

MEMORANDUM

July 15, 2016

TO: Hillary Hauser
FROM: Mitchell Bass

RE: The Draft 2015 City of Goleta Coastal Hazards Vulnerability Assessment and Fiscal Impact Report

Introduction

On December 1, 2015, the City of Goleta approved and adopted the *Draft 2015 City of Goleta Coastal Hazards Vulnerability Assessment and Fiscal Impact Report* (prepared by the City of Goleta with Assistance from Revell Coastal, Santa Cruz, CA., December 2015). This unanimous vote to adopt by the Mayor and the City Council should be interpreted as a sign of the City's commitment to take into account, in its formulation of a new Local Coast Program, the risks it is predicted to face as a result of climate change. In support of this interpretation, it should be noted that the recommendation to approve from the City's Planning and Environmental Review Director stated that "(c)limate change is upon us, affecting almost every facet of California's natural and built environment" (1). In addition, each clause of the resolution adopting the report reflected a concern for such risks. For example, the initial clause read: "(T)he risk of coastal hazards is significant for people living on the south coast of Santa Barbara County, including the City of Goleta, due to the potential loss of life, property damage, and potential loss of natural and cultural resources" (2).

Background to the Report

In response to the perceived threats to coastal cities due to climate change, the California Coastal Commission (CCC) directed local governments to update their LCPs with provisions that plan accordingly for these widely predicted threats. Even more specifically, the CCC now sees the challenges posed by the singular threat of sea level rise (SLR) to be particularly urgent. As a result, in August 2015 the CCC unanimously adopted the Sea Level Rise Policy Guidance, which provides an overview of the science addressing SLR along the California coast and suggests ways for local coastal communities to prepare for rising coastal waters in their CCC planning and regulatory actions (3). The *Draft 2015 City of Goleta Coastal Hazards Vulnerability Assessment and Fiscal Impact Report* is the result of this climate change-sensitive stance by the CCC.

What is a Coastal Hazards Vulnerability Assessment?

According to the report, a *Coastal Hazards Vulnerability Assessment* is a process "whereby a community collaboratively seeks to understand the threat of climate-induced coastal hazards, such as sea level rise (and) identifies the community's values, determines whether these values are vulnerable to damage or loss from coastal hazards, and develops a course of action for protecting those values." Behind the process lies a methodology that relied on climate models, fiscal analysis, accessible field and archival data, and stakeholder input gathered through

meetings with community leaders, CCC staff, attendees at a coastal hazards public workshop, and members of the City's Planning Commission and other Departments, and its City Council. The *Fiscal Impact* of the report's title reflects the estimates of the financial costs to the City due to the expected impacts of climate change (4).

In its analysis of these impacts, the report profiles 11 vulnerable City sectors, and for each of the sectors recommends a set of remedies and adaptations. The sectors highlighted in the report include (5):

- Land Use and Structures (Old Town Area)
- Land Use and Structures (Coastal Resources Area)
- Coastal Armoring
- Oil and Gas
- Hazardous Materials
- Natural Resources
- Public Access
- Transportation
- Wastewater
- Water Supply
- Utilities

The City is roughly midway toward its goal of a new LCP. Overall, the process toward an LCP requires six steps to satisfy the CCC's policy guidance, and, with the issuance and adoption of the *Draft 2015 City of Goleta Coastal Hazards Vulnerability Assessment and Fiscal Impact Report*, the City has met steps one through four (6). However, this means that its recommendations should be considered provisional. Until the report or an updated draft of the current report receives CCC certification, all the recommendations for remediation and adaptation found in the report are considered only possible options against the threats of climate change, rather than mandated actions (7).

However, finding itself at this point in the process has an additional significance for the City. It also means that, at this stage (step four), not only will Goleta be using the results from the report to refine its adaptation measures and policy options to ensure their consistency with CCC policy guidance, but it can also use this time "to generate financial incentives and generate revenues to support risk reduction and removal of nuisance structures" (8).

Looking ahead, the report describes step five as calling for the drafting of a new LCP for final plan certification by the CCC, once there has been additional public outreach and any resulting revisions to the plan. Finally, step six covers implementation, monitoring and revision as warranted, which can necessitate an updated report that can take advantage of refinements to adaptation models and implementation strategies (9).

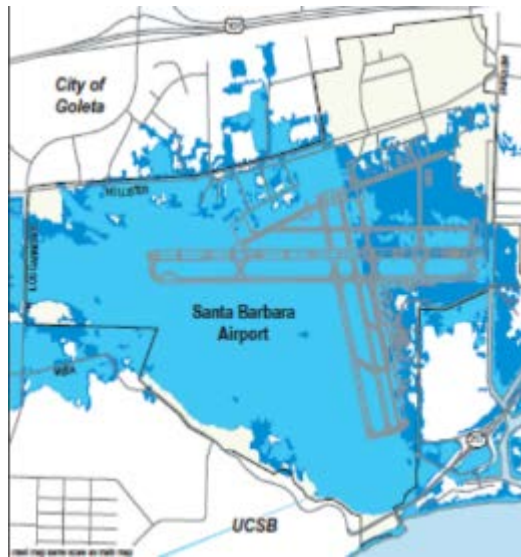
The Wastewater Sector and Its Vulnerabilities

It should be obvious why Goleta's wastewater infrastructure qualifies as a vulnerable sector. Wastewater treatment plants (WWTPs) have typically been constructed close to the California coastline for ease of disposal of wastewater through ocean outfalls. Unfortunately, this also makes them susceptible to inundation and flooding from sea level rise. Furthermore, SLR is predicted to occur in combination with more intense storms, occasioning a scenario that presents a serious public health concern as it increases the risk of raw, untreated sewage entering coastal waters. Indeed, it would be serious enough should even partially untreated effluent make its way into the Pacific. Additionally, discharges of untreated sewage for even a short period of time have the potential to lead to serious degradation of coastal waters (10).

Moreover, the projected impacts of wastewater treatment plant (WWTP) flooding, due to predictions of SLR and more intense storms along the coast, were also outlined in a 2009 Pacific Institute report entitled *The Impacts of Sea-Level Rise on the California Coast*. “[I]nundation from floods,” the Pacific Institute states, “could damage pumps and other equipment, and lead to untreated sewage discharges. Besides the flood risk to plants, higher water levels could interfere with discharge from outfalls sited on the coast.” (11)

The vulnerability of the Goleta Sanitary District's WWTP to severe future flooding and SLR is already evident in a number of studies. It is located adjacent to the Santa Barbara Airport, and according to flood estimates and projections from the Environmental Impact report (EIR) for the City of Santa Barbara's *Plan Santa Barbara* General Plan Update, airport facilities are already vulnerable to inundation in a 100-year flood event under year 2000 baseline conditions (12). Furthermore, the 2012 Santa Barbara Sea-Level Rise Vulnerability Study, looking ahead to the year 2100, states: “With a rising sea level, the frequency and magnitude of flooding in the Goleta Slough and Airport area can be expected to increase, (as it is an area projected) to be affected by a 100-year coastal flood with as much as 55 inches (1.4 meters) of sea level rise” (13). Similarly, in its comments in response to the Draft Santa Barbara Climate Action Plan, Heal the Ocean made the point that any flooding projections for the year 2100 threatening the Santa Barbara Airport threaten the Goleta Sanitary District as well given their proximity (14).

The map below presents the predicted 100-year flood events for existing conditions correlated with the projected 2100 SLR scenario from the *Plan Santa Barbara* General Plan Update. The flooded areas are in blue (15):



In response to similar projected threats to their WWTPs, other municipalities have already acted. For example, in Washington D.C., the District of Columbia Water and Sewer Authority will be spending the next several years constructing a 17.2-foot high seawall to protect its Blue Plains WWTP from a 500-year flood event (16). Boston has also shown foresight. In designing its Deer Island Sewage Treatment Plant during the 1980s, years before its opening in 1995, the Massachusetts Water Resources Authority chose to elevate the WWTP by 1.9 feet over its original planned height in order to accommodate predicted SLR through 2050, the year when the facility is slated to close (17).

Wastewater Sector 100-Year Planning Horizons

The *Draft 2015 City of Goleta Coastal Hazards Vulnerability Assessment and Fiscal Impact Report* contains recommendations for both current and future remediation and adaptation projects through the year 2100 that the City can put into effect to counter the threats from climate change to its WWTP and related infrastructure. Recognizing that the primary flood risk for Goleta comes from closed barrier beach flooding, these adaptations include flood-proofing to protect vulnerable infrastructure, targeting inlet management to reduce flood levels, and increasing the elevation of vital access roads for better emergency access to valves and the WWTP itself (18).

The total period for the remediation projects covered by the report extends nearly 100 years, from 2010 through 2100. For planning purposes, the entire period is broken up into four discreet “planning horizons.” Each horizon corresponds to the onset of a specific time frame during which certain predicted impacts can be expected, and initiates with an onset year (2010, 2030, 2060, 2100) from which a specific remediation plan can be set in motion (19). The year 2010 is considered the first year of the first planning horizon, since the mapping of existing hazards was based on a LiDARi (Light Detection and Ranging) topographic survey dating from that year (20).

With each planning horizon year comes a predicted rise in sea level, increasing in severity over time. The SLR projections from the report are as follows:

- Commencing in 2030: As much as 1 foot
- Commencing in 2060: Around 2 feet
- Commencing in 2100: Around 5 feet

Wastewater Sector Remedies and Adaptations (21)

The *Draft 2015 City of Goleta Coastal Hazards Vulnerability Assessment and Fiscal Impact Report* focuses on flood-proofing as the primary means to protect vulnerable WWTP infrastructure. Its recommendations, with their associated costs, are below:

1. Retrofit to flood-proof two lift stations (\$150,000 each).....\$300,000

This work includes the installation of collars at storm drain entrances. It is described in the report as a relatively low-cost option to accommodate several feet of SLR, but no other detail is provided.

2. Seal vulnerable wastewater manhole covers.....\$150 per manhole

Sealing manholes minimizes the infiltration of brackish floodwaters and stormwater into the wastewater system. The total number of vulnerable manholes that should be sealed at each planning horizon can be found below:

- 2010 (current): 6 manholes for total of \$900
 - These are recently relocated manholes due to the Mesa Road Realignment Project
- 2030 (<1 ft of SLR): 14 additional manholes for total of **\$2,100**
- 2060 (~2 ft of SLR): 29 additional manholes for total of **\$4,350**
- 2100 (~5 ft of SLR): 82 additional manholes for total of **\$12,300**

3. Relocation of ocean outfall cleanout access vault at Goleta Beach.....\$75,000

Erosion is the likely leading cause of the potential need to relocate the access vault. The report does not indicate a new location for the access vault, or provide any additional detail.

4. Relocation of WWTP.....~\$9 million

The ongoing Ocean Meadows/Upper Devereux Restoration Project presents an opportunity to relocate the WWTP from its current wetlands location as a part of the project. At the very least, the sewer line, which crosses the restoration area at Upper Devereux Slough/North Campus Open Space at UCSB, could be relocated. The report gives no further specifics.

Wastewater Considerations (22)

The *Draft 2015 City of Goleta Coastal Hazards Vulnerability Assessment and Fiscal Impact Report* mentions additional areas of concern, with some lacking remedies at the time of the report, that could impact the wastewater infrastructure or the release of effluent into the ocean. These are:

1. Underground pipes

Underground pipes (sewer lines) exposed to coastal flooding should not pose a risk. Maintenance costs, however, may rise, and emergency access could be affected during flooding. The aggregate length of vulnerable sewer line at each planning horizon is:

- 2010 (current): 1,535 feet of pipe
- 2030: an additional 2,885 feet of pipe
- 2060: an additional 7,128 feet of pipe
- 2100: an additional 22,945 feet of pipe

2. Creek flooding

According to FEMA, 640 acres (12 percent of Goleta) lie within the agency's 100-year creek flood hazard zone map. Taking steps to prepare for coastal flooding in advance would allow the City to focus future existing resources on responding to creek flooding. It should be kept in mind that any severe floods could overload the existing stormwater system. There are 204 manholes and 63,416 feet of pipe (sewer line) vulnerable to creek flooding.

3. Seawall armoring

The existing coastal timber seawall armoring is severely outdated and derelict, and the structure will no doubt continue to erode, becoming an issue of greater concern over time. SLR will cause the eventual failure of this armoring and escalating erosion. The cost of removing this structure is approximately \$1 million, with the City's financial obligation amounting to approximately \$250,000 of the total cost. Other coastal landowners would be liable for their individual portion. After its removal, the construction of a new seawall would cost the City a similar amount for its portion. (This work was previously approved as part of the California State Lands Commission Beach Hazards Removal Project, but so far has only been partially achieved.)

References

(1) *Memorandum to Mayor and Councilmembers*, City of Goleta, Undated.
<<http://www.cityofgoleta.org/home/showdocument?id=11174>>.

(2) *Resolution No.15-55 and Draft 2015 City of Goleta Coastal Hazards Vulnerability Assessment and Fiscal Impact Report*. City of Goleta, December 1, 2015.
<<http://www.cityofgoleta.org/home/showdocument?id=11317>>.

(3) California Coastal Commission. *Sea Level Rise Adopted Policy Guidance*, August 12, 2015.
<<http://www.coastal.ca.gov/climate/slrguidance.html>>.

- (4) *Draft 2015 City of Goleta Coastal Hazards Vulnerability Assessment and Fiscal Impact Report*. City of Goleta, op. cit., p. ES-1.
- (5) Ibid., p. 5-6.
- (6) Ibid., p. 1-4.
- (7) Ibid., pp. 1-4, 1-5.
- (8) Ibid., pp. 1-6, 1-7.
- (9) Ibid., p.1-7.
- (10) Heal the Ocean. Letter to California Natural Resources Agency addressing Safeguarding California Plan, October 30, 2013, p.1.
<http://healtheocean.org/images/ugc/uploads/press/HTO_Input_on_Safeguarding_California_Plan_10-30-13_1.pdf>.
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- (12) Griggs, Gary, and Nicole L. Russell (University of California, Santa Cruz). *City of Santa Barbara Sea-Level Rise Vulnerability Study*, California Energy Commission, Publication number: CEC-500-2012-XXX, 2012, p. 43.
- (13) Ibid.
- (14) Heal the Ocean. Comment letter in response to the Draft Santa Barbara Climate Action Plan, p. 3.
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<http://www.youplansb.org/docManager/1000000694/18.0_Global_Climate_Change.pdf>.
- (16) Environment and Energy Publishing (E&E). *Washington, D.C.'s Water Utility Takes Lead in Preparing Cities for Warming World*, January 13, 2014.
<<http://www.eenews.net/stories/1059992780>>.

(17) Climate Adaptation Knowledge Exchange (CAKE). *Proactive Incorporation of Sea Level Rise into the Design of the Deer Island Wastewater Treatment Plant*, December 18, 2010. < <http://www.cakex.org/case-studies/proactive-incorporation-sea-level-rise-design-deer-island-wastewater-treatment-plant>>.

(18) *The 2015 City of Goleta Coastal Hazards Vulnerability Assessment and Fiscal Impact Report (Draft)*, op. cit., Appendix A, p. A-10.

(19) Ibid., pp. ES1-ES2.

(20) Ibid., p. ES-2.

(21) Ibid., Appendix A, p. A-10.

(22) Ibid.