Carlsbad Area 1

Sea Level Rise 0.0 m - 020 year storm



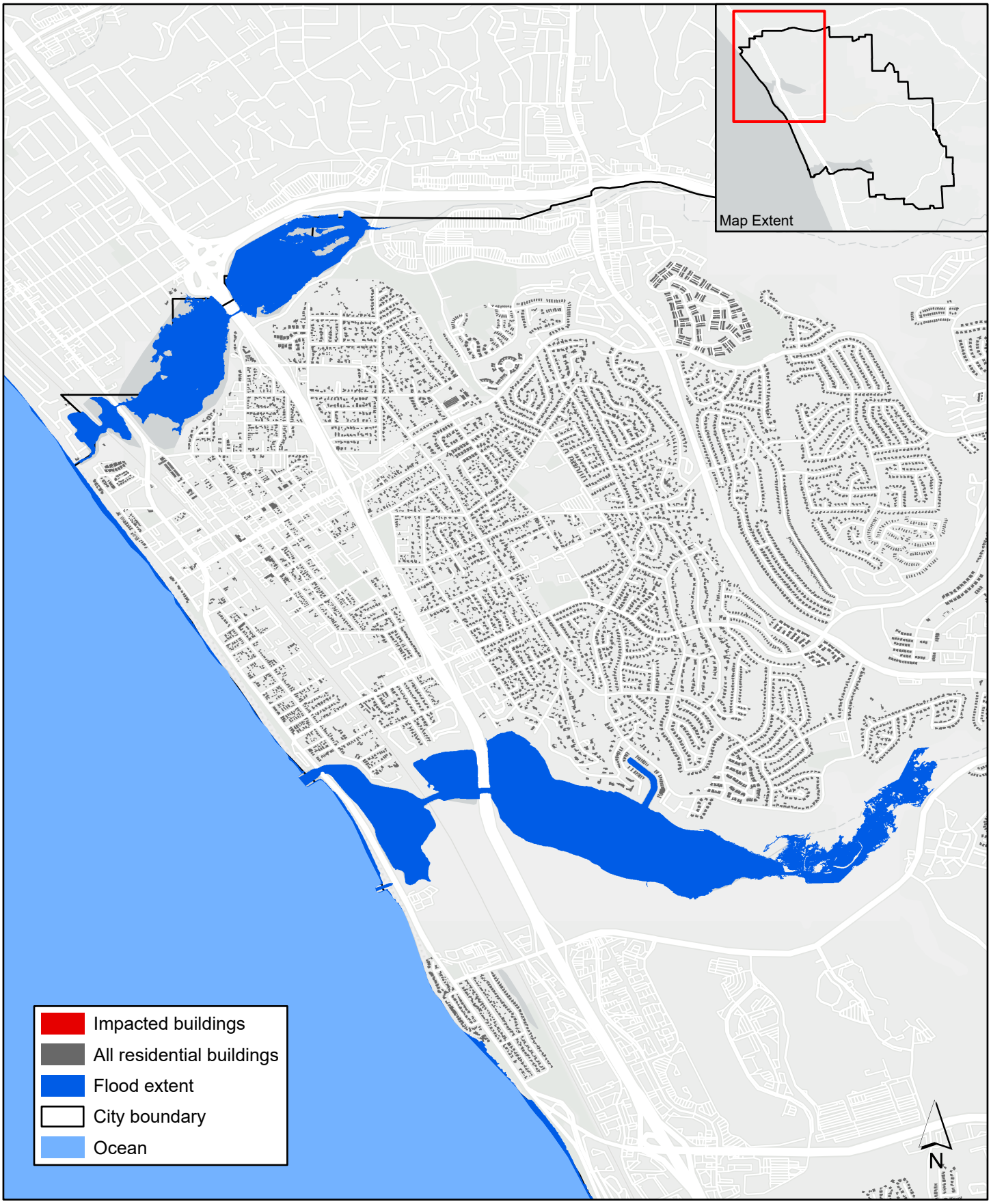
Carlsbad Area 1

Sea Level Rise 0.0 m - 100 year storm



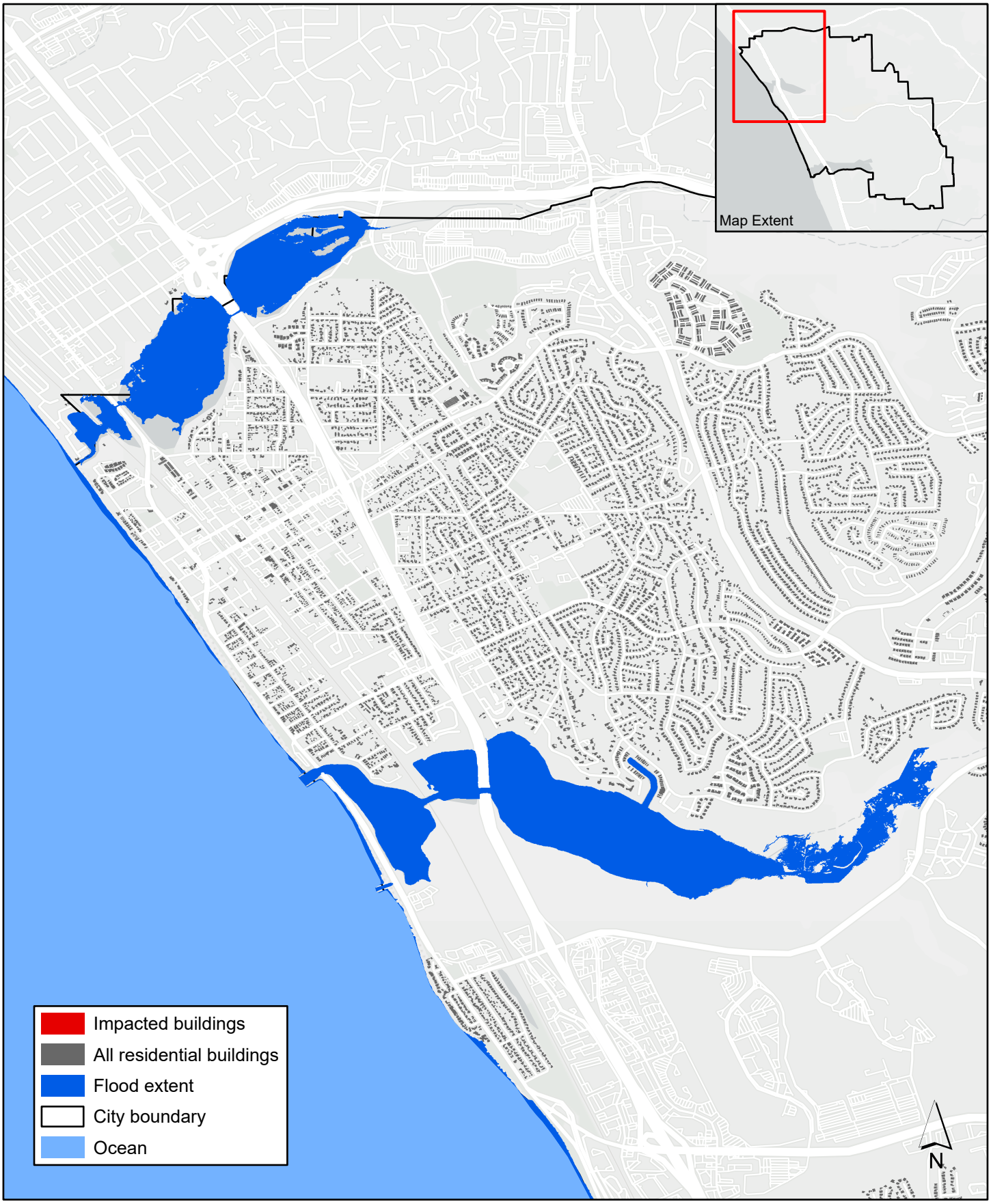
Carlsbad Area 1

Sea Level Rise 0.25 m - No storm



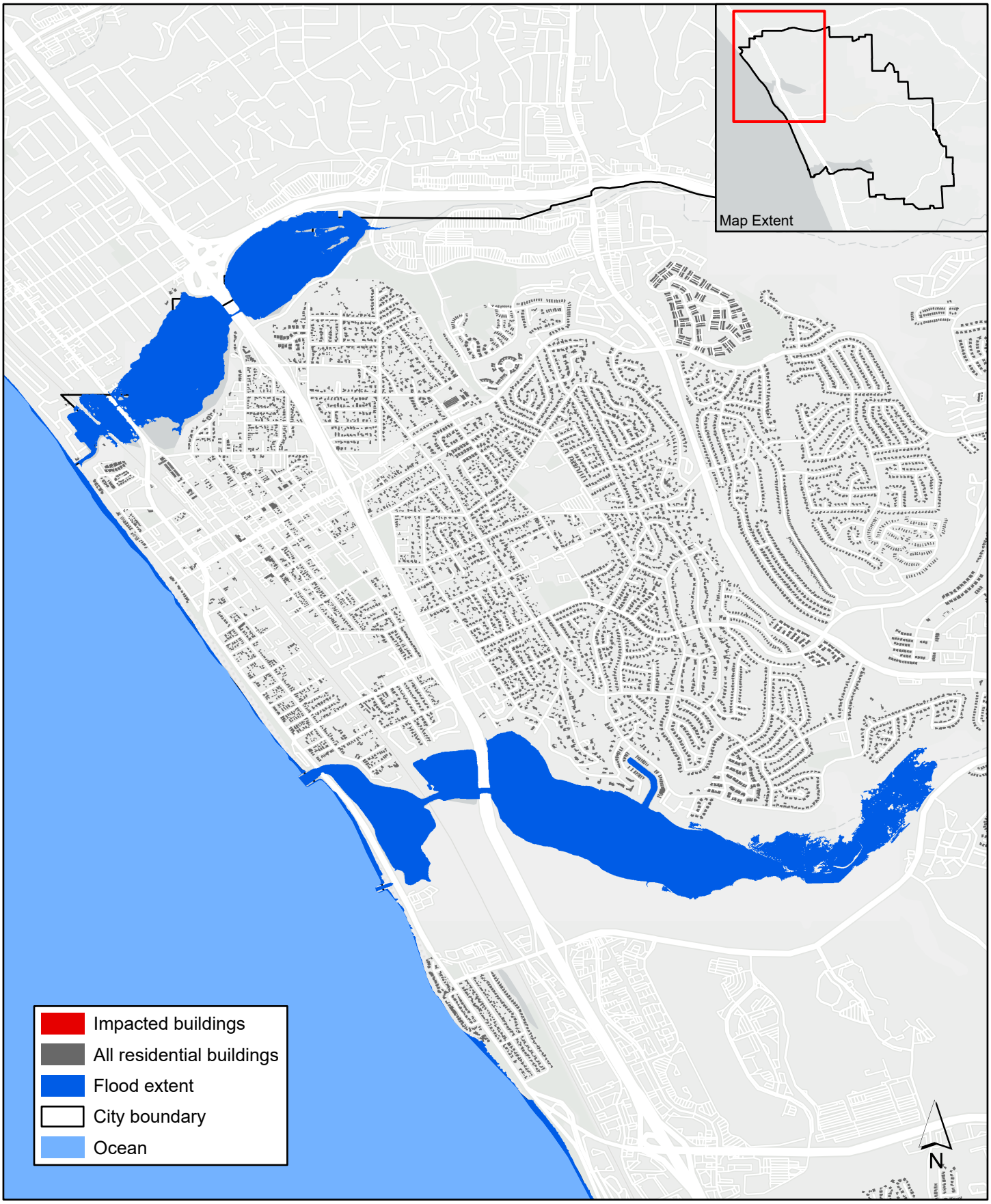
Carlsbad Area 1

Sea Level Rise 0.25 m - 001 year storm



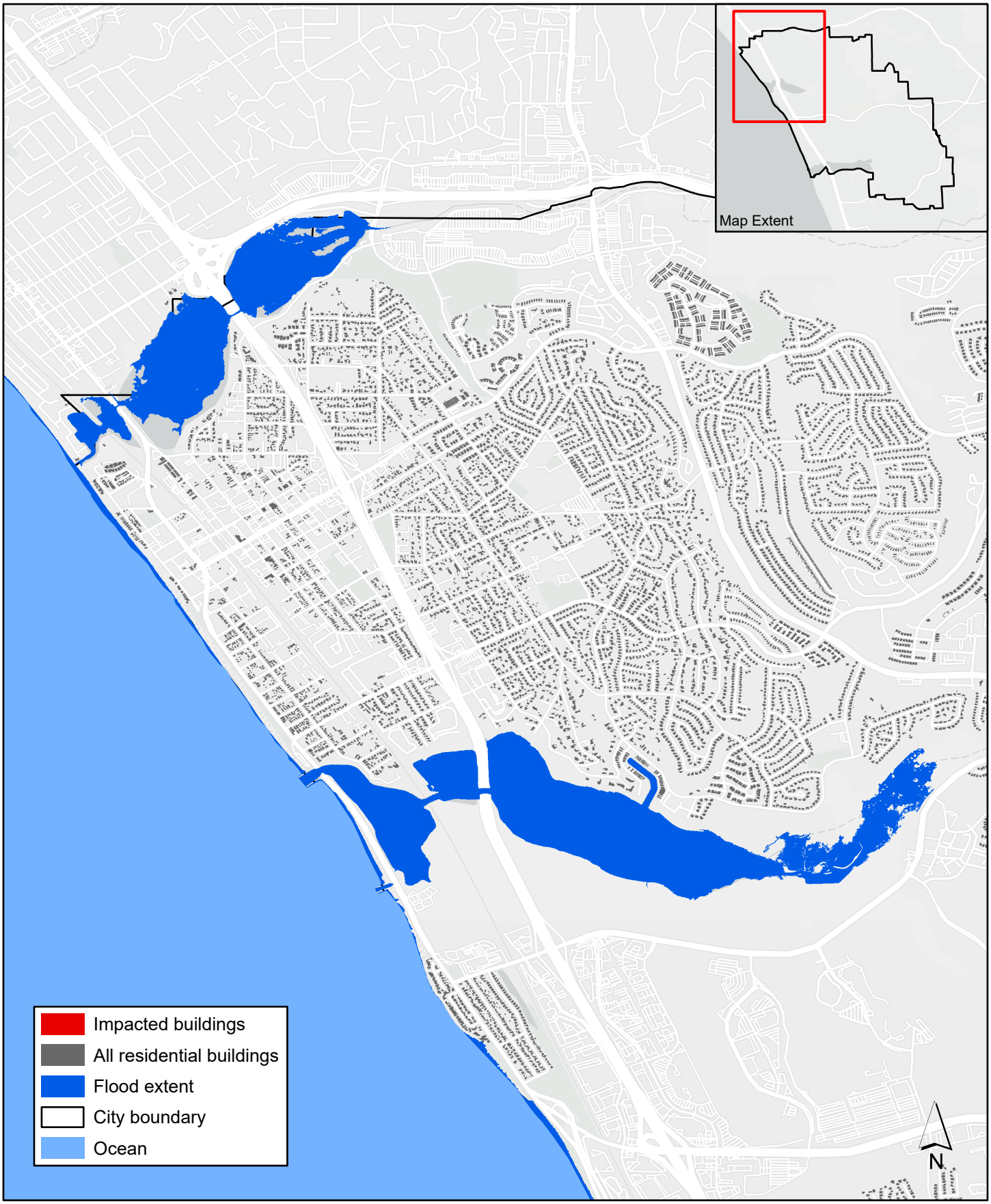
Carlsbad Area 1

Sea Level Rise 0.25 m - 020 year storm



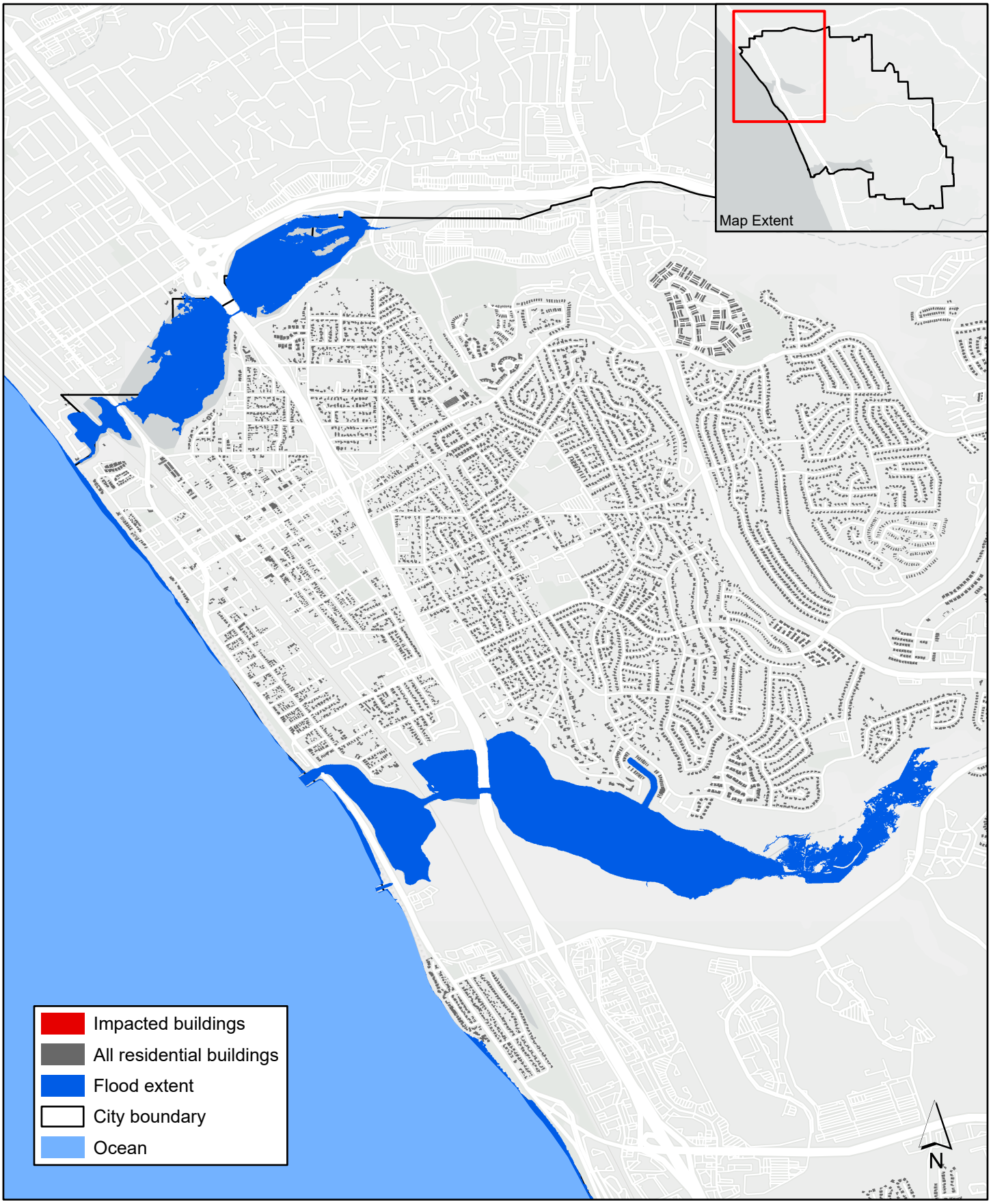
Carlsbad Area 1

Sea Level Rise 0.25 m - 100 year storm



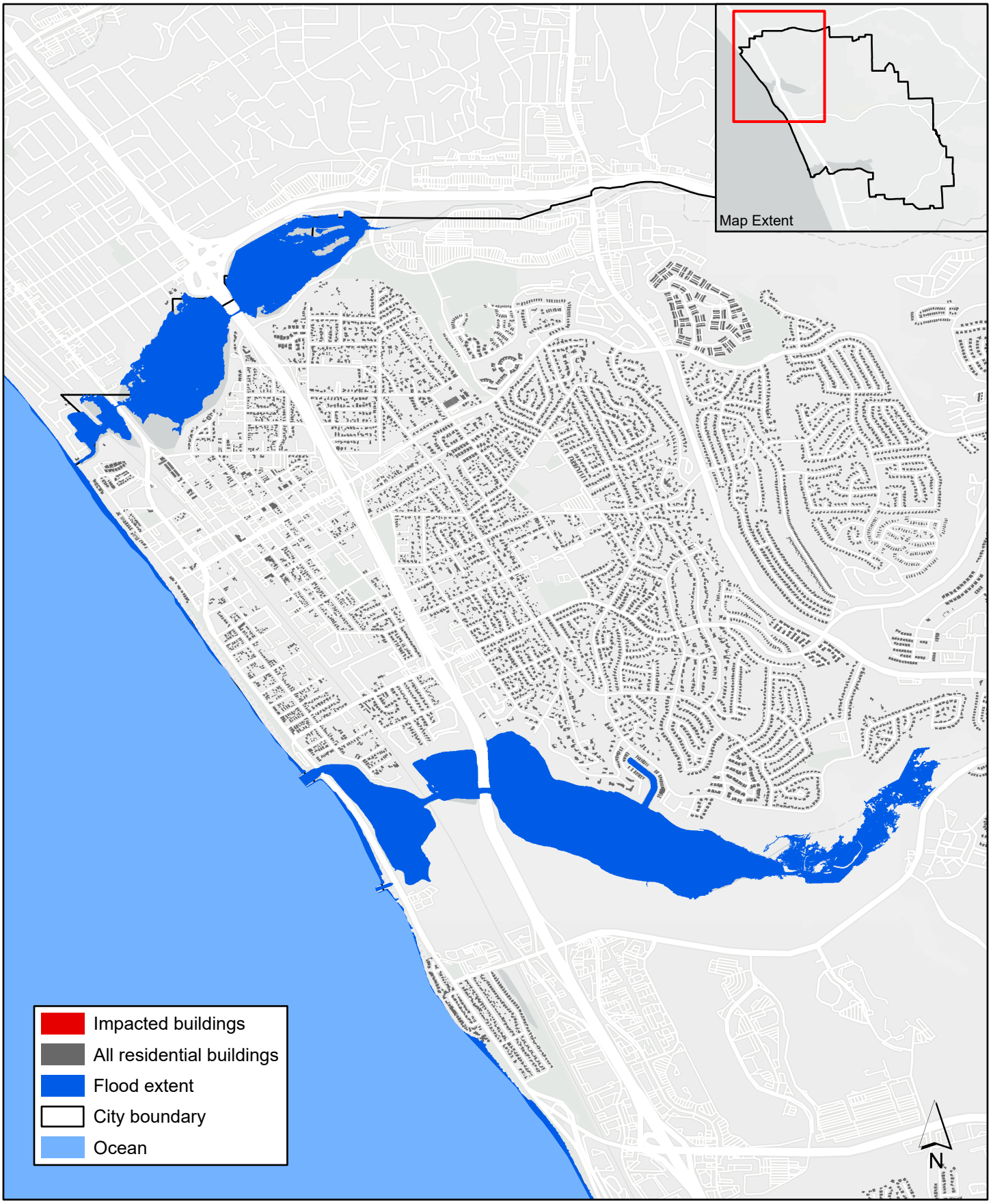
Carlsbad Area 1

Sea Level Rise 0.5 m - No storm



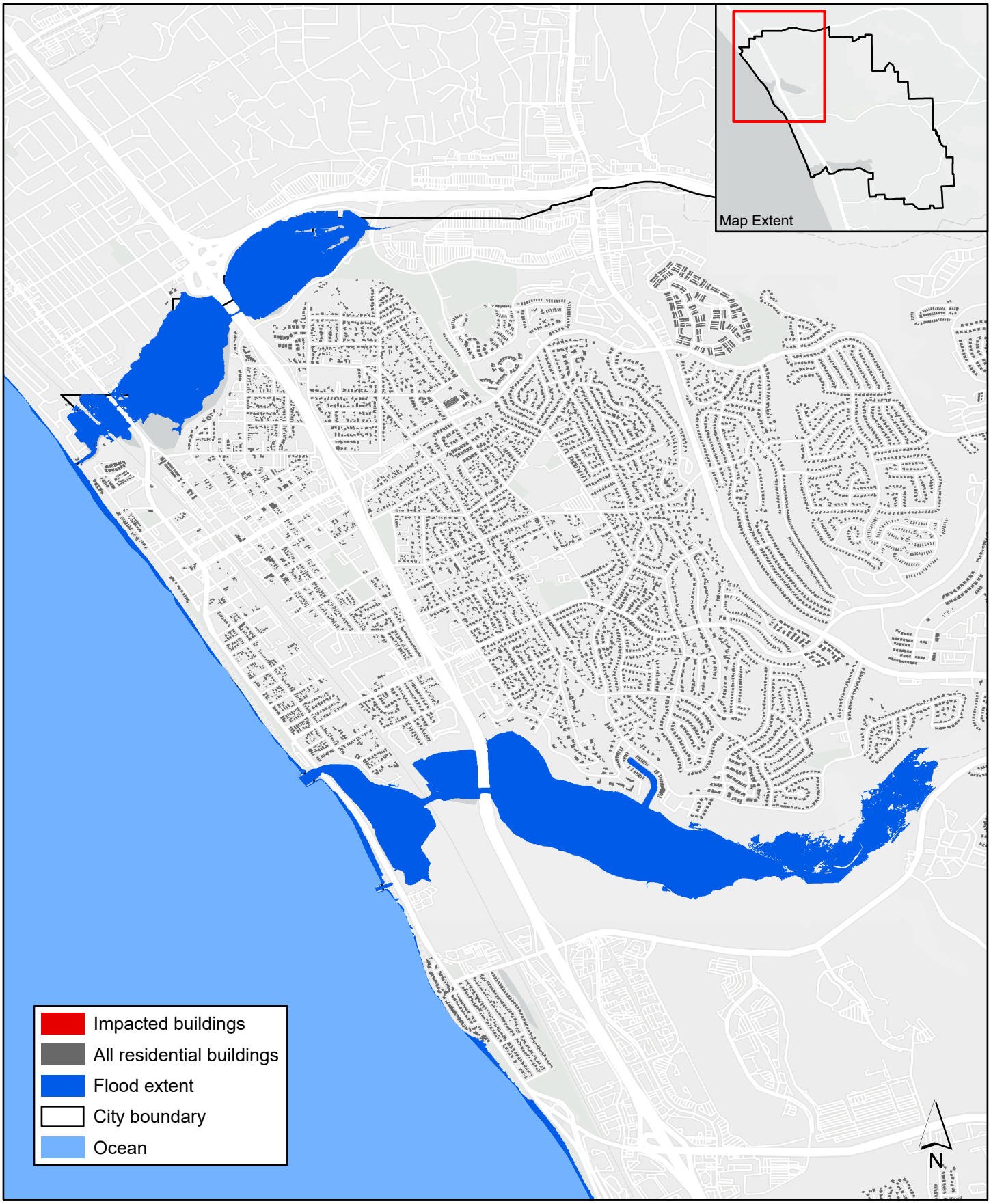
Carlsbad Area 1

Sea Level Rise 0.5 m - 001 year storm



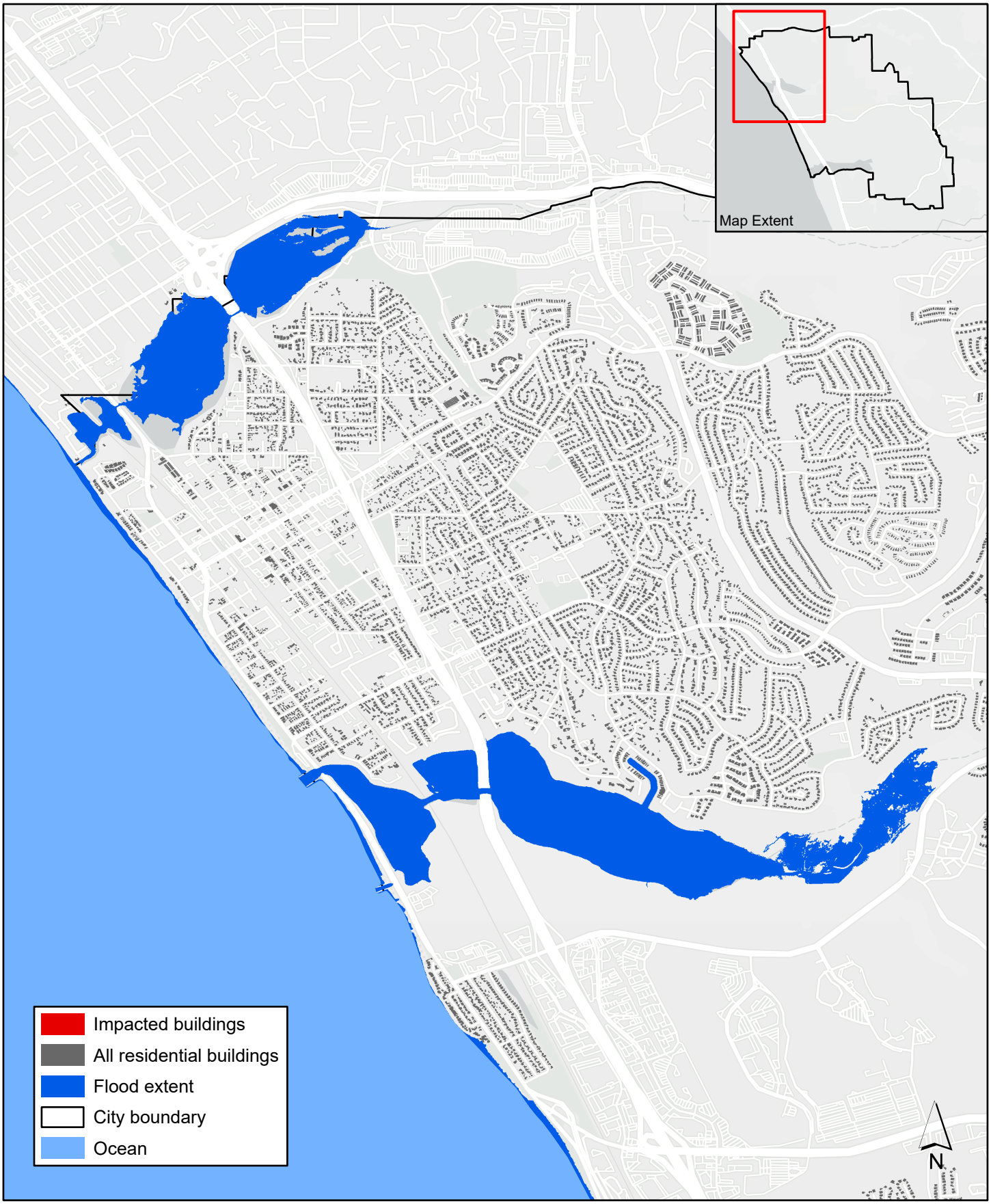
Carlsbad Area 1

Sea Level Rise 0.5 m - 020 year storm



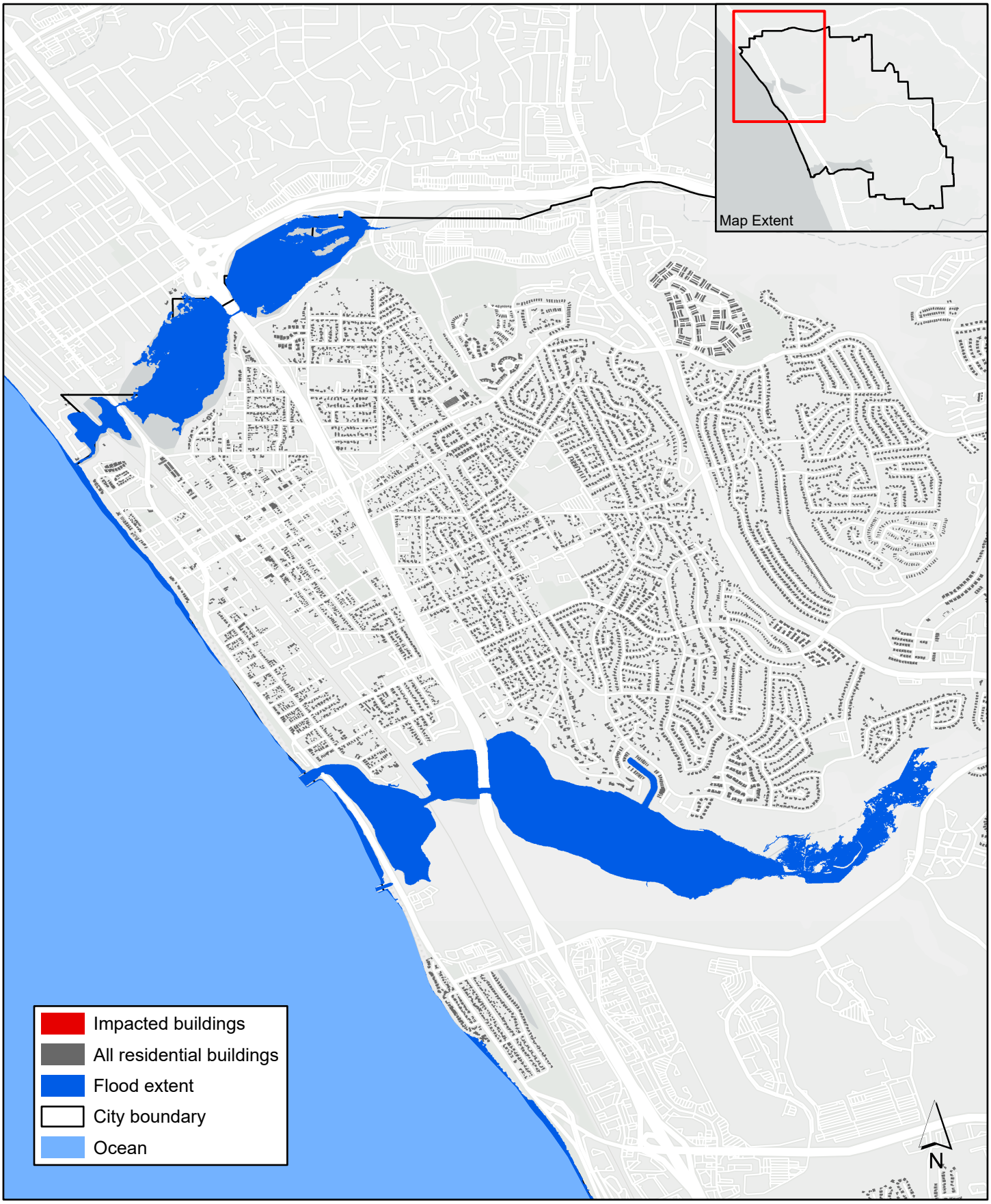
Carlsbad Area 1

Sea Level Rise 0.5 m - 100 year storm



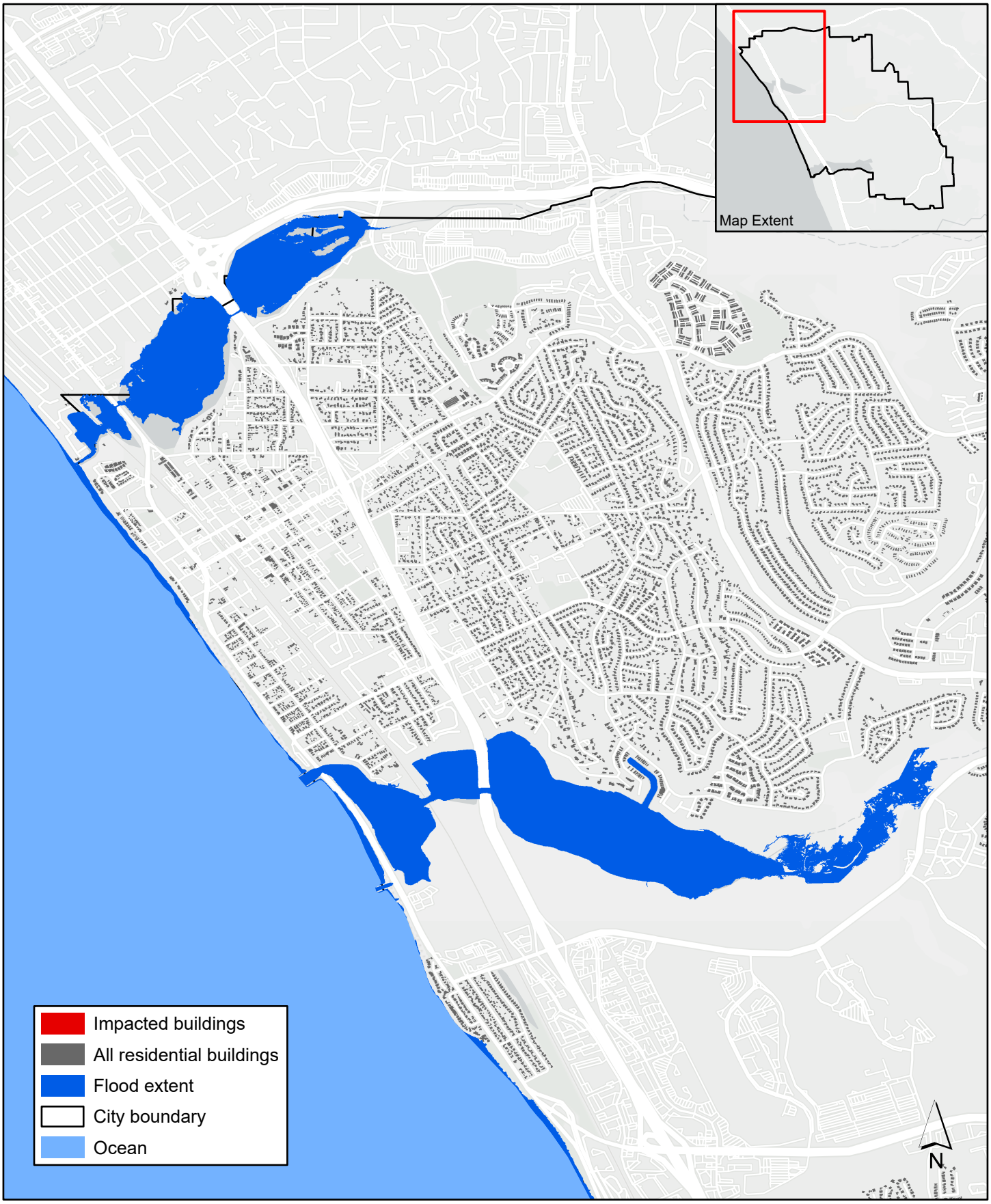
Carlsbad Area 1

Sea Level Rise 0.75 m - No storm



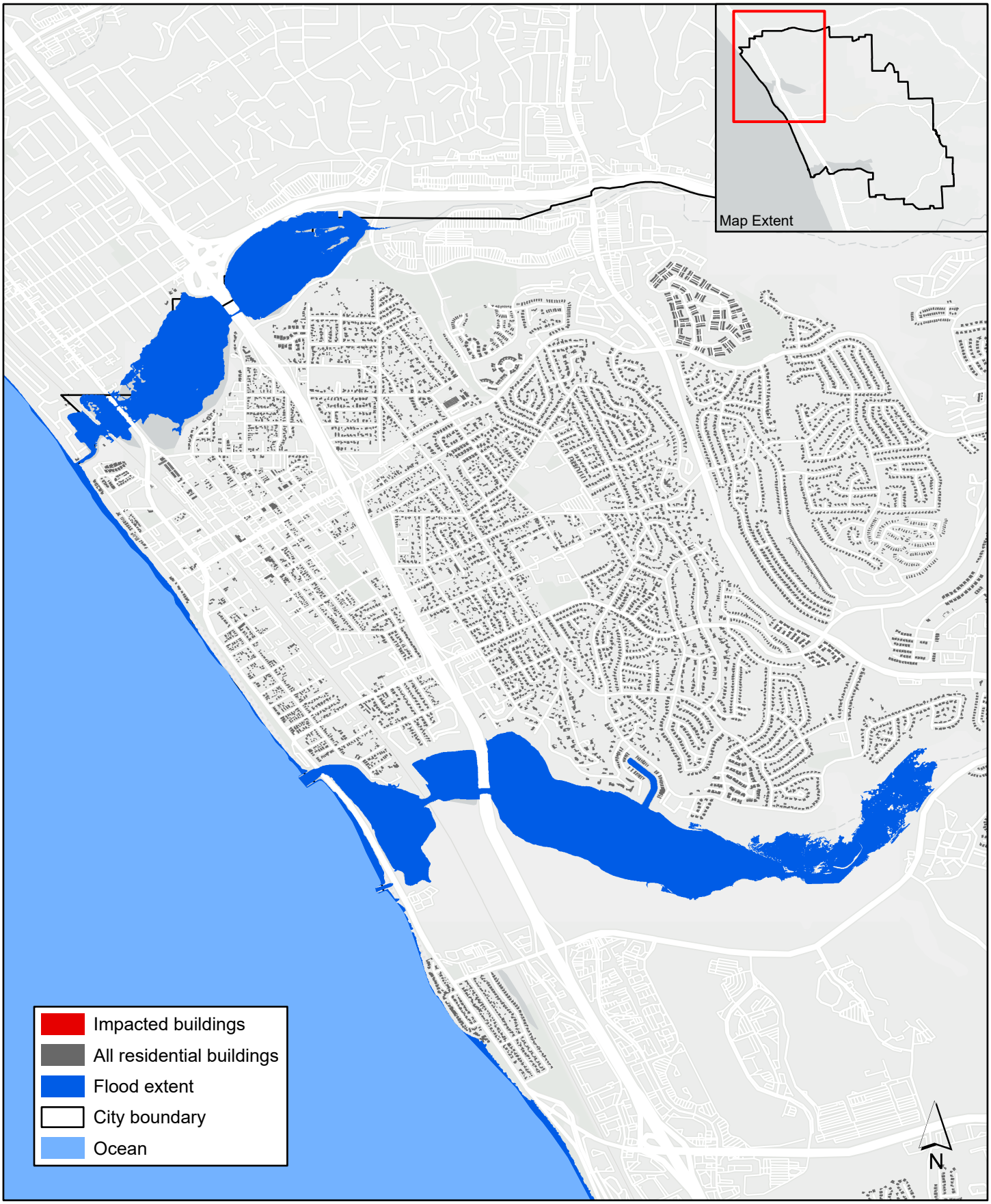
Carlsbad Area 1

Sea Level Rise 0.75 m - 001 year storm



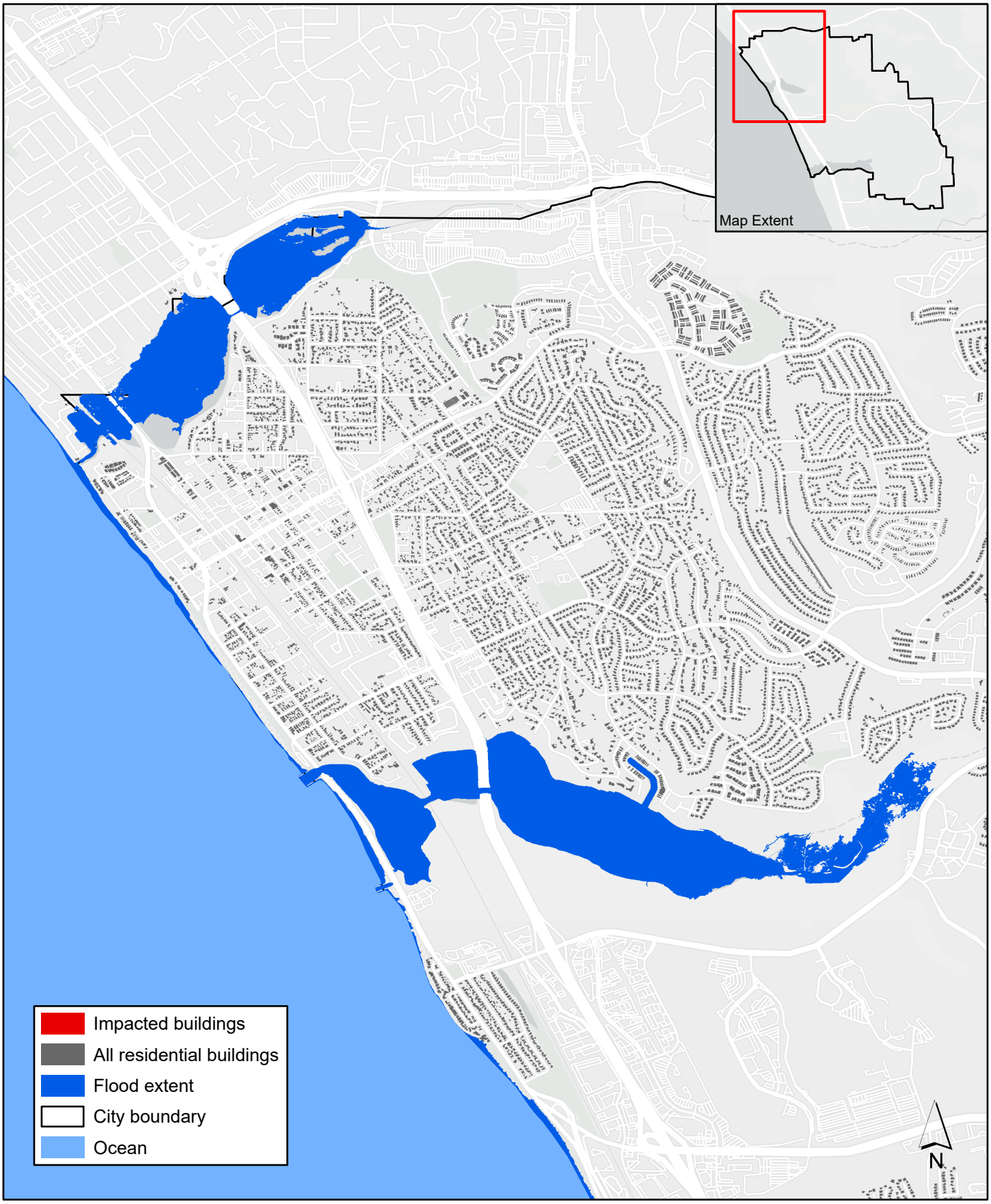
Carlsbad Area 1

Sea Level Rise 0.75 m - 020 year storm



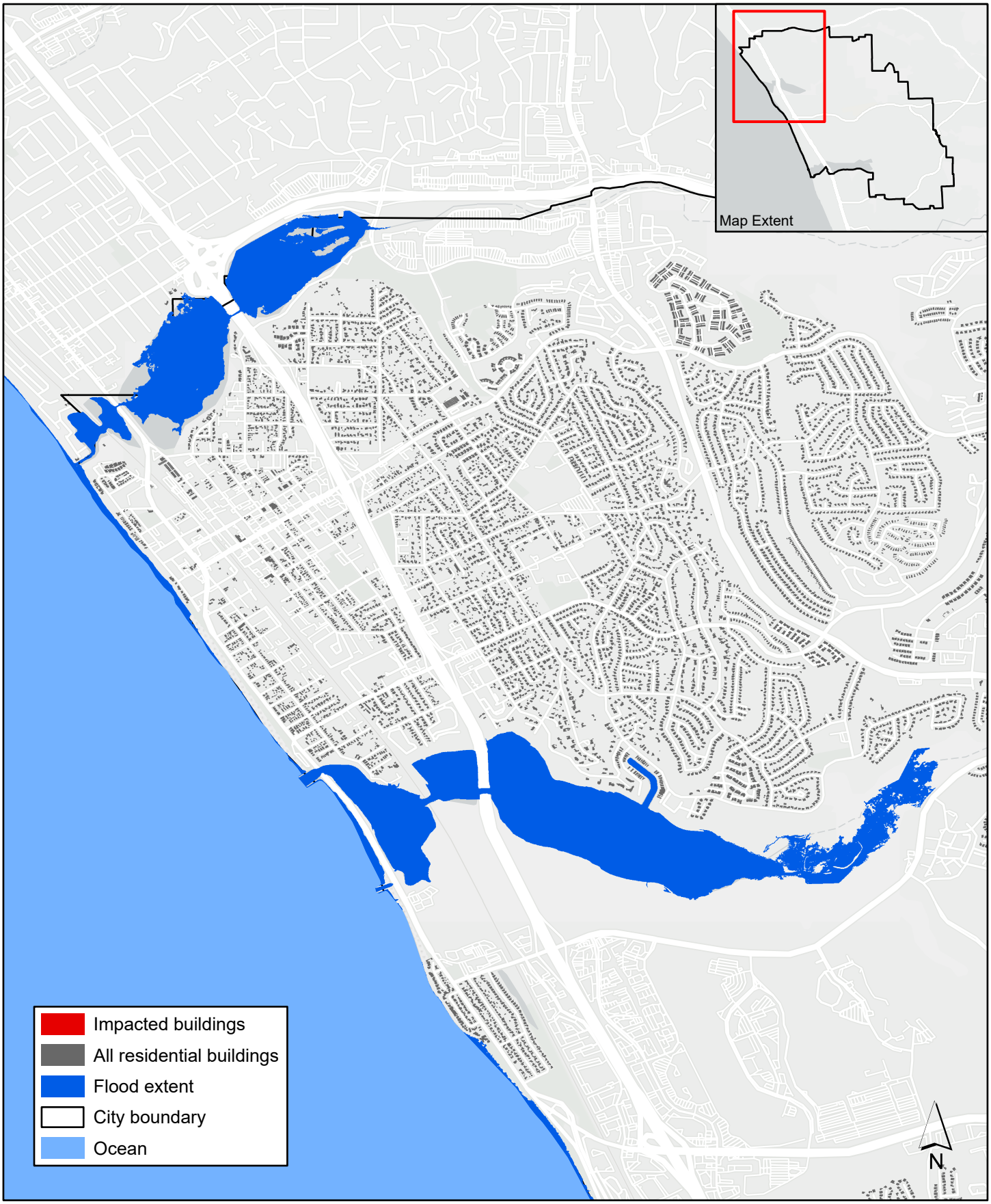
Carlsbad Area 1

Sea Level Rise 0.75 m - 100 year storm



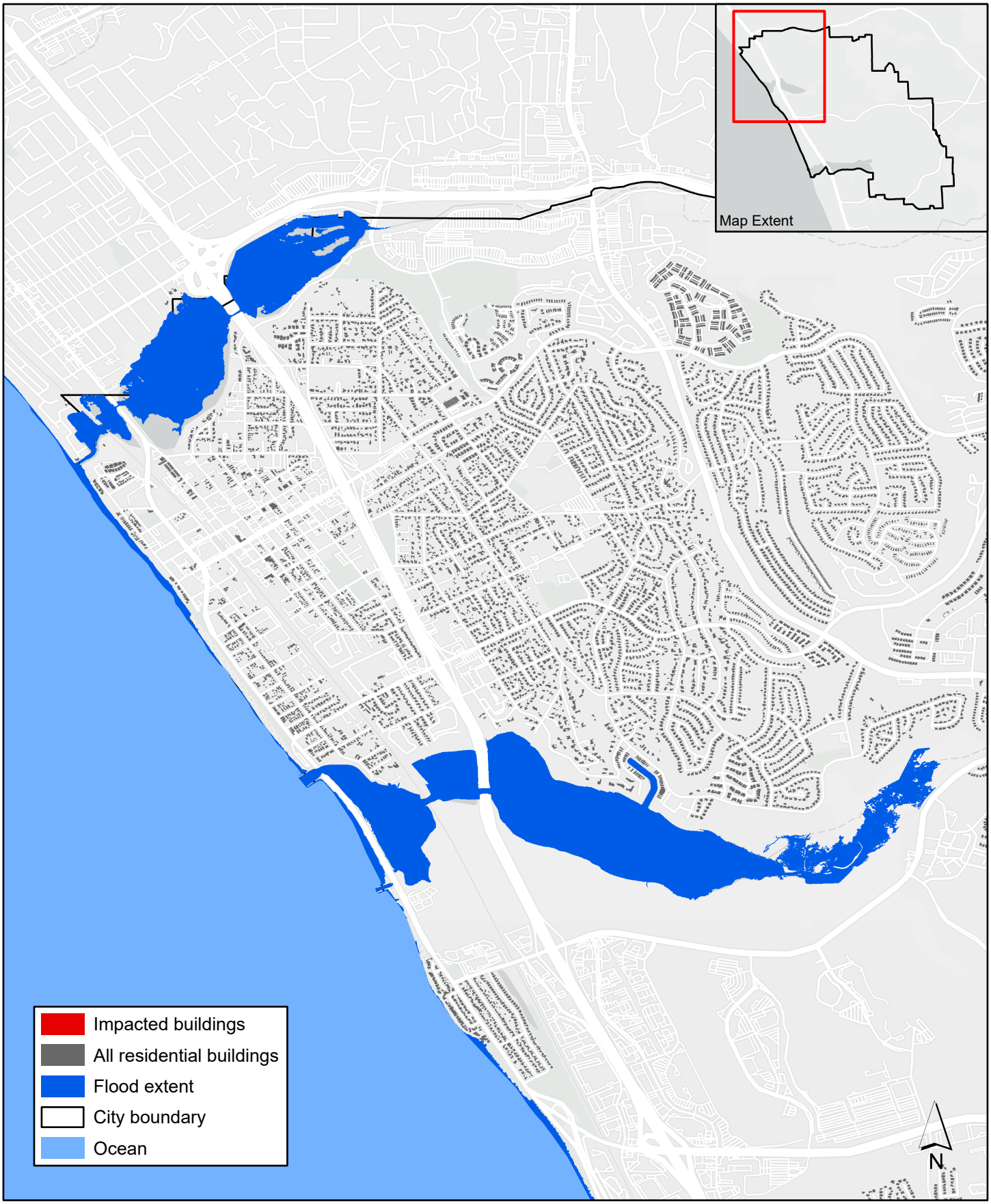
Carlsbad Area 1

Sea Level Rise 1.0 m - No storm



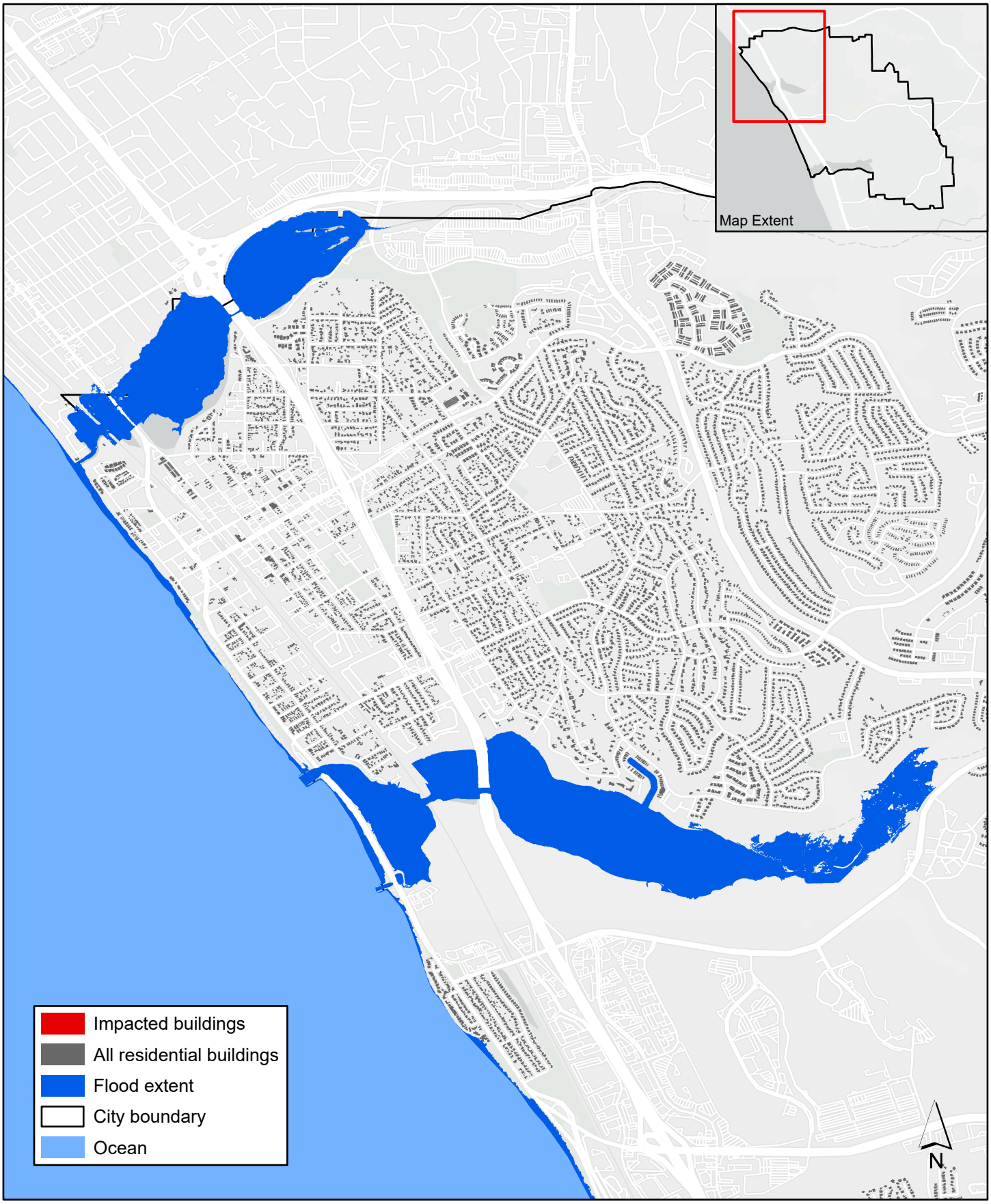
Carlsbad Area 1

Sea Level Rise 1.0 m - 001 year storm



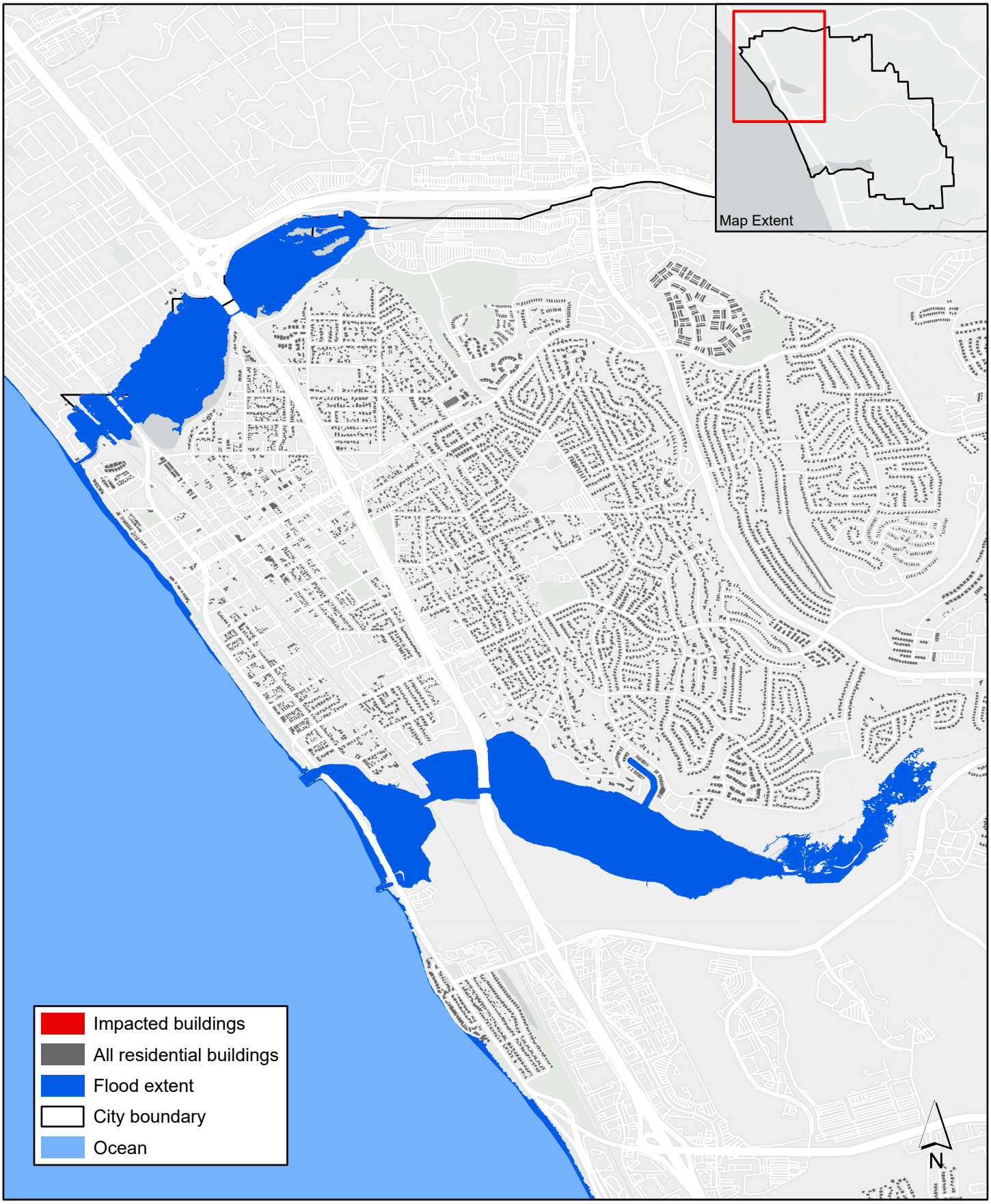
Carlsbad Area 1

Sea Level Rise 1.0 m - 020 year storm



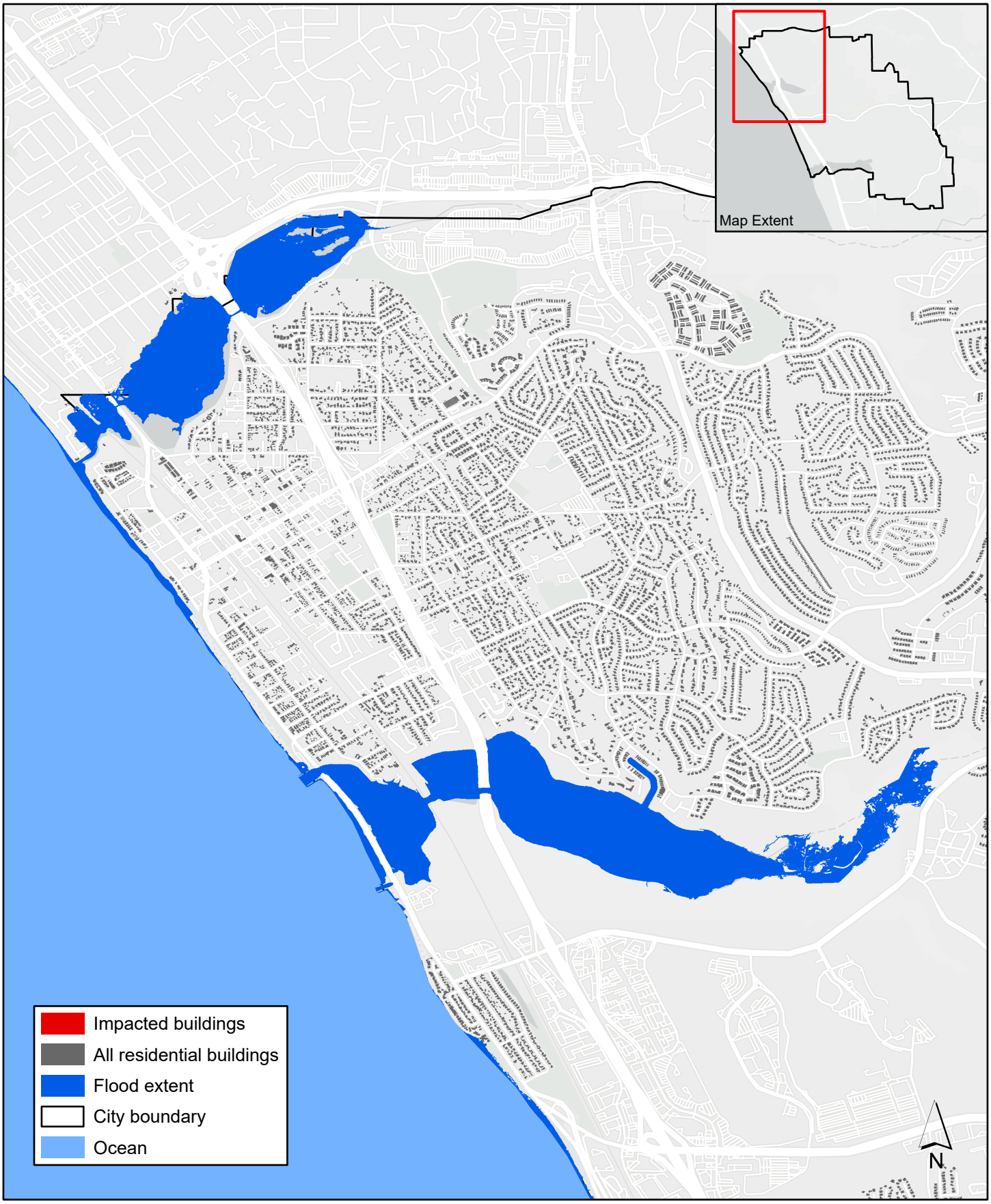
Carlsbad Area 1

Sea Level Rise 1.0 m - 100 year storm



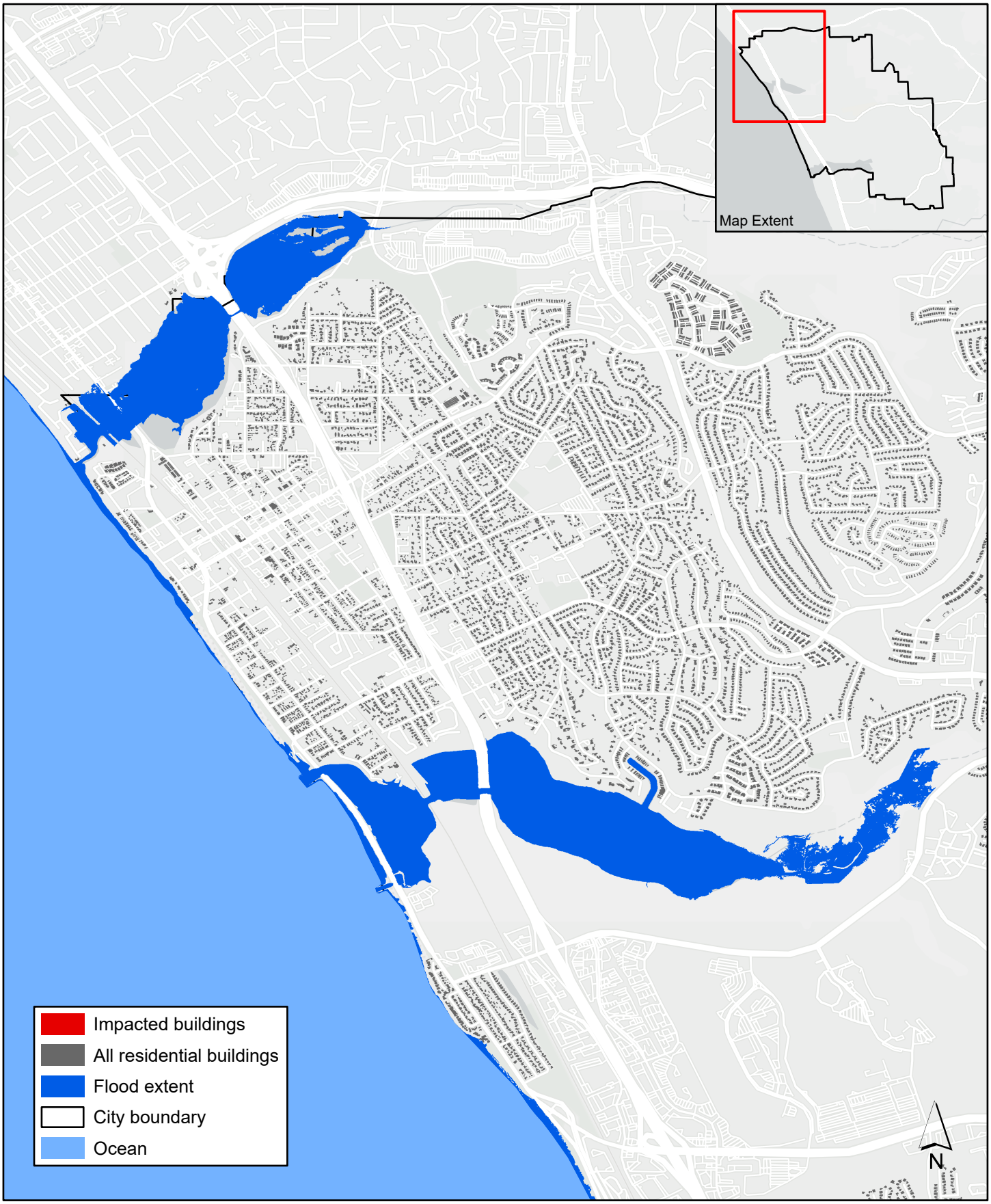
Carlsbad Area 1

Sea Level Rise 1.5 m - No storm



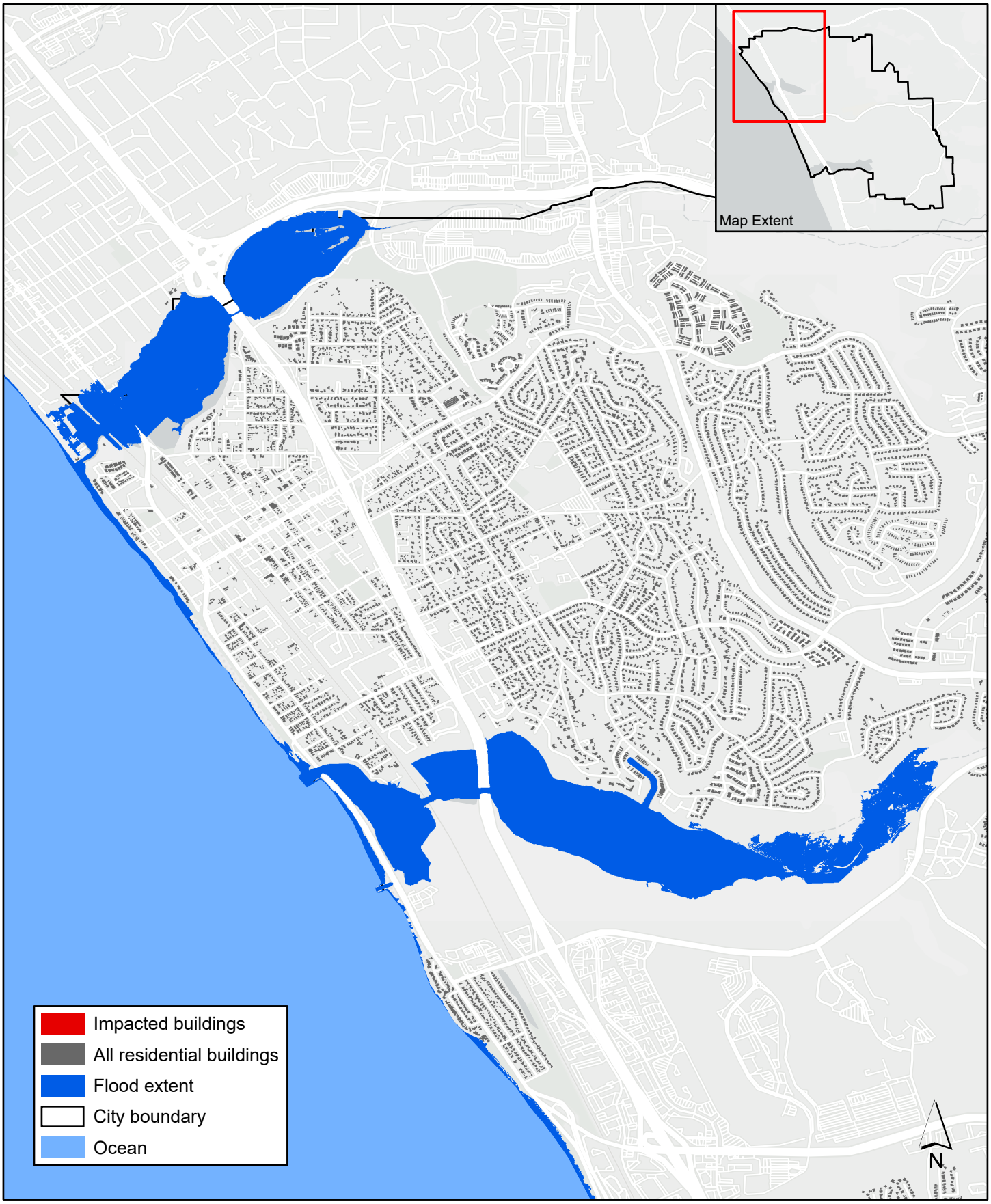
Carlsbad Area 1

Sea Level Rise 1.5 m - 001 year storm



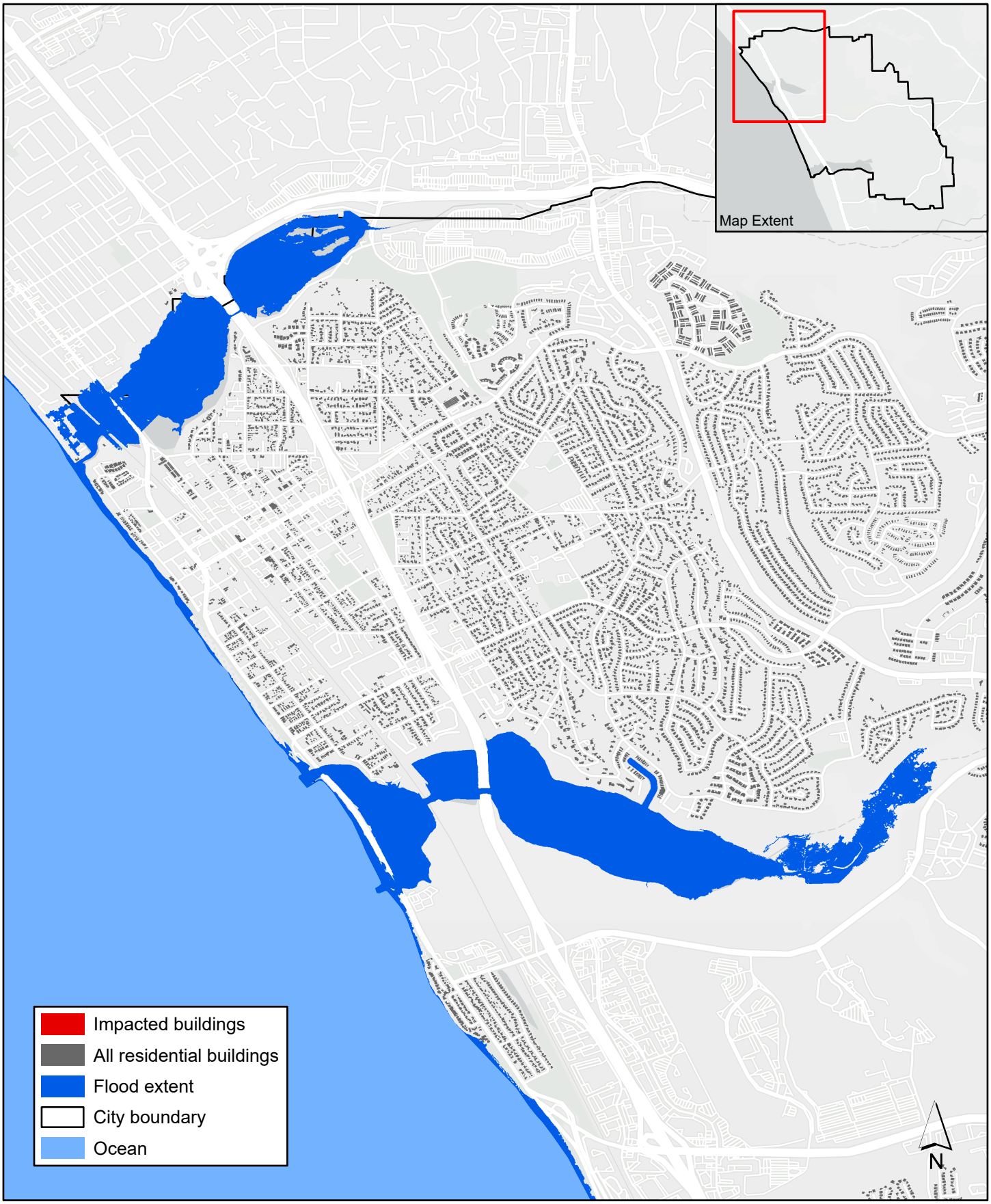
Carlsbad Area 1

Sea Level Rise 1.5 m - 020 year storm



Carlsbad Area 1

Sea Level Rise 1.5 m - 100 year storm



Carlsbad Area 1

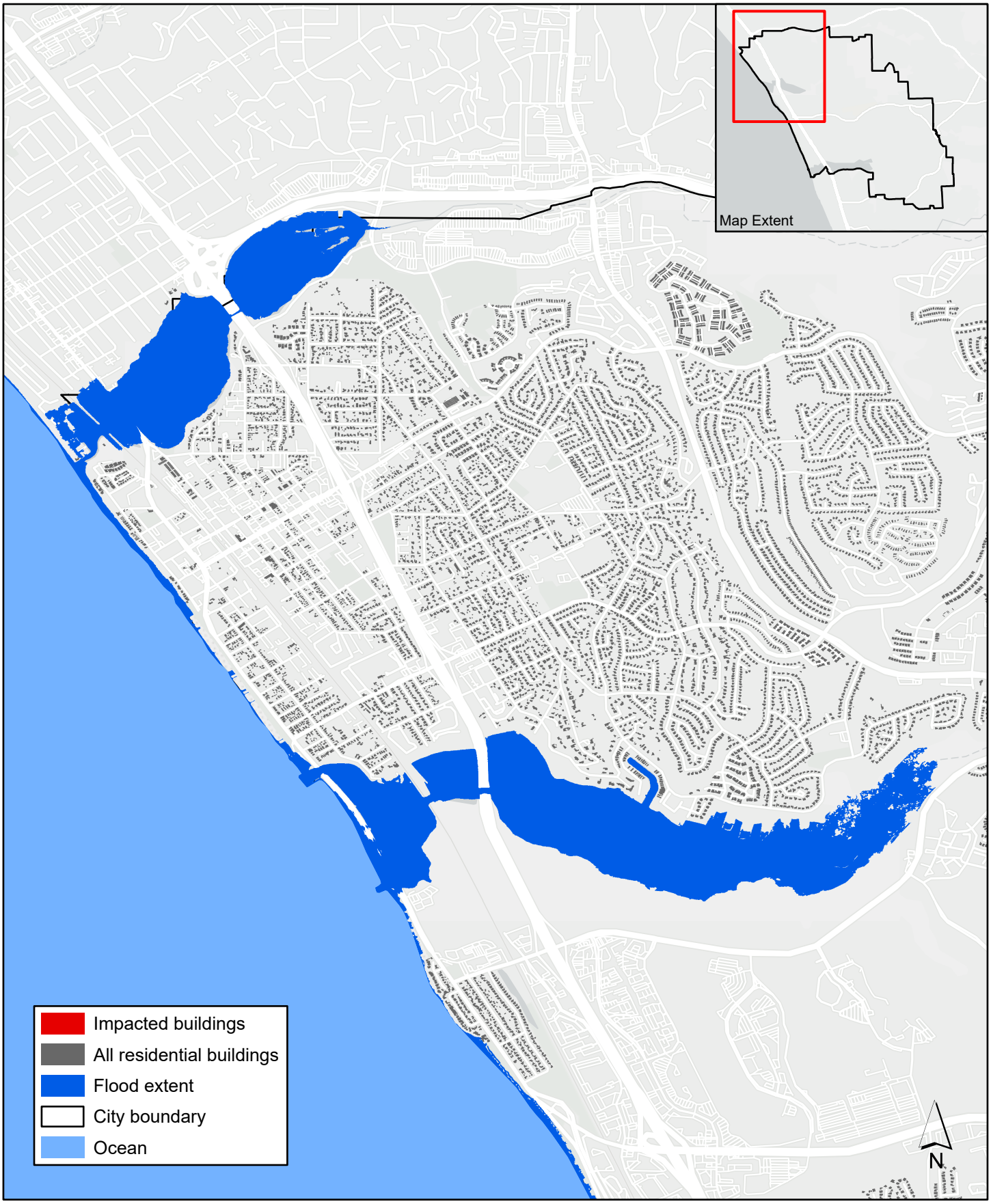
Sea Level Rise 2.0 m - No storm

Carlsbad Area 1

Sea Level Rise 2.0 m - 001 year storm

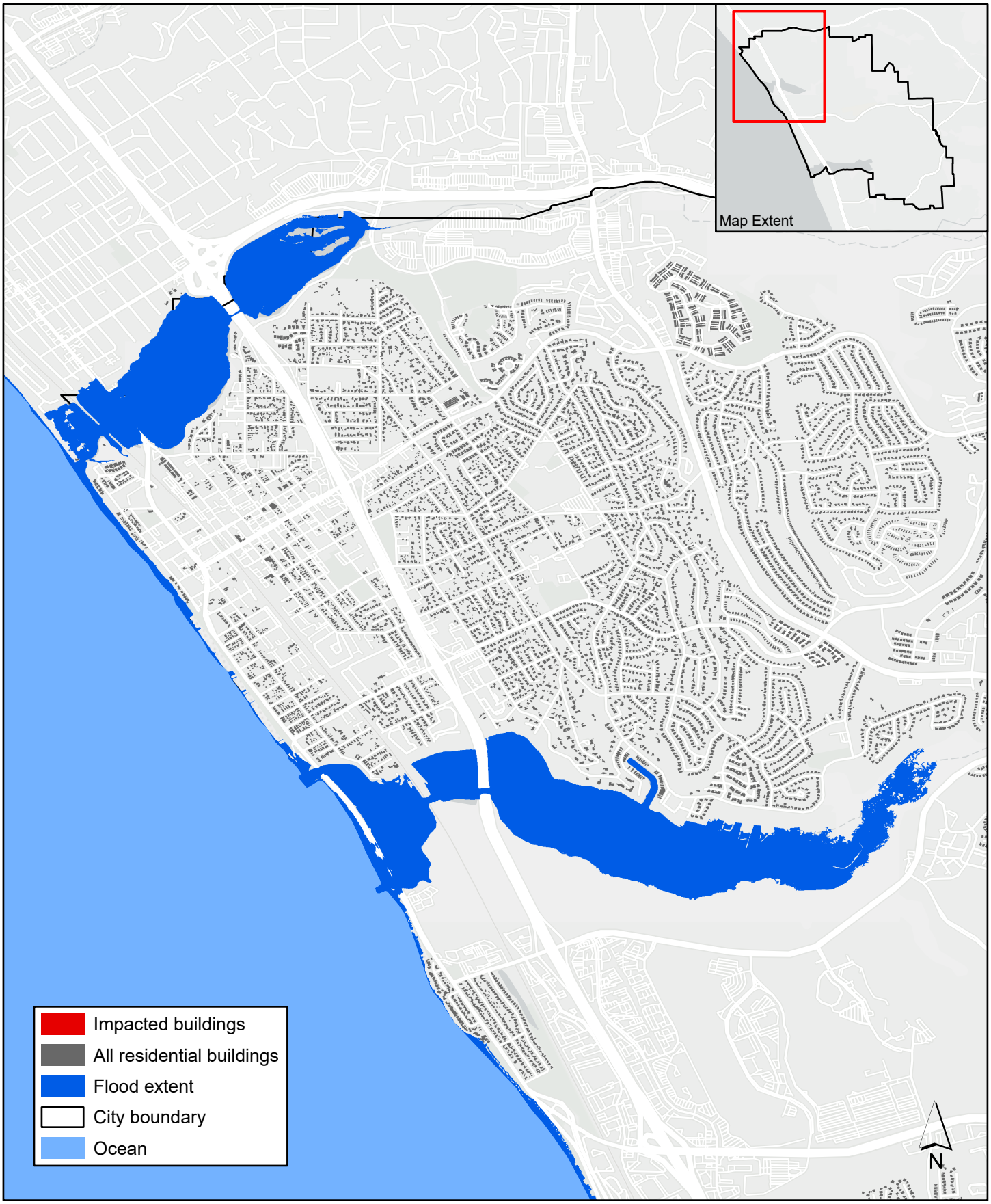
Carlsbad Area 1

Sea Level Rise 2.0 m - 020 year storm



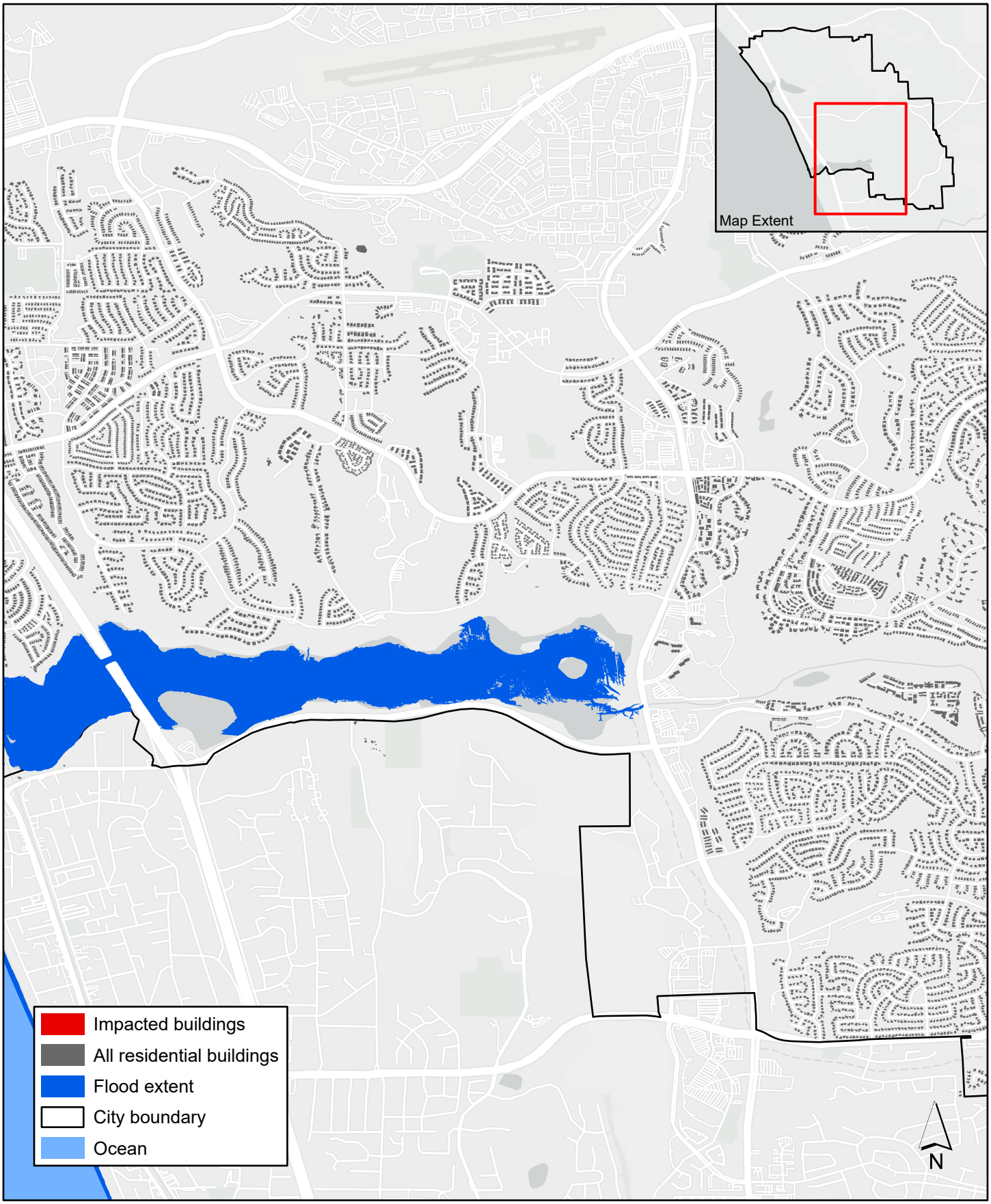
Carlsbad Area 1

Sea Level Rise 2.0 m - 100 year storm



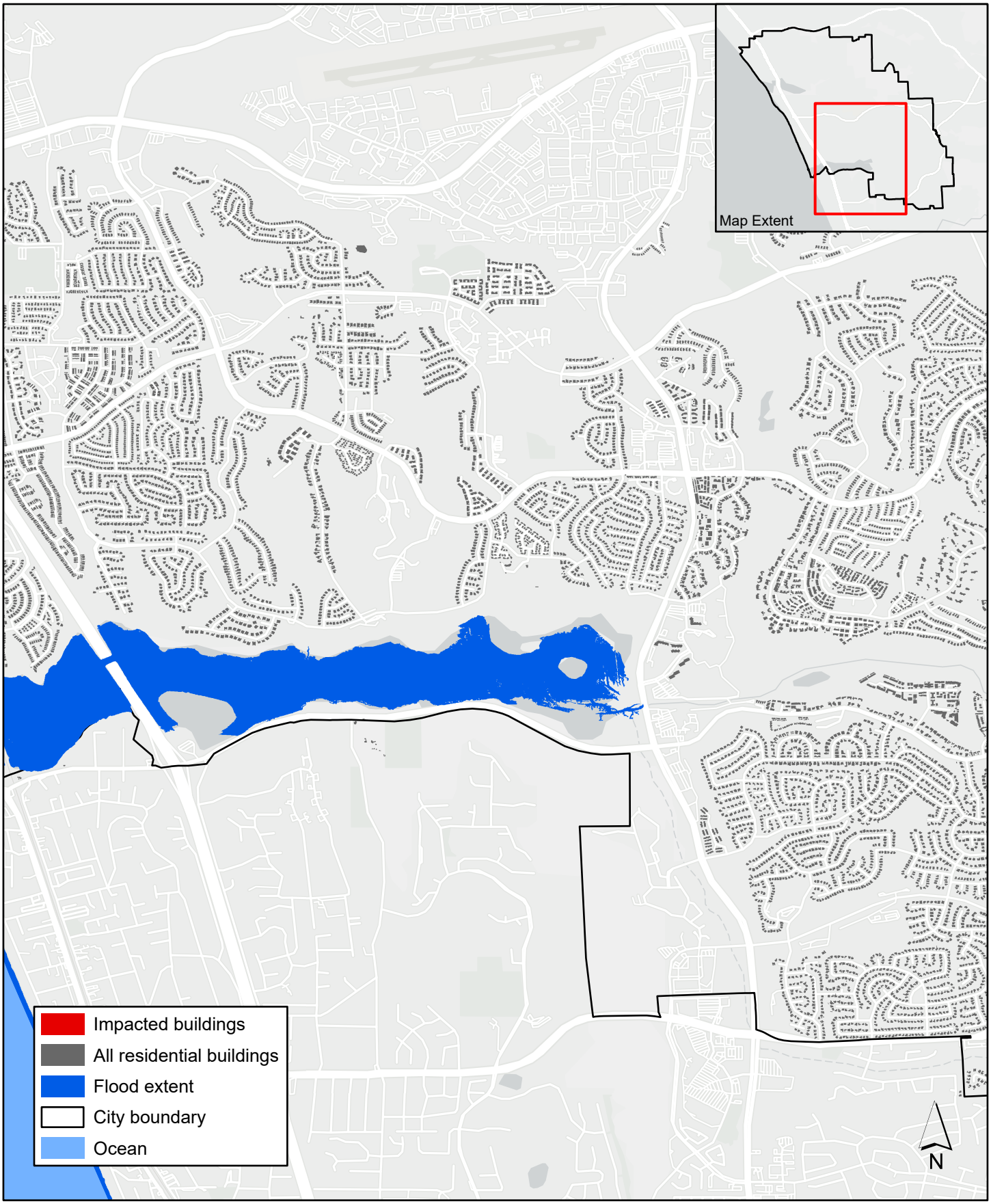
Carlsbad Area 2

Sea Level Rise 0.0 m - No storm



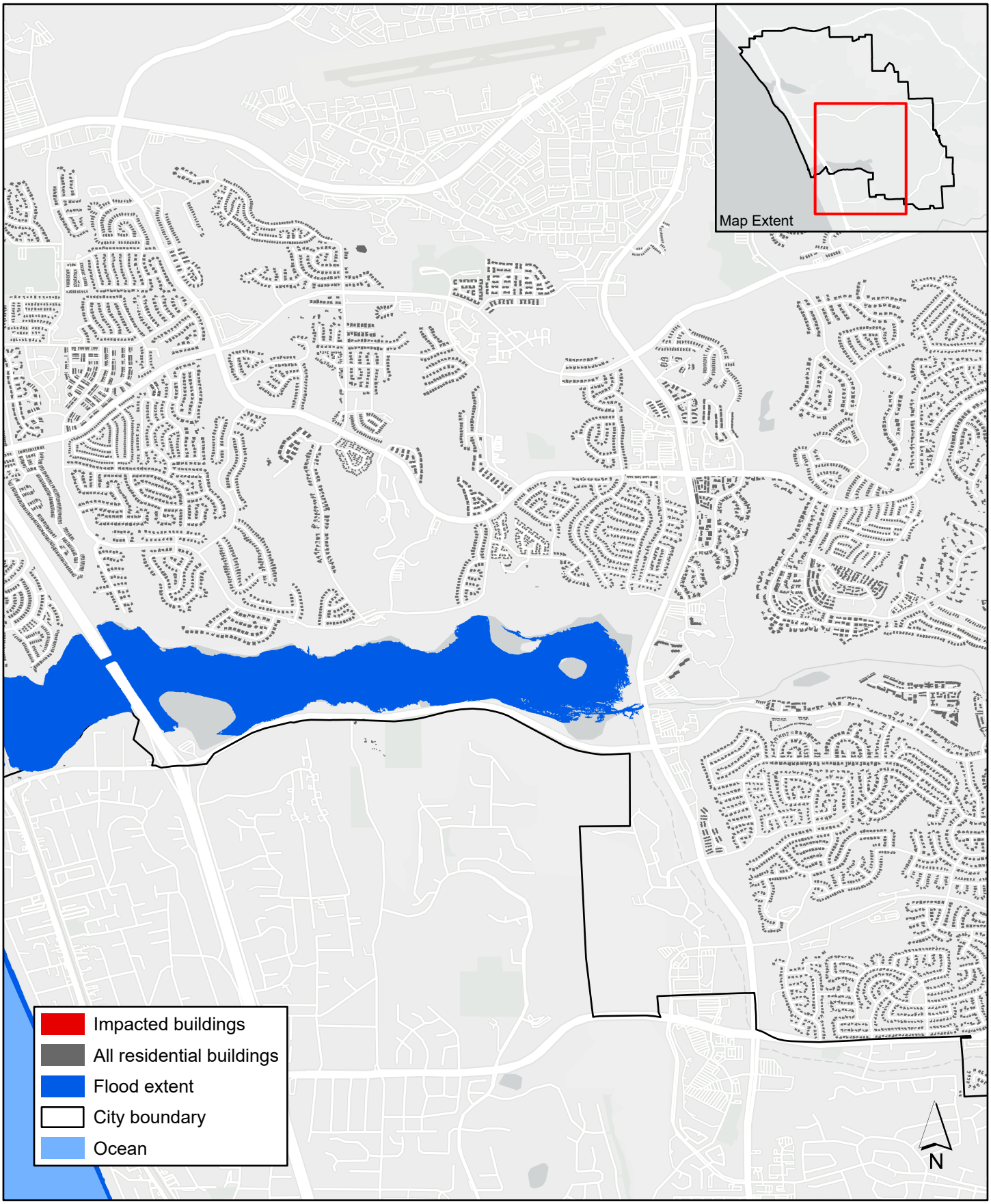
Carlsbad Area 2

Sea Level Rise 0.0 m - 001 year storm



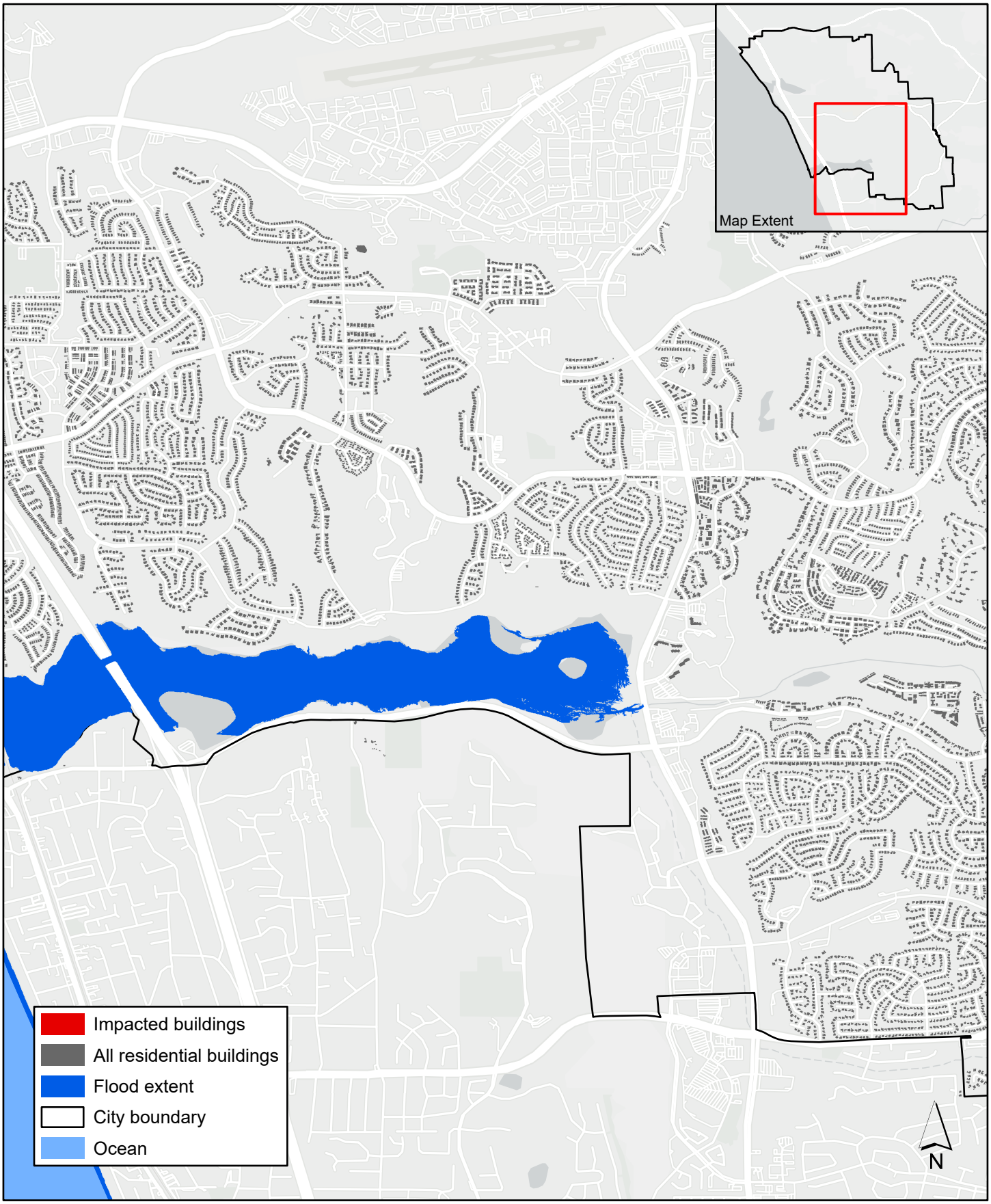
Carlsbad Area 2

Sea Level Rise 0.0 m - 020 year storm



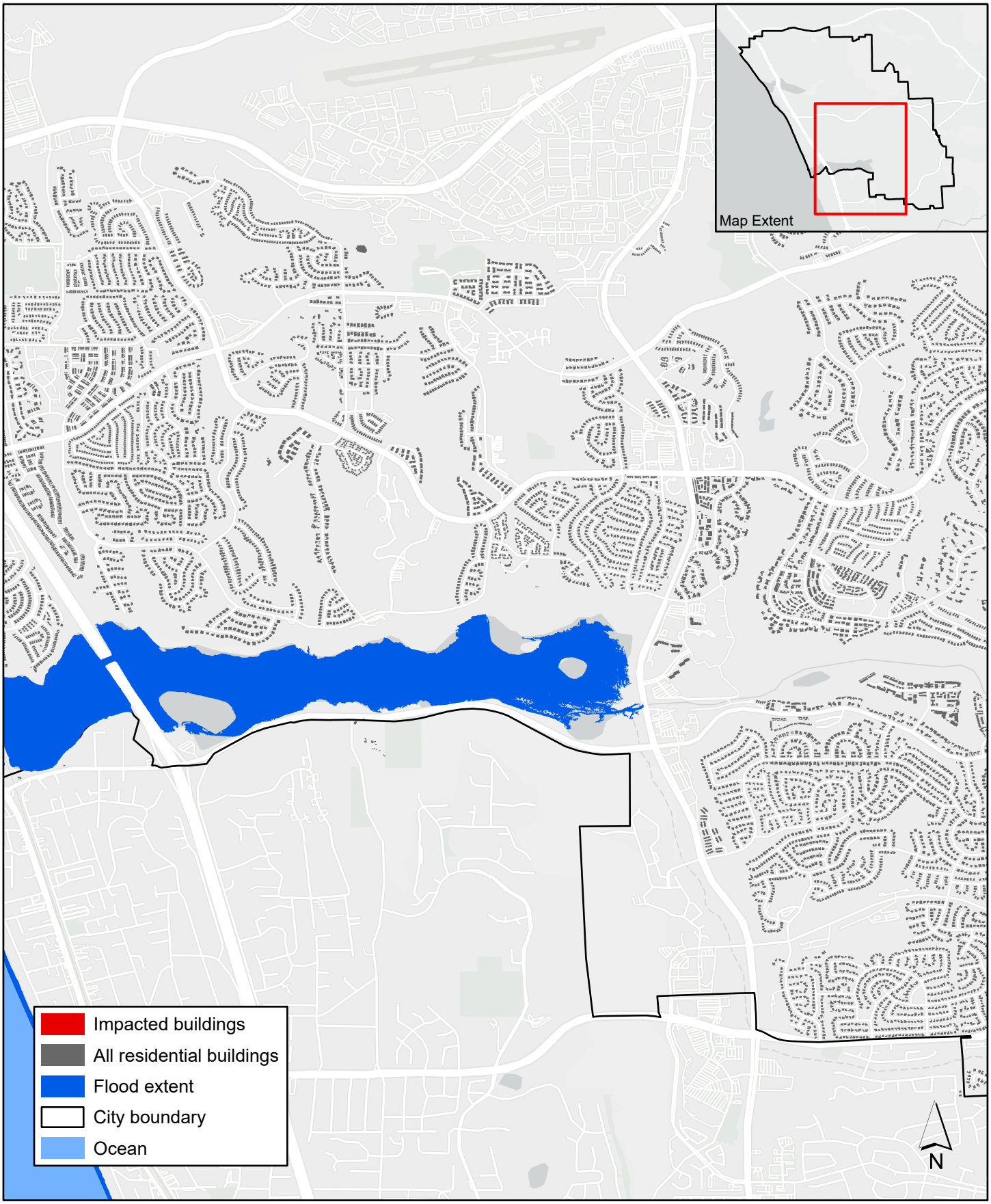
Carlsbad Area 2

Sea Level Rise 0.0 m - 100 year storm



Carlsbad Area 2

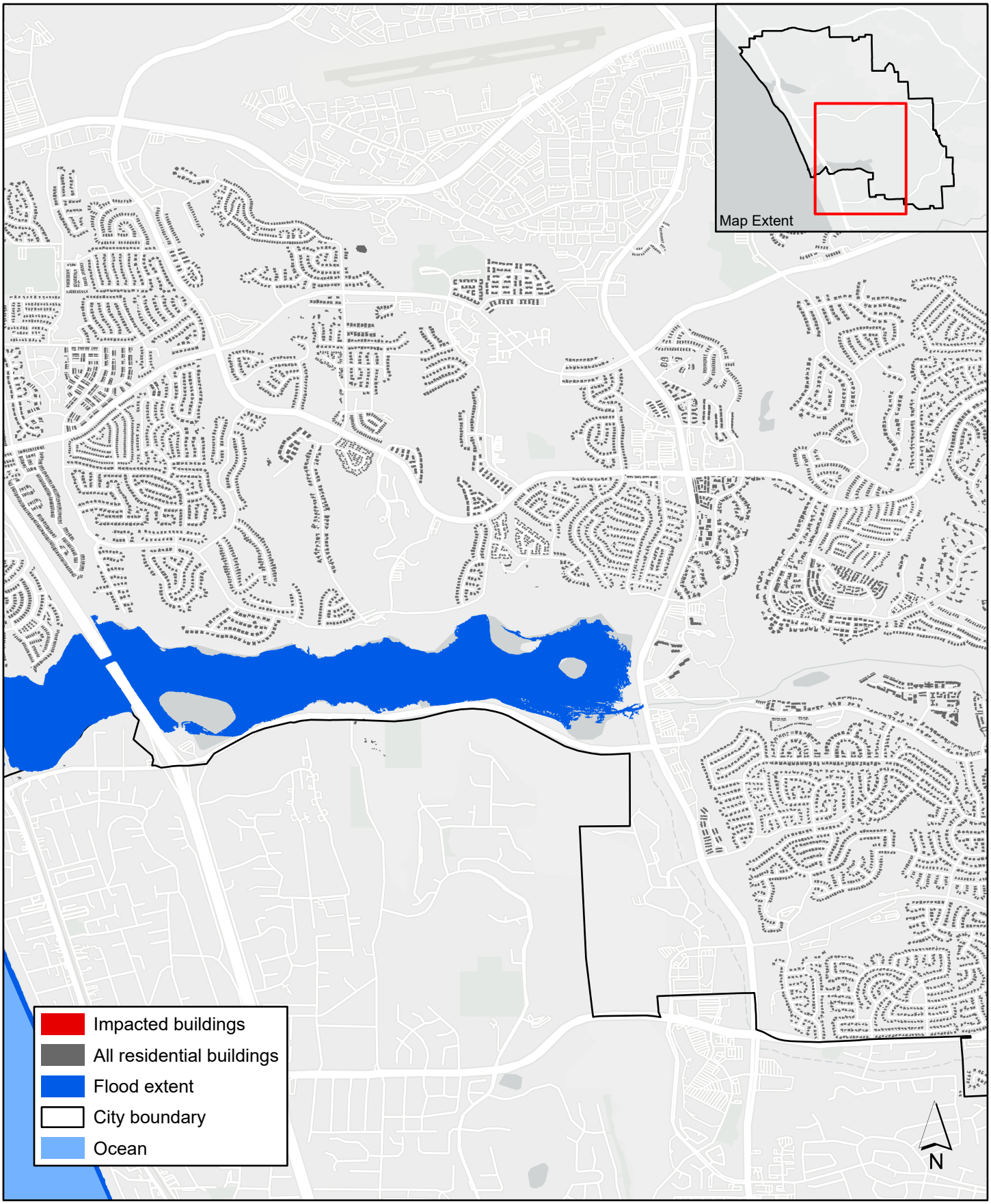
Sea Level Rise 0.25 m - No storm



Appendix F

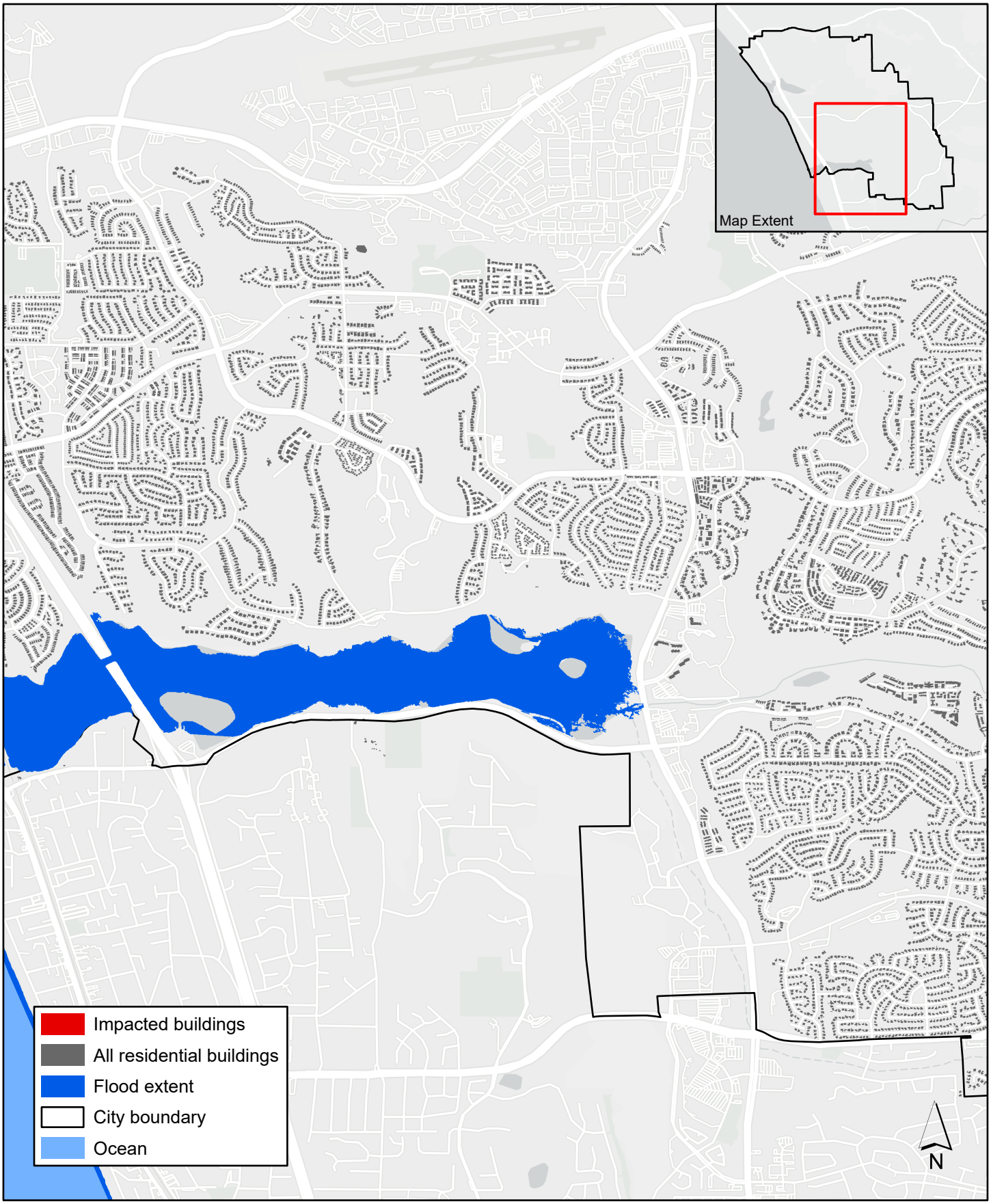
Carlsbad Area 2

Sea Level Rise 0.25 m - 001 year storm



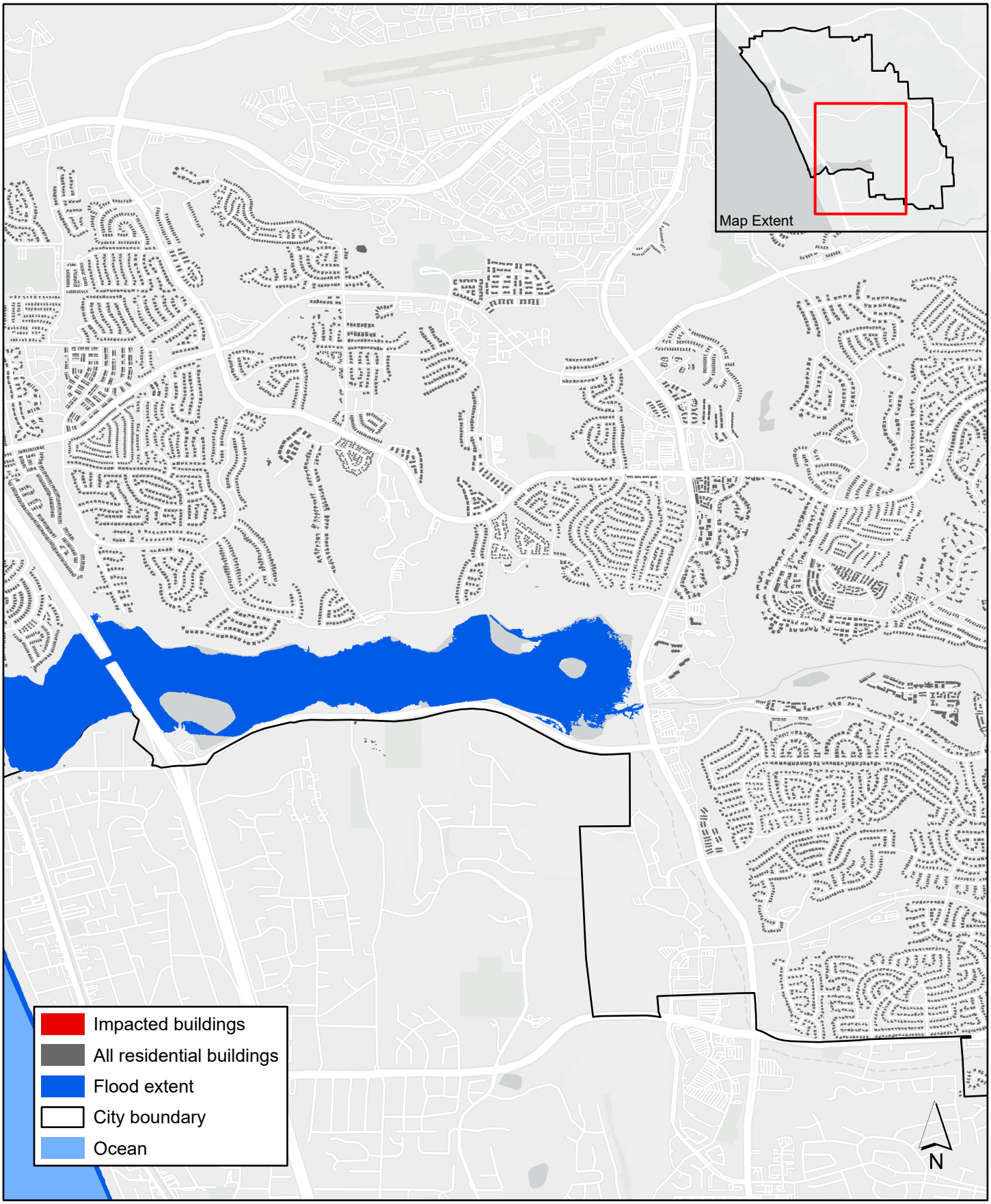
Carlsbad Area 2

Sea Level Rise 0.25 m - 020 year storm



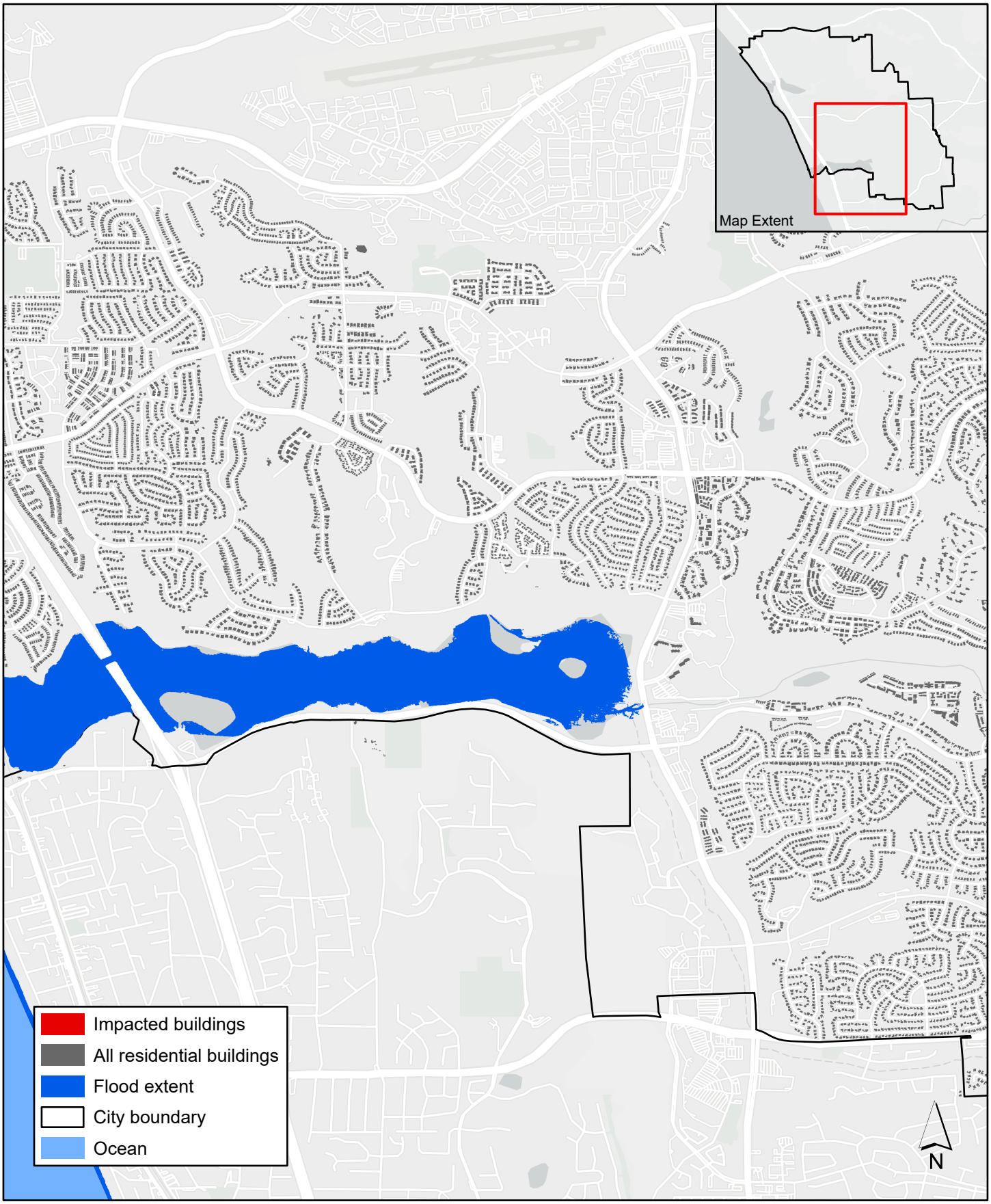
Carlsbad Area 2

Sea Level Rise 0.25 m - 100 year storm



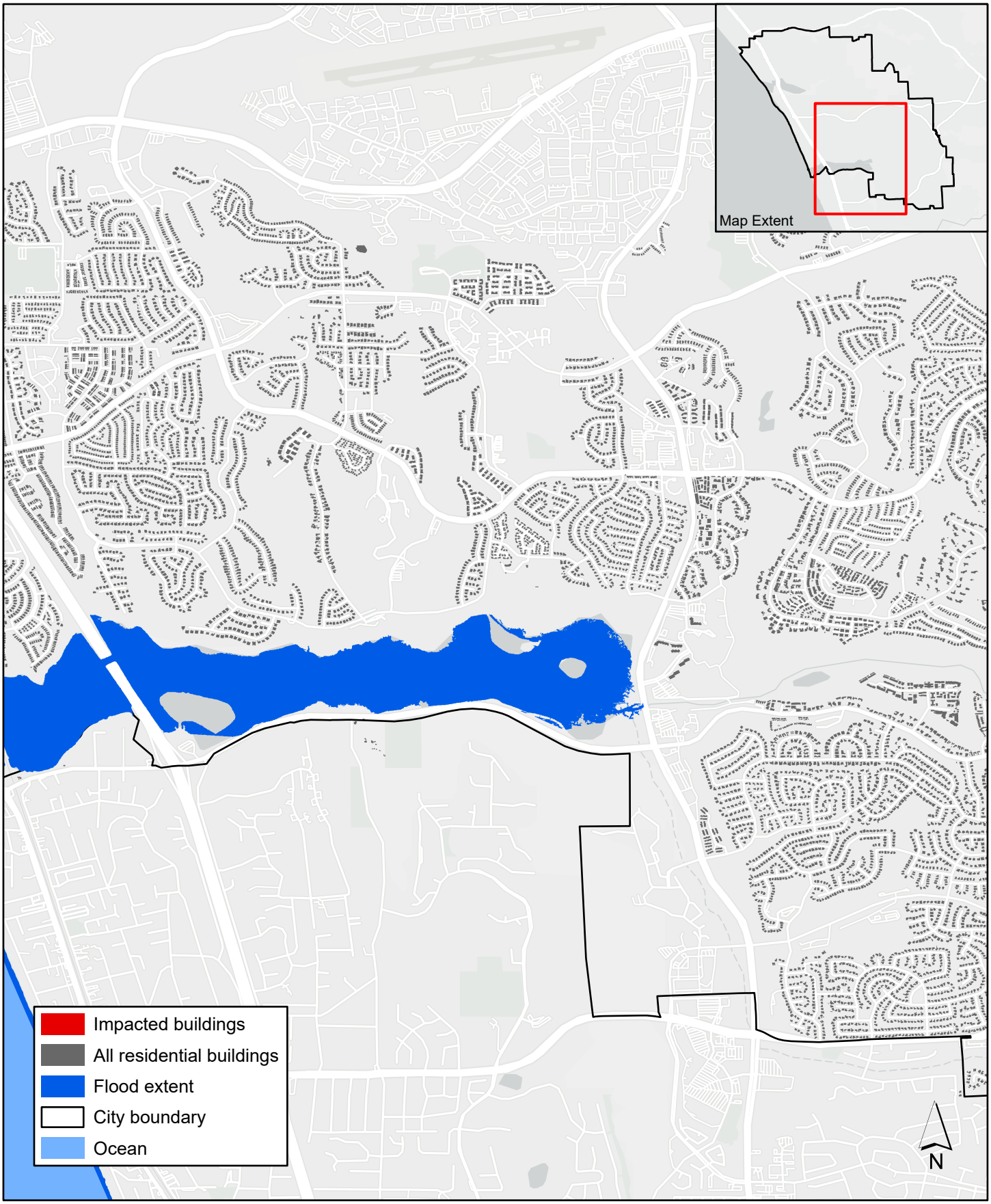
Carlsbad Area 2

Sea Level Rise 0.5 m - No storm



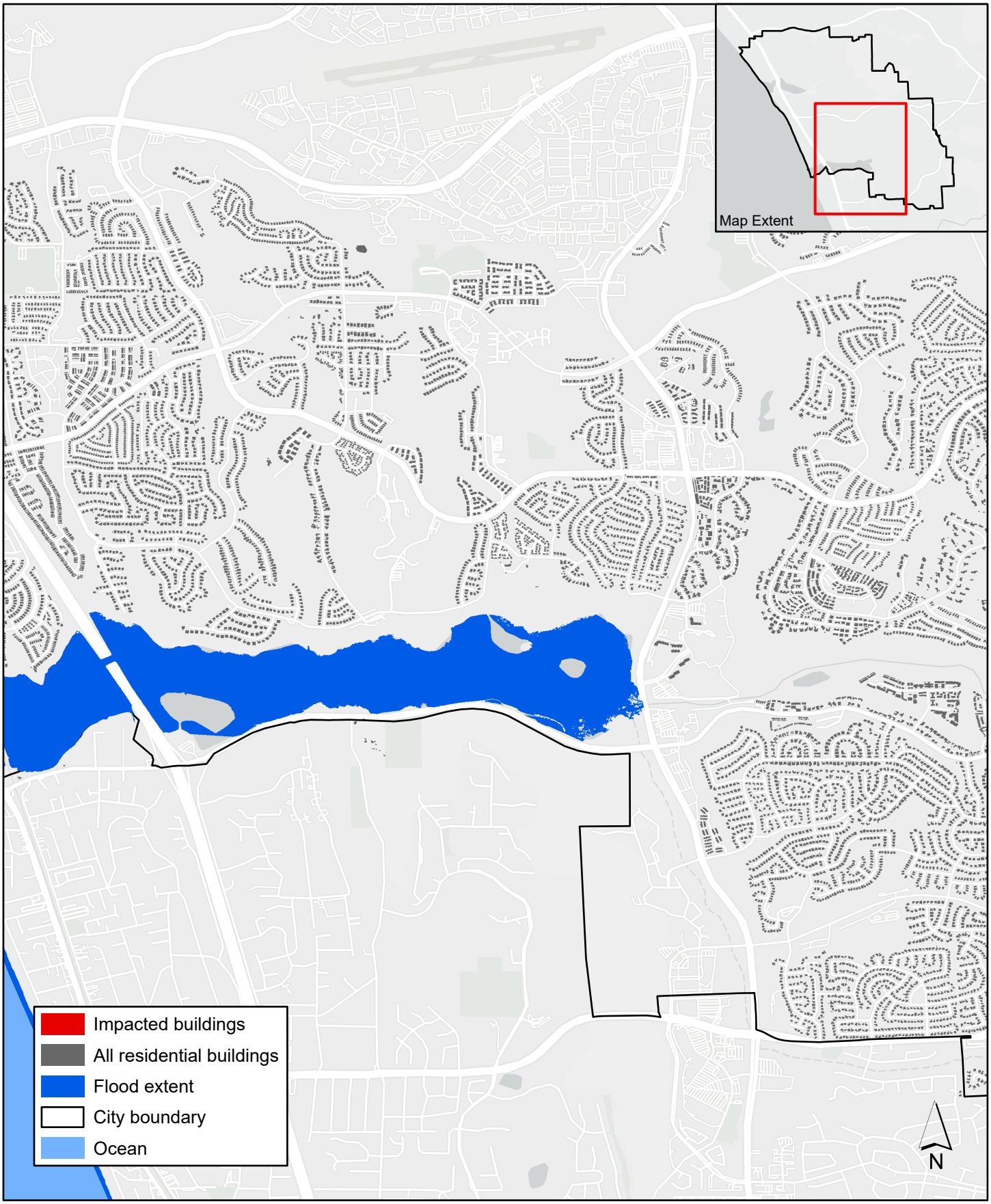
Carlsbad Area 2

Sea Level Rise 0.5 m - 001 year storm



Carlsbad Area 2

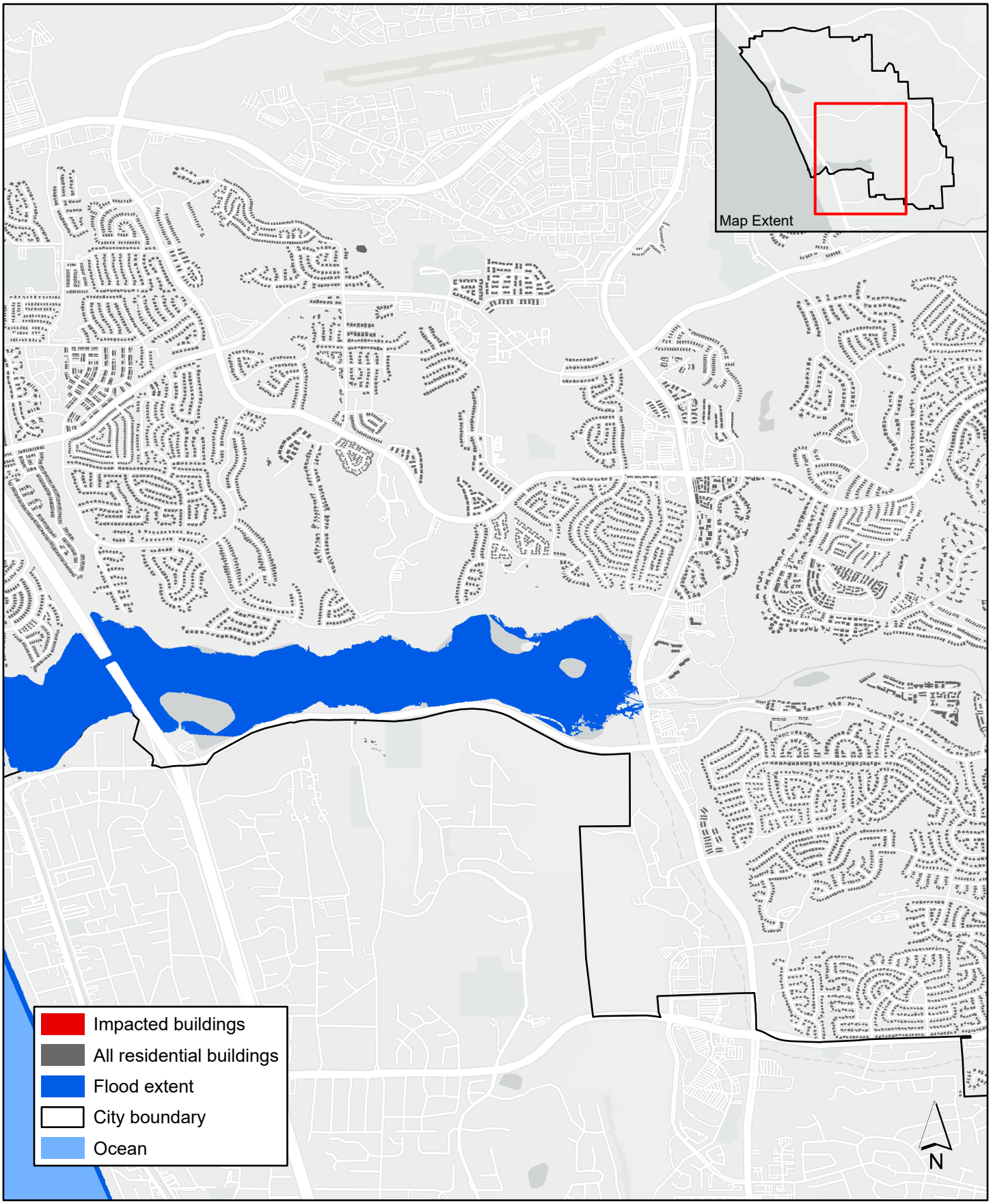
Sea Level Rise 0.5 m - 020 year storm



Appendix F

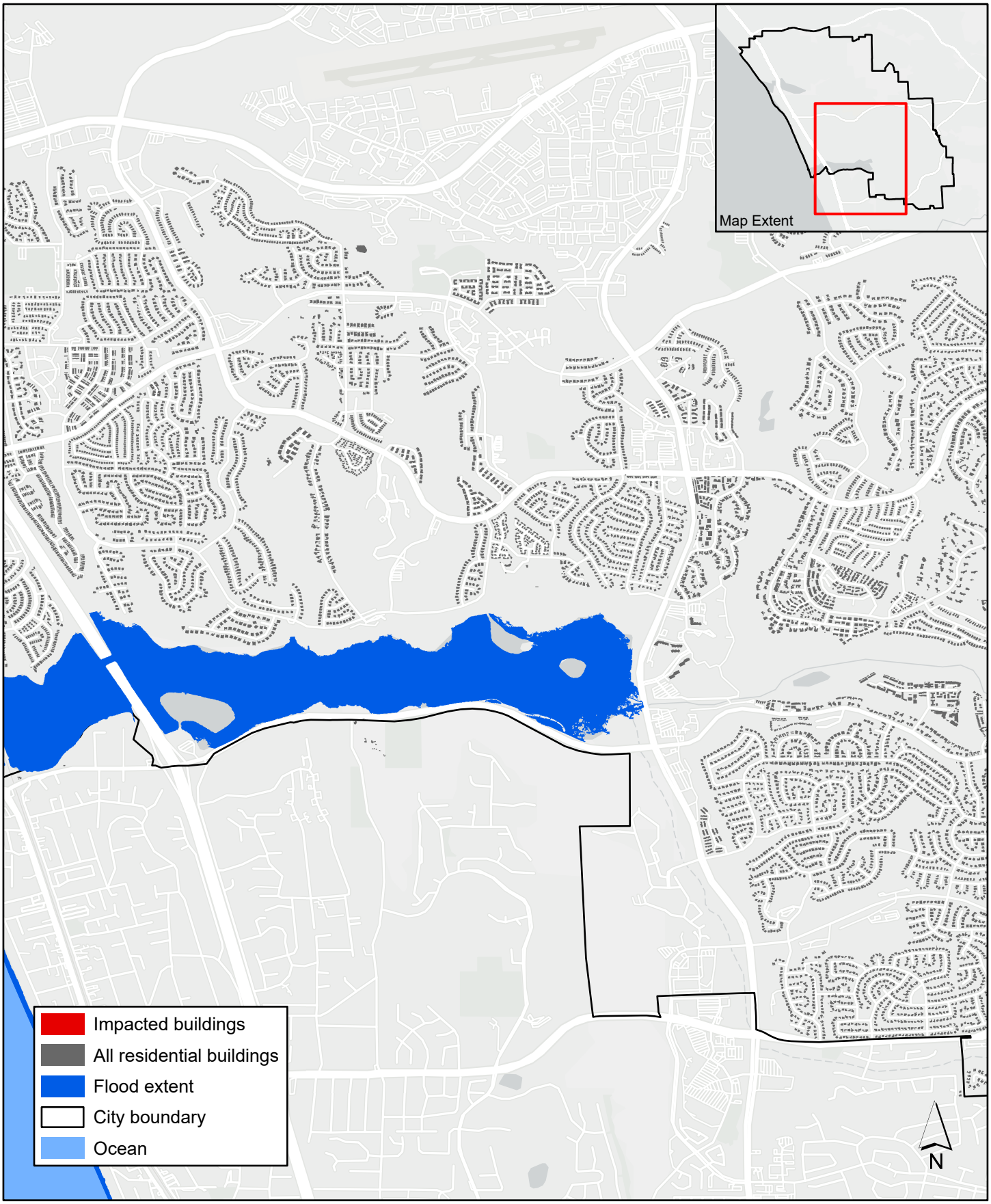
Carlsbad Area 2

Sea Level Rise 0.5 m - 100 year storm



Carlsbad Area 2

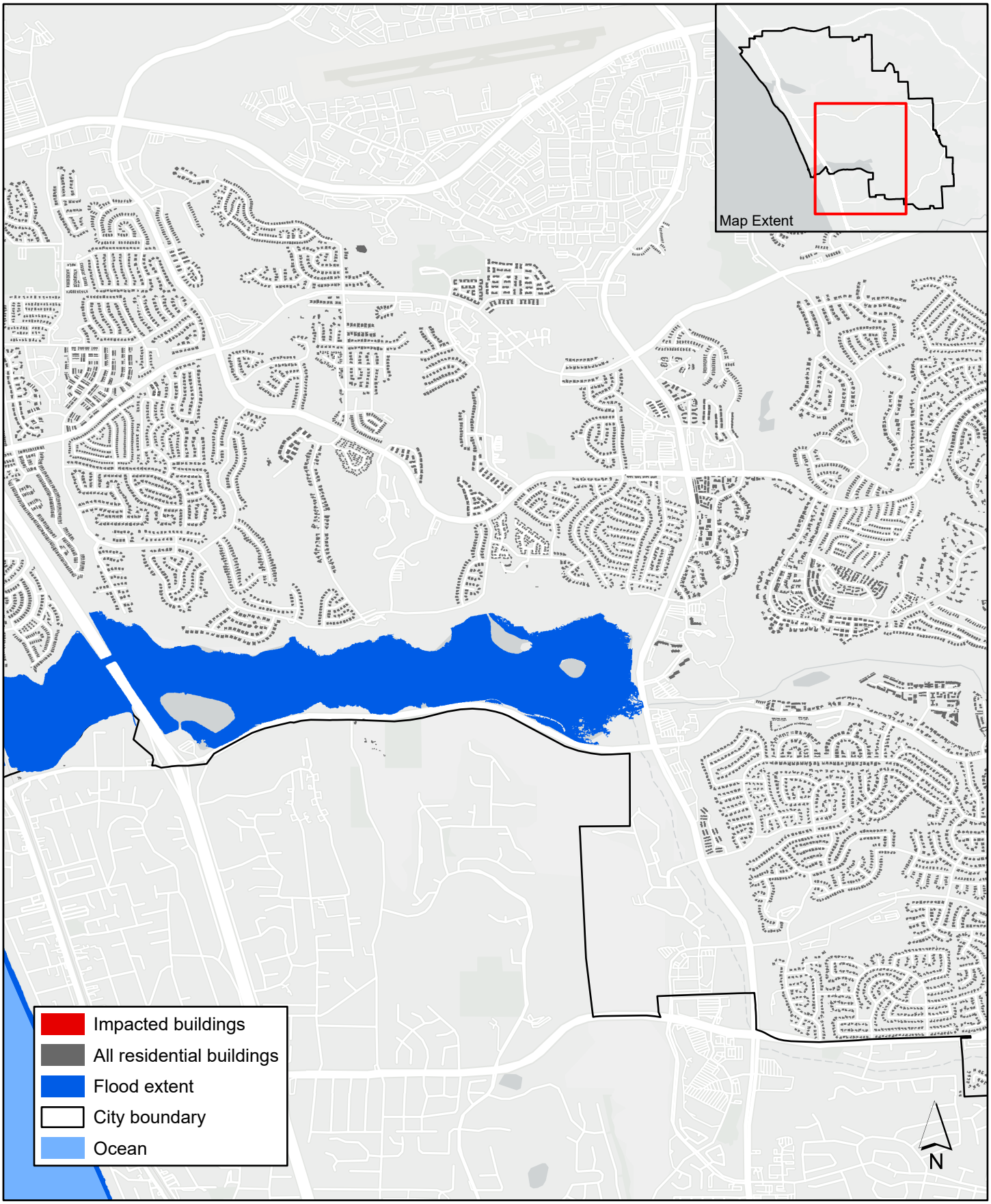
Sea Level Rise 0.75 m - No storm



Appendix F

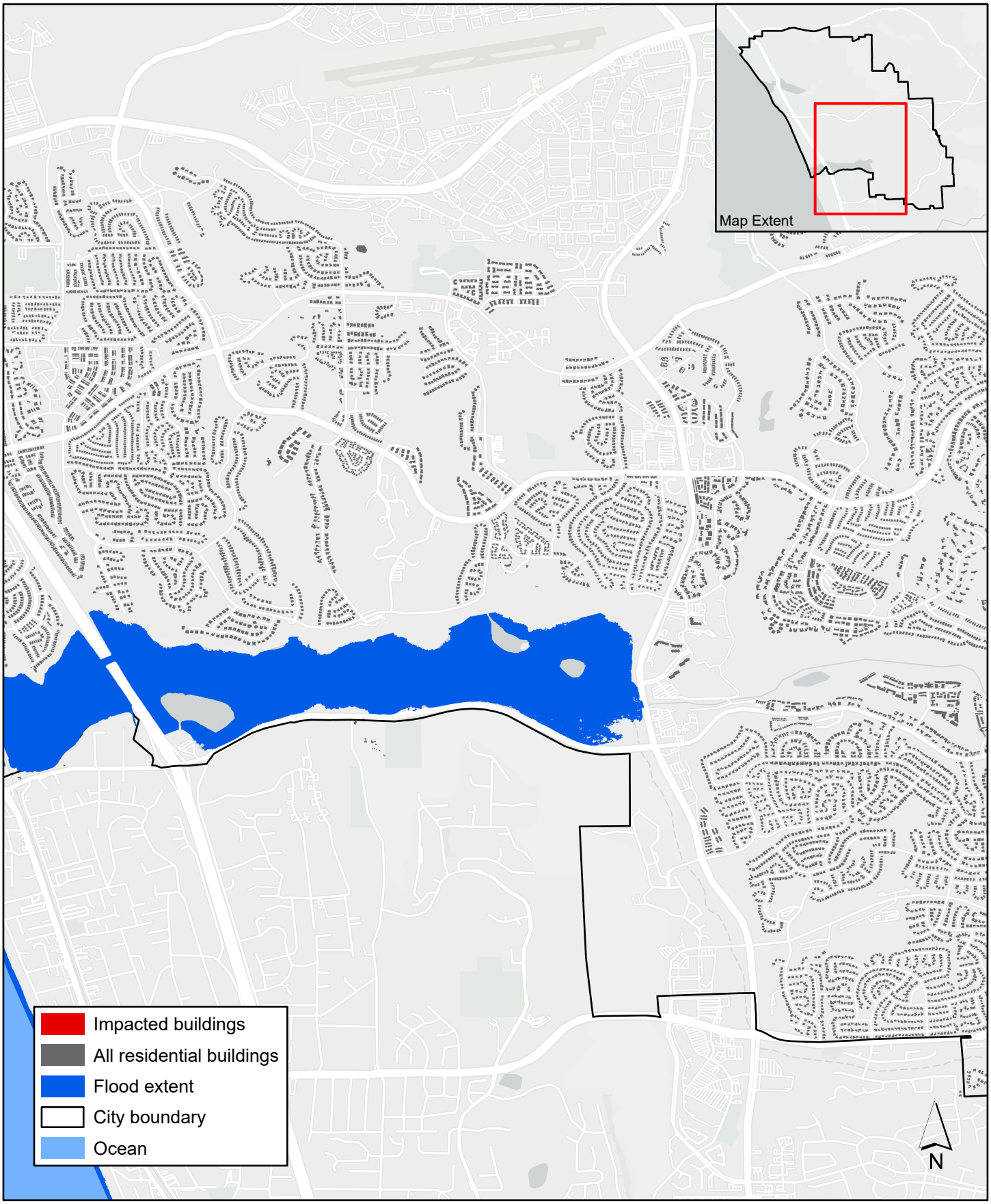
Carlsbad Area 2

Sea Level Rise 0.75 m - 001 year storm



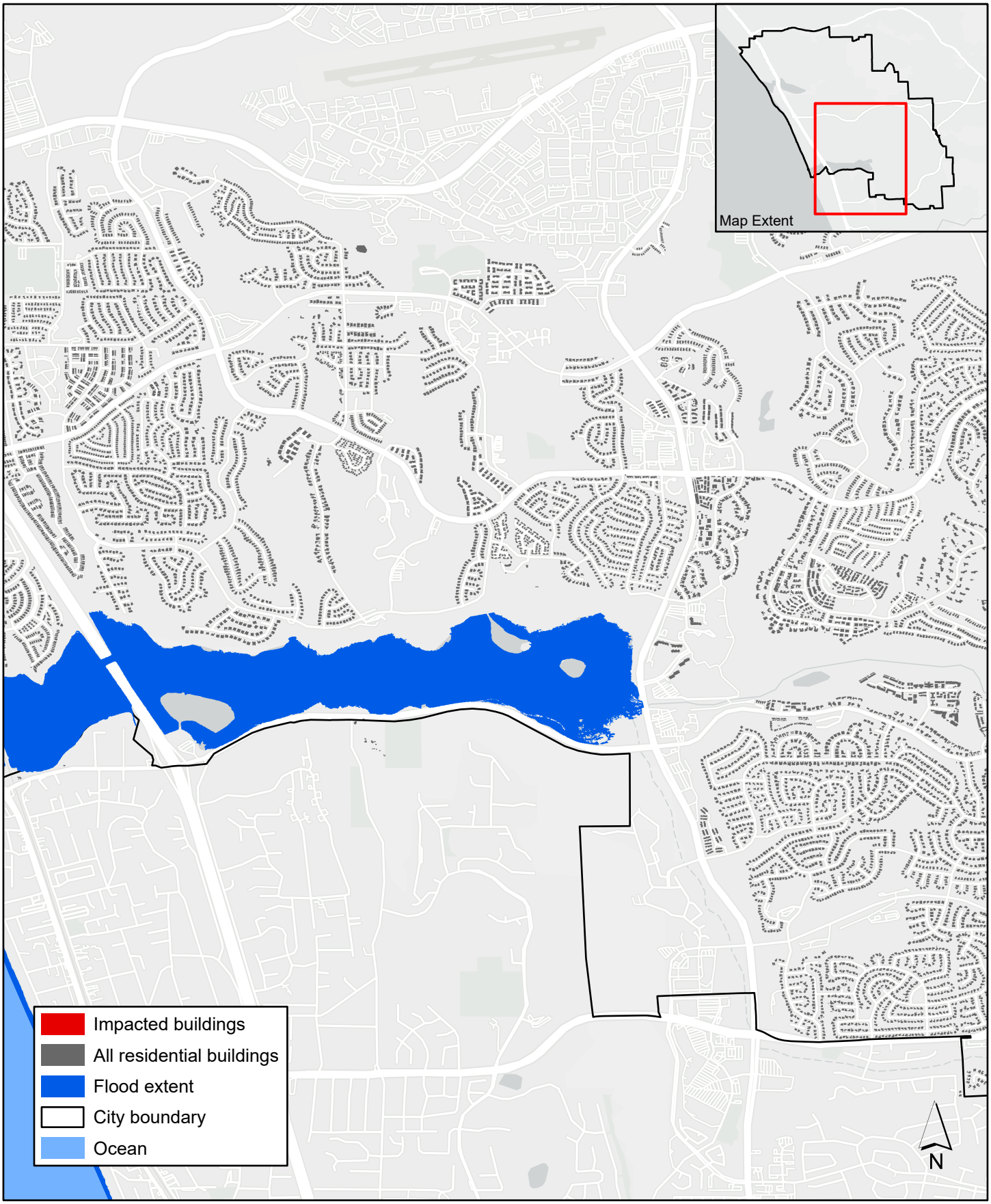
Carlsbad Area 2

Sea Level Rise 0.75 m - 020 year storm



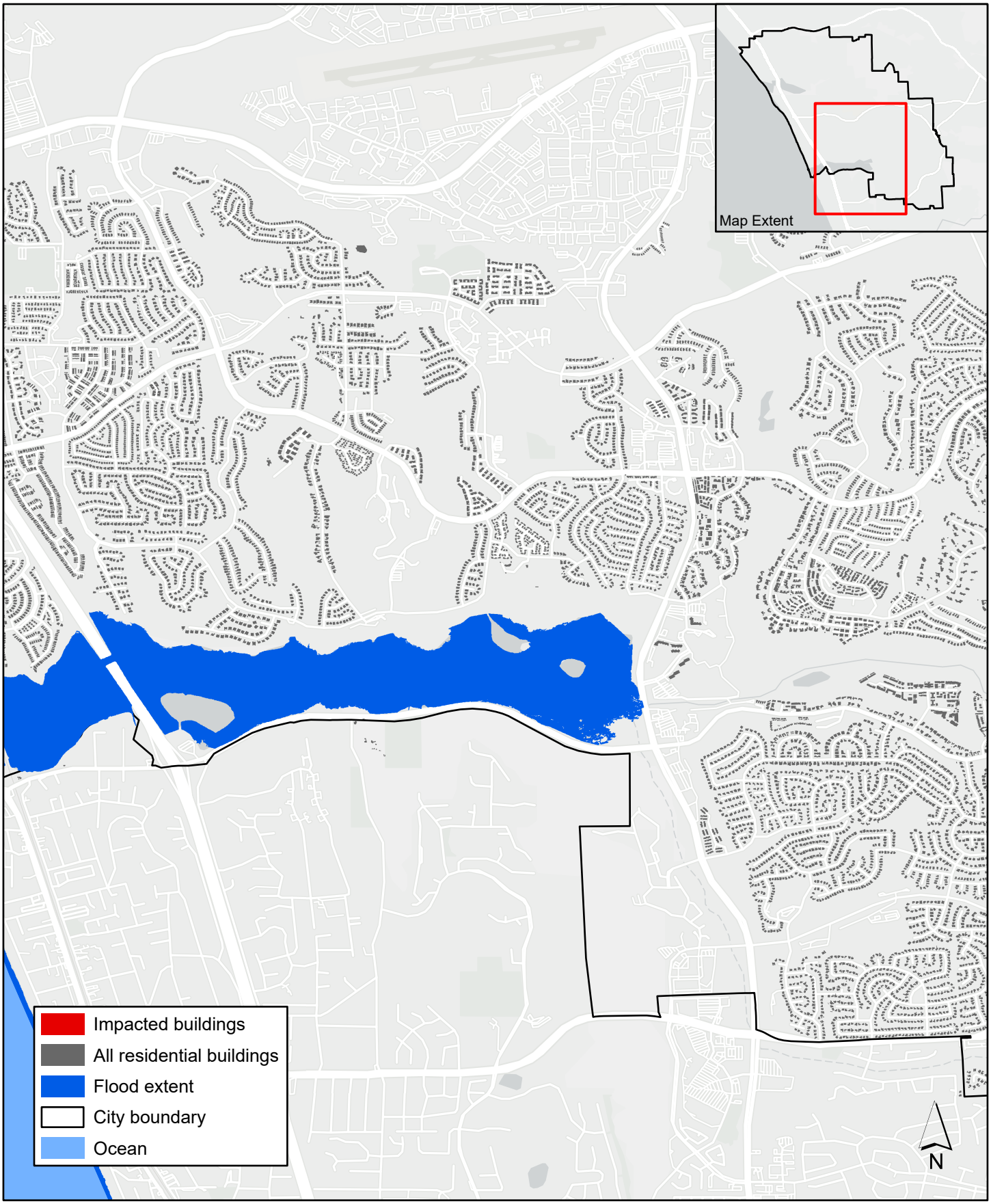
Carlsbad Area 2

Sea Level Rise 0.75 m - 100 year storm



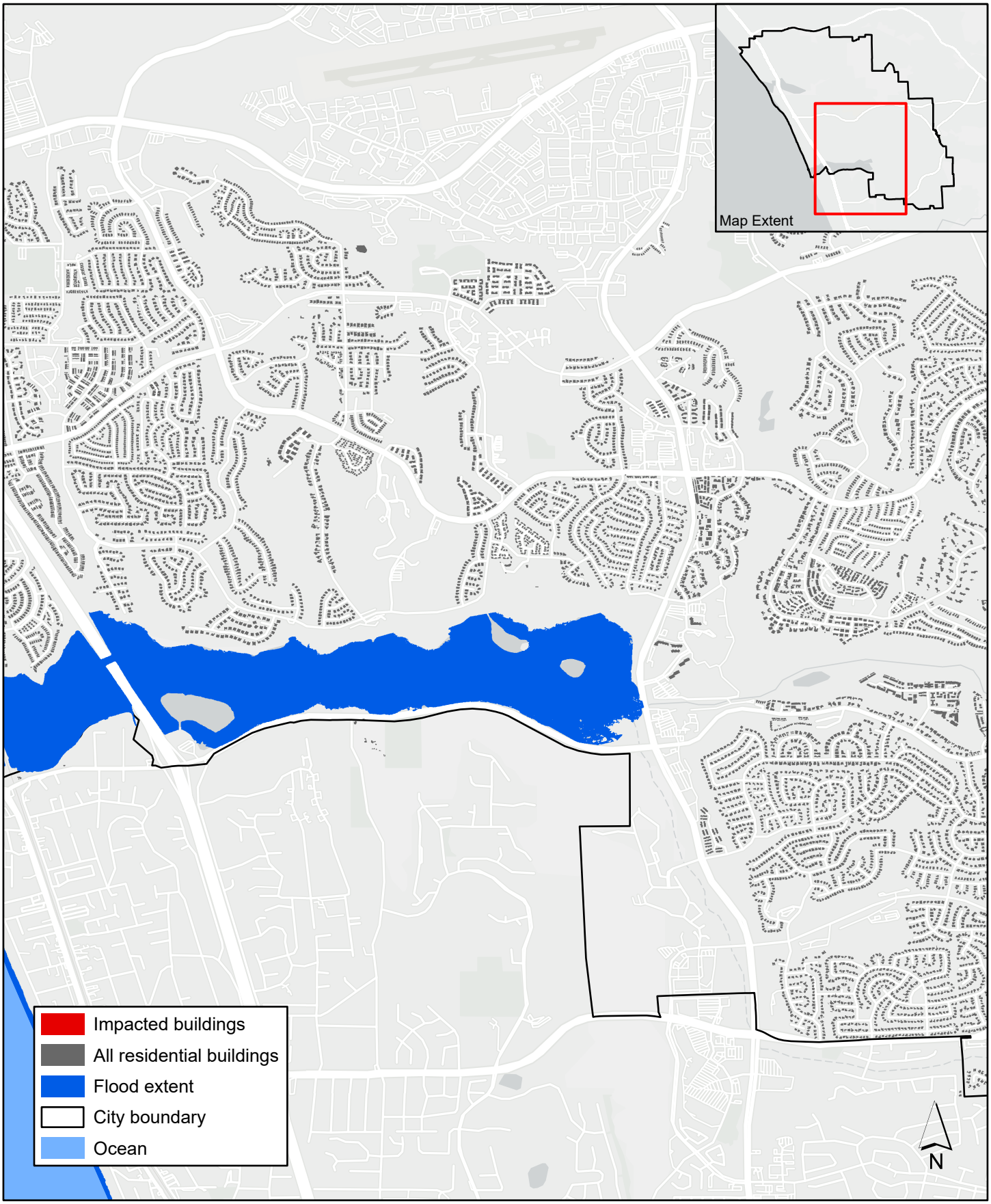
Carlsbad Area 2

Sea Level Rise 1.0 m - No storm



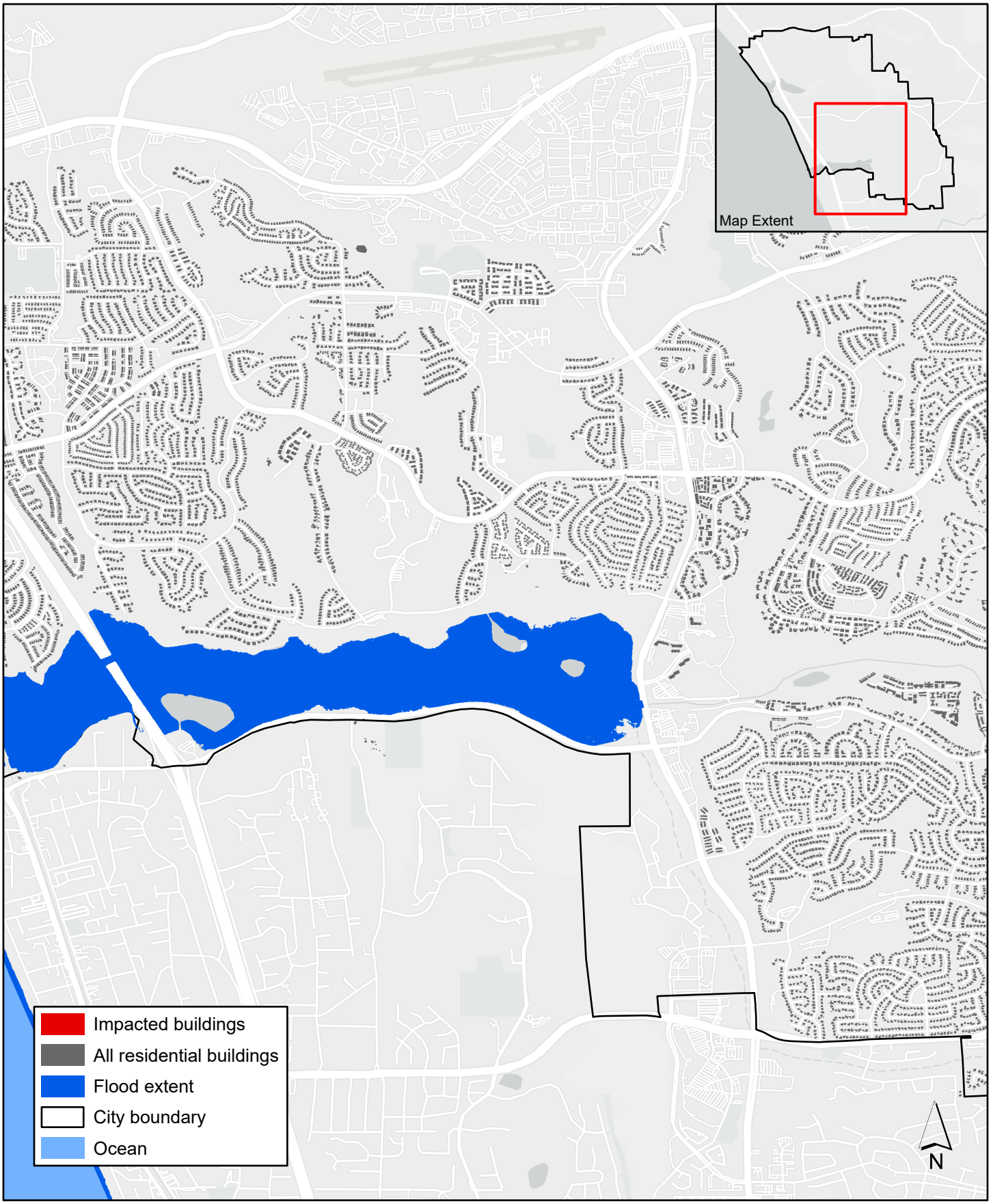
Carlsbad Area 2

Sea Level Rise 1.0 m - 001 year storm



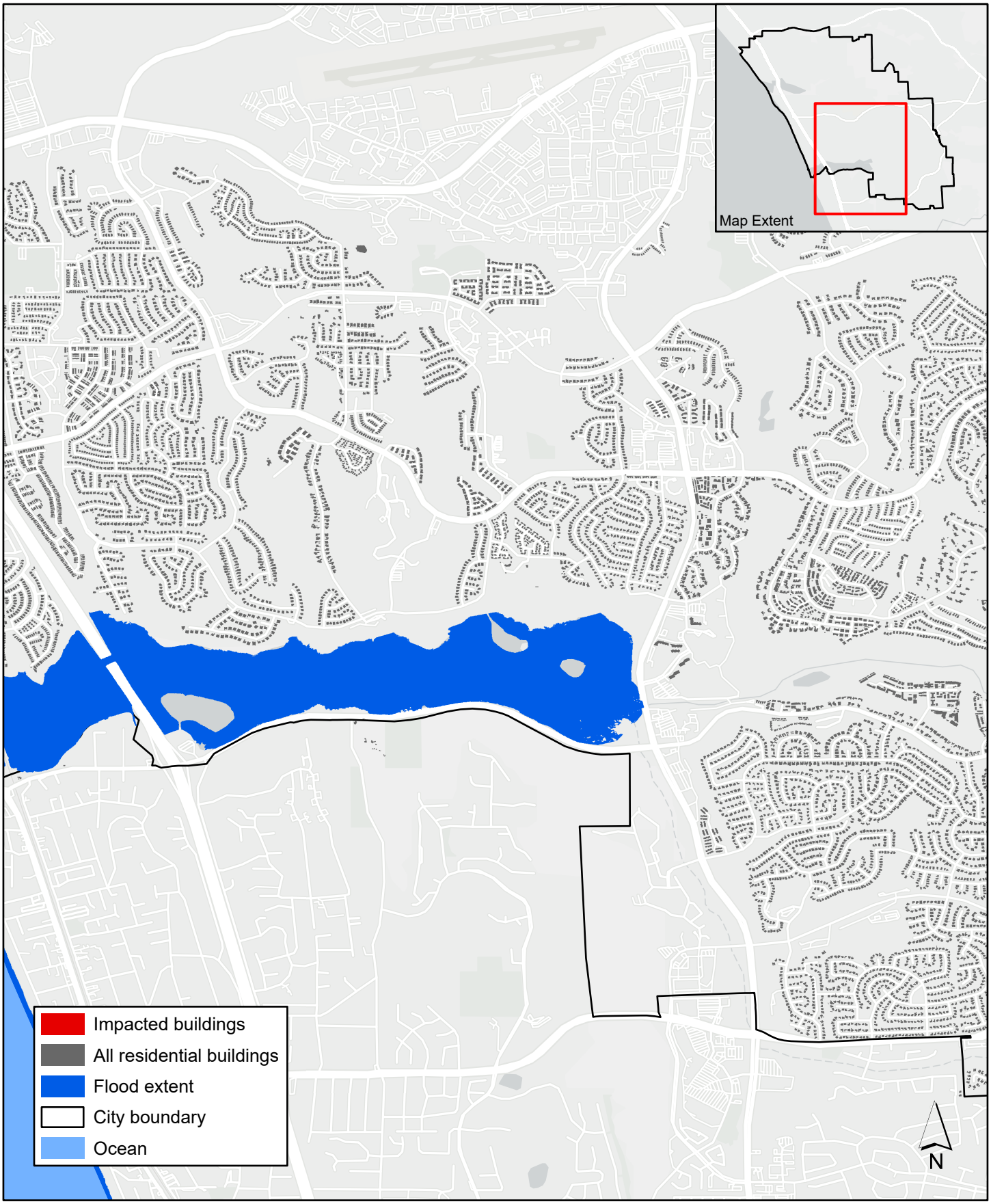
Carlsbad Area 2

Sea Level Rise 1.0 m - 020 year storm



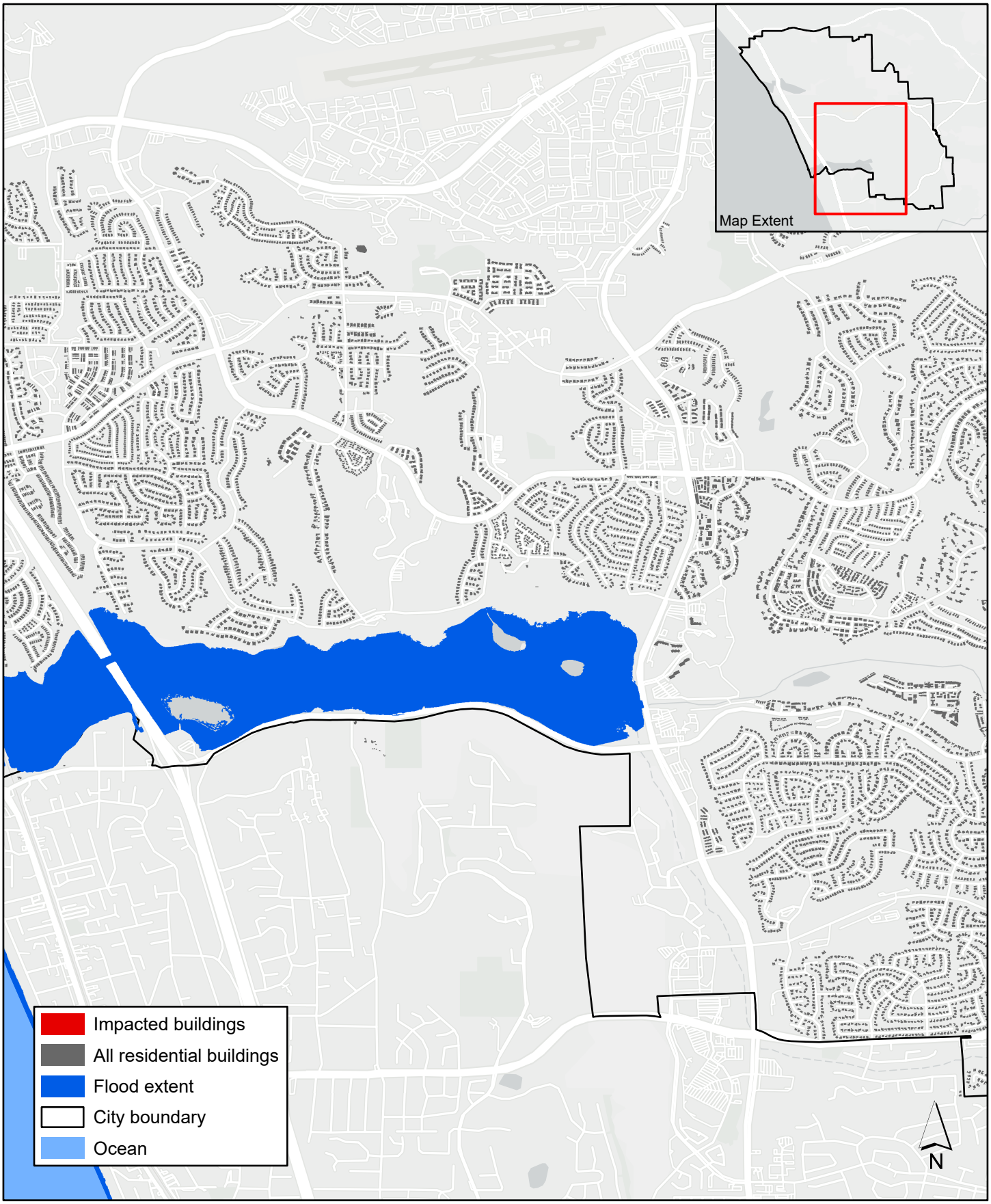
Carlsbad Area 2

Sea Level Rise 1.0 m - 100 year storm



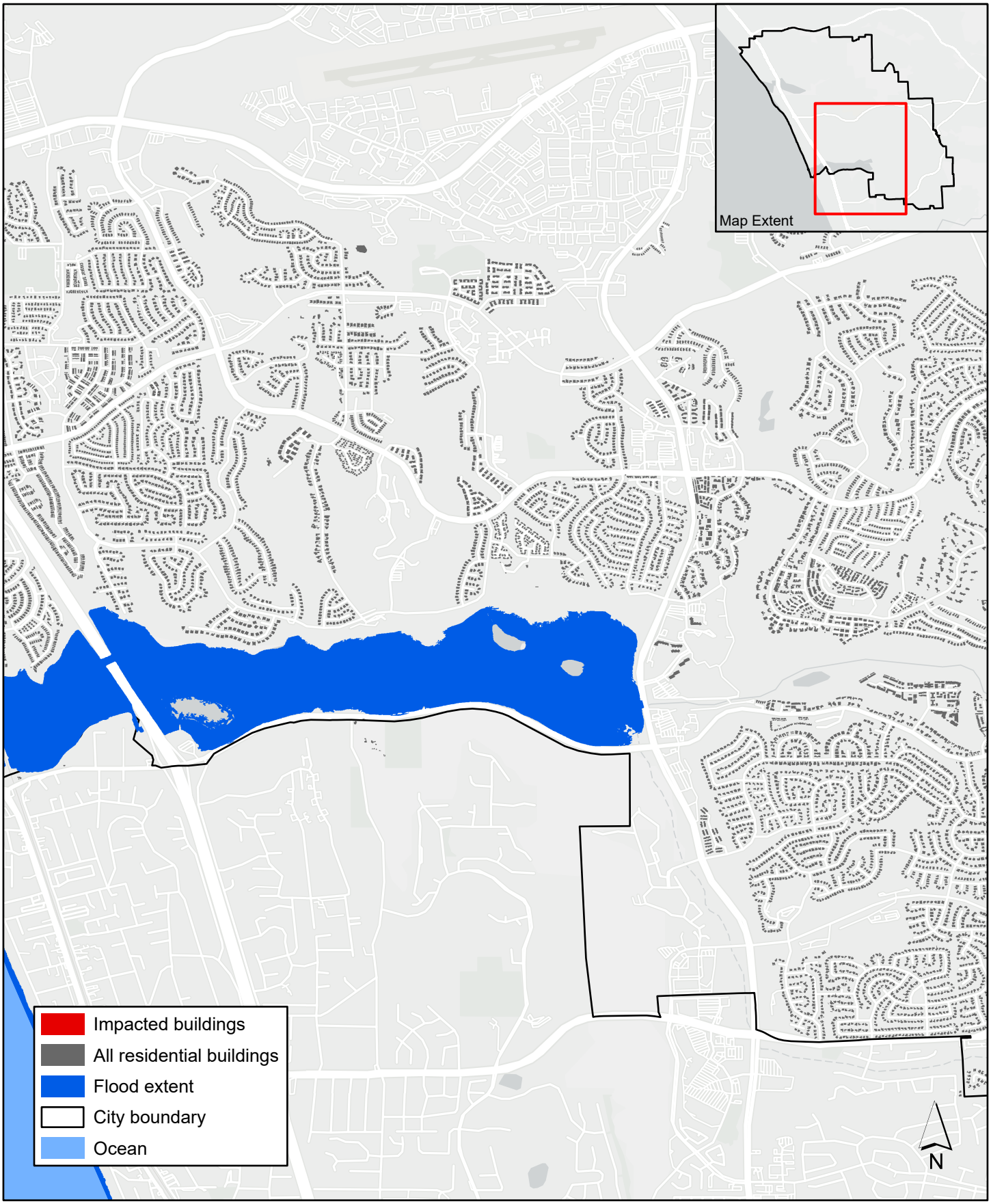
Carlsbad Area 2

Sea Level Rise 1.5 m - No storm



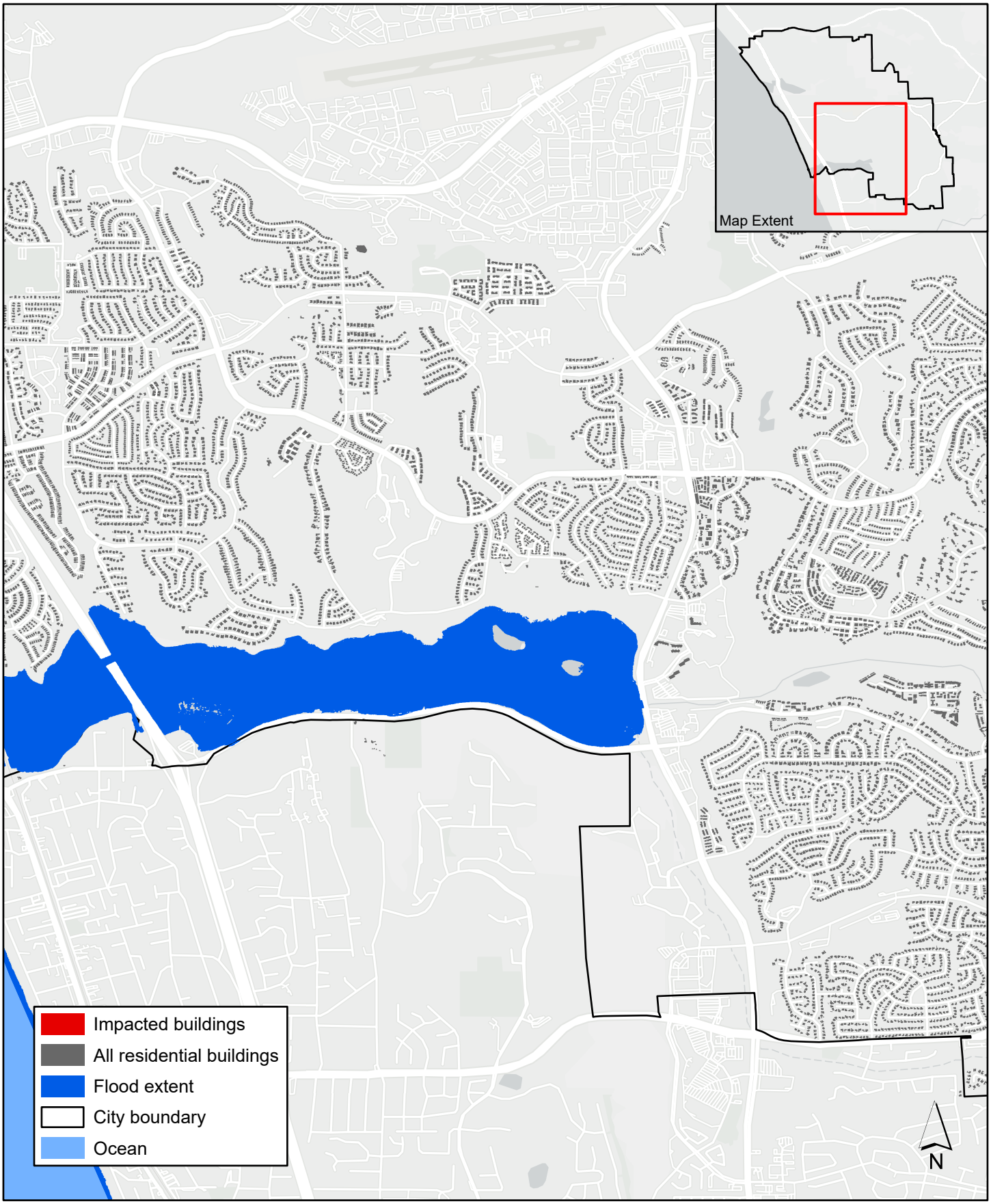
Carlsbad Area 2

Sea Level Rise 1.5 m - 001 year storm



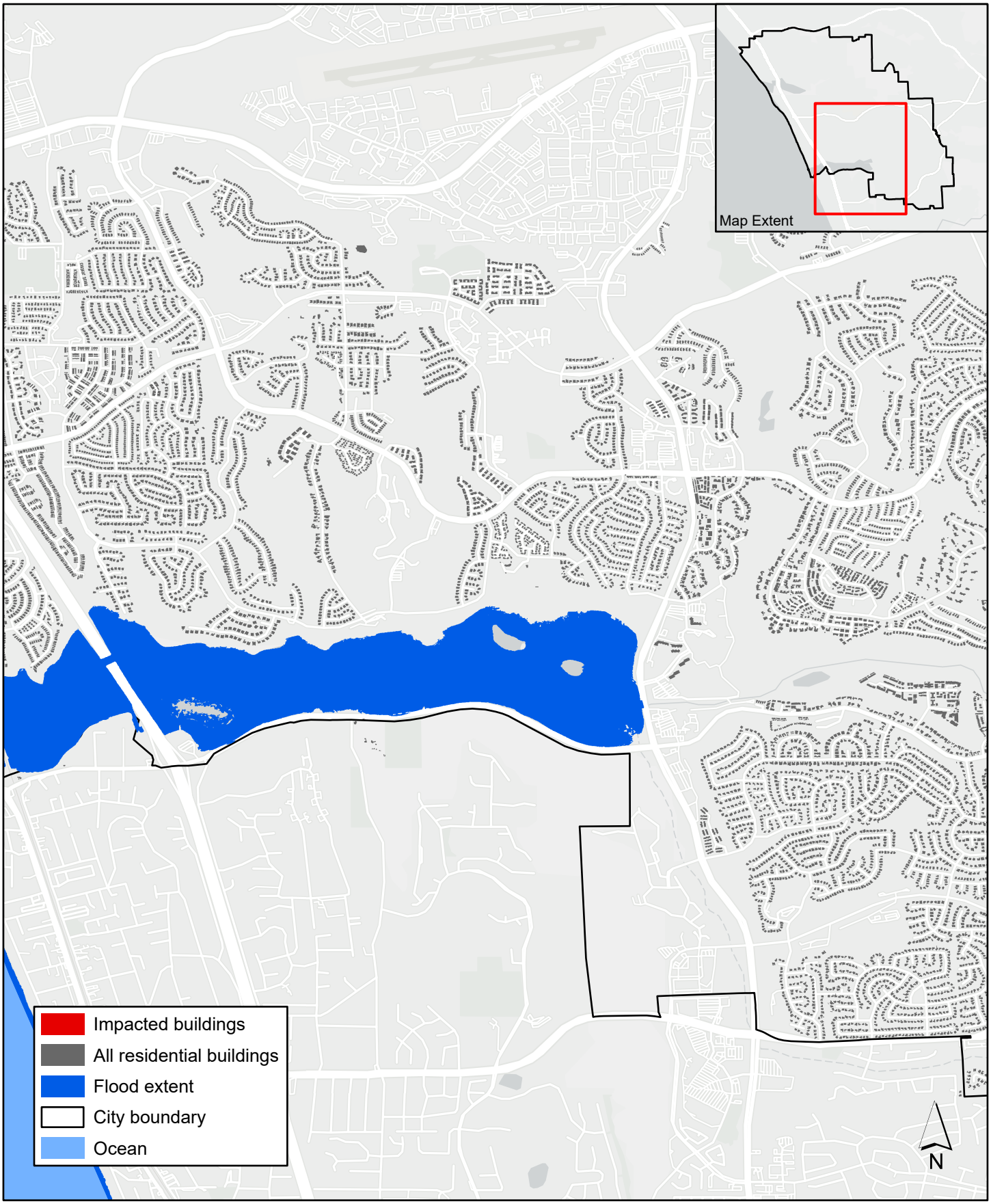
Carlsbad Area 2

Sea Level Rise 1.5 m - 020 year storm



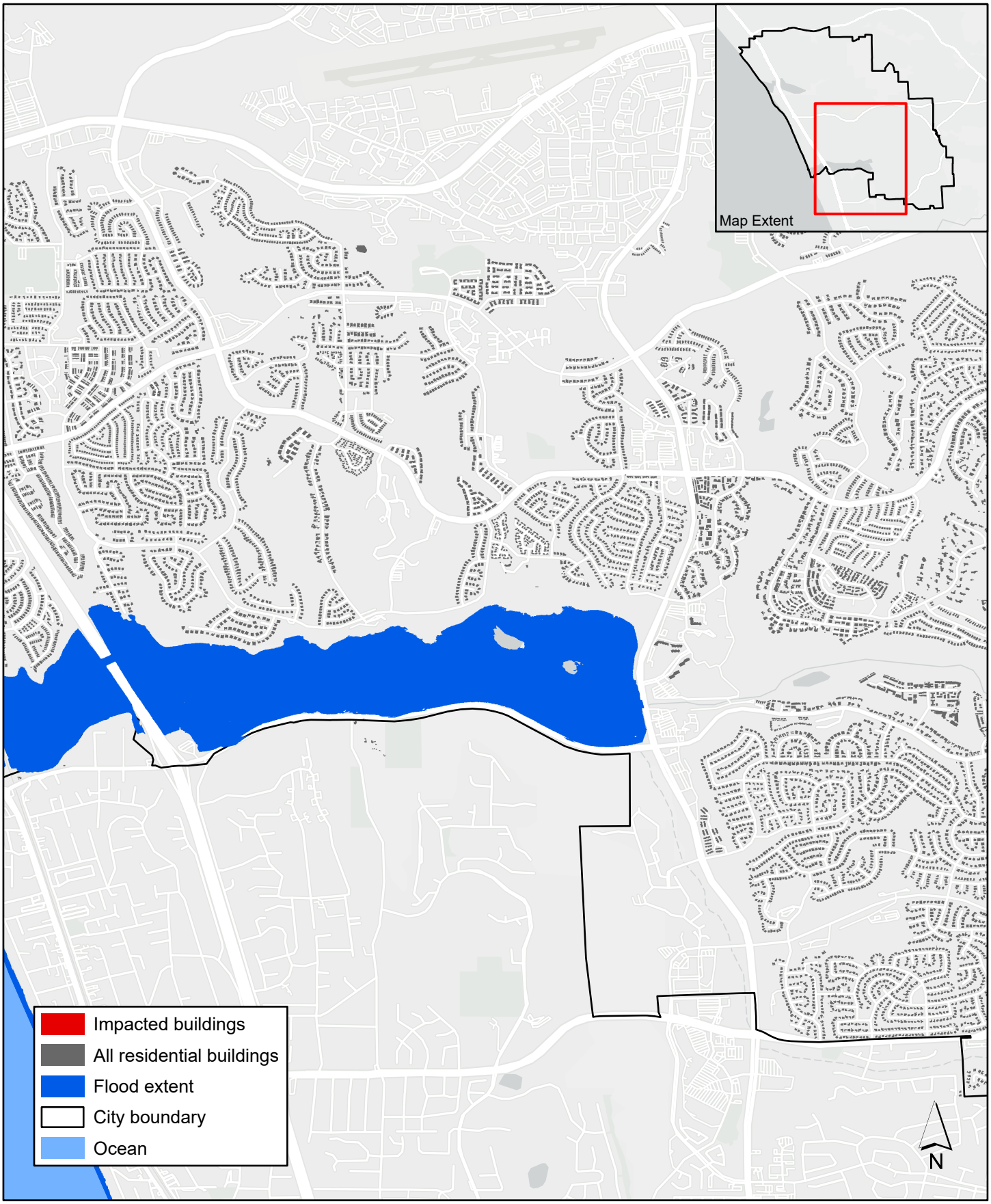
Carlsbad Area 2

Sea Level Rise 1.5 m - 100 year storm



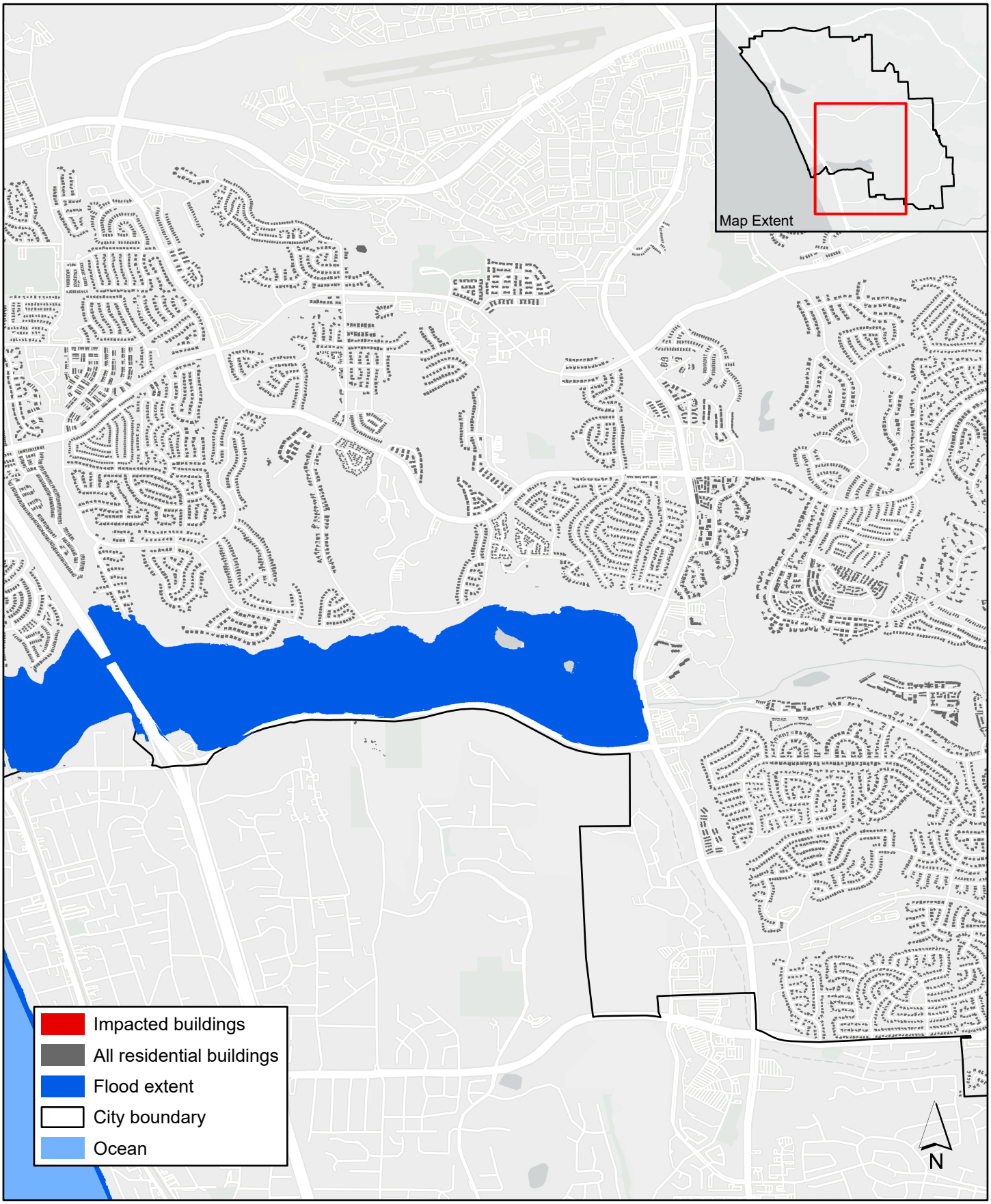
Carlsbad Area 2

Sea Level Rise 2.0 m - No storm



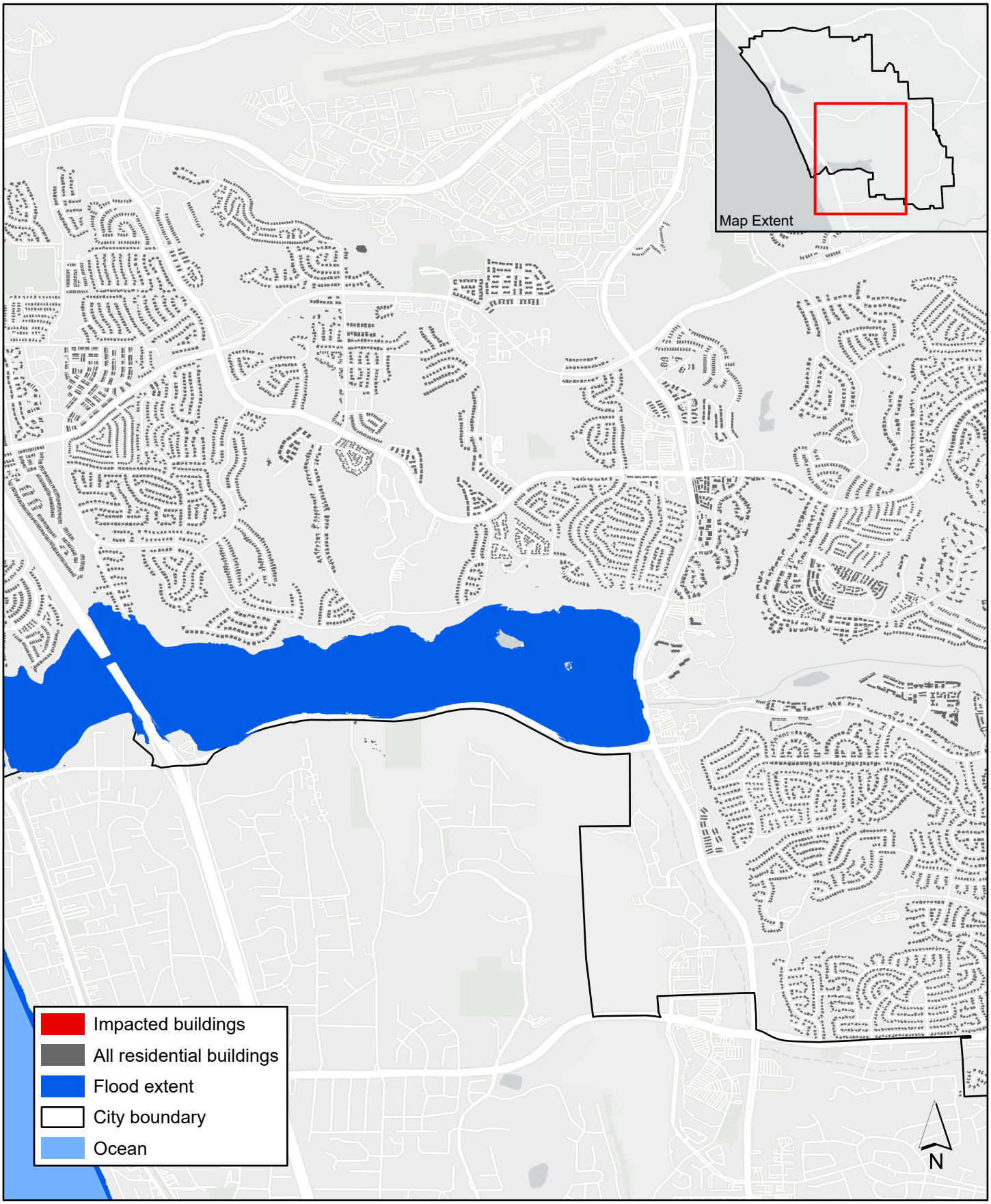
Carlsbad Area 2

Sea Level Rise 2.0 m - 001 year storm



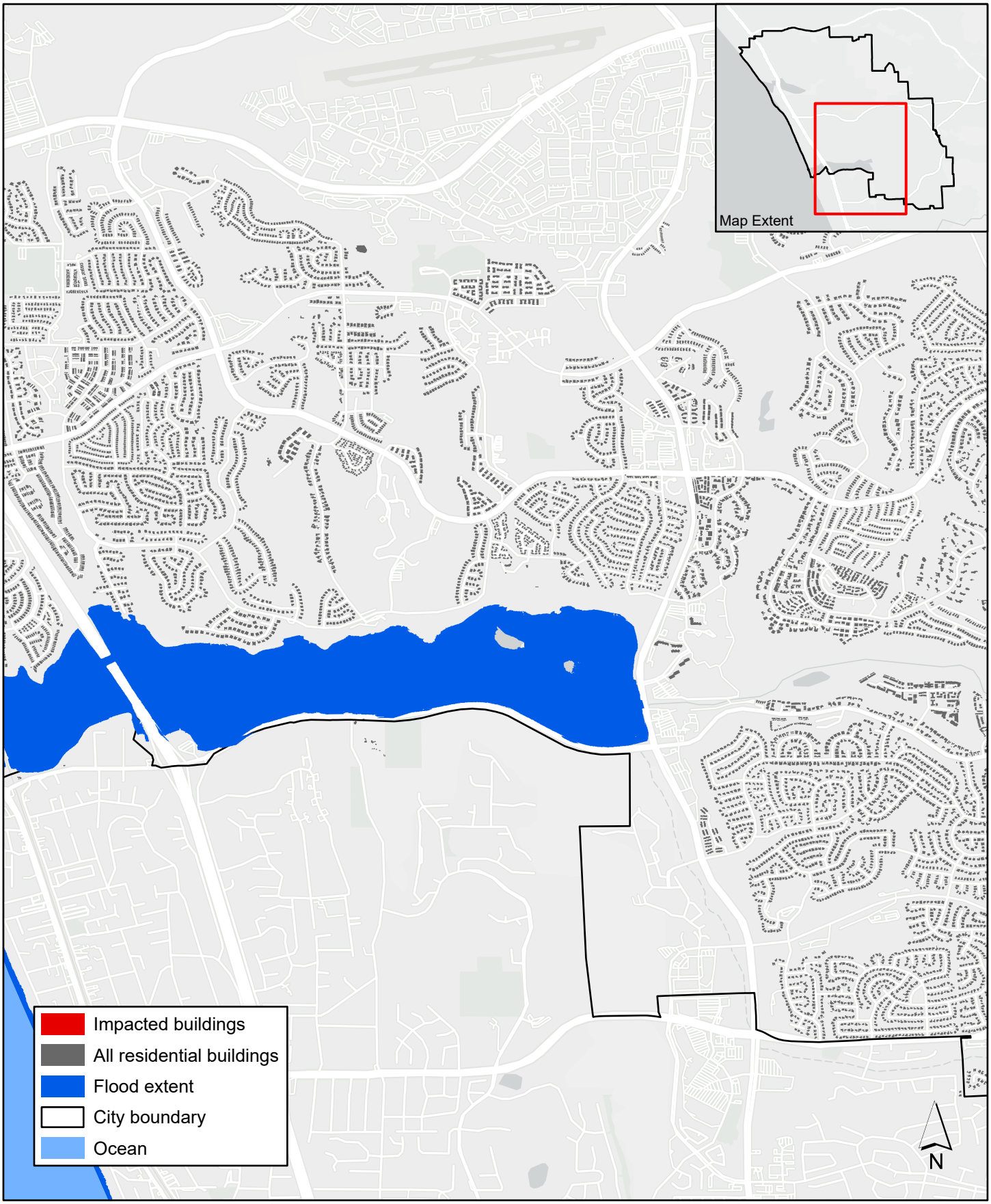
Carlsbad Area 2

Sea Level Rise 2.0 m - 020 year storm



Carlsbad Area 2

Sea Level Rise 2.0 m - 100 year storm



US Army Corps
of Engineers
Baltimore District

March 2019

REGIONAL SEDIMENT MANAGEMENT

Section 204(e) of the Water Resources Development Act of 1992, as amended

Authority and Scope: Subsection (e) of Section 204 of Water Resources Development Act (WRDA) of 1992, as amended by Section 2037 of the WRDA 2007, provides that the Secretary of the Army may cooperate with any State in the preparation of a comprehensive State or regional sediment management plan within the boundaries of the State, encourage State participation in the implementation of the plan, and submit to Congress reports and recommendations with respect to federal participation in carrying out the plan.

The Corps' role is to participate in the regional sediment management study in a coordination and collaboration role. Priority will be given to studies that leverage Section 204 funds with other federal and non-federal funds to accomplish broad systemic regional sediment management goals.

This authority can also be used to develop plans for transportation and placement of sediment obtained through construction, operation or maintenance of an authorized federal project, to reduce storm damages to property and to protect, restore, and create aquatic and ecologically related habitats, including wetlands

The Process: A Section 204 regional sediment management planning project consists of collaboration and cooperation in the development of a regional sediment plan. There are no phases as in other CAP projects, and no agreements need to be signed.

Corps assistance can include participation in team meetings, performing analyses to assist in plan development, or other tasks as determined in the planning process.

Section 204 authority limits Federal cost for preparation of comprehensive regional sediment management plans to $5 million Federal per fiscal year for the Nation.

How to Request Assistance: If you are a regional entity conducting a Regional Sediment Management Study, and are interested in Corps assistance, please contact the Baltimore District at the phone number or e-mail below. The Continuing Authorities Program Manager will be happy to assist you and can discuss the desired level of involvement. Upon receipt of a letter of request from a non-Federal project sponsor the Corps of Engineers can initiate the study and request funds to support the effort. Funds are limited.

For Further Information, Contact:

Mr. Anthony Clark
Continuing Authorities Program Manager
Planning Division
anthony.a.clark@usace.army.mil
(410) 962-3413

SAMPLE LETTER OF REQUEST
FOR A
SECTION 204(e) STUDY

John T. Litz, PMP
Colonel, U.S. Army
Commander and District Engineer
U.S. Army Engineer District, Baltimore
2 Hopkins Plaza
Baltimore, Maryland 21201

ATTN: Planning Branch

Dear COL Litz:

This letter is to request the assistance of the U.S. Army Corps of Engineers under Subsection (e) of Section 204 of Water Resources Development Act of 1992, as amended. To participate in a regional sediment management study for *[region or state]*.

[Briefly describe the nature and severity of the problem, any issues that could affect the study, and the desired scope of Corps involvement, if known.]

We understand that funds are limited available, but that there is no requirement for non-Federal funds.

Please contact *[name, address, telephone]* for further information.

[Name and Title of public official authorized to request the study]

Regional Beach Sand Project III (RBSPIII) Feasibility Study & Economic Analysis Scope of Work

INTRODUCTION:

SANDAG is the Metropolitan Planning Organization (MPO) for the San Diego region and plays a key role in the regional coordination of a variety of projects. The San Diego region has 19 jurisdictions, 10 of which are located in the coastal zone and collectively manage approximately 70 miles of coastline which can be accessed via transit, highways, roadways, and bicycle and pedestrian facilities. A number of these facilities are at risk from the impacts of rising seas, high tides, and strong storms. As such, access to beaches, residences, and public facilities may be impacted. This would be particularly impactful to disadvantaged populations living in the cities of Oceanside, Carlsbad, City of San Diego, National City, Chula Vista, and Imperial Beach which have populations that fall in the 70-100 percentile of the demographic index (source: EJSCREEN).

SANDAG proposes to conduct a feasibility study for a regional beach sand nourishment project which would use information from SANDAG's Round 1 SB 1 Caltrans Adaptation Planning Grant effort to identify transportation facilities that will be impacted by sea-level rise and may benefit from beach nourishment. Implementation of a regional beach sand project would involve dredging beach quality sand from offshore borrow sites and placing it on highly eroded beaches in the San Diego region. Beach nourishment is being considered as a sea-level rise adaptation strategy by a number of cities in the San Diego region who have updated their Local Coastal Programs to align with the California Coastal Commission's Guidance on sea-level rise. Wide beaches can help protect coastal communities and coastal transportation facilities by acting as a buffer to alleviate some of the impacts from sea-level rise, strong storm events, and high tides. SANDAG has previously completed two regional beach sand nourishment projects in 2001 and 2012 (RBSP I and RBSP II, respectively), adding approximately 3.5 million cubic yards of sand to the region's local beaches. In addition, SANDAG has an established regional forum (the Shoreline Preservation Working Group) where elected officials are engaged in regional adaptation projects, such as beach nourishment.

SANDAG will coordinate closely with city staff, city council members who serve on SANDAG's Shoreline Preservation Working Group (SPWG), and other technical advisors on this project. Work efforts from this project will be summarized in two final deliverables: the feasibility study and the off-shore borrow site survey plan.

RESPONSIBLE PARTIES

SANDAG will require the assistance of a consulting team to complete this work. SANDAG has not yet selected which firm will provide this assistance, but will utilize the agency's list of on-call consultants, selected through the established procurement procedures, to find the appropriate firm(s) to perform this work. Generally, SANDAG will be responsible for overall project management and administration and will play a role in coordinating with local jurisdictions as well as drafting and editing the feasibility study. The consultant will be responsible for the majority of other tasks including the review of existing monitoring data, completing the offshore borrow site survey plan, completing the economic analysis, and finalizing the feasibility study.

Exhibit A – Scope of Work

OVERALL PROJECT OBJECTIVES:

- Identify beach erosion areas in the San Diego region that may impact coastal transportation infrastructure through review of existing data and coordination with coastal jurisdiction staff.
- Evaluate the economic costs and benefits of implementing a regional beach nourishment project and several alternatives to that project that may include one pilot sand retention strategy.
- Complete a feasibility study for a future regional beach nourishment project and alternatives.
- Create a plan for surveying offshore sand borrow sites to ensure adequate quantities of sand are available to nourish the San Diego region's beaches.

1. Project Management and Administration

- SANDAG will hold a kick-off meeting to discuss procedures and project expectations, including invoicing, quarterly reporting, and other relevant project information. Meeting summary will be documented.
- Utilize an existing on-call agreement to select consultants using the proper procurement procedures.
- SANDAG will hold a kick-off meeting with the consultants to review the scope of work, timeline, communication protocols, and other relevant project information. Meeting summary will be documented.
- Coordinate with the consultants through regular communication (including in-person meetings and/or conference calls) to ensure project remains on time and within budget. Meeting notes will be documented.
- Consultant will invoice SANDAG and provide a brief summary of work efforts on a monthly basis.

Task 1 Deliverables

- Meeting Notes and Summaries
- Subcontractor Agreements
- Invoice Packages and Quarterly Reports

2. Economic Analysis

- Using actual costs from RBSP II, the economic analysis conducted for the 2007 feasibility study (for RBSP II), as a template, the consultant will prepare an economic analysis that will include the following components: preliminary cost estimates of a range of project alternatives that may include one pilot sand retention strategy, a benefit/cost analysis of the project alternatives, and a discussion of economic impacts. This economic analysis will be summarized in the feasibility study and included as an appendix to the final document.

Task 2 Deliverables

- Economic Analysis Technical Appendix

3. Regional Beach Sand Replenishment Project (RBSP III) Feasibility Study

- Using information obtained from Tasks 2, consultant will draft a feasibility study for a future regional beach sand project (RBSPIII). The 2007 feasibility study that was prepared for RBSP II will be used as a template and the updated feasibility study will address the same major topics including, but not limited to: a statement of the problem, a description of existing site conditions, consideration of project alternatives, methods to reduce costs and leverage other efforts in southern California, and economic considerations.

- The feasibility study will also include an explanation of how beach nourishment can be used to protect coastal critical infrastructure in the region from seal level rise. .
- Finally, the feasibility study will identify the various permits and approvals that would be needed for the implementation of this project. Recommendations for streamline permitting will also be included, with emphasis on replicating work done previously, and applying lessons-learned from RBSP I and II, and from other projects in southern California. The consultant should seek ways to leverage opportunities arising from the San Diego Coastal Storm Damage Reduction Project, the Army Corps new west coast dredge and any other southern California beach nourishment project.
- A meeting will be scheduled with interested stakeholders (city staff, members of the SPWG, members of the public) to review the draft feasibility study and solicit feedback. SANDAG will likely use a scheduled SPWG meeting as the forum for this discussion. Comments from stakeholders may also be submitted in writing and revisions to the feasibility study will be made as needed.
- Consultant will incorporate comments from SANDAG staff and interested stakeholders into a final version of the feasibility study.

Task 3 Deliverables

- Draft Feasibility Study
- Host meetings to discuss draft Feasibility Study
- Finalize Feasibility Study

4. Off-Shore Borrow Site

- Conduct a literature review of offshore investigations completed for Regional Beach Sand Projects I and II (RBSP I and RBSP II) to identify any additional candidate borrow sites in the northern portion of San Diego County that could be utilized to implement a future beach nourishment project.
- Prepare a plan and scope of work to conduct an investigation of a minimum of three offshore borrow sites to determine the outer boundaries of the two offshore borrow sites used for RBSP II (MB-1 and SO-5) and at least one new borrow site in the northern portion of San Diego County. Once completed, these surveys will help to estimate the quantity of sand available for beach nourishment on the San Diego coastline.

Task 4 Deliverable

- Perform Off-Shore Borrow Site existing data review
- Prepare Off-Shore Borrow Site Plan and Scope of Work for Three Sites

Exhibit B – Budget Schedule

Regional Beach Sand Project III (RBSPIII) Feasibility Study & Economic Analysis					
Task Name		Description	Budget	State Date	End Date
1	**Project Management and Administration**	SANDAG to monitor Project Management and Administration	$10,000.00		
2	**Economic Analysis**	Subconsultant to prepare an updated Economic Analysis	$50,000.00		
3	**Regional Beach Sand Replenishment Project (RBSP III) Feasibility Study**	Draft RBSP III Feasibility Study, Review, and Finalize	$100,000.00		
4	**Off-shore Borrow Site**	Subconsultant will prepare an Offshore Borrow Site Plan and Scope of Work for Three Sites	$40,000.00		
		Total	**$200,000**	**NTP**	

Exhibit C – Project Schedule

Regional Beach Sand Project III (RBSPIII) Feasibility Study & Economic Analysis				
Task Name		Description	State Date	End Date
1	**Project Management and Administration**	SANDAG to monitor Project Management and Administration	NTP	
2	**Economic Analysis**	Subconsultant to prepare an updated Economic Analysis	NTP	
3	**Regional Beach Sand Replenishment Project (RBSP III) Feasibility Study**	Draft RBSP III Feasibility Study, Review, and Finalize	NTP	
4	**Off-shore Borrow Site**	Subconsultant will prepare an Offshore Borrow Site Plan and Scope of Work for Three Sites	NTP	

WALLA WALLA COST ENGINEERING MANDATORY CENTER OF EXPERTISE

COST AGENCY TECHNICAL REVIEW

CERTIFICATION STATEMENT

For Project No. 104713

SPL – San Clemente Beach
Initial & Periodic Nourishments

The San Clemente Beach Nourishment project, as presented by Los Angeles District, has undergone a successful cost update and Cost Agency Technical Review (Cost ATR), performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of May 21, 2021, the Cost MCX certifies the estimated total project cost:

<u>INITIAL</u>	
FY23 Project First Cost INITIAL:	$15,019,000 (excluding spent costs)
SPENT:	$ 1,218,000
Total Project First Cost:	$16,237,000
FULLY FUNDED w/ SPENT:	$16,237,000

<u>PERIODIC – 8 Renourishments</u>	
FY23 Project First Cost (2027-69):	$114,313,000
SPENT:	$ -0-
FULLY FUNDED w/ SPENT:	$239,598,000

Cost Certification assumes Efficient Implementation (Funding). It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management through the period of Federal participation.

Michael P Jacobs, PE, CCE
Chief, Cost Engineering MCX
Walla Walla District

****** TOTAL PROJECT COST SUMMARY ******

PROJECT: San Clemente Beach Nourishment
PROJECT No: P2 104713
LOCATION: Orange County, California

DISTRICT: Los Angeles District (SPL)
POC: Juan Dominguez, Cost Engineering

PREPARED: May 13, 2021

INITIAL BEACH NOURISHMENT

This Estimate reflects the scope and schedule in: Estimate based on Chief's Report for FY23 Budget Submittal

WBS STRUCTURE		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
						Program Year (Budget EC): 2023									
						Effective Price Level Date: 1 Oct 2022									
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Spent Thru: 1 Oct 2019 ($K)	TOTAL FIRST COST ($K)	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*				*M*	*N*	*O*
	INITIAL BEACH NOURISHMENT														
17	BEACH REPLENISHMENT - Mob/Demob	1,667	600	36%	2,267	4.8%	1,747	629	2,376		2,376		1,747	629	2,376
17	BEACH REPLENISHMENT - Dredging Cost	5,489	1,976	36%	7,465	4.8%	5,753	2,071	7,824		7,824		5,753	2,071	7,824
	CONSTRUCTION ESTIMATE TOTALS:	7,156	2,576		9,732		7,500	2,700	10,200		10,200		7,500	2,700	10,200
01	LANDS AND DAMAGES	71	18	25%	89	5.6%	75	19	94		94	0.3%	75	19	94
30	PLANNING, ENGINEERING & DESIGN	2,808	1,011	36%	3,819	5.1%	2,950	1,060	4,010	1,218	5,228		2,950	1,060	5,228
31	CONSTRUCTION MANAGEMENT	501	180	36%	681	5.0%	526	189	715		715		526	189	715
	PROJECT COST TOTALS:	10,536	3,785	36%	**14,321**		11,051	3,968	**15,019**	1,218	**16,237**	0.0%	11,051	3,968	**16,237**

_____ CHIEF, A-E MANAGEMENT, COST AND VALUE ENGINEERING, Mark Cooke, P.E.

ESTIMATED TOTAL PROJECT COST: 16,237

_____ PROJECT MANAGEMENT, Susan M. Ming, P.E.

_____ CHIEF, REAL ESTATE, Cheryl Connett

_____ CHIEF, ENGINEERING, Vangil C. Crisostomo, P.E.

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: San Clemente Beach Nourishment
LOCATION: Orange County, California

DISTRICT: Los Angeles District (SPL)
POC: Juan Dominguez, Cost Engineering

PREPARED: May 13, 2021

Estimate based on Chief's Report for FY23 Budget Submittal

WBS STRUCTURE		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)					
		Mii Estimate Prepared:		12 May 2021		Program Year (Budget EC):			2023						
		Effective Price Level:		1 Oct 2020		Effective Price Level Date:			1 Oct 2022						
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)	
	INITIAL BEACH NOURISHMENT - CYCLE No. 1														
17	BEACH REPLENISHMENT - Mob/Demob	1,667	600	36%	2,267	4.8%	1,747	629	2,376	2021Q4		1,747	629	2,376	
17	BEACH REPLENISHMENT - Dredging Cost	5,489	1,976	**36%**	7,465	4.8%	5,753	2,071	7,824	2021Q4		5,753	2,071	7,824	
	CONSTRUCTION ESTIMATE TOTALS:	7,156	2,576	36%	9,732		7,500	2,700	10,200			7,500	2,700	10,200	
01	LANDS AND DAMAGES	71	18	**25%**	89	5.5%	75	19	94	2021Q1		75	19	94	
30	PLANNING, ENGINEERING & DESIGN														
1.0%	Project Management	72	26	36%	98	4.9%	76	27	103	2021Q1		76	27	103	
1.0%	Planning & Environmental Compliance	72	26	36%	98	4.9%	76	27	103	2021Q1		76	27	103	
6.0%	Engineering & Design	429	154	36%	583	4.9%	450	162	612	2021Q1		450	162	612	
1.0%	Reviews, ATRs, IEPRs, VE	72	26	36%	98	4.9%	76	27	103	2021Q1		76	27	103	
1.0%	Life Cycle Updates (cost, schedule, risks)	72	26	36%	98	4.9%	76	27	103	2021Q1		76	27	103	
1.0%	Contracting & ReprographicsContracting	72	26	36%	98	4.9%	76	27	103	2021Q1		76	27	103	
1.0%	Engineering During Construction	72	26	36%	98	4.9%	76	27	103	2021Q4		76	27	103	
1.0%	Real Estate and Planning During Construction	72	26	36%	98	4.9%	76	27	103	2021Q4		76	27	103	
12.3%	***Adaptive Mgmt & Environmental Monitoring***	882	318	36%	1,200	4.9%	926	334	1,260	2021Q2		926	334	1,260	
13.9%	***Physical Monitoring***	993	357	36%	1,350	4.9%	1,042	375	1,417	2021Q2		1,042	375	1,417	
	Project Operation			36%											
39.2%															
31	CONSTRUCTION MANAGEMENT														
7.0%	Construction Management	501	180	36%	681	4.9%	526	189	715	2021Q4		526	189	715	
	Project Operation:			36%											
	Project Management			36%											
	CONTRACT COST TOTALS:	10,536	3,785		14,321		11,051	3,968	15,019			11,051	3,968	**15,019**	
COST SPLIT															
65.0%	**FEDERAL COST TOTALS:**				6,768				7,095					9,762	
35.0%	**NON-FEDERAL COSTS TOTALS:**				7,552				7,924					5,257	

****** TOTAL PROJECT COST SUMMARY ******

PROJECT: San Clemente Beach Nourishment
PROJECT No: P2 104713
LOCATION: Orange County, California

DISTRICT: Los Angeles District (SPL)
POC: Juan Dominguez, Cost Engineering

PREPARED: May 13, 2021

SUBSEQUENT BEACH NOURISHMENTS

This Estimate reflects the scope and schedule in: Estimate based on Chief's Report for FY23 Budget Submittal

WBS STRUCTURE		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
						Program Year (Budget EC): 2023									
						Effective Price Level Date: 1 Oct 2022									
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Spent Thru: 1 Oct 2019 ($K)	TOTAL FIRST COST ($K)	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*				*M*	*N*	*O*
	SUBSEQUENT BEACH NOURISHMENTS														
17	BEACH REPLENISHMENT - Mob/Demob	13,336	4,800	36%	18,136	4.8%	13,976	5,032	19,008		19,008	116.3%	30,229	10,884	41,113
17	BEACH REPLENISHMENT - Dredging Cost	40,290	14,504	36%	54,794	4.8%	42,228	15,201	57,429		57,429	103.0%	85,706	30,851	116,557
	CONSTRUCTION ESTIMATE TOTALS:	53,626	19,304		72,930		56,204	20,233	76,437		76,437	106.3%	115,935	41,735	157,670
01	LANDS AND DAMAGES	568	142	25%	710	5.6%	600	150	750		750	382.9%	2,897	724	3,621
30	PLANNING, ENGINEERING & DESIGN	21,988	7,919	36%	29,907	5.1%	23,099	8,307	31,406		31,406	109.9%	48,482	17,451	65,933
31	CONSTRUCTION MANAGEMENT	4,008	1,440	36%	5,448	5.0%	4,208	1,512	5,720		5,720	116.3%	9,103	3,271	12,374
	PROJECT COST TOTALS:	80,190	28,805	36%	**108,995**		84,111	30,202	**114,313**		**114,313**	109.6%	176,417	63,181	**239,598**

CHIEF, A-E MANAGEMENT, COST AND VALUE ENGINEERING, Mark Cooke, P.E.

ESTIMATED TOTAL PROJECT COST: 239,598

PROJECT MANAGEMENT, Susan M. Ming, P.E.

CHIEF, REAL ESTATE, Cheryl Connett

CHIEF, ENGINEERING, Vangil C. Crisostomo, P.E.

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: San Clemente Beach Nourishment
LOCATION: Orange County, California

DISTRICT: Los Angeles District (SPL)
POC: Juan Dominguez, Cost Engineering

PREPARED: May 13, 2021

Estimate based on Chief's Report for FY23 Budget Submittal

WBS STRUCTURE		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Mii Estimate Prepared: 12 May 2021 Effective Price Level: 1 Oct 2020				Program Year (Budget EC): 2023 Effective Price Level Date: 1 Oct 2022								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
	BEACH RE-NOURISHMENT - CYCLE No. 2													
17	BEACH REPLENISHMENT - Mob/Demob	1,667	600	36%	2,267	4.8%	1,747	629	2,376	2027Q4	12.5%	1,965	707	2,672
17	BEACH REPLENISHMENT - Dredging Cost	5,489	1,976	36%	7,465	4.8%	5,753	2,071	7,824	2027Q4	12.5%	6,470	2,329	8,799
	CONSTRUCTION ESTIMATE TOTALS:	7,156	2,576	36%	9,732		7,500	2,700	10,200			8,435	3,036	11,471
01	LANDS AND DAMAGES	71	18	25%	89	5.5%	75	19	94	2027Q1	11.1%	83	21	104
30	PLANNING, ENGINEERING & DESIGN													
1.0%	Project Management	72	26	36%	98	4.9%	76	27	103	2027Q1	10.4%	84	30	114
1.0%	Planning & Environmental Compliance	72	26	36%	98	4.9%	76	27	103	2027Q1	10.4%	84	30	114
6.0%	Engineering & Design	429	154	36%	583	4.9%	450	162	612	2027Q1	10.4%	497	179	676
1.0%	Reviews, ATRs, IEPRs, VE	72	26	36%	98	4.9%	76	27	103	2027Q1	10.4%	84	30	114
1.0%	Life Cycle Updates (cost, schedule, risks)	72	26	36%	98	4.9%	76	27	103	2027Q1	10.4%	84	30	114
1.0%	Contracting & ReprographicsContracting	72	26	36%	98	4.9%	76	27	103	2027Q1	10.4%	84	30	114
1.0%	Engineering During Construction	72	26	36%	98	4.9%	76	27	103	2027Q4	12.4%	85	30	115
1.0%	Real Estate and Planning During Construction	72	26	36%	98	4.9%	76	27	103	2027Q4	12.4%	85	30	115
12.3%	***Adaptive Mgmt & Environmental Monitoring***	882	318	36%	1,200	4.9%	926	334	1,260	2027Q2	11.1%	1,028	371	1,399
13.9%	***Physical Monitoring***	993	357	36%	1,350	4.9%	1,042	375	1,417	2027Q2	11.1%	1,157	416	1,573
	Project Operation													
39.2%														
31	CONSTRUCTION MANAGEMENT													
7.0%	Construction Management	501	180	36%	681	4.9%	526	189	715	2027Q4	12.4%	591	213	804
	Project Operation: Project Management													
	CONTRACT COST TOTALS:	10,536	3,785		14,321		11,051	3,968	15,019			12,381	4,446	**16,827**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				5,207				5,458					8,414
50.0%	**NON-FEDERAL COSTS TOTALS:**				9,114				9,561					8,414

Filename: San Clemente TPCS 5.12.21.xlsx
TPCS SUBSEQUENT

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: San Clemente Beach Nourishment
LOCATION: Orange County, California

DISTRICT: Los Angeles District (SPL)
POC: Juan Dominguez, Cost Engineering

PREPARED: May 13, 2021

Estimate based on Chief's Report for FY23 Budget Submittal

WBS STRUCTURE		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Mii Estimate Prepared:		12 May 2021		Program Year (Budget EC):			2023					
		Effective Price Level:		1 Oct 2020		Effective Price Level Date:			1 Oct 2022					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
	BEACH RE-NOURISHMENT - CYCLE No. 3													
17	BEACH REPLENISHMENT - Mob/Demob	1,667	600	36%	2,267	4.8%	1,747	629	2,376	2033Q4	31.4%	2,296	827	3,123
17	BEACH REPLENISHMENT - Dredging Cost	5,489	1,976	36%	7,465	4.8%	5,753	2,071	7,824	2033Q4	31.4%	7,561	2,722	10,283
	CONSTRUCTION ESTIMATE TOTALS:	7,156	2,576	36%	9,732		7,500	2,700	10,200			9,857	3,549	13,406
01	LANDS AND DAMAGES	71	18	25%	89	5.5%	75	19	94	2033Q1	27.9%	96	24	120
30	PLANNING, ENGINEERING & DESIGN													
1.0%	Project Management	72	26	36%	98	4.9%	76	27	103	2033Q1	28.8%	98	35	133
1.0%	Planning & Environmental Compliance	72	26	36%	98	4.9%	76	27	103	2033Q1	28.8%	98	35	133
6.0%	Engineering & Design	429	154	36%	583	4.9%	450	162	612	2033Q1	28.8%	580	209	789
1.0%	Reviews, ATRs, IEPRs, VE	72	26	36%	98	4.9%	76	27	103	2033Q1	28.8%	98	35	133
1.0%	Life Cycle Updates (cost, schedule, risks)	72	26	36%	98	4.9%	76	27	103	2033Q1	28.8%	98	35	133
1.0%	Contracting & ReprographicsContracting	72	26	36%	98	4.9%	76	27	103	2033Q1	28.8%	98	35	133
1.0%	Engineering During Construction	72	26	36%	98	4.9%	76	27	103	2033Q4	31.4%	100	35	135
1.0%	Real Estate and Planning During Construction	72	26	36%	98	4.9%	76	27	103	2033Q4	31.4%	100	35	135
12.3%	***Adaptive Mgmt & Environmental Monitoring***	882	318	36%	1,200	4.9%	926	334	1,260	2033Q2	29.7%	1,201	433	1,634
13.9%	***Physical Monitoring***	993	357	36%	1,350	4.9%	1,042	375	1,417	2033Q2	29.7%	1,351	486	1,837
	Project Operation													
39.2%														
31	CONSTRUCTION MANAGEMENT													
7.0%	Construction Management	501	180	36%	681	4.9%	526	189	715	2033Q4	31.4%	691	248	939
	Project Operation: Project Management													
	CONTRACT COST TOTALS:	10,536	3,785		14,321		11,051	3,968	15,019			14,466	5,194	**19,660**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				5,207				5,458					9,830
50.0%	**NON-FEDERAL COSTS TOTALS:**				9,114				9,561					9,830

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: San Clemente Beach Nourishment
LOCATION: Orange County, California

DISTRICT: Los Angeles District (SPL)
POC: Juan Dominguez, Cost Engineering

PREPARED: May 13, 2021

Estimate based on Chief's Report for FY23 Budget Submittal

WBS STRUCTURE		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Mii Estimate Prepared:		12 May 2021		Program Year (Budget EC):			2023					
		Effective Price Level:		1 Oct 2020		Effective Price Level Date:			1 Oct 2022					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
	BEACH RE-NOURISHMENT - CYCLE No. 4													
17	BEACH REPLENISHMENT - Mob/Demob	1,667	600	36%	2,267	4.8%	1,747	629	2,376	2039Q4	54.7%	2,703	973	3,676
17	BEACH REPLENISHMENT - Dredging Cost	5,489	1,976	36%	7,465	4.8%	5,753	2,071	7,824	2039Q4	54.7%	8,900	3,204	12,104
	CONSTRUCTION ESTIMATE TOTALS:	7,156	2,576	36%	9,732		7,500	2,700	10,200			11,603	4,177	15,780
01	LANDS AND DAMAGES	71	18	25%	89	5.5%	75	19	94	2039Q1	44.6%	108	27	135
30	PLANNING, ENGINEERING & DESIGN													
1.0%	Project Management	72	26	36%	98	4.9%	76	27	103	2039Q1	51.6%	115	41	156
1.0%	Planning & Environmental Compliance	72	26	36%	98	4.9%	76	27	103	2039Q1	51.6%	115	41	156
6.0%	Engineering & Design	429	154	36%	583	4.9%	450	162	612	2039Q1	51.6%	682	246	928
1.0%	Reviews, ATRs, IEPRs, VE	72	26	36%	98	4.9%	76	27	103	2039Q1	51.6%	115	41	156
1.0%	Life Cycle Updates (cost, schedule, risks)	72	26	36%	98	4.9%	76	27	103	2039Q1	51.6%	115	41	156
1.0%	Contracting & ReprographicsContracting	72	26	36%	98	4.9%	76	27	103	2039Q1	51.6%	115	41	156
1.0%	Engineering During Construction	72	26	36%	98	4.9%	76	27	103	2039Q4	54.7%	118	42	160
1.0%	Real Estate and Planning During Construction	72	26	36%	98	4.9%	76	27	103	2039Q4	54.7%	118	42	160
12.3%	***Adaptive Mgmt & Environmental Monitoring***	882	318	36%	1,200	4.9%	926	334	1,260	2039Q2	52.6%	1,413	510	1,923
13.9%	***Physical Monitoring***	993	357	36%	1,350	4.9%	1,042	375	1,417	2039Q2	52.6%	1,590	572	2,162
	Project Operation													
39.2%														
31	CONSTRUCTION MANAGEMENT													
7.0%	Construction Management	501	180	36%	681	4.9%	526	189	715	2039Q4	54.7%	814	292	1,106
	Project Operation: Project Management													
	CONTRACT COST TOTALS:	10,536	3,785		14,321		11,051	3,968	15,019			17,021	6,113	**23,134**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				5,207				5,458					11,567
50.0%	**NON-FEDERAL COSTS TOTALS:**				9,114				9,561					11,567

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: San Clemente Beach Nourishment
LOCATION: Orange County, California

DISTRICT: Los Angeles District (SPL)
POC: Juan Dominguez, Cost Engineering

PREPARED: May 13, 2021

Estimate based on Chief's Report for FY23 Budget Submittal

WBS STRUCTURE		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Mii Estimate Prepared:		12 May 2021		Program Year (Budget EC):			2023					
		Effective Price Level:		1 Oct 2020		Effective Price Level Date:			1 Oct 2022					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
	BEACH RE-NOURISHMENT - CYCLE No. 5													
17	BEACH REPLENISHMENT - Mob/Demob	1,667	600	36%	2,267	4.8%	1,747	629	2,376	2045Q4	83.5%	3,207	1,155	4,362
17	BEACH REPLENISHMENT - Dredging Cost	5,489	1,976	36%	7,465	4.8%	5,753	2,071	7,824	2045Q4	83.5%	10,560	3,801	14,361
	CONSTRUCTION ESTIMATE TOTALS:	7,156	2,576	36%	9,732		7,500	2,700	10,200			13,767	4,956	18,723
01	LANDS AND DAMAGES	71	18	25%	89	5.5%	75	19	94	2045Q1	339.8%	330	82	412
30	PLANNING, ENGINEERING & DESIGN													
1.0%	Project Management	72	26	36%	98	4.9%	76	27	103	2045Q1	79.7%	137	49	186
1.0%	Planning & Environmental Compliance	72	26	36%	98	4.9%	76	27	103	2045Q1	79.7%	137	49	186
6.0%	Engineering & Design	429	154	36%	583	4.9%	450	162	612	2045Q1	79.7%	809	291	1,100
1.0%	Reviews, ATRs, IEPRs, VE	72	26	36%	98	4.9%	76	27	103	2045Q1	79.7%	137	49	186
1.0%	Life Cycle Updates (cost, schedule, risks)	72	26	36%	98	4.9%	76	27	103	2045Q1	79.7%	137	49	186
1.0%	Contracting & ReprographicsContracting	72	26	36%	98	4.9%	76	27	103	2045Q1	79.7%	137	49	186
1.0%	Engineering During Construction	72	26	36%	98	4.9%	76	27	103	2045Q4	83.6%	140	50	190
1.0%	Real Estate and Planning During Construction	72	26	36%	98	4.9%	76	27	103	2045Q4	83.6%	140	50	190
12.3%	***Adaptive Mgmt & Environmental Monitoring***	882	318	36%	1,200	4.9%	926	334	1,260	2045Q2	81.0%	1,676	604	2,280
13.9%	***Physical Monitoring***	993	357	36%	1,350	4.9%	1,042	375	1,417	2045Q2	81.0%	1,886	679	2,565
	Project Operation													
39.2%														
31	CONSTRUCTION MANAGEMENT													
7.0%	Construction Management	501	180	36%	681	4.9%	526	189	715	2045Q4	83.6%	966	347	1,313
	Project Operation: Project Management													
	CONTRACT COST TOTALS:	10,536	3,785		14,321		11,051	3,968	15,019			20,399	7,304	**27,703**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				5,207				5,458					13,852
50.0%	**NON-FEDERAL COSTS TOTALS:**				9,114				9,561					13,852

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: San Clemente Beach Nourishment
LOCATION: Orange County, California

DISTRICT: Los Angeles District (SPL)
POC: Juan Dominguez, Cost Engineering

PREPARED: May 13, 2021

Estimate based on Chief's Report for FY23 Budget Submittal

WBS STRUCTURE		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Mii Estimate Prepared:		**12 May 2021**		Program Year (Budget EC):			2023					
		Effective Price Level:		1 Oct 2020		Effective Price Level Date:			1 Oct 2022					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
	BEACH RE-NOURISHMENT - CYCLE No. 6													
17	BEACH REPLENISHMENT - Mob/Demob	1,667	600	36%	2,267	4.8%	1,747	629	2,376	2051Q4	117.9%	3,807	1,371	5,178
17	BEACH REPLENISHMENT - Dredging Cost	5,489	1,976	36%	7,465	4.8%	5,753	2,071	7,824	2051Q4	117.9%	12,535	4,513	17,048
	CONSTRUCTION ESTIMATE TOTALS:	7,156	2,576	36%	9,732		7,500	2,700	10,200			16,342	5,884	22,226
01	LANDS AND DAMAGES	71	18	25%	89	5.5%	75	19	94	2051Q1	635.1%	551	138	689
30	PLANNING, ENGINEERING & DESIGN													
1.0%	Project Management	72	26	36%	98	4.9%	76	27	103	2051Q1	113.3%	162	58	220
1.0%	Planning & Environmental Compliance	72	26	36%	98	4.9%	76	27	103	2051Q1	113.3%	162	58	220
6.0%	Engineering & Design	429	154	36%	583	4.9%	450	162	612	2051Q1	113.3%	960	346	1,306
1.0%	Reviews, ATRs, IEPRs, VE	72	26	36%	98	4.9%	76	27	103	2051Q1	113.3%	162	58	220
1.0%	Life Cycle Updates (cost, schedule, risks)	72	26	36%	98	4.9%	76	27	103	2051Q1	113.3%	162	58	220
1.0%	Contracting & ReprographicsContracting	72	26	36%	98	4.9%	76	27	103	2051Q1	113.3%	162	58	220
1.0%	Engineering During Construction	72	26	36%	98	4.9%	76	27	103	2051Q4	118.0%	166	59	225
1.0%	Real Estate and Planning During Construction	72	26	36%	98	4.9%	76	27	103	2051Q4	118.0%	166	59	225
12.3%	***Adaptive Mgmt & Environmental Monitoring***	882	318	36%	1,200	4.9%	926	334	1,260	2051Q2	114.8%	1,989	718	2,707
13.9%	***Physical Monitoring***	993	357	36%	1,350	4.9%	1,042	375	1,417	2051Q2	114.8%	2,239	806	3,045
	Project Operation													
39.2%														
31	CONSTRUCTION MANAGEMENT													
7.0%	Construction Management	501	180	36%	681	4.9%	526	189	715	2051Q4	118.0%	1,146	412	1,558
	Project Operation: Project Management													
	CONTRACT COST TOTALS:	10,536	3,785		14,321		11,051	3,968	15,019			24,369	8,712	**33,081**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				5,207				5,458					16,541
50.0%	**NON-FEDERAL COSTS TOTALS:**				9,114				9,561					16,541

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: San Clemente Beach Nourishment
LOCATION: Orange County, California

DISTRICT: Los Angeles District (SPL)
POC: Juan Dominguez, Cost Engineering

PREPARED: May 13, 2021

Estimate based on Chief's Report for FY23 Budget Submittal

WBS STRUCTURE		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Mii Estimate Prepared:		**12 May 2021**		Program Year (Budget EC):			2023					
		Effective Price Level:		1 Oct 2020		Effective Price Level Date:			1 Oct 2022					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
	BEACH RE-NOURISHMENT - CYCLE No. 7													
17	BEACH REPLENISHMENT - Mob/Demob	1,667	600	36%	2,267	4.8%	1,747	629	2,376	2057Q4	158.7%	4,519	1,627	6,146
17	BEACH REPLENISHMENT - Dredging Cost	5,489	1,976	36%	7,465	4.8%	5,753	2,071	7,824	2057Q4	158.7%	14,881	5,357	20,238
	CONSTRUCTION ESTIMATE TOTALS:	7,156	2,576	36%	9,732		7,500	2,700	10,200			19,400	6,984	26,384
01	LANDS AND DAMAGES	71	18	25%	89	5.5%	75	19	94	2057Q1	651.8%	564	141	705
30	PLANNING, ENGINEERING & DESIGN													
1.0%	Project Management	72	26	36%	98	4.9%	76	27	103	2057Q1	153.2%	192	68	260
1.0%	Planning & Environmental Compliance	72	26	36%	98	4.9%	76	27	103	2057Q1	153.2%	192	68	260
6.0%	Engineering & Design	429	154	36%	583	4.9%	450	162	612	2057Q1	153.2%	1,140	410	1,550
1.0%	Reviews, ATRs, IEPRs, VE	72	26	36%	98	4.9%	76	27	103	2057Q1	153.2%	192	68	260
1.0%	Life Cycle Updates (cost, schedule, risks)	72	26	36%	98	4.9%	76	27	103	2057Q1	153.2%	192	68	260
1.0%	Contracting & ReprographicsContracting	72	26	36%	98	4.9%	76	27	103	2057Q1	153.2%	192	68	260
1.0%	Engineering During Construction	72	26	36%	98	4.9%	76	27	103	2057Q4	158.7%	197	70	267
1.0%	Real Estate and Planning During Construction	72	26	36%	98	4.9%	76	27	103	2057Q4	158.7%	197	70	267
12.3%	***Adaptive Mgmt & Environmental Monitoring***	882	318	36%	1,200	4.9%	926	334	1,260	2057Q2	155.0%	2,362	852	3,214
13.9%	***Physical Monitoring***	993	357	36%	1,350	4.9%	1,042	375	1,417	2057Q2	155.0%	2,657	956	3,613
	Project Operation													
39.2%														
31	CONSTRUCTION MANAGEMENT													
7.0%	Construction Management	501	180	36%	681	4.9%	526	189	715	2057Q4	158.7%	1,361	489	1,850
	Project Operation: Project Management													
	CONTRACT COST TOTALS:	10,536	3,785		14,321		11,051	3,968	15,019			28,838	10,312	**39,150**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				5,207				5,458					19,575
50.0%	**NON-FEDERAL COSTS TOTALS:**				9,114				9,561					19,575

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: San Clemente Beach Nourishment
LOCATION: Orange County, California

DISTRICT: Los Angeles District (SPL)
POC: Juan Dominguez, Cost Engineering

PREPARED: May 13, 2021

Estimate based on Chief's Report for FY23 Budget Submittal

WBS STRUCTURE		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Mii Estimate Prepared:		12 May 2021		Program Year (Budget EC):			2023					
		Effective Price Level:		1 Oct 2020		Effective Price Level Date:			1 Oct 2022					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
	BEACH RE-NOURISHMENT - CYCLE No. 8													
17	BEACH REPLENISHMENT - Mob/Demob	1,667	600	36%	2,267	4.8%	1,747	629	2,376	2063Q4	207.1%	5,364	1,931	7,295
17	BEACH REPLENISHMENT - Dredging Cost	5,489	1,976	36%	7,465	4.8%	5,753	2,071	7,824	2063Q4	207.1%	17,665	6,359	24,024
	CONSTRUCTION ESTIMATE TOTALS:	7,156	2,576	36%	9,732		7,500	2,700	10,200			23,029	8,290	31,319
01	LANDS AND DAMAGES	71	18	25%	89	5.5%	75	19	94	2063Q1	668.5%	576	144	720
30	PLANNING, ENGINEERING & DESIGN													
1.0%	Project Management	72	26	36%	98	4.9%	76	27	103	2063Q1	200.6%	228	81	309
1.0%	Planning & Environmental Compliance	72	26	36%	98	4.9%	76	27	103	2063Q1	200.6%	228	81	309
6.0%	Engineering & Design	429	154	36%	583	4.9%	450	162	612	2063Q1	200.6%	1,353	487	1,840
1.0%	Reviews, ATRs, IEPRs, VE	72	26	36%	98	4.9%	76	27	103	2063Q1	200.6%	228	81	309
1.0%	Life Cycle Updates (cost, schedule, risks)	72	26	36%	98	4.9%	76	27	103	2063Q1	200.6%	228	81	309
1.0%	Contracting & ReprographicsContracting	72	26	36%	98	4.9%	76	27	103	2063Q1	200.6%	228	81	309
1.0%	Engineering During Construction	72	26	36%	98	4.9%	76	27	103	2063Q4	207.1%	233	83	316
1.0%	Real Estate and Planning During Construction	72	26	36%	98	4.9%	76	27	103	2063Q4	207.1%	233	83	316
12.3%	***Adaptive Mgmt & Environmental Monitoring***	882	318	36%	1,200	4.9%	926	334	1,260	2063Q2	202.8%	2,804	1,011	3,815
13.9%	***Physical Monitoring***	993	357	36%	1,350	4.9%	1,042	375	1,417	2063Q2	202.8%	3,155	1,135	4,290
	Project Operation													
39.2%														
31	CONSTRUCTION MANAGEMENT													
7.0%	Construction Management	501	180	36%	681	4.9%	526	189	715	2063Q4	207.1%	1,616	581	2,197
	Project Operation: Project Management													
	CONTRACT COST TOTALS:	10,536	3,785		14,321		11,051	3,968	15,019			34,139	12,219	**46,358**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				5,207				5,458					23,179
50.0%	**NON-FEDERAL COSTS TOTALS:**				9,114				9,561					23,179

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: San Clemente Beach Nourishment
LOCATION: Orange County, California

DISTRICT: Los Angeles District (SPL)
POC: Juan Dominguez, Cost Engineering

PREPARED: May 13, 2021

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WBS STRUCTURE		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Mii Estimate Prepared:		12 May 2021		Program Year (Budget EC):			2023					
		Effective Price Level:		1 Oct 2020		Effective Price Level Date:			1 Oct 2022					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
	BEACH RE-NOURISHMENT - CYCLE No. 9													
17	BEACH REPLENISHMENT - Mob/Demob	1,667	600	36%	2,267	4.8%	1,747	629	2,376	2069Q4	264.5%	6,368	2,293	8,661
17	BEACH REPLENISHMENT - Dredging Cost	1,867	672	36%	2,539	4.8%	1,957	704	2,661	2069Q4	264.5%	7,134	2,566	9,700
	CONSTRUCTION ESTIMATE TOTALS:	3,534	1,272	36%	4,806		3,704	1,333	5,037			13,502	4,859	18,361
01	LANDS AND DAMAGES	71	18	25%	89	5.5%	75	19	94	2069Q1	685.2%	589	147	736
30	PLANNING, ENGINEERING & DESIGN													
1.0%	Project Management	35	13	36%	48	4.9%	37	14	51	2069Q1	256.9%	132	50	182
1.0%	Planning & Environmental Compliance	35	13	36%	48	4.9%	37	14	51	2069Q1	256.9%	132	50	182
6.0%	Engineering & Design	212	76	36%	288	4.9%	222	80	302	2069Q1	256.9%	792	286	1,078
1.0%	Reviews, ATRs, IEPRs, VE	35	13	36%	48	4.9%	37	14	51	2069Q1	256.9%	132	50	182
1.0%	Life Cycle Updates (cost, schedule, risks)	35	13	36%	48	4.9%	37	14	51	2069Q1	256.9%	132	50	182
1.0%	Contracting & ReprographicsContracting	35	13	36%	48	4.9%	37	14	51	2069Q1	256.9%	132	50	182
1.0%	Engineering During Construction	35	13	36%	48	4.9%	37	14	51	2069Q4	264.6%	135	51	186
1.0%	Real Estate and Planning During Construction	35	13	36%	48	4.9%	37	14	51	2069Q4	264.6%	135	51	186
25.0%	***Adaptive Mgmt & Environmental Monitoring***	882	318	36%	1,200	4.9%	926	334	1,260	2069Q2	259.4%	3,328	1,200	4,528
28.1%	***Physical Monitoring***	993	357	36%	1,350	4.9%	1,042	375	1,417	2069Q2	259.4%	3,745	1,348	5,093
	Project Operation													
66.1%														
31	CONSTRUCTION MANAGEMENT													
7.0%	Construction Management	501	180	36%	681	4.9%	526	189	715	2069Q4	264.6%	1,918	689	2,607
	Project Operation:													
	Project Management													
	CONTRACT COST TOTALS:	6,438	2,312		8,750		6,754	2,428	9,182			24,804	8,881	**33,685**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				2,744				2,876					16,843
50.0%	**NON-FEDERAL COSTS TOTALS:**				6,006				6,306					16,843

WALLA WALLA COST ENGINEERING MANDATORY CENTER OF EXPERTISE

COST AGENCY TECHNICAL REVIEW

CERTIFICATION STATEMENT

SPL - PN 104716
Solana-Encinitas Coastal Storm Damage Reduction Project

The Solana-Encinitas Costal Storm Damage Reduction Project, as presented by the Los Angeles District, has undergone a successful Cost Agency Technical Review (Cost ATR) of remaining costs, performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the cost products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of October 26, 2022, the Cost MCX certifies the estimated total project cost:

INITIAL

FY23 Project First Cost INITIAL:	$47,115,000 (excluding spent costs)
SPENT:	$ 499,000
Total Project First Cost:	$47,614,000
FULLY FUNDED w/ SPENT:	$49,584,000

PERIODIC: Encinitas - 9 Renourishments, Solana - 4 Renourishments

FY23 Project First Cost (2028-72):	$206,062,000
SPENT:	$ -0-
FULLY FUNDED w/ SPENT:	$416,499,000

Note: Cost Certification assumes Efficient Implementation (Funding). Cost ATR was devoted to remaining work. It did not review spent costs, which requires an audit process. It remains the responsibility of the District to correctly reflect these cost values and to implement effective project management controls and implementation procedures including risk management through the period of Federal participation.

Michael P Jacobs, PE, CCE
Chief, Cost Engineering MCX
Walla Walla District

****** TOTAL PROJECT COST SUMMARY ******

PROJECT: **Encinitas-Solana Beach Coastal Storm Damage Reduction - LPP**
PROJECT NO: P2 104716
LOCATION: San Diego County, CA

DISTRICT: **Los Angeles District, SPL**
POC: **JUAN DOMINGUEZ, P.E., C.C.E.**

PREPARED: **10/21/2022**

INITIAL NOURISHMENT EVENT

This estimate reflects the scope and schedule in Chief's Report.

FY23 Economic Re-evaluation Report (ERR)

Civil Works Work Breakdown Structure		ESTIMATED COST				PROGRAM / BUDGET YEAR COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
						Program Year (Budget EC): 2023									
						Effective Price Level Date: 1 OCT 22									
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	**TOTAL ($K)**	Spent Thru: **1-Oct-21** ($K)	**TOTAL COST** ($K)	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*		*K*	*L*	*M*	*N*	*O*
17	BEACH REPLENISHMENT (w/ Shoreline Monitoring)	$18,470	$7,388	40%	$25,858	17.2%	$21,639	$8,656	$30,295		$30,295	3%	$22,257	$8,903	$31,160
06	FISH & WILDLIFE FACILITIES: REEF CONSTRUCTION	$2,672	$1,470	55%	$4,142	27.8%	$3,415	$1,878	$5,294		$5,294	8%	$3,675	$2,021	$5,697
06	FISH & WILDLIFE FACILITIES MITIGATION: MONITORING AND LAGOON SEDIMENTATION	$2,751	$1,513	55%	$4,264	27.8%	$3,516	$1,934	$5,450		$5,450	11%	$3,898	$2,144	$6,042
18	CULTURAL RESOURCE PRESERVATION	$43	$9	21%	$52	36.8%	$59	$12	$71		$71	3%	$60	$13	$73
	CONSTRUCTION ESTIMATE TOTALS:	$23,936	$10,380	43%	$34,316	19.8%	$28,629	$12,480	$41,110	$0	$41,110	5%	$29,890	$13,081	$42,971
01	LANDS AND DAMAGES	$68	$14	20%	$82	5.9%	$72	$14	$86		$86	0%	$72	$14	$86
30	PLANNING, ENGINEERING & DESIGN	$2,943	$589	20%	$3,532	6.4%	$3,131	$626	$3,757	$499	$4,256	1%	$3,150	$630	$4,279
31	CONSTRUCTION MANAGEMENT	$1,694	$339	20%	$2,033	6.4%	$1,802	$360	$2,162		$2,162	2%	$1,843	$369	$2,211
	PROJECT COST TOTALS:	$28,641	$11,321	40%	$39,962		$33,634	$13,481	**$47,115**	$499	**$47,614**	4%	$34,955	$14,094	$49,548

CHIEF, A-E MANAGEMENT, COST AND VALUE ENGINEERING, Mark Cooke, P.E.

ESTIMATED TOTAL PROJECT COST: **$49,548**

PREVIOUS TPCS: **46,961**
PROJECT MANAGER, Susie Ming, P.E. **Dated:** August 26, 2022

THIS TPCS REFLECTS A PROJECT COST INCREASE OF: **2,587**

THE 902 COST LIMIT IS:
CHIEF, REAL ESTATE, Cheryl Connett **Dated:**

O&M OUTSIDE OF TOTAL PROJECT COST: **N/A**

CHIEF, ENGINEERING, Pamela J. Lovasz, P.E.

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Encinitas-Solana Beach Coastal Storm Damage Reduction - LPP
LOCATION: San Diego County, CA
This estimate reflects the scope and schedule in Chief's Report.

DISTRICT: Los Angeles District, SPL
POC: JUAN DOMINGUEZ, P.E., C.C.E.

PREPARED: 10/21/2022

FY23 Economic Re-evaluation Report (ERR)

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
	PLANNING, ENGINEERING & DESIGN	Estimate Prepared: / Effective Price Level:			21-May-21 / 1-Oct-20	Program Year (Budget EC): / Effective Price Level Date:			2023 / 1 OCT 22					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	RISK BASED CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
	ENCINITAS & SONATA BEACH NOURISHMENT INITIAL EVENT													
17	Solana - Encinitas Initial Beach Nourishment (Yr 2023)	$17,887	$7,155	40%	$25,042	17.2%	$20,956	$8,382	$29,338	2023Q4	2.7%	$21,522	$8,609	$30,130
06	Solana - Reef Mitigation (Yr 2025)	$2,672	$1,470	55%	$4,142	27.8%	$3,415	$1,878	$5,294	2025Q4	7.6%	$3,675	$2,021	$5,697
17	Shoreline Monitoring (Yearly - Yr 2022 thru Yr 2027)	$583	$233	40%	$816	17.2%	$683	$273	$956	2025Q4	7.6%	$735	$294	$1,029
06	Habitat Monitoring Plan (Yearly - Yr 2022 thru Yr 2025)	$307	$169	55%	$476	27.8%	$392	$216	$608	2024Q4	4.9%	$412	$226	$638
06	Surfing Monitoring Plan (Yearly - Yr 2022 thru Yr 2027)	$150	$83	55%	$233	27.8%	$192	$105	$297	2025Q4	7.6%	$206	$113	$320
06	Borrow Site Monitoring Plan (Yearly - Yr 2022 thru Yr 2025)	$224	$123	55%	$347	27.8%	$286	$157	$444	2024Q4	4.9%	$300	$165	$465
06	Encinitas - Lagoon Sedimentation: San Elijo and Batiquitos - (Yearly - Yr 2023 thru Yr 2027)	$240	$132	55%	$372	27.8%	$307	$169	$475	2025Q4	7.6%	$330	$182	$512
06	Solana - Lagoon Sedimentation: San Dieguito, San Elijo, and Peñasquitos (Yearly - Yr 2023 thru Yr 2032)	$1,830	$1,007	55%	$2,837	27.8%	$2,339	$1,286	$3,625	2027Q4	13.3%	$2,650	$1,457	$4,107
18	Cultural Resources Plan (Yr 2023)	$43	$9	21%	$52	36.8%	$59	$12	$71	2023Q4	2.7%	$60	$13	$73
	CONSTRUCTION ESTIMATE TOTALS:	$23,936	$10,380	43.4%	**$34,316**		$28,629	$12,480	$41,110			$29,890	$13,081	$42,971
01	LANDS AND DAMAGES	68	$14	20%	$82	5.9%	$72	$14	$86	2023Q4	0.0%	$72	$14	$86
30	PLANNING, ENGINEERING & DESIGN													
0.0%	Project Management	$88	$18	20%	$106	6.4%	$94	$19	$112	2022Q4	0.0%	$94	$19	$112
0.0%	Planning & Environmental Compliance	$14	$3	20%	$17	6.4%	$15	$3	$18	2022Q4	0.0%	$15	$3	$18
0.0%	Engineering & Design	$1,530	$306	20%	$1,836	6.4%	$1,627	$325	$1,953	2022Q4	0.0%	$1,627	$325	$1,953
0.0%	Reviews, ATRs, IEPRs, VE	$408	$82	20%	$490	6.4%	$434	$87	$521	2022Q4	0.0%	$434	$87	$521
0.0%	Life Cycle Updates (cost, schedule, risks)	$37	$7	20%	$44	6.4%	$39	$8	$47	2022Q4	0.0%	$39	$8	$47
0.0%	Contracting & Reprographics	$45	$9	20%	$54	6.4%	$48	$10	$57	2022Q4	0.0%	$48	$10	$57
0.0%	Engineering During Construction	$646	$129	20%	$775	6.4%	$687	$137	$825	2023Q4	2.3%	$703	$141	$843
0.0%	Real Estate & Planning During Construction	$175	$35	20%	$210	6.4%	$186	$37	$223	2023Q4	2.3%	$190	$38	$228
0.0%	Project Operations													
31	CONSTRUCTION MANAGEMENT													
0.0%	Construction Management	$1,694	$339	20%	$2,033	6.4%	$1,802	$360	$2,162	2023Q4	2.3%	$1,843	$369	$2,211
0.0%	Project Operation:													
0.0%	Project Management													
	CONTRACT COST TOTALS:	$28,641	$11,321		**$39,962**		$33,634	$13,481	$47,115			$34,955	$14,094	**$49,049**

****** TOTAL PROJECT COST SUMMARY ******

PROJECT: **Encinitas-Solana Beach Coastal Storm Damage Reduction - LPP**
PROJECT NO: P2 104716
LOCATION: San Diego County, CA

DISTRICT: **Los Angeles District, SPL**
POC: **JUAN DOMINGUEZ, P.E., C.C.E.**

PREPARED: **10/21/2022**

SUBSEQUENT RE-NOURISHMENT EVENTS

This estimate reflects the scope and schedule in Chief's Report.

FY23 Economic Re-evaluation Report (ERR)

Civil Works Work Breakdown Structure		ESTIMATED COST				PROGRAM / BUDGET YEAR COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
						Program Year (Budget EC): 2023									
						Effective Price Level Date: 1 OCT 22									
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	**TOTAL ($K)**	Spent Thru: **1-Oct-21** ($K)	**TOTAL COST** ($K)	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*		*K*	*L*	*M*	*N*	*O*
17	BEACH REPLENISHMENT (w/ Shoreline Monitoring)	$87,316	$34,926	40%	$122,242	17.2%	$102,297	$40,919	$143,216		$143,216	107%	$212,263	$84,905	$297,168
06	FISH & WILDLIFE FACILITIES: REEF CONSTRUCTION				$0	-			$0		$0	-			$0
06	FISH & WILDLIFE FACILITIES MITIGATION: MONITORING AND LAGOON SEDIMENTATION	$11,967	$6,582	55%	$18,549	27.8%	$15,296	$8,413	$23,708		$23,708	105%	$31,327	$17,230	$48,556
18	CULTURAL RESOURCE PRESERVATION				$0	-			$0		$0	-			$0
	CONSTRUCTION ESTIMATE TOTALS:	$99,283	$41,508	42%	$140,791	18.6%	$117,593	$49,332	$166,925	$0	$166,925	107%	$243,589	$102,135	$345,724
01	LANDS AND DAMAGES	$440	$88	20%	$528	5.9%	$466	$93	$559		$559	644%	$3,468	$694	$4,162
30	PLANNING, ENGINEERING & DESIGN	$24,471	$4,894	20%	$29,365	6.4%	$26,030	$5,206	$31,236		$31,236	72%	$44,816	$8,963	$53,779
31	CONSTRUCTION MANAGEMENT	$5,752	$1,150	20%	$6,902	6.4%	$6,118	$1,224	$7,342		$7,342	75%	$10,695	$2,139	$12,834
	PROJECT COST TOTALS:	$129,946	$47,641	37%	$177,587		$150,208	$55,855	**$206,062**	$0	**$206,062**	102%	$302,569	$113,931	$416,499

CHIEF, A-E MANAGEMENT, COST AND VALUE ENGINEERING, Mark Cooke, P.E.

ESTIMATED TOTAL PROJECT COST: **$416,499**

PROJECT MANAGER, Susie Ming, P.E.

PREVIOUS TPCS: **406,779**
Dated: August 26, 2022

THIS TPCS REFLECTS A PROJECT COST INCREASE OF: **9,720**

CHIEF, REAL ESTATE, Cheryl Connett

THE 902 COST LIMIT IS:
Dated:

O&M OUTSIDE OF TOTAL PROJECT COST: **N/A**

CHIEF, ENGINEERING, Pamela J. Lovasz, P.E.

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Encinitas-Solana Beach Coastal Storm Damage Reduction - LPP
LOCATION: San Diego County, CA
This estimate reflects the scope and schedule in Chief's Report.

DISTRICT: Los Angeles District, SPL
POC: JUAN DOMINGUEZ, P.E., C.C.E.

PREPARED: 10/21/2022

FY23 Economic Re-evaluation Report (ERR)

Civil Works Work Breakdown Structure		ESTIMATED COST				PROGRAM / BUDGET YEAR COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: / Effective Price Level:			21-May-21 / 1-Oct-20	Program Year (Budget EC): / Effective Price Level Date:			2023 / 1 OCT 22					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	RISK BASED CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	ENCINITAS - 9 PERIODIC BEACH NOURISHMENTS ON 5-YR CYCLES 50-FT beach width)													
17	Encinitas - Subsequent Beach Nourishment (Yr 2028)	$6,357	$2,543	40%	$8,900	17.2%	$7,448	$2,979	$10,427	2028Q4	16.2%	$8,656	$3,462	$12,119
17	Encinitas - Subsequent Beach Nourishment (Yr 2033)	$4,950	$1,980	40%	$6,930	17.2%	$5,799	$2,320	$8,119	2033Q4	32.1%	$7,663	$3,065	$10,728
17	Encinitas - Subsequent Beach Nourishment (Yr 2038)	$6,357	$2,543	40%	$8,900	17.2%	$7,448	$2,979	$10,427	2038Q4	50.2%	$11,189	$4,476	$15,665
17	Encinitas - Subsequent Beach Nourishment (Yr 2043)	$4,950	$1,980	40%	$6,930	17.2%	$5,799	$2,320	$8,119	2043Q4	70.8%	$9,906	$3,962	$13,868
17	Encinitas - Subsequent Beach Nourishment (Yr 2048)	$6,357	$2,543	40%	$8,900	17.2%	$7,448	$2,979	$10,427	2048Q3	92.9%	$14,370	$5,748	$20,118
17	Encinitas - Subsequent Beach Nourishment (Yr 2053)	$6,357	$2,543	40%	$8,900	17.2%	$7,448	$2,979	$10,427	2053Q4	120.8%	$16,444	$6,578	$23,021
17	Encinitas - Subsequent Beach Nourishment (Yr 2058)	$6,357	$2,543	40%	$8,900	17.2%	$7,448	$2,979	$10,427	2058Q4	151.0%	$18,696	$7,478	$26,174
17	Encinitas - Subsequent Beach Nourishment (Yr 2063)	$6,357	$2,543	40%	$8,900	17.2%	$7,448	$2,979	$10,427	2063Q4	185.4%	$21,256	$8,502	$29,758
17	Encinitas - Subsequent Beach Nourishment (Yr 2068)	$6,357	$2,543	40%	$8,900	17.2%	$7,448	$2,979	$10,427	2068Q4	224.5%	$24,167	$9,667	$33,833
17	Shoreline and Surfing Monitoring (Yearly - Yr 2028 thru Yr 2072)	$3,825	$1,530	40%	$5,355	17.2%	$4,481	$1,793	$6,274	2052Q4	115.2%	$9,644	$3,857	$13,501
06	Borrow Site Monitoring (Yrs 2028, 2033, 2038, 2043, 2048, 2053, 2058, 2063, 2068)	$1,809	$995	55%	$2,804	27.8%	$2,312	$1,272	$3,584	2043Q4	70.8%	$3,949	$2,172	$6,122
06	Encinitas - Lagoon Sedimentation: San Elijo & Batiquitos (Yearly - Yr 2028 thru Yr 2072)	$2,160	$1,188	55%	$3,348	27.8%	$2,761	$1,518	$4,279	2052Q4	115.2%	$5,941	$3,268	$9,209
	CONSTRUCTION ESTIMATE TOTALS:	$62,193	$25,473	41.0%	**$87,666**		$73,287	$30,076	$103,363			$151,880	$62,236	$214,116
01	LANDS AND DAMAGES	320	$64	20%	$384	5.9%	$339	$68	$407	2048Q4	643.5%	$2,519	$504	$3,023
30	PLANNING, ENGINEERING & DESIGN													
0.0%	Project Management	$541	$108	20%	$649	6.4%	$575	$115	$691	2047Q4	70.4%	$981	$196	$1,177
0.0%	Planning & Environmental Compliance	$105	$21	20%	$126	6.4%	$112	$22	$134	2047Q4	70.4%	$190	$38	$228
0.0%	Engineering & Design	$10,501	$2,100	20%	$12,601	6.4%	$11,170	$2,234	$13,404	2047Q4	70.4%	$19,034	$3,807	$22,840
0.0%	Reviews, ATRs, IEPRs, VE	$1,370	$274	20%	$1,644	6.4%	$1,457	$291	$1,749	2047Q4	70.4%	$2,483	$497	$2,980
0.0%	Life Cycle Updates (cost, schedule, risks)	$546	$109	20%	$655	6.4%	$581	$116	$697	2047Q4	70.4%	$990	$198	$1,188
0.0%	Contracting & Reprographics	$360	$72	20%	$432	6.4%	$383	$77	$460	2047Q4	70.4%	$653	$131	$783
0.0%	Engineering During Construction	$3,054	$611	20%	$3,665	6.4%	$3,249	$650	$3,898	2048Q4	73.8%	$5,646	$1,129	$6,775
0.0%	Real Estate & Planning During Construction	$1,320	$264	20%	$1,584	6.4%	$1,404	$281	$1,685	2048Q4	73.8%	$2,440	$488	$2,928
0.0%	Project Operations													
31	CONSTRUCTION MANAGEMENT													
0.0%	Construction Management	$4,105	$821	20%	$4,926	6.4%	$4,367	$873	$5,240	2048Q4	73.8%	$7,589	$1,518	$9,107
0.0%	Project Operation:													
0.0%	Project Management													
	CONTRACT COST TOTALS:	$84,415	$29,917		**$114,332**		$96,923	$34,803	$131,726			$194,406	$70,741	**$265,146**

****** TOTAL PROJECT COST SUMMARY ******

****** CONTRACT COST SUMMARY ******

PROJECT: Encinitas-Solana Beach Coastal Storm Damage Reduction - LPP
LOCATION: San Diego County, CA
This estimate reflects the scope and schedule in Chief's Report.

DISTRICT: Los Angeles District, SPL
POC: JUAN DOMINGUEZ, P.E., C.C.E.

PREPARED: 10/21/2022

FY23 Economic Re-evaluation Report (ERR)

Civil Works Work Breakdown Structure		ESTIMATED COST				PROGRAM / BUDGET YEAR COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared:			21-May-21	Program Year (Budget EC):			2023					
		Effective Price Level:			1-Oct-20	Effective Price Level Date:			1 OCT 22					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	RISK BASED CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	SOLANA - 4 PERIODIC BEACH NOURISHMENTS ON 10-YR CYCLES (150-FT beach width)													
17	Solana - Subsequent Beach Nourishment (Yr 2033)	$5,821	$2,328	40%	$8,149	17.2%	$6,820	$2,728	$9,548	2033Q4	32.1%	$9,012	$3,605	$12,616
17	Solana - Subsequent Beach Nourishment (Yr 2043)	$5,821	$2,328	40%	$8,149	17.2%	$6,820	$2,728	$9,548	2043Q4	70.8%	$11,649	$4,659	$16,308
17	Solana - Subsequent Beach Nourishment (Yr 2053)	$6,857	$2,743	40%	$9,600	17.2%	$8,034	$3,213	$11,247	2053Q4	120.8%	$17,737	$7,095	$24,832
17	Solana - Subsequent Beach Nourishment (Yr 2063)	$6,857	$2,743	40%	$9,600	17.2%	$8,034	$3,213	$11,247	2063Q4	185.4%	$22,928	$9,171	$32,099
17	Shoreline and Surfing Monitoring (Yearly - Yr 2028 thru Yr 2072)	$3,736	$1,494	40%	$5,230	17.2%	$4,377	$1,751	$6,128	2050Q4	104.4%	$8,948	$3,579	$12,527
06	Borrow Site Monitoring (Yr 2033, Yr 2043, Yr 2053 and Yr 2063)	$678	$373	55%	$1,051	27.8%	$867	$477	$1,343	2038Q4	50.2%	$1,302	$716	$2,018
06	Solana - Lagoon Sedimentation: San Dieguito, San Elijo and Peñasquitos (Yearly - Yr 2033 thru Yr 2072)	$7,320	$4,026	55%	$11,346	27.8%	$9,356	$5,146	$14,502	2052Q4	115.2%	$20,134	$11,074	$31,208
	CONSTRUCTION ESTIMATE TOTALS:	$37,090	$16,036	43.2%	**$53,126**		$44,306	$19,256	$63,562			$91,709	$39,899	$131,608
01	LANDS AND DAMAGES	120	$24	20%	$144	5.9%	$127	$25	$152	2049Q4	646.4%	$948	$190	$1,138
30	PLANNING, ENGINEERING & DESIGN													
0.0%	Project Management	$203	$41	20%	$244	6.4%	$216	$43	$259	2048Q4	73.8%	$375	$75	$450
0.0%	Planning & Environmental Compliance	$39	$8	20%	$47	6.4%	$41	$8	$50	2048Q4	73.8%	$72	$14	$87
0.0%	Engineering & Design	$3,938	$788	20%	$4,726	6.4%	$4,189	$838	$5,027	2048Q4	73.8%	$7,281	$1,456	$8,737
0.0%	Reviews, ATRs, IEPRs, VE	$514	$103	20%	$617	6.4%	$547	$109	$656	2048Q4	73.8%	$950	$190	$1,140
0.0%	Life Cycle Updates (cost, schedule, risks)	$205	$41	20%	$246	6.4%	$218	$44	$262	2048Q4	73.8%	$379	$76	$455
0.0%	Contracting & Reprographics	$135	$27	20%	$162	6.4%	$144	$29	$172	2048Q4	73.8%	$250	$50	$300
0.0%	Engineering During Construction	$1,145	$229	20%	$1,374	6.4%	$1,218	$244	$1,462	2049Q4	77.3%	$2,159	$432	$2,591
0.0%	Real Estate & Planning During Construction	$495	$99	20%	$594	6.4%	$527	$105	$632	2049Q4	77.3%	$933	$187	$1,120
0.0%	Project Operations													
31	CONSTRUCTION MANAGEMENT													
0.0%	Construction Management	$1,647	$329	20%	$1,976	6.4%	$1,752	$350	$2,102	2049Q4	77.3%	$3,106	$621	$3,727
0.0%	Project Operation:													
0.0%	Project Management													
	CONTRACT COST TOTALS:	$45,531	$17,724		**$63,255**		$53,284	$21,052	$74,336			$108,163	$43,190	**$151,353**

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INSIGHT

Infrastructure Investment and Jobs Act (IIJA) Funding for U.S. Army Corps of Engineers (USACE) Civil Works: Policy Primer

Updated January 10, 2023

Congress authorizes and funds the U.S. Army Corps of Engineers (USACE) to undertake civil works activities, including planning and construction of water resource projects and maintenance of navigation improvements and other infrastructure.

Division J, Title III, of the Infrastructure Investment and Jobs Act (IIJA; P.L. 117-58), which became law on November 15, 2021, provided $17.1 billion in emergency appropriations to various USACE accounts (see **Figure 1**), with the majority going to three accounts:

- Construction (68%)
- Operation and Maintenance (O&M; 23%)
- Mississippi River and Tributaries (MR&T; 5%)

IIJA also provided

- $251 million for repair of damages to existing projects, including nonfederal levees and shore protection through the Flood Control and Coastal Emergencies (FCCE) account
- $75 million to the Water Infrastructure Finance and Innovation Program (WIFIP) account for USACE to implement a direct loan and loan guarantee program, which IIJA limited to nonfederal dam safety work (similar to a limit applied to FY2021 and FY2022 annual appropriations)

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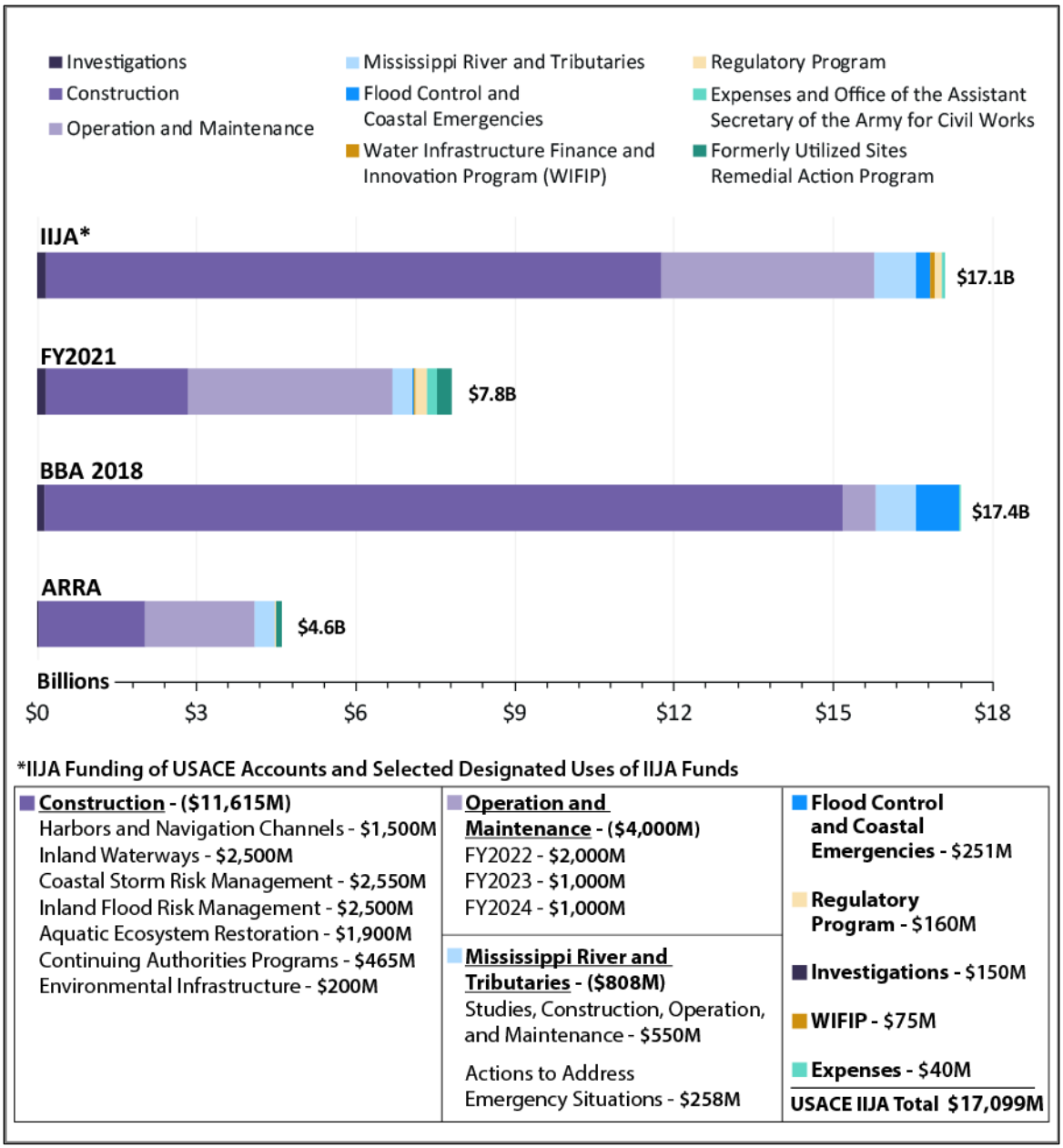
IN11723

Figure 1. IIJA's USACE Funding in Context of Other USACE Appropriations and Selected IIJA Designated Uses, by Account

(amounts are nominal and in billions [B] or millions [M] of dollars)



Sources: CRS using P.L. 117-58, P.L. 116-260 (Consolidated Appropriations Act, 2021), P.L. 115-123 (Bipartisan Budget Act of 2018, BBA 2018), and P.L. 111-5 (American Recovery and Reinvestment Act of 2009, ARRA).

IIJA Funding in Context

Figure 1 shows IIJA funding in the context of annual civil works appropriations preceding IIJA enactment (FY2021; Division D, Title I, of P.L. 116-260) and two emergency appropriations:

- Bipartisan Budget Act of 2018 (BBA 2018; P.L. 115-123), which funded USACE flood disaster repair and recovery and flood risk management studies and projects

- American Recovery and Reinvestment Act of 2009 (ARRA; P.L. 111-5), which funded USACE activities for economic stimulus purposes and other policy objectives

As shown in **Figure 1**, IIJA provided funding equal to multiple years of recent annual appropriations, particularly for the Construction account. Below are some project types that IIJA funded, with FY2021 funding levels provided in parentheses:

- $2.50 billion for inland waterways construction ($0.81 billion)
- $2.55 billion and $2.50 billion for risk management of coastal floods and inland floods ($0.81 billion and $0.36 billion), respectively
- $1.90 billion for aquatic ecosystem restoration ($0.56 billion)
- $465 million for continuing authorities programs ($69.5 million)
- $30 million in FY2023 for a new USACE pilot program for flood risk management feasibility studies for economically disadvantaged or rural communities

Similar to other emergency appropriations legislation, Congress applied some but not other statutory requirements and common USACE annual appropriations policy limitations to IIJA funds (see **Table 1**). IIJA included the following direction for USACE in using the $2.50 billion for inland flood risk construction: prioritize projects benefitting "economically disadvantaged communities," and consider prioritizing projects benefiting areas with minority groups and populations in poverty greater than the national average percentages.

Table 1. Selected Requirements and Policies Applied to Certain USACE Funding

Statutory Requirements or Other Policies (Source)	IIJA	FY2021	BBA 2018	ARRA
Project Costs and Starts				
Limit to increases in project cost without obtaining congressional authorization (33 U.S.C. §2280)	Not applied	Applied	Not applied	Not applied
Limit to number of construction starts[a] (annual appropriations bills)	Not applied	Applied (limit was seven new starts)	Not applied	Applied[b] (no new starts)
Trust Fund Contributions				
Harbor Maintenance Trust Fund (HMTF) pays eligible harbor maintenance costs (33 U.S.C. §2238)	Not applied	Applied	Applied	Applied
Inland Waterways Trust Fund pays a portion of certain waterway construction costs (33 U.S.C. §2212; §109, Division AA, of P.L. 116-260)	Not applied	Applied	NA (construction funds were for flood activities)	Not applied
Nonfederal Construction Cost Share (e.g., 33 U.S.C. §§2211-2213 for most water resource projects)				
Ongoing construction	Applied[c]	Applied	Not applied	Applied
New construction	Applied[c]	Applied	Applied (waived for Puerto Rico and U.S. Virgin Islands)	Applied
Nonfederal Share of Costs for Repair of Certain Damaged Flood Control Works (33 U.S.C. §701n)				
Repairs to damaged shore protection	Not applied	Applied	Not applied	NA

Statutory Requirements or Other Policies (Source)	IIJA	FY2021	BBA 2018	ARRA
Other eligible repairs (e.g., inland levees)	Applied	Applied	Applied	NA

Sources: CRS using P.L. 117-58; P.L. 116-260; P.L. 115-123; P.L. 111-5; the *U.S. Code*; U.S. Congress, House Committee on Transportation and Infrastructure, *Recovery Act: One-Year Progress Report for Transportation and Infrastructure Investments*, hearing, 111th Cong., 2nd sess., February 23, 2010 (Washington, DC: GPO, 2010), p. 102; and USACE, *ARRA Financial and Operational Review Report*, undated.

Notes: NA = Not applicable.

a. Congress limited the number of new starts in USACE annual appropriations from FY2014 to FY2021.

b. The Administration interpreted ARRA as limiting new construction starts and providing for HMTF contributions.

c. IIJA maintained nonfederal construction cost-share requirements, except for certain projects and assistance related to restoring fish and wildlife passage.

Next Steps

IIJA included account-specific language regarding reporting to congressional appropriations committees. IIJA required the USACE Chief of Engineers to deliver

- *Spend plans* within 60 days of enactment on use of IIJA funds available in FY2022 for the Investigation, O&M, and MR&T accounts and use of IIJA funds available in FY2022, FY2023, and FY2024 for the Construction account
- Monthly reports on allocations and obligations for the Investigations, Construction, and MR&T accounts, beginning within 120 days of enactment (March 15, 2022)
- Spend plans as part of the President's FY2023 budget request for IIJA FY2023 Investigations and O&M funds and FY2024 budget request for IIJA FY2024 O&M funds

USACE has published IIJA spend plans for FY2022 and FY2023 that include project names and locations. USACE has not released IIJA spend plans for FY2024; they may accompany the President's FY2024 budget request. Some FY2022 funds remain unassigned to specific projects as of the end of CY2022.

Issues for Congress may include the pace of USACE implementation of IIJA funded projects and plans for funding the completion of partially funded IIJA projects. IIJA oversight may occur in the context of broader congressional inquiries into USACE supplemental appropriations. Many in Congress have previously expressed concerns about USACE challenges with execution, cost overruns, and delays with projects funded by BBA 2018 and completion of projects partially funded by the Disaster Relief Supplemental Appropriations Act, 2022 (P.L. 117-43).

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Regional Beach Sand Project III (RBSPIII)
Phase I - Preliminary Planning Activities
Scope of Work AM 2

INTRODUCTION:

SANDAG is the Metropolitan Planning Organization (MPO) for the San Diego region and plays a key role in the regional coordination of a variety of projects. The San Diego region has 19 jurisdictions, 10 of which are located in the coastal zone and collectively manage approximately 70 miles of coastline which can be accessed via transit, highways, roadways, and bicycle and pedestrian facilities. A number of these facilities are at risk from the impacts of rising seas, high tides, and strong storms. As such, access to beaches, residences, and public facilities may be impacted. This would be particularly impactful to disadvantaged populations living in the cities of Oceanside, Carlsbad, City of San Diego, National City, Chula Vista, and Imperial Beach which have populations that fall in the 70-100 percentile of the demographic index (source: EJSCREEN).

SANDAG proposes to conduct a feasibility study for a regional beach sand nourishment project which would use information from SANDAG's Round 1 SB 1 Caltrans Adaptation Planning Grant effort to identify transportation facilities that will be impacted by sea-level rise and may benefit from beach nourishment. Implementation of a regional beach sand project would involve dredging beach quality sand from offshore borrow sites and placing it on highly eroded beaches in the San Diego region. Beach nourishment is being considered as a sea-level rise adaptation strategy by a number of cities in the San Diego region who have updated their Local Coastal Programs to align with the California Coastal Commission's Guidance on sea-level rise. Wide beaches can help protect coastal communities and coastal transportation facilities by acting as a buffer to alleviate some of the impacts from sea-level rise, strong storm events, and high tides. SANDAG has previously completed two regional beach sand nourishment projects in 2001 and 2012 (RBSP I and RBSP II, respectively), adding approximately 3.5 million cubic yards of sand to the region's local beaches. In addition, SANDAG has an established regional forum (the Shoreline Preservation Working Group) where elected officials are engaged in regional adaptation projects, such as beach nourishment.

SANDAG will coordinate closely with city staff, city council members who serve on SANDAG's Shoreline Preservation Working Group (SPWG), and other technical advisors on this project. Work efforts from this project will be summarized in two final deliverables: the Feasibility Study and the Offshore Borrow Site Survey Plan.

SANDAG has also been in contact with jurisdictions in Orange County on beach nourishment planning efforts, in part because sand transport in the Oceanside littoral cell extends generally from Dana Harbor south to the undersea canyon off La Jolla.

RESPONSIBLE PARTIES

SANDAG has retained a consulting team to complete two deliverables: Feasibility Study (with economic analysis) and Offshore Borrow Site Survey Plan. Generally, SANDAG will be responsible for overall project management and administration and will play a role in coordinating with local jurisdictions as well as drafting and editing the feasibility study. The consultant will be responsible for the majority of other tasks including the review of existing

monitoring data, completing the Offshore Borrow Site Survey Plan, completing the Economic Analysis, and finalizing the Feasibility Study.

OVERALL PROJECT OBJECTIVES:

- Identify beach erosion areas in the three littoral cells of the San Diego region, which extends from the U.S. border with Mexico to Dana point Harbor in southern Orange County, that may impact coastal transportation and other public infrastructure through review of existing data and coordination with coastal jurisdiction staff.
- Evaluate the economic costs and benefits of implementing a regional beach nourishment project and several alternatives to that project that may include one pilot sand retention strategy.
- Complete a Feasibility Study for a future regional beach nourishment project and alternatives, including potential programmatic strategies.
- Identify lessons learned from the past two regional beach sand projects administered by SANDAG and other southern California beach nourishments efforts and identify how to expedite project delivery and minimize project costs compared to prior efforts.
- Create a plan for surveying offshore sand borrow sites to ensure adequate quantities of sand are available to nourish the San Diego region's beaches.

The current scope of work addresses these two deliverables in the San Diego region and City of San Clemente (Tasks 1-5). This Amendment 2 provides scope and funding for similar evaluation in the City of Dana Point (Task 6)

1. Task 1: Project Management and Administration

SANDAG will hold a kick-off meeting with the consultants to review the procedures and project expectations, including invoicing, quarterly reporting, scope of work, timeline, communication protocols, and other relevant project information. A meeting summary shall be documented by the Consultant. SANDAG will coordinate with the consultants through regular communication (including in-person meetings and/or conference calls) to ensure project remains on time and within budget. Meeting notes shall be documented by the Consultant. The consultant shall invoice SANDAG and provide a brief summary of work efforts on a monthly basis. Time spent preparing invoices shall be included in the Consultant's overhead cost. SANDAG shall not pay for time spent preparing billing for SANDAG.

Task 1 Deliverables

- Meeting Notes and Summaries
- Subcontractor Agreements
- Quarterly Progress Reports

Task 1 Assumptions

- 1 in person kickoff meeting attended by AECOM (3 staff), M&N (1 staff), CFC (1 staff), Merkel (1 staff), Phil King
- 1 field site visit attended by AECOM (2 staff), M&N (1 staff), Merkel (1 staff), Phil King on same day as kick off (to maximize travel efficiency).

- 8 meetings (virtual and in person) attended by AECOM with associated agenda/meeting notes/action items

2. Task 2: Economic Analysis

Using actual costs from RBSP II, the consultant shall prepare an economic analysis that includes the following components: preliminary cost estimates of a range of project alternatives that may include one pilot sand retention strategy, a benefit/cost analysis of the project alternatives, and a discussion of economic impacts. This economic analysis shall be summarized in the feasibility study and included as an appendix to the final document. The consultant shall evaluate the Benefit Cost Analysis (BCA) prepared by the U.S. Army Corps of Engineers for the Encinitas-Solana Beach Coastal Storm Damage Reduction Project and the economic analysis conducted for the 2007 Feasibility Study (prepared for RBSP II) in order to provide a methodology for the analysis for approval by SANDAG. The BCA should be developed to allow federal agencies to evaluate the benefit to cost ratio of the project and various subsegments of the project (by littoral cell or jurisdiction).

The methodology approach below will be finalized as a deliverable prior to undertaking the analysis. The quantitative analysis is anticipated to address two elements 1) "non-market value" of recreational benefits of RBSP III, which will be incorporated into a benefit-cost analysis and) 2) an estimate of the economic impacts—additional spending, jobs, and local taxes generated by RBSP III.

- Data Collection: Consultant will collect the following data: (a) daily attendance data at all State and local beaches where available (most); (b) data from San Diego County assessor's office which includes geospatial data, currently assessed (property tax) value; (c) data from local governments on the value of their property, which is not assessed for property tax purposes; (d) data on beach width/area before and after nourishment and over the 5-10 year life of the project as pulled from past shoreline monitoring; (e) any available data on beach spending patterns; (e) data on the likely costs of RBSP III including compliance costs.
- Data Analysis: The following analyses will be performed with the data collected:
  - Estimates of local property value: The analysis will use the best available public data (e.g., Zillow) to estimate the value of local property.
  - Analysis of non-market benefits of nourishment: The analysis of beach value incorporates daily attendance and capacity constraints. Since fill sites do not always correspond with beach jurisdictions (e.g., Oceanside), adjustments to attendance at these sites will be made.
  - Analysis of economic impacts: The additional recreation and tourism will generate additional spending and taxes. The analysis will estimate: (i) increases in local spending; (ii) increases in local taxes, in particular sales and transient occupancy taxes; (iii) indirect and induced impacts as well as job creation, applying IMPLAN or similar software.
- The benefits of storm damage reduction will not be addressed quantitatively because the USACE modeling requirements are extensive and not within the budget parameters. The team will identify locations that are potentially vulnerable to flooding/storm damage (from existing Cosmos data, team knowledge and possibly land managers/city staff). Then qualitatively address how the project may benefit/reduce potential damage.

- Benefit/Cost Analysis: Consultant will conduct a benefit/cost analysis over the life of the project, using a discount rate agreed to by SANDAG, but consistent with federal assumptions (likely NOAA and not USACE). This analysis will examine the "net benefits"—whether the benefits exceed the cost, including a benefit/cost ratio where necessary. As with RSBP II, this analysis will be broken down by individual fill receiver sites. The benefits and costs will also be delineated into recreational (non-market) benefits and economic and tax impacts. Possible benefits to private and public property from storm damage reduction as linked to potentially vulnerable locations will be noted. The study will generate a BCA but not using the exact same methods/inputs as the standard USACE approach.

There is also interest in considering potential sand nourishment projects along the shoreline of San Diego Bay. For purposes of this analysis, we assume one existing public beach location in the Bay may be identified from the Feasibility Study. The economic analysis will qualitatively describe net benefits, The communities that could benefit (considering proximity and observations) will be noted.

The consultant should assume three rounds of comments in the preparation of the Draft Economic Analysis as follows, comments by SANDAG on the draft, comments from the members of the Shoreline Preservation Working Group on the draft, and comments from the public.

Task 2 Deliverables

- Finalized Methodology Approach for the Economic Analysis
- Draft Economic Analysis Technical Appendix
- Final Economic Analysis Technical Appendix

Task 2 Assumptions

- Technical Appendix >30 pages, ~ 10 power point slides for SPWG meeting
- Budget assumes a set of up to 12 fill site envelopes derived from RBSP I and II, with alternative variations from retention features or other refinements at up to 6 sites, for no more 18 alternatives/configurations. If additional sites or program configurations are developed, the economic analysis and assumptions may be revisited for additional scope and fee.

3. Task 3: Regional Beach Sand Replenishment Project (RBSP III) Feasibility Study

Using information obtained from Tasks 2, the consultant shall draft a feasibility study for a future regional beach sand project (RBSPIII). The 2007 Feasibility Study that was prepared for RBSP II will be used as a template and the updated Feasibility Study shall address the same major topics including, but not limited to: a statement of the problem, a description of existing site conditions, consideration of project alternatives and ways to extend the life between beach nourishment cycles, methods to reduce costs and leverage other efforts in southern California, and economic considerations. The Feasibility Study shall also include an explanation of how beach nourishment can be used to protect coastal critical infrastructure in the region from sea level rise, examples from other regions should be provided. The Feasibility Study shall identify the various permits and approvals that would be needed for the implementation of this project. As part of the Feasibility Study, or a separate report, the consultant shall address the lessons learned from prior RBSP I and II, and opportunities to expedite project delivery and reduce costs. The consultant shall specifically address the following:

Exhibit A – Scope of Work

1. Ways to streamline environmental clearance under CEQA/NEPA (e.g., use of Mitigated Negative Declarations and focused EIRs, Supplementing EIR/EIS prepared for Encinitas-Solana Beach Coastal Storm Damage Reduction Project, development and tiering of Program EIR, etc.), and regulatory permits;
2. Ways to leverage opportunities arising from the Encinitas-Solana Beach Coastal Storm Damage Reduction Project and other southern California beach nourishment or sand bypass projects;
3. Opportunities to reduce cost mobilization of dredging (e.g., utilization of dredge under contract by U.S. Army Corps of Engineers, shared purchase of a hopper dredge for southern California nourishment efforts, etc.);
4. Analysis of issues that led to the damages resulting from the sand placement in Imperial Beach during RBSP II and ways to avoid damages in the future; and
5. Opportunities to reduce post-construction monitoring based upon past efforts.

The Feasibility Study shall also address the needs of the sand nourishment, if any, of jurisdictions fronting the San Diego Bay (e.g., Coronado's Grand Caribe Isle located in the Coronado Cays).

Consultant has developed one possible Annotated Table of Contents (provided below) with approach/scope of work described in more detail in the following text.

DRAFT Feasibility Study
San Diego Regional Beach Sand Project III
Annotated Table of Contents

Site condition patterns are relatively similar over the past few decades, so will be described based on the two primary sources (2007 Feasibility Study and 2009 Coastal Sediment Management Plan) plus monitoring data collected annually as shared with the SPWG. Consultant will also consolidate information on other related projects (ongoing, planned, potential) which will be key to considering creative regional approaches to routine beach nourishment. Chapter 3 will address items 1-5 noted above. Regarding CEQA/NEPA and Permitting, the study will disclose various document types and possible permits relative to the various alternatives considered. The potential ocean dredging projects and beach nourishment efforts in Section 2.6 will be explored in terms of leveraging opportunities based on timing and ability to share equipment. Documenting lessons learned from RBSP II in Imperial Beach will provide for best practices that can be applied elsewhere. Regarding post-construction monitoring, Consultant will develop a list of possible of monitoring elements for various phases of RBSP III and conduct an analysis as to the likelihood that each could be eliminated or reduced based on lessons learned from RBSP I, RBSP II, San Elijo and others.

Consultant team will focus their collective knowledge and expertise in working session(s) to explore the broad suite of alternatives and document the outcome in Chapter 4. The list above is intended as preliminary ideas and not complete.

The Feasibility Study will address the economic issue via the BCA results (which are useful for grant funding opportunities) and exploration of regional funding options. The study will summarize the project configuration used to calculate the BCA. There is a world of project variations given the number of potential sites, amount of material that could be placed per site, location of retention (if included), location of borrow site(s), etc. Based on discussions with SANDAG, existing designs plus monitoring data from RBSP I and II, Consultant team will identify a prototype project for the BCA. Chapter 5 will describe that prototype project and the resulting modelled BCA (by site and/or by littoral cell). The economic study will be an appendix. The feasibility study will also explore finance options available to city and county governments to raise revenues to pay for future nourishments. This study will examine options such as special property tax districts like Geologic Hazard Abatement District (GHAD) or Community Finance Districts, increases in transient occupancy taxes (TOTs), or reducing restrictions on short-term (STRs) to generate sales tax increases. The study will note where else in California these revenue options have been, or are, under consideration. Finally, the study will note possible approaches to reduce high-cost items, like the dredge, that could substantially lessen the overall price-tag.

A meeting shall be scheduled with interested stakeholders (city staff, members of the SPWG, members of the public, etc.) to review the draft feasibility study and solicit feedback. SANDAG will likely use a scheduled SPWG meeting as the forum for this discussion. Comments from stakeholders may also be submitted in writing and revisions to the feasibility study shall be made as needed. The consultant shall incorporate comments from SANDAG staff and interested stakeholders into a final version of the feasibility study.

Task 3 Deliverables

- Draft Feasibility Study
- Host meetings to discuss draft Feasibility Study
- Finalize Feasibility Study

Task 3 Assumptions

- Up to 8 alternatives addressed in Chapter 4.0, not all at equal level of detail.
- Present draft finding at SPWG meeting in person (AECOM, M&N) and virtual (Merkel, CFC, King).

4. Task 4: Off-Shore Borrow Site

The consultant shall conduct a literature review of offshore investigations completed for Regional Beach Sand Projects I and II (RBSP I and RBSP II) to identify any additional candidate borrow sites in the northern portion of San Diego County that could be utilized to implement a future beach nourishment project. The consultant shall prepare a plan and scope of work to conduct an investigation of a minimum of three offshore borrow sites to determine the outer boundaries of the two offshore borrow sites used for RBSP II (MB-1 and SO-5) and at least one new borrow site in the northern portion of San Diego County. Once completed, these surveys will help to estimate the quantity of sand available for beach nourishment on the San Diego coastline.

Consultant's approach to this task leverages their experience from two prior RBSP efforts and more recent research. Consultant will update ArcGIS model with available coastal, geophysical and geologic and geoarchaeology literature post RBSP II to focus on North County and MB-1. We recommend the offshore borrow investigations for RBSP III be planned similar to the RBSP II approach carried out at that time. The investigation plan will provide the exploration methodology starting with permitting and agency coordination needs for the eventual offshore field work. No field work will be performed at this stage.

Task 4 Deliverable

- Perform Off-Shore Borrow Site existing data review
- Prepare Off-Shore Borrow Site Plan and Scope of Work for Three Sites

5. Optional Task 5: San Clemente Nourishment Planning

This is an optional task, so no work will be performed without prior authorization from the City of San Clemente via entering into a MOU with SANDAG for Phase I – Preliminary Planning Activities. If exercised, Tasks 1-4 will be expanded upon to cover possible beach nourishment for the City of San Clemente. The consultant shall review the San Clemente component of the U.S. Army Corps of Engineer Storm Damage Reduction Project and what additional areas need beach nourishment in the City of San Clemente. Additional areas will be included in the economic analysis BCA and included in the Feasibility Analysis. The consultant shall evaluate one additional offshore borrow site located in the Northern extent of the Oceanside Littoral cell in addition those identified in Task 4 for possible beach sand nourishment in San Clemente.

Consultant would revise the table of contents for the Feasibility Study to include information for San Clemente. For example, Site Conditions would address Wave Climate (and other topics in Chapter 2) in the San Diego region as a subsection and there would be a new subsection for the San Clemente Wave Climate. Other Related Projects (Section 2.6) would be expanded into Orange County. While the Lessons Learned (Chapter 3.0) would remain largely focused on San Diego, the Recommendations for Efficiencies could consider this new opportunity. If San Clemente were formally a part of RBSP III, then "possible" efficiencies in shared dredge would

become more certain. Alternatively, the approach to CEQA streamlining may become more complex as decisions would need to be made regarding lead agency or lead agencies. The universe of alternatives would expand so Section 4 would expand as well. For costing purposes, we assume up to two receiver sites could be identified (one each north and south of the USACE site).

Once defined, the project envelopes for the economic analysis would be evaluated to generate BCA. The same methodology would be applied, but new data would need to be collected in Orange County for property value and attendance.

For the Offshore Borrow Site Study, the team would review offshore investigations for potential sites identified by USACE and published studies. Candidate borrow sites are anticipated to include current borrow sites identified by USACE including Oceanside and other potential sites along Camp Pendleton and Orange County. Consultant will develop a work plan for a future offshore investigation. The work plan objectives would involve confirming known sites, as needed, or further investigating beach material suitability at one new potential borrow site (where only limited investigations have been performed historically).

The program management approach would remain as proposed but there would be additional time required to facilitate coordination and communication with a broader group. A second kick-off meeting would be scheduled with San Clemente and SANDAG staff, with a site visit that same day. Attendees in person will include team members from AECOM, M&N, and Dr. King with others virtual. The complexity and cost of adding the San Clemente location is minimized if the option is exercised very soon after the Feasibility Study project is kicked off, so for costing purposes we assume the authorization is received within a month of project initiation.

Task 5 Deliverable

- Expanded Economic Analysis and Feasibility Study
- Perform Off-Shore Borrow Site existing data review
- Prepare Off-Shore Borrow Site Plan and Scope of Work for fourth area

Task 5 Assumptions

- Authorization to proceed received one month after NTP for RBSP III San Diego region. The longer between initiation of the San Diego region project and adding San Clemente, the less efficient and there may be need for additional funding.
- 1 field site visit attended by AECOM (2 staff), M&N (1 staff), and Phil King: CFC (1 staff) and Merkel (1 staff) virtual kick off.
- No more than 2 alternative receiver sites added to Chapter 4.0 of the Feasibility Study (excluding the site under consideration by USACE).

6. Task 6: Dana Point Nourishment Planning (Doheny/Capo Beach)

The consultant shall review existing documentation from Dana Point and Orange County Parks to evaluate additional locations for beach nourishment in the City of Dana Point.

The consultant shall evaluate one possible location for beach nourishment within publicly owned property south of San Juan Creek with an estimated total placement volume of up to approximately 500,000 cubic yards (cy). This area is generally Doheny Beach and Capistrano Beach (or Doheny/Capo Beach).

Consultant shall revise the table of contents for the Feasibility Study to include information for Dana Point. Information may be integrated into each section of the Feasibility Study or maybe a separate chapter of the report. For example, Site Conditions would address Wave Climate (and other topics in Chapter 2) in the San Diego region as a subsection and there would be a new subsection for Dana Point Wave Climate. Other Related Projects (Section 2.6) would be expanded into Dana Point. While the Lessons Learned (Chapter 3.0) would remain largely focused on San Diego, the Recommendations for Efficiencies could consider this new opportunity. If Dana Point were formally a part of RBSP III, then "possible" efficiencies in sharing a dredge would become more certain. Alternatively, the approach to CEQA streamlining may become more complex as decisions would need to be made regarding lead agency or lead agencies. The universe of alternatives would expand so Section 4 would expand as well.

Once defined (based on engineering and marine biology considerations), the project envelope of this general location would be evaluated to generate economic benefits relative to cost (BCA). The methodology for economic analysis would focus on recreational benefits, as is being performed in San Diego County and San Clemente, but new data would need to be collected in Orange County for property value and attendance in Dana Point. Potential benefits to recreational facilities would also be qualitatively evaluated (including public parking and sports equipment/facilities).

No new borrow site evaluations would be completed as the research for San Clemente would also apply to Dana Point.

The program management approach would remain as proposed but there would be additional time required to facilitate coordination and communication with a broader group. A kick-off meeting would be scheduled with Dana Point, Orange County Parks and SANDAG staff, with a site visit that same day. Attendees in person will include team members from AECOM, M&N, Coastal Frontiers, Merkel, and Dr. King The complexity and cost of adding the Dana Point location is minimized if the option is exercised very soon after the Feasibility Study project is kicked off, so for costing purposes we assume the authorization is received in February 2024.

Task 6 Deliverable

- Expanded Economic Analysis and Feasibility Study for Dana Point (Doheny/Capo Beach stretch)

Task 6 Assumptions

- Authorization to proceed received in February 2024 to maximize efficiencies from kicking off RBSP III in the San Diego region.
- 1 field site visit attended by AECOM (3 staff), M&N (2 staff), Phil King, CFC (1 staff). and Merkel (1 staff).
- One alternative receiver site added to Chapter 4.0 of the Feasibility Study (Dohoney/Capo Beach).
- The marine biology information would be based on existing materials from the City and others, no field surveys will be performed. The level of detail, extent of coverage relative to the sites, and season collected/age of data is unknown.

Exhibit C – Project Schedule

Regional Beach Sand Project III (RBSPIII) Preliminary Planning Activities				
Task Name		Description	State Date	End Date
1	**Project Management and Administration**	SANDAG to monitor Project Management and Administration	NTP	15 months from NTP
2	**Economic Analysis**	Subconsultant to prepare an updated Economic Analysis	NTP	12 months from NTP
3	**Regional Beach Sand Replenishment Project (RBSP III) Feasibility Study**	Draft RBSP III Feasibility Study, Review, and Finalize	NTP	14 months from NTP
4	**Off-shore Borrow Site Plan**	Consultant will prepare an Offshore Borrow Site Plan and Scope of Work for Three Sites	NTP	15 months from NTP
5	**Optional Task: City of San Clemente Nourishment Planning**	Consultant will expand upon the Feasibility Study, Economic Analysis, and Offshore Borrow Site Plan to include the City of San Clemente	TBD Upon SANDAG authorization	13 months from NTP
6	**City of Dana Point Nourishment Planning**	Consultant will expand upon the Economic Analysis and Feasibility Study to include for the City of Dana Point generally Doheny/Capo Beach area.	TBD Upon SANDAG authorization	TBD Upon SANDAG authorization

Appendix M
Recreational Opportunities

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Coastal Conditions and Recreational Opportunities by Beach

May 22, 2024

Introduction

The discussion below is adapted from the *Orange County Coastal Regional Sediment Management Plan* (USACE 2013) and highlights the recreational opportunities at each major beach in the study area starting from the north and moving south to the County of Orange (County) jurisdictional line with San Diego County.

Dana Point Beaches

Doheny State Beach

Doheny State Beach is located at the intersection of Highway 1 and Dana Point Harbor Drive. Amenities include lifeguards, a snack bar, bathrooms and showers, volleyball nets, barbeques, picnic areas, fire pits, and camping areas. The beach is popular year-round with overnight tourists and local and County residents. There are a few reefs and a river-mouth sandbar that produce soft but well-shaped waves that are popular with longboard and novice surfers and make the waves safe for children. There is also a large grassy area that is used in the summertime for concerts and events and otherwise is often crowded with visitors playing a range of games. In the park, there are 120 camping sites, and there are also many hotels in the area.

Capistrano County Beach

Capistrano County Beach is located directly west of Highway 1 on Beach Road. The beach has been damaged by coastal storms and lack of sand supply, and the County is actively developing solutions to prevent further damage to this beach. There is currently limited public parking at this beach due to storm damage. Across the street among the hotels are a small cluster of bars and restaurants.

Poche Beach

Poche Beach is located at the intersection of Highway 1 and Camino Capistrano. Free parking is available on Camino Capistrano and in a lot of approximately 100 spots across Highway 1. The lot also caters to overflow parking from an adjoining plaza containing a Department of Motor Vehicles office and a few other shops. There is seasonal lifeguard service and volleyball net but no other public amenities. This beach is the southernmost beach in Dana Point.

San Clemente City Beaches

Shorecliffs

This beach represents the northern City of San Clemente limit (Shorecliffs Beach Club fence line) to the north end of Capistrano Shores mobile home park community. This beach encompasses the private Shorecliffs Beach Club property and undeveloped beach north of the Capistrano Shores fence line. The Capistrano Shores mobile home park community is located along this stretch of beach. The Shorecliffs reach is halved between two distinct subsections. The northern section is mostly made up of the coastal infrastructure and beachside amenities of the Shorecliffs Beach Club, while the southern half is primarily relic vegetated dune habitat.

San Clemente City Beach (North)

The northern section of San Clemente's coast is, for the most part, a thin stretch of sand just west of the railroad tracks that caters largely to surfers. These beaches can be reached via pedestrian paths off of Mariposa and Buena Vista streets, and parking is limited to the residential streets. The exception is at the north end, where a metered parking lot of approximately 250 spots located just off Highway 1 caters to the patrons of the Ole Hanson Beach Club, a Metrolink station, and a beach that has seasonal lifeguards, a snack bar, a playground, and restrooms. This beach is popular with bodyboarders and local and County families in the summertime but in winter is primarily used for surfing. The north end is also where the San Clemente Pedestrian Beach Trail begins.

San Clemente City Beach (Main and South)

At the foot of Avenida Del Mar at the center of San Clemente sits the San Clemente Pier; the city beach stretches to the north and south. The pier is enjoyed year-round by visitors and residents and a wide variety of beach users. There are hotels and other types of overnight accommodations located nearby, so overnight visitors represent a significant source of tourism, especially in the summer. The pier is also popular with local and County residents who surf, bodyboard, fish, or dine at the restaurants on the pier, the snack bar on the beach, or any of the establishments located across the street from the beach in the area known as the Pier Bowl. Parking is provided in a metered lot of approximately 170 parking spots, plus additional metered street parking. Additional amenities at the beach include bathroom and shower facilities, shaded picnic areas, and a playground. Just north of the pier is the San Clemente City Lifeguard Headquarters. Farther north of the pier is Linda Lane Beach Park, located at the base of Linda Lane. This beach has similar amenities to the pier and is just a short walk away. This beach, however, is slightly less crowded and caters more to local and County families.

Farther south from the San Clemente pier are Calafia and T-Street beaches. At Calafia Beach, the City of San Clemente provides a metered parking lot of 190 spots, a restroom and shower facility, seasonal food, and lifeguard service. The beach here is narrower than the beaches to the north or

south, nevertheless, due to the amenities available, it is heavily populated by local, County, and tourist beachgoers when the weather is favorable. In the winter, surfers remain. The San Clemente Inn is just a few blocks from this beach, and a few other hotels are located east of the freeway. Continuing north is T-Street Beach, a popular surfing destination located at the intersection of Esplanade and West Paso de Cristobal. Near the beach there are 30 metered parking spots and additional street parking further up the two streets and within the residential area. A pedestrian bridge leads from the bluff down to the beach where there are lifeguards, a seasonal snack bar, and restroom and shower facilities. T-Street is very popular with locals and County residents year-round. In the summer, surfing is prohibited from 10:00 a.m. to 6:00 p.m., and swimmers, bodyboarders, and sunbathers dominate the wide sandy beach. During summer mornings and evenings, and in the winter, surfing is popular at the centrally located reef break.

San Clemente State Beach

San Clemente State Beach can be reached off Avenida Calafia, which intersects the I-5 freeway. The park provides approximately 150 campsites, year-round lifeguard service, and restroom and shower facilities. Trails from the bluff top park lead to the beach. In the summer months the beach and campground are filled with overnight visitors. In the winter, mostly local surfers remain.

Cyprus Shores

Cyprus Shores and Cotton's Point are the southernmost beaches in the County and the northernmost beach in the Trestles area. Cyprus Shores is accessible via a bike path off Christianitos Road that runs through San Onofre State Beach and the San Mateo Wetlands. Parking is available on the east side of the I-5 in a paid lot of just over 100 spots or on the adjacent street. There are no amenities here apart from a pit toilet at the base of the bike path. Cotton Point is a well-regarded surfing destination, and the beach is primarily used by surfers. In the winter the demographic is mostly local and Southern California residents; however, in the summer, the beach is crowded with traveling surfers. Cotton Point is also the location of President Nixon's Western White House, La Casa Pacifica, which sits atop the point overlooking the ocean in southern San Clemente.

Reference

USACE (U.S. Army Corps of Engineers), 2013. *Orange County Coastal Regional Sediment Management Plan*. Prepared for U.S. Army Corps of Engineers, County of Orange, and California Coastal Sediment Management Workgroup. Prepared by Everest International Consultants, Inc., in association with Science Applications International Corporation and Dr. Philip King. June 2013.