Field Data Collection

Kimley-Horn conducted a site visit on May 4, 2022, in Buttonwood to collect storm grate elevations. Elevations were collected using an EOS Arrow Gold RTK with a survey antenna and a GIS field map. The data was processed using GIS ArcPro Z-Value analysis tool. All the data collected in the field uses NAVD88 vertical datum. Storm grate inverts and sizes collected from the field were used as the primary inputs into the Kimley-Horn ICPR4 model.

A second site visit was conducted on May 18, 2022, to document the high tide event occurring at approximately 2 pm. The event was recorded at elevation 1.80 feet NAVD88 and was used to evaluate the Buttonwood roadways for sunny day flooding conditions.

2018 DEM

The 2018 Florida Peninsular Digital Elevation Model (DEM) was published by USGS on the USGS Science Base-Catalog and is in the vertical datum of NAVD88. The data collection for the DEM was conducted from November 2018 to January 2019; thus, the DEM does not include topographical changes that took place after January 2019.

Finish Floor Elevation Certificates

The Town provided Kimley-Horn with available Elevation Certificates (EC). In the Buttonwood community, 8 parcels have an elevation certificate with dates of certification ranging from 1990 to 2015. The certificates provide verification of the lowest floor elevations in relation to the BFE in the vicinity.

Sea Level Projection Data

The 2017 NOAA SLR Projections (Intermediate High) were utilized in this stormwater analysis. The closest NOAA tidal benchmark station to the project area is 8726520 – St. Petersburg, FL. See Figure 2, Figure 3, and Table 1 below for inputs and projection data.

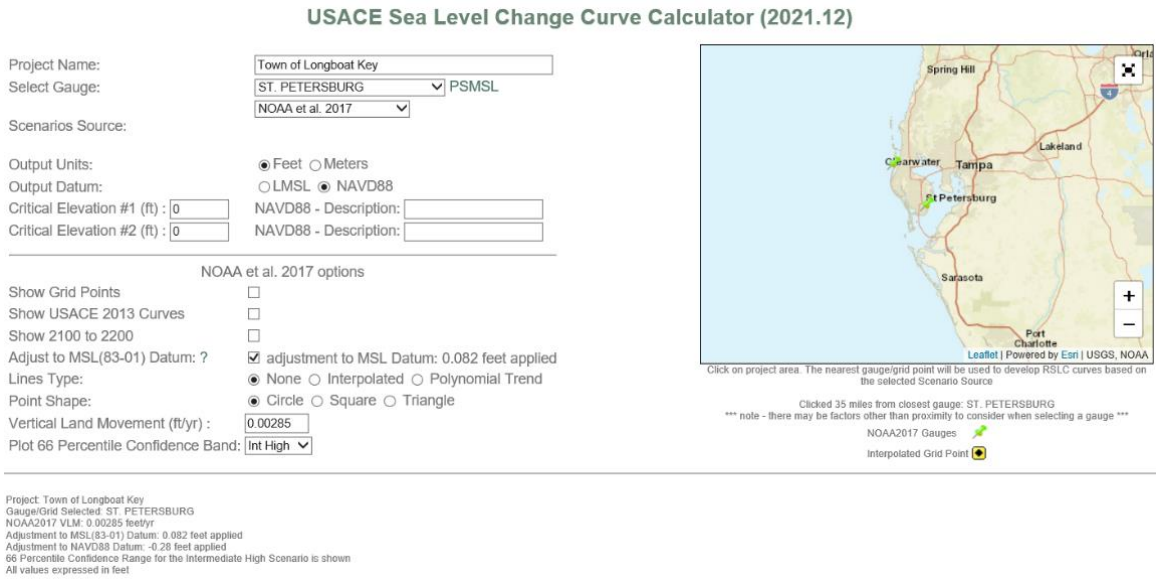

Figure 2: US Army Corps of Engineers data inputs.

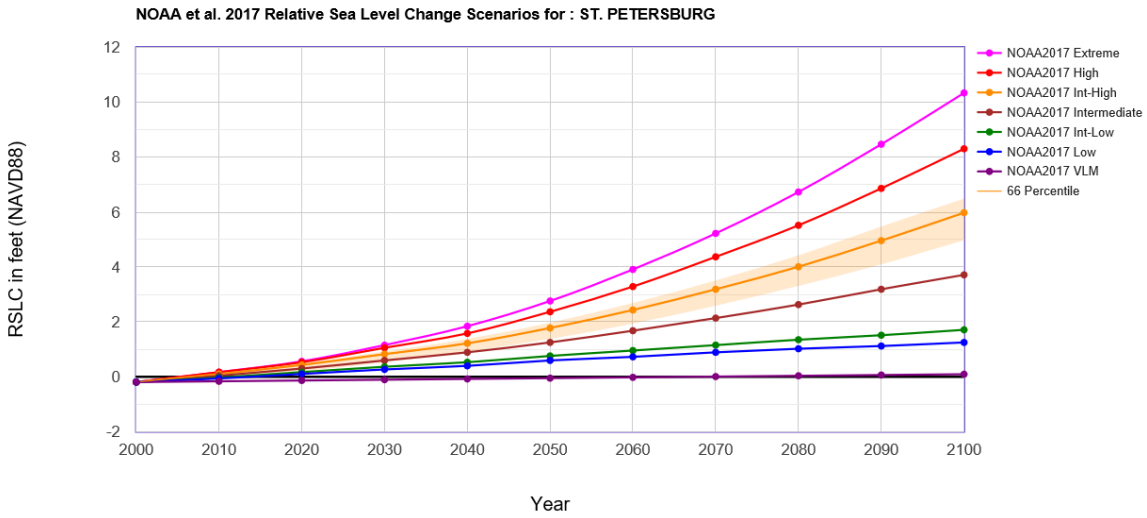

Figure 3: NOAA 2017 Relative Sea Level Change data.

Table 1: NOAA 2017 Sea Level Change Data

Town of Longboat Key
Scenarios for ST. PETERSBURG
NOAA2017 VLM: 0.00285 feet/yr
All values are expressed in feet

Year	NOAA2017 VLM	NOAA2017 Low	NOAA2017 Int-Low	NOAA2017 Intermediate	NOAA2017 Int-High	NOAA2017 High	NOAA2017 Extreme
2000	-0.19	-0.19	-0.19	-0.19	-0.19	-0.19	-0.19
2010	-0.16	-0.06	-0.03	0.04	0.10	0.17	0.17
2020	-0.14	0.10	0.17	0.30	0.43	0.53	0.56
2030	-0.11	0.27	0.36	0.59	0.82	1.05	1.15
2040	-0.08	0.40	0.53	0.89	1.22	1.58	1.84
2050	-0.05	0.59	0.76	1.25	1.78	2.37	2.76
2060	-0.02	0.73	0.95	1.68	2.43	3.28	3.91
2070	0.01	0.89	1.15	2.14	3.19	4.37	5.22
2080	0.03	1.02	1.35	2.63	4.01	5.52	6.73
2090	0.06	1.12	1.51	3.19	4.96	6.86	8.47
2100	0.09	1.25	1.71	3.71	5.97	8.30	10.34

2.2 Hydraulic and Hydrology Modeling

The stormwater modeling for this analysis was conducted using Interconnected Channel and Pond Routing, Version 4 (ICPR4). This model was created from scratch and includes the project area and the surrounding areas that drain through the project. Using the 2018 DEM, survey data, Town of Longboat Key Stormwater Inventory (*StormWaterSurvey.gdb*), and field collected data; basins, nodes, and links were placed to best represent the existing drainage patterns. To analyze the model, four design storm events and three boundary stage conditions were used to emulate a storm and tidal event occurring at the same time. The results were then used to create several GIS maps exhibiting flooding in the design scenarios.

Basin Delineation

Using the 2018 LiDAR data and the locations of the stormwater inlets, drainage basins were delineated to represent the existing conditions in the Buttonwood community. Within the Buttonwood neighborhood and the rear lot grate inlets from Triton Bend, each basin represented the area that drained to each grate inlet or drains into the rear lot ditch. It can be seen that a large portion of area around Triton Bend and Neptune Avenue drain into the Buttonwood project area; thus, these areas are included in the stormwater model. In addition, a portion of Gulf of Mexico Drive drains into the Buttonwood neighborhood. From there the basins were further divided based upon the storm inlets, swales, and the location of high points in the roadway.