

### 3.1 Proposed FPLOS Evaluation

The proposed FPLOS criteria consider the type of road and the return period of the storm. The criteria assume that no flooding may occur on evacuation routes at any time, but nuisance flooding may occur on less traveled streets as long as homes and businesses are not affected. This also allows distinguishing between nuisance flooding and hazard flooding. **Table 2** shows the proposed FPLOS criteria.

**Table 2. Proposed FPLOS Criteria for Collier County**

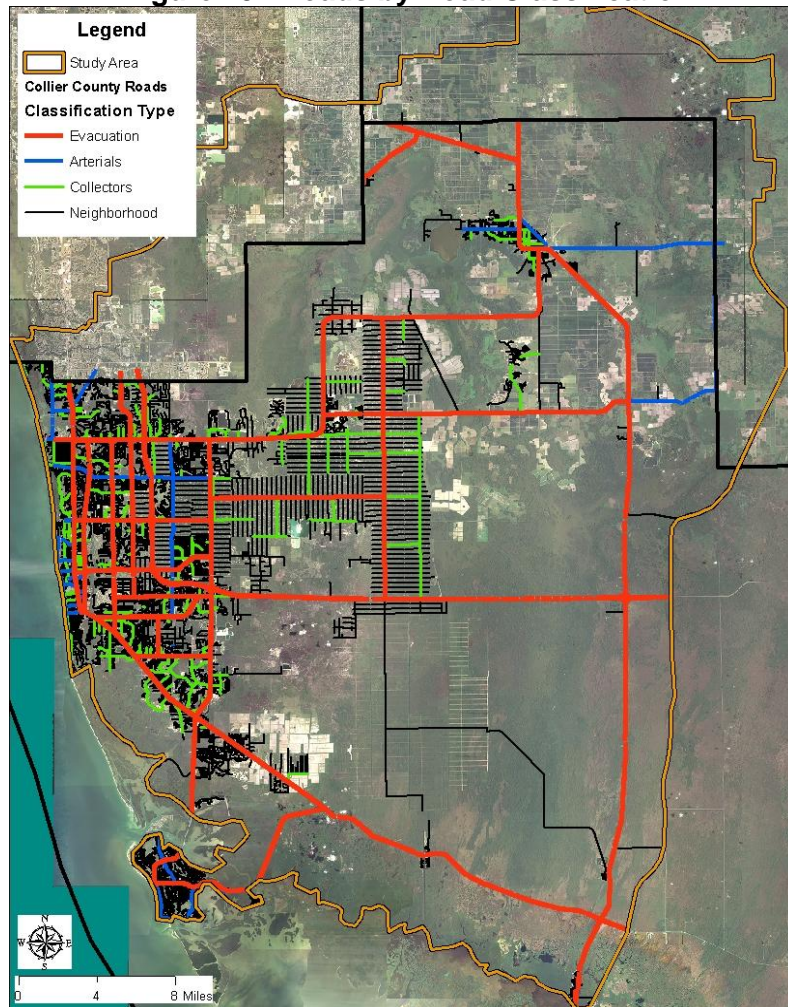
Roadways	Storm Return Period (years)		
	10	25	100
A. Evacuation Routes	None	None	None
B. Arterials	None	None	6 inches
C. Collectors	None	6 inches	9 inches
D. Neighborhood	6 inches	9 inches	12 inches
<b>Open Space</b>			
Flooding of open space is acceptable if it does not compromise public health and safety			

The evaluation of the proposed FPLOS was completed by classifying roads within Collier County as Evacuation Routes, Arterials, Collectors, or Neighborhood. The roads shapefile provided by Collier County included Census Feature Class Code (CFCC) designation for individual types of roads. PBS&J was unable to define a consistent relationship between CFCC designations and the proposed road classifications; therefore, review of aerial photography and best professional judgment was used to classify each road in the County based on the criteria listed below. **Figure 15** shows the distribution of the various road classifications in Collier County.

- Evacuation Routes – These are roads identified as evacuation routes by Collier County regardless of CFCC designation
- Arterial Roads – These are high capacity urban roads that connect developed areas to freeways and evacuation routes
- Collectors – These are low to moderate traffic roads that link local streets to arterial roads. These also provide access the residential areas
- Neighborhood – These are local roads within neighborhoods or other developed areas

To evaluate the proposed FPLOS criteria, model inundation elevation results from the 10-, 25-, and 100-year, 72-hour storm events were converted to grid based water surface elevations and compared to road surface elevations. The difference between the inundation elevation and road surface elevation was calculated and each road segment was classified as failing if the difference between the inundation elevation and the road surface elevation exceeded the proposed FPLOS criteria.

**Figure 15. Roads by Road Classification**



**Figures 16 through 18** show the results of the proposed FPLOS for the evacuation routes during the 10-, 25- and 100-year; 72-hr storm events. The figures indicate that the proposed FPLOS results for the evacuation routes do not change significantly from the existing FPLOS results.

However, this analysis indicates that the criteria are not met along the evacuation routes even for the 10-yr/72-hr storm event conditions. The failures occur along US-41 in the City of Naples and near the intersection with Airport Pulling Road. Failures are also predicted on Golden Gate Boulevard west of Airport Pulling Road and in the Golden Gate City area. In the northern Golden Gates Estates, Everglades Blvd is predicted to fail the proposed FPLOS during all storm events.

The results for the arterial roads analysis are shown in **Figures 19 through 21**. The figures indicate consistency with the existing FPLOS results. The results also indicate that most road segments that fail 25-year design storm criteria also fail the 10-year storm criteria. However, several road segments, primarily along Vanderbilt Beach Rd and Logan Blvd, that fail the 25-year design storm criteria, pass the 100-year criteria. That is because the proposed 100-yr criteria allow six (6) inches of inundation above the road surface. The results suggest that the 25-year design storm should be used to support drainage design for arterial roads.

**Figures 22 through 24** show the results of the proposed FPLOS for the collector roads. The most significant difference in the number of road segments that pass the proposed FPLOS

criteria is between the 10-year and 25-year storm events. There is little difference in the number of road segments that pass the proposed FPLOS results between the 25-yr and 100-yr storm events. This is related to the allowable depth of water above the road surface for the 25-yr and 100-yr storm events. This also suggests that the 10-year design storm should be used to evaluate drainage design of collector roads in Collier County.

The results for the neighborhood roads are shown in **Figures 25 through 27**. The effect of the difference in the FPLOS criteria is most evident on the neighborhood roads during the 10-yr storm event. Many of the neighborhood roads that fail the existing FPLOS criteria pass the proposed 10-yr FPLOS criteria because inundation is predicted to be less than six (6) inches above the road surface. It is also interesting to note that many neighborhood roads that failed the proposed 10-yr FPLOS, pass the proposed 25-yr FPLOS. In addition, all neighborhood roads are predicted to pass the proposed FPLOS criteria for the 100-yr design storm. This result is also directly related to the difference in the allowable level of inundation over the road surface. As with the collector roads, results indicate that the 10-yr design storm should be used to support design of neighborhood roads in Collier County.

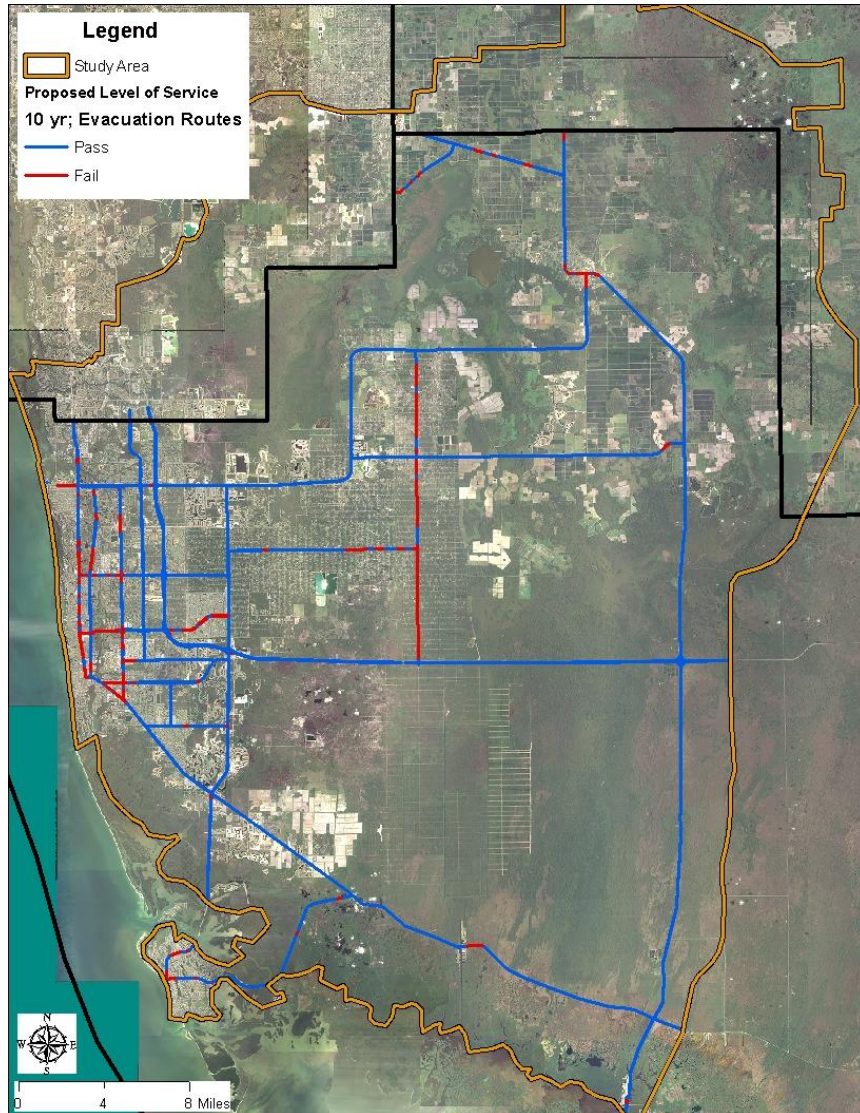
## 1.0 Conclusions

The results of comparing the existing and proposed FPLOS criteria have several implications for Collier County.

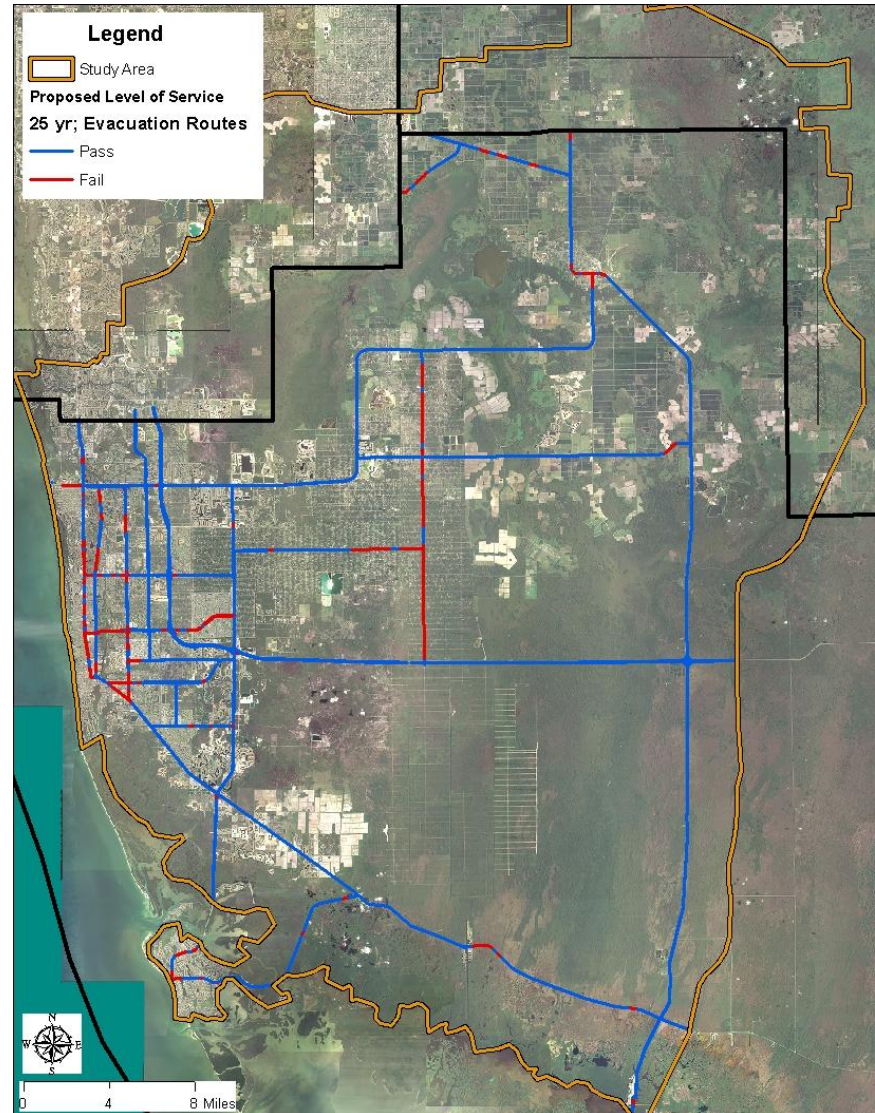
- Currently, roads within the county are considered as either evacuation routes or other surface streets. There is no distinction between arterial, collector, or neighborhood roads for flood protection. The existing FPLOS analysis indicates that most of the evacuation routes meet the 25-yr; 72-hr storm event criteria; however, most of the surface streets fail. There is no effective means for the county to prioritize projects to address flooding.
- The proposed FPLOS analysis indicates that several segments of road along the evacuation routes should be evaluated more thoroughly to ensure that there is no flooding and that the routes remain open during the 100-yr, 72-hr storm event. These road segments should be the first priority for flood protection projects in Collier County.
- Existing arterial, collector, and neighborhood roads should be more rigorously evaluated based on the proposed FPLOS. Arterial roads should be designed based on the 25-yr, 72-hr storm event, and collector and neighborhood roads should be designed to meet the proposed FPLOS for the 10-yr, 72-hr storm event.



**Figure 16. Proposed Level of Service for 10-yr/72-hr Storm Event: Evacuation Routes**

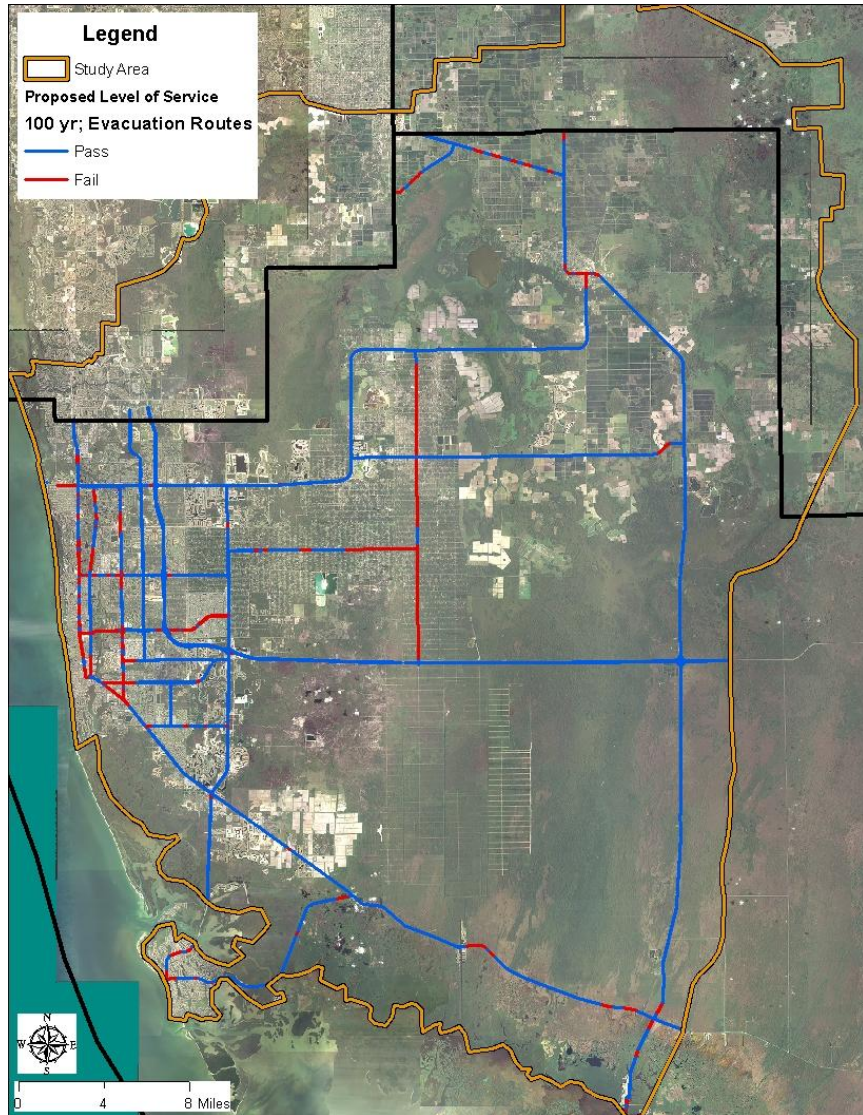


**Figure 17. Proposed Level of Service for 25-yr/72-hr Storm Event: Evacuation Routes**

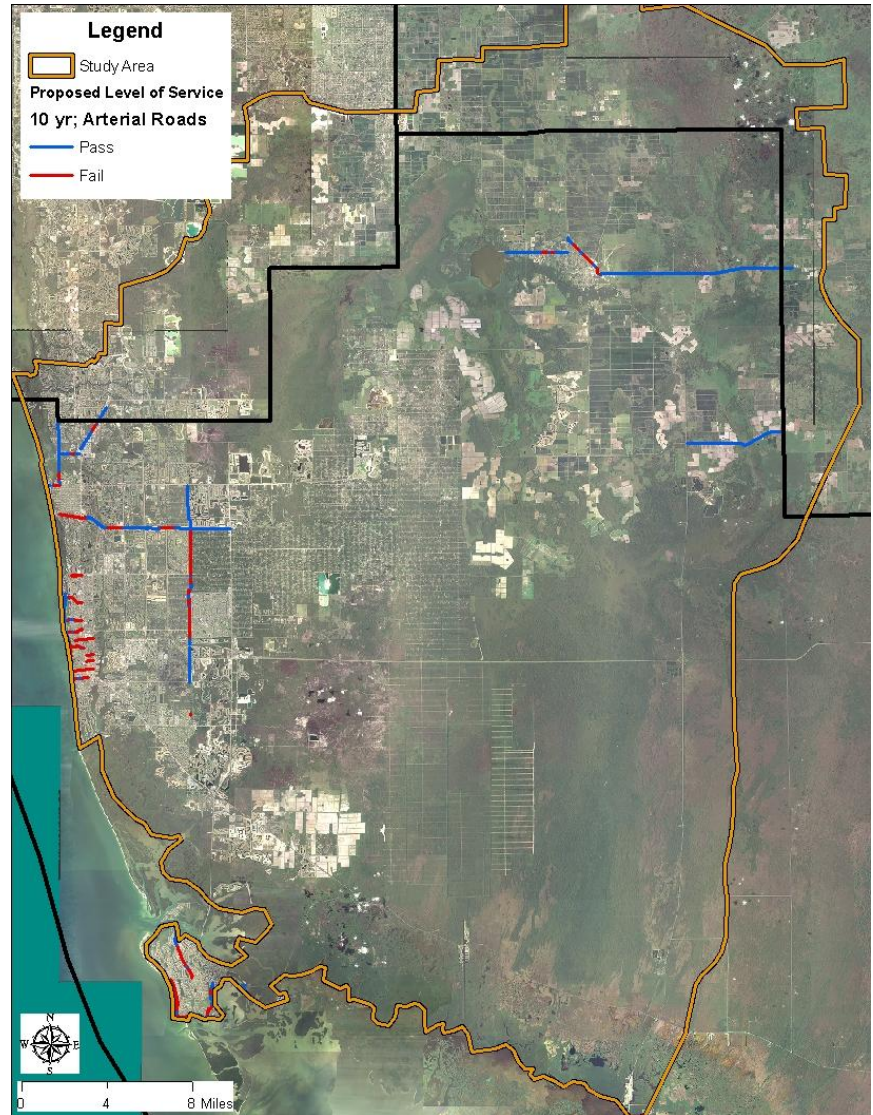




**Figure 18. Proposed Level of Service for 100-yr/72-hr Storm Event: Evacuation Routes**

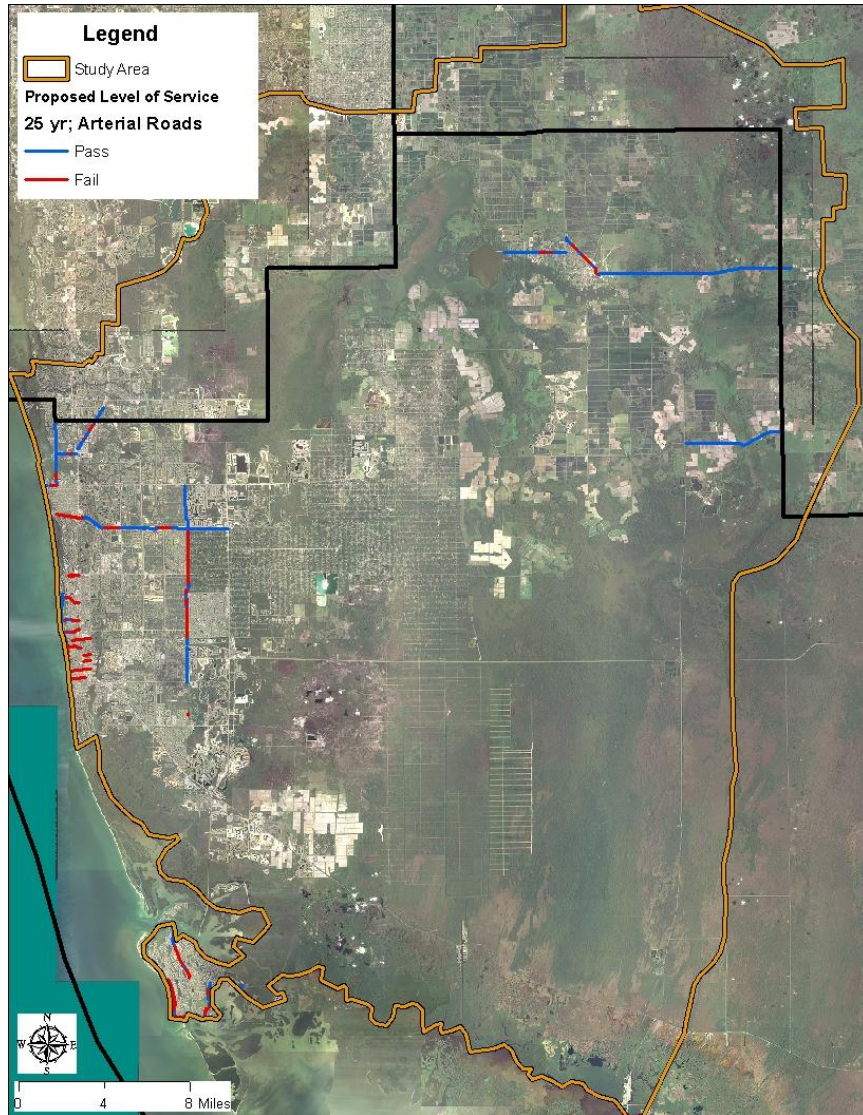


**Figure 19. Proposed Level of Service for 10-yr/72-hr Storm Event: Arterial Roads**

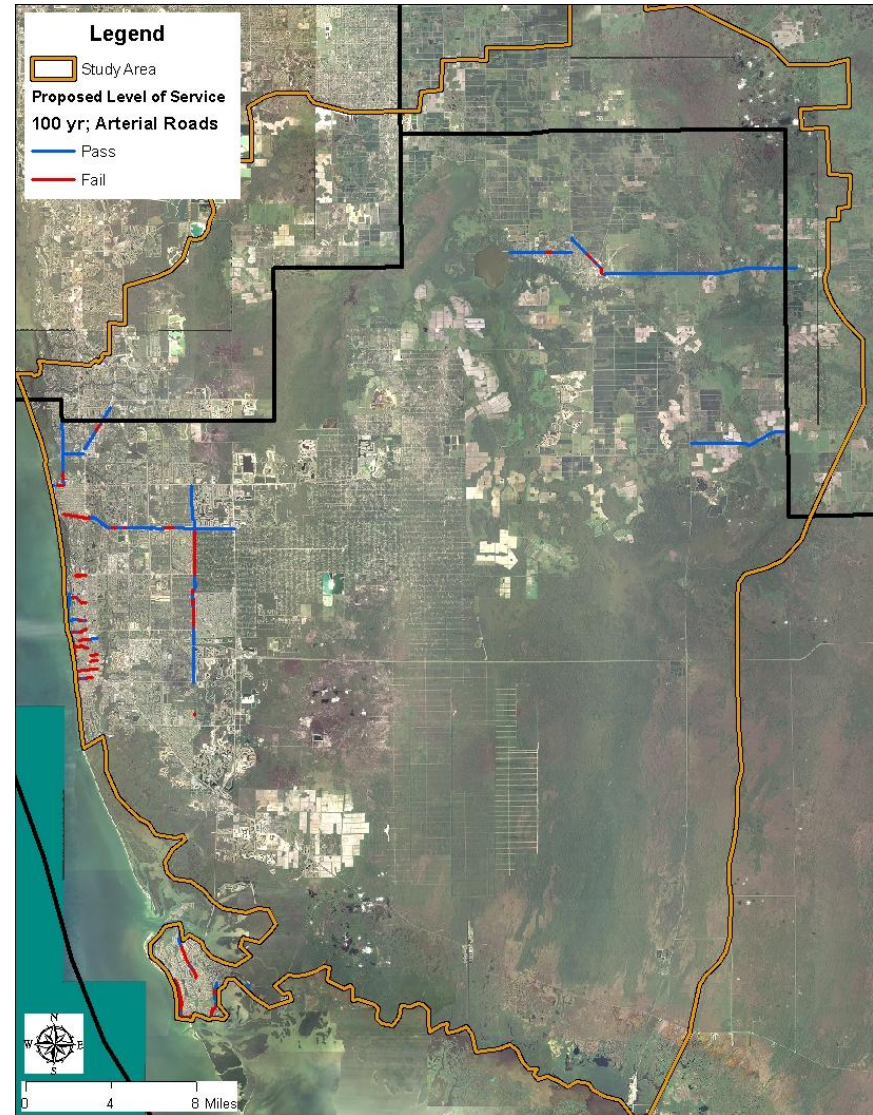




**Figure 20. Proposed Level of Service for 25-yr/72-hr Storm Event: Arterial Roads**

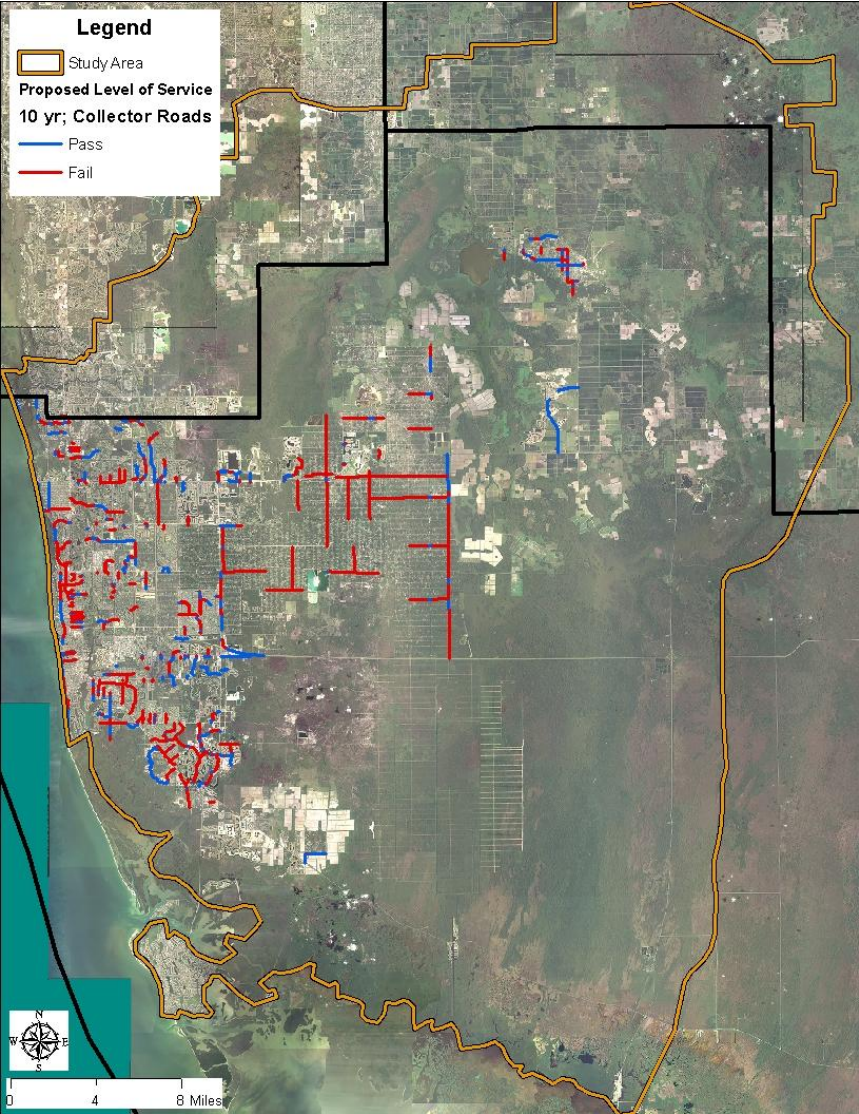


**Figure 21. Proposed Level of Service for 100-yr/72-hr Storm Event: Arterial Roads**

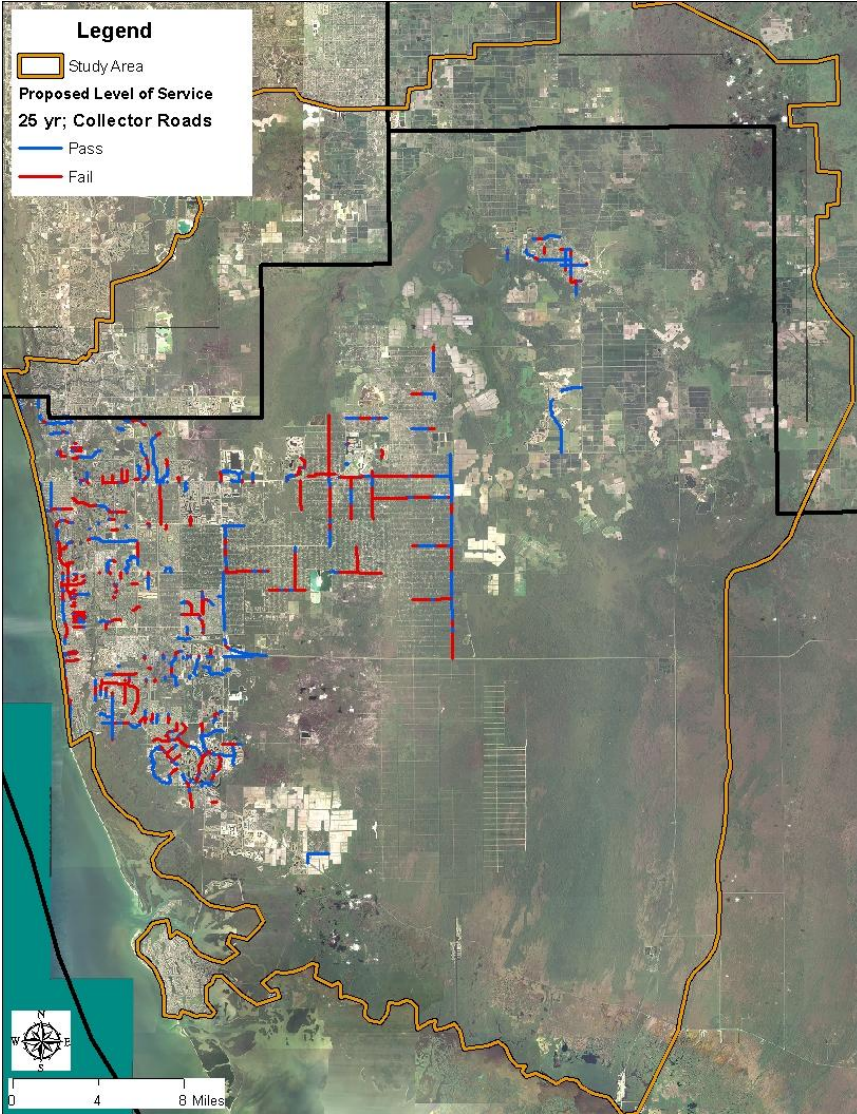




**Figure 22. Proposed Level of Service for 10-yr/72-hr Storm Event: Collector Roads**

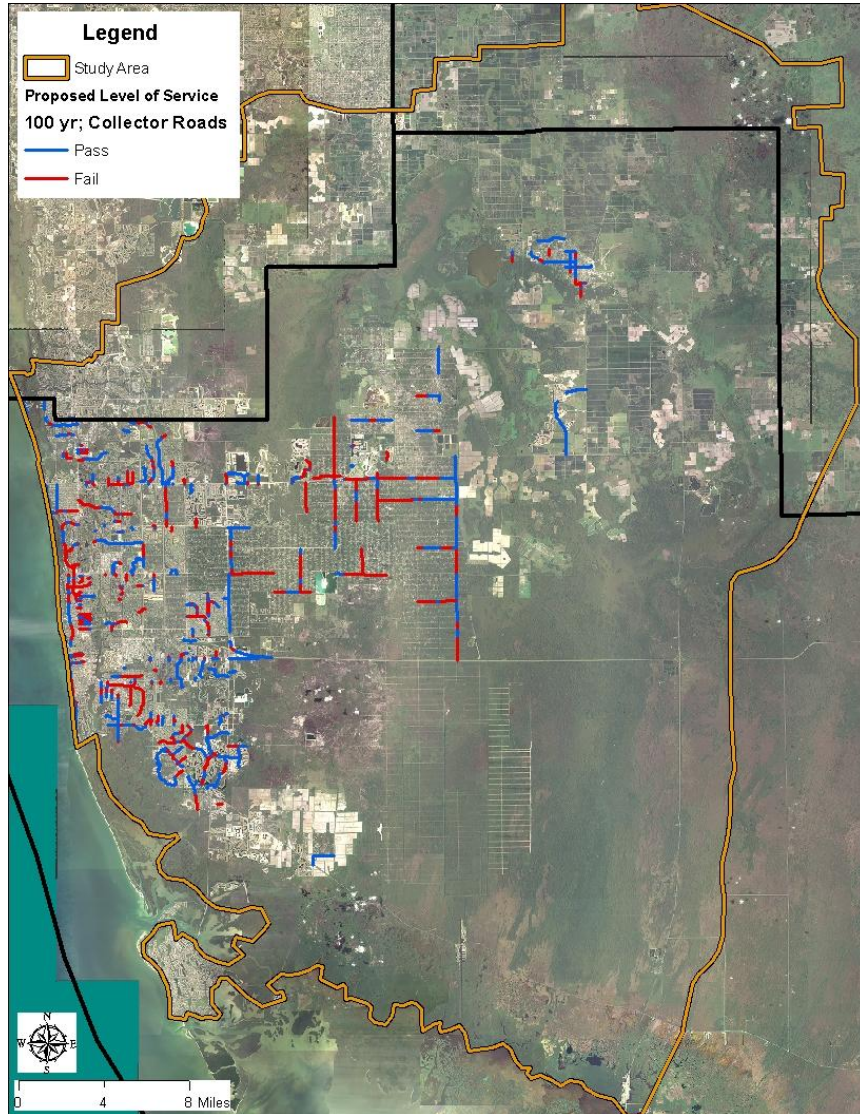


**Figure 23. Proposed Level of Service for 25-yr/72-hr Storm Event: Collector Roads**

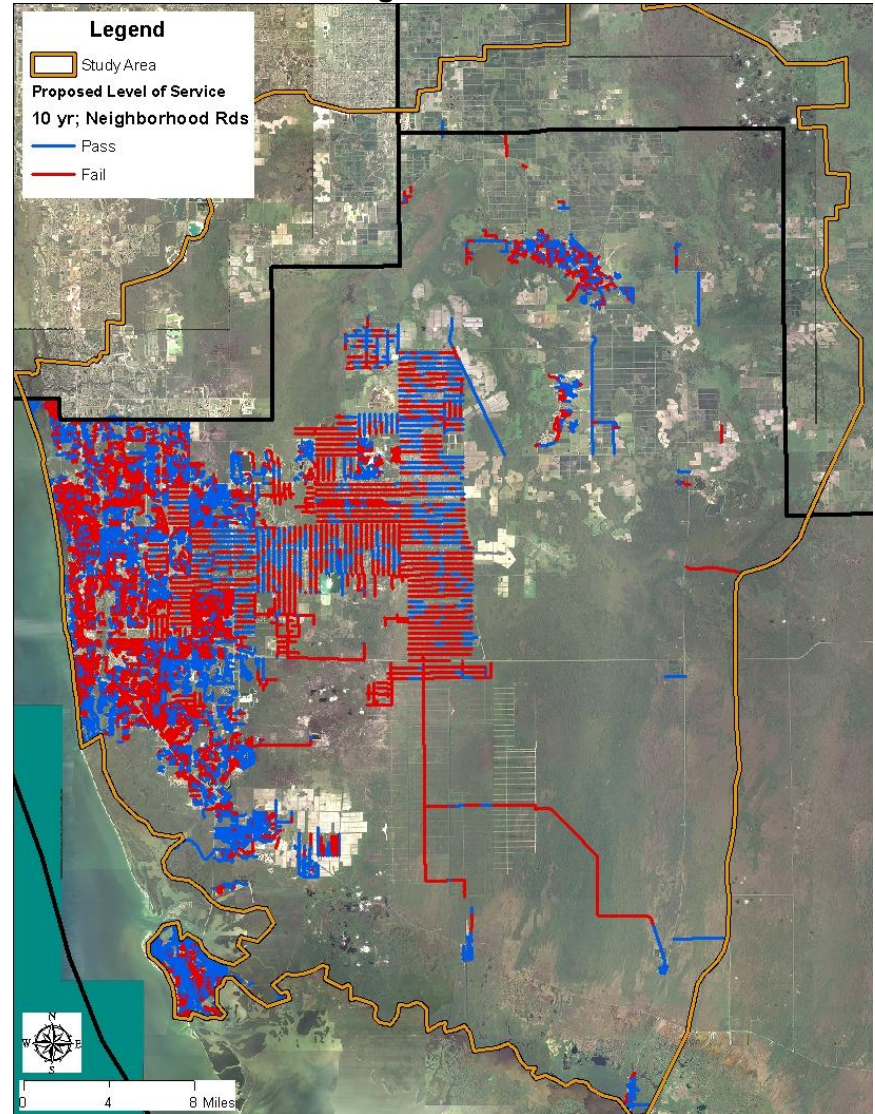




**Figure 24. Proposed Level of Service for 100-yr/72-hr Storm Event: Collector Roads**

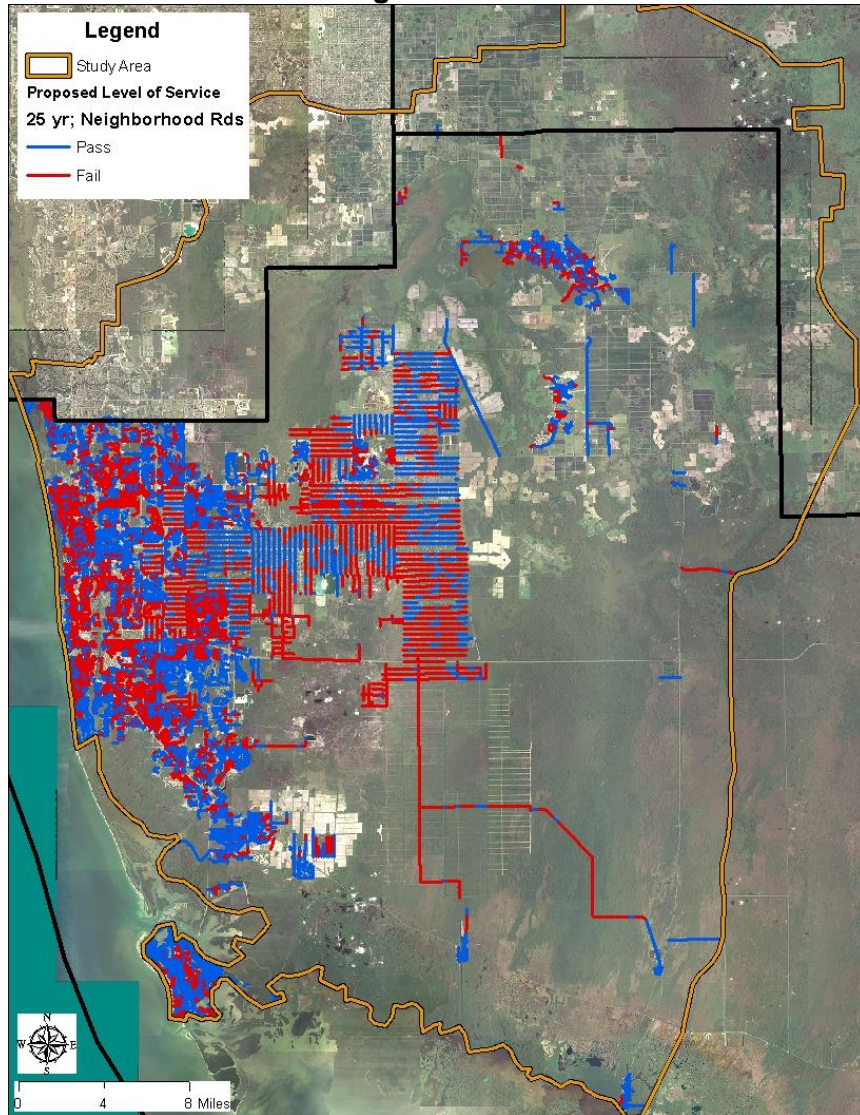


**Figure 25. Proposed Level of Service for 10-yr/72-hr Storm Event: Neighborhood Roads**

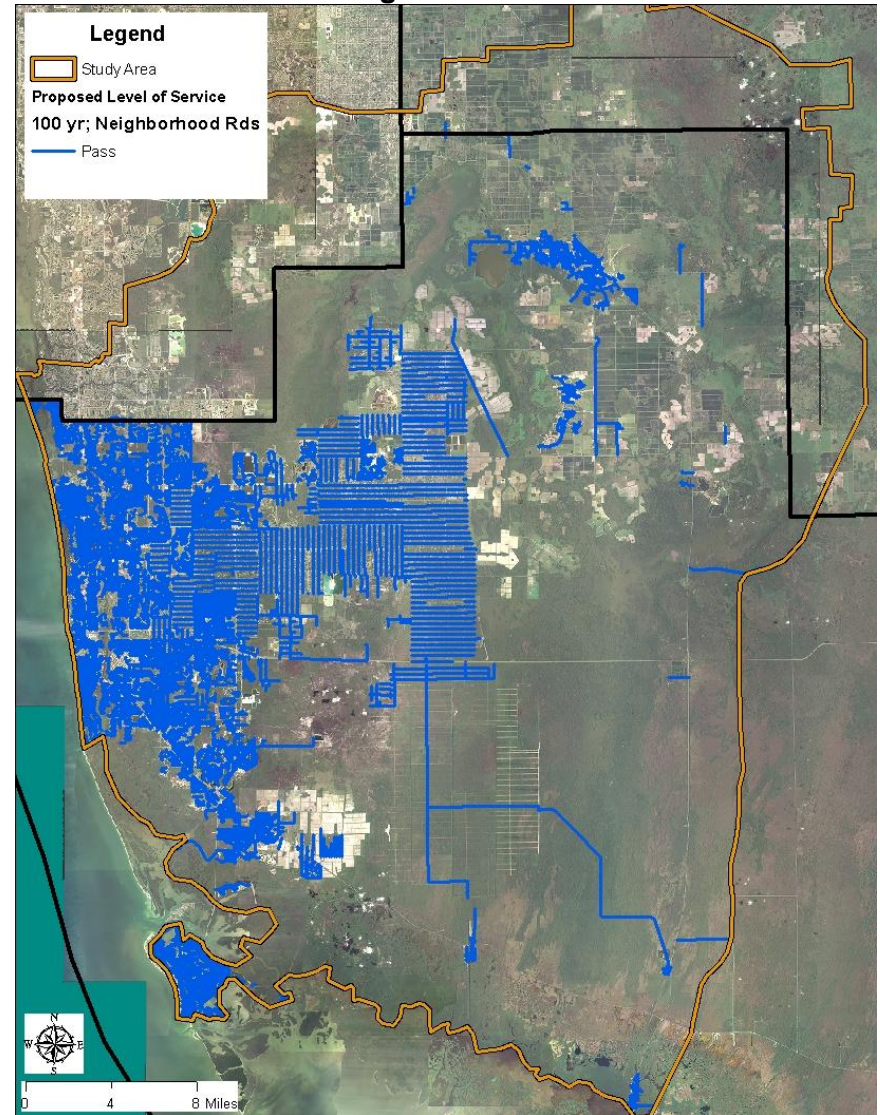




**Figure 26. Proposed Level of Service for 25-yr/72-hr Storm Event: Neighborhood Roads**



**Figure 27. Proposed Level of Service for 100-yr/72-hr Storm Event: Neighborhood Roads**





## 2.0 References

Collier County Ordinance Number 90-10,

<http://www.colliergov.net/modules/ShowDocument.aspx?documentid=1843>

Collier County Ordinance Number 2007-11,

<http://www.colliergov.net/modules/ShowDocument.aspx?documentid=21529>

Post, Buckley, Schuh & Jernigan, Inc, 1990, Collier County Stormwater Management Program, Section 5, Level of Service Analysis.

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