5.2.20 STUDY AREA 20 – US-1 AND SE 15TH STREET

This study area is a residential neighborhood located between US-1 and the Intracoastal Waterway along SE 13th Street, SE 13th Court, SE 14th Street and SE 15th Street. The ground surface elevations within this study area are very low, which creates some the flooding problems. The existing stormwater system includes recently installed exfiltration system, approximately 7,000 linear feet, without a positive outfall into the Intracoastal Waterway. The storage and infiltration capacity of the existing exfiltration system is limited due to the low elevations within these right-of-way areas. However, there are some roadways in the study area, such as SE 23rd Avenue, SE 24th Avenue and SE 24th Terrace, which are without existing drainage facilities.

The existing conditions stormwater model was used to evaluate the flooding under the existing conditions during a 5-year, 24-hour design storm event with 7.8 inches of rainfall. The topography of the study area along with the model schematics are displayed on Figure 5.20A at the end of this section. The study area is defined by the sub-basin SE_023_01 within the stormwater model. According to the topography, most roadways within the study area are consistently low. Based on the results of the stormwater model, the extents of the expected flooding within the study area is displayed on Figure 5.20B at the end of this section. According to the results of the stormwater model, the estimated flooding depth is greater than 1 inch throughout the entire study area.

The only feasible system improvement alternative for this study area is expanding the exfiltration trench system within the public right-of-way areas which are not currently served by drainage infrastructure. The installation of a new positive outfall is not possible due to regulatory restrictions. The installation of the drainage well would not have an impact to the low ground surface elevation in relation to the water table depth, which would limit the discharge capacity. The system improvement alternative for this study area is summarized below.

Alternative 1: Exfiltration Trench

The stormwater model was used to conduct several simulations of the installation of the proposed exfiltration trench within the study area, which is not currently served by an existing stormwater system. The purpose of this system improvement alternative is to provide additional storage and infiltration capacity to alleviate the existing flooding issues quicker. Under Alternative 1, the proposed construction includes a total of 1,730 LF of exfiltration trench along SE 23rd Avenue, SE 24th Avenue, and SE 24th Terrace. The installation of additional exfiltration systems within the study area will help draw down any flooding after rainfall events. The estimated design and construction costs for this exfiltration trench alternative are approximately $1,889,000. CMA conducted an analysis with the stormwater model of Alternative 2 to estimate the maximum potential reduction in peak flood stage and flood duration due to an exfiltration trench system within this study area. During the evaluation of Alternative 1, the design parameters for the proposed exfiltration trench are assumed within the stormwater model to be as follows:

- Trench Width: 4 feet
- Trench Height: 4 feet
- Perforated pipe diameter: 18-inch
- Hydraulic conductivity: 9.8×10^{-4} CFS/ft^2-ft head

Based on our analysis with the stormwater model, the reduction in peak flood stage under Alternative 1 is summarized within Table 5.20.1 below. The results show a negligible reduction in peak flood stages from implementing this alternative. Based on the model results, Alternative 1 does not provide any significant reduction in peak flood stage. At the critical model node (Node SE02301), the peak flood depth is reduced from 0.71 feet under the existing conditions to 0.70 feet under Alternative 1.

Table 5.20.1 – Alternative 1 Peak Flood Stage Summary					
	Existing Conditions			Alternative 1	
Nodes	Peak Stage (feet, NAVD)	Ground Elevation (feet, NAVD)	Flood Depth (feet)	Peak Stage (feet, NAVD)	Peak Stage Reduction (feet)
SE02301	4.21	3.5	0.71	4.20	-0.01

Based on our analysis with the stormwater model, the reduction in flooding duration under Alternative 1 is summarized within Table 5.20.2 below. Alternative 1 does not reduce the expected flood duration within the study area at the critical model node (Node SE02301).

Table 5.20.2 – Alternative 1 Flood Duration Summary				
Nodes	Reference Street Elevation (feet, NAVD)	Flood Duration (hours)		
		Existing Conditions	Alternative 1	Reduction (%)
SE02301	3.50	22.0	22.0	0

Alternative Comparison

Based on our analysis with the stormwater model, Alternative 1 provides basically no flood control benefit to the study area as a whole in regards to the reduction of both peak flood stage or flood duration. Alternative 1 will not provide any flood control benefit to the entire study area. Additional system improvement alternatives, such as drainage wells, pump stations, pipe size upgrades, and retention areas, were not feasible for this study area due to the low ground surface elevations and the lack of existing positive outfalls or existing drainage system to interconnect with. Due to these site conditions within the study areas, a system improvement alternative to be considered for this study areas would be the implementation of additional local improvements which provide additional storage volume for stormwater runoff, such as regraded swales or subsurface soil storage along the public roadways within the study area. These additional local improvements will only provide limited flood control benefits to the entire study area but will reduce the extent of localized flooding within the roadway areas.

CMA recommends the installation of exfiltration trench in targeted City right-of-ways which address isolated flooding problem locations within the study area without existing drainage infrastructure. The recommended stormwater improvements for this study area include the installation of new exfiltration trench along SE 23rd Avenue, SE 24th Avenue and SE 24th Terrace to address localized flooding problems in this area. The swale areas should also be regraded throughout the study area to provide additional storage volume for stormwater runoff. For the recommended stormwater improvements for this study area, CMA has prepared a conceptual layout, which is enclosed within Appendix A-1 and a preliminary cost estimate, which is enclosed within Appendix A-2. During the detailed design phase, Alternative 2 will encounter various constructability concerns related to potential utility conflicts with other underground utilities within the public right-of-way area, which could reduce the extent of the exfiltration trench installed.

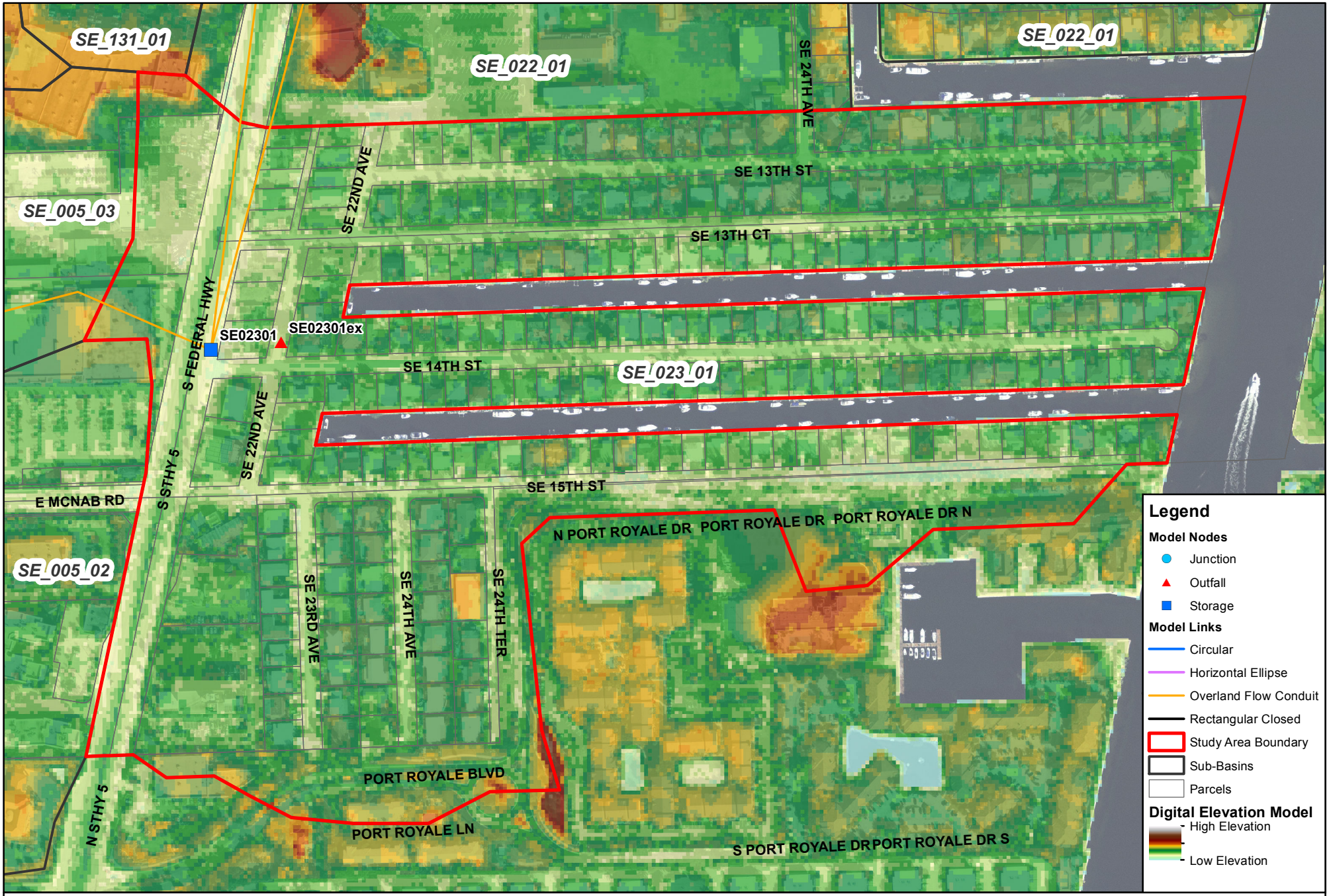

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Figure 5-20A
US-1 & SE 15th Street
Existing Topography & Model Schematics

0 150 300
Feet

N
W E
S

Figure 5-20B
US-1 & SE 15th Street
Potential Flooding Depth