# TECHNICAL MEMORANDUM

## Lower Myakka Watershed Management Plan Model Update

**TO:** Robert Bresciani; Bob Laura, PE, CFM (Sarasota County)

**FROM:** Thy Do, PE, CFM; and Chelsea Goodman, PE

**DATE:** June 16, 2023

**SUBJECT:** Lower Myakka Watershed Management Plan Model Update
Sarasota County Contract No. 2021-268
Jones Edmunds Project No. 19006-073-01

# 1 PURPOSE AND OBJECTIVES

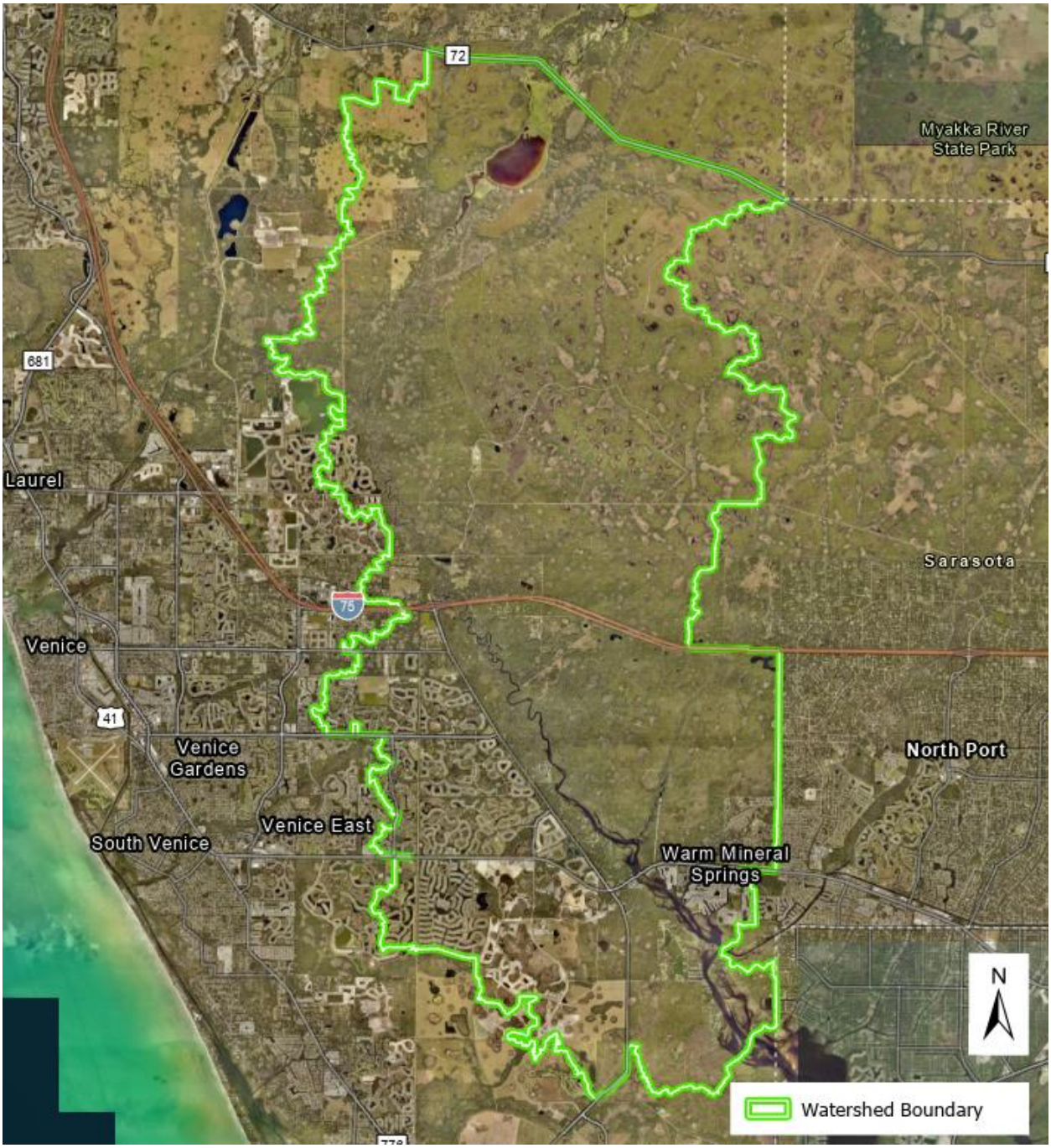
Sarasota County has identified the importance of maintaining up-to-date watershed-scale models for planning purposes. The County has been using the Interconnected Channel and Pond Routing software Version 3 (ICPR3) for stormwater modeling; however, Streamline Technologies, Inc. discontinued support for ICPR3 in 2016. ICPR3 has been replaced by ICPR Version 4 (ICPR4) and the County is converting its watershed models from ICPR3 to ICPR4. The County contracted Jones Edmunds to convert four watershed models from ICPR3 to ICPR4 and perform model updates for six watersheds under the Request for Professional Services (RPS) #202061MN of Sarasota County Contract No. 2021-268. This Technical Memorandum documents the model update for the Lower Myakka Watershed Management Plan. Figure 1 illustrates the location of the Lower Myakka Watershed.

Jones Edmunds converted the Lower Myakka Watershed Model from ICPR3 to ICPR4 in prior tasks. This task consists of updating the watershed model to incorporate new developments that have occurred over the years using enhanced 2019 LiDAR data obtained from the Southwest Florida Water Management District (SWFWMD) and address watershed boundary gaps and overlaps with adjacent watersheds.

# 2 MODEL UPDATE

The Lower Myakka Watershed Management Plan was last updated in 2017. For this update, the new 2019 LiDAR was used to refine the watershed boundaries, incorporate new developments, and address gaps and overlaps with adjacent watersheds.

**Figure 1 Location Map**




## 2.1 TOPGRAPHIC VOID UPDATE

The 2019 LiDAR reflects the new developments that have occurred as well as the more detailed and refined surface information that results from advanced topographic data capture technologies. Jones Edmunds reviewed the SWFWMD Environmental Resource Permits, 2019 LiDAR, and 2020 aerial imagery to identify those developments that would have a significant impact on the watershed model. Some of the developments identified for updates are topographic voids in the 2019 LiDAR. Topographic voids are areas in the digital elevation model (DEM) that do not represent actual ground conditions based on aerial

imagery review. After reviewing the areas of new development, Jones Edmunds identified several topographic void areas that were large enough to cause notable inaccuracies in the model results and floodplain mapping if not addressed. Jones Edmunds updated the DEM in these areas to reflect current conditions. Table 1 lists the developments where we conducted DEM updates.

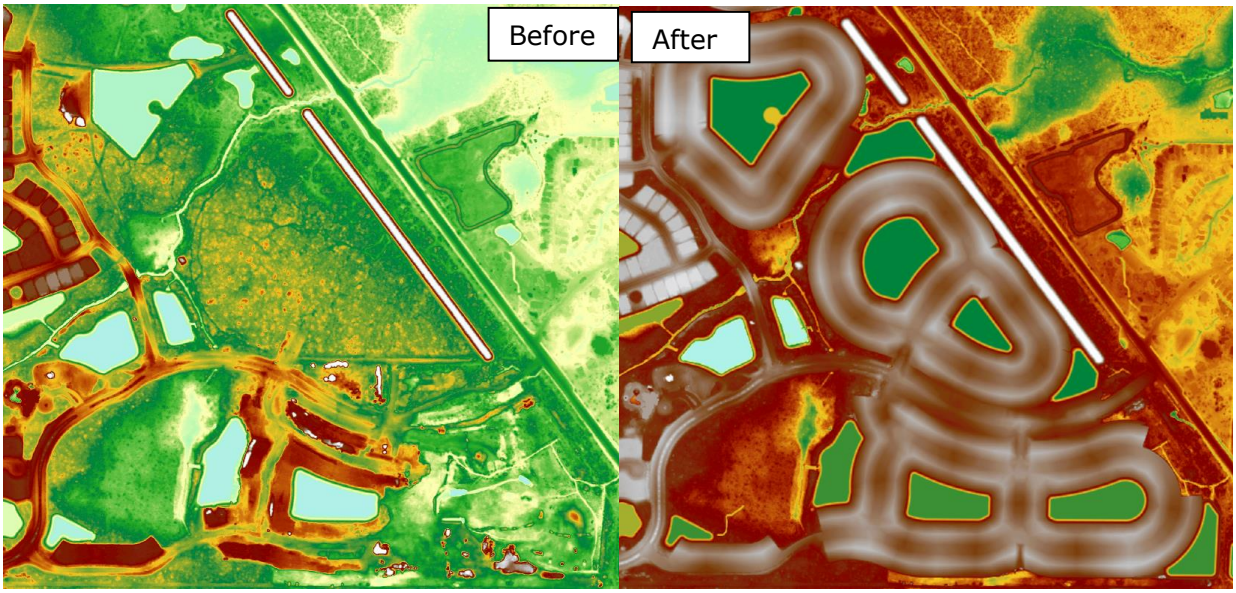
**Table 1 Topographic Void Developments**

| Project Name | ERP Number |
|---|---|
| Grand Paradiso Phase 4B | ERP_028393_012 |
| Grand Palm Phase 2A | ERP_024192_008 |
| Grand Palm Phase 2B | ERP_024192_018 |
| Grand Palm Phase 1B | ERP_042731_001 |
| N. River Rd. Commercial Subdivision | ERP_043386_001 |
| Islandwalk Phase 7 | ERP_028524_034 |
| Islandwalk Phase 8 | ERP_028524_035 |
| Islandwalk Amenity Center | ERP_028524_036 |
| Islandwalk Phase 6 | ERP_028524_037 |

For each area, Jones Edmunds georeferenced the applicable design drawings in GIS. These drawings were used to digitize ponds, building pads, parking lots, ditches, and any other features that would assist in updating the terrain. Figure 2 illustrates the topographic features used to update the terrain for the Grand Palm development. Figure 3 shows the before and after DEM for the Grand Palm Phase 2A and 2B development.

**Figure 2 Grand Palm Phase 2A & 2B Development DEM Update Features**

**Figure 2 Grand Palm Phase 2A and 2B Topographic Void DEM Comparison**




## 2.2 New Developments Update

There have been numerous developments that have occurred in the watershed since it was last updated in 2017. Table 2 lists the developments that have significant impacts on the watershed model and were included in the model update.

**Table 2 Significant Developments in the Lower Myakka Watershed**

| Project Name | ERP Permit Plans |
|---|---|
| Manatee Community College | ERP_011757_001 |
| Blackburn Creek | ERP_024192_002 |
| Grand Palm East-West Road | ERP_024192_003 |
| Grand Palm Phase 1B | ERP_024192_004 |
| Grand Palm Phase 1A | ERP_024192_005 |
| Grand Palm Phase 1C | ERP_024192_006 |
| Grand Palm Phase 1D | ERP_024192_007 |
| Grand Palm Phase 2A | ERP_024192_008 |
| Grand Palm Phase 1Aa | ERP_024192_010 |
| Grand Palm Phase 3A | ERP_024192_011 |
| Grand Palm Phase 3B | ERP_024192_014 |
| Grand Palm Phase 3C | ERP_024192_015 |
| Grand Palm East-West Road | ERP_024192_017 |
| Grand Palm Phase 2B | ERP_024192_018 |
| Grand Palm Phase 2C | ERP_024192_019 |
| St. Andrew Park Phase 4 | ERP_024424_000 |
| St. Andrew | ERP_024424_002 |
| St. Andrew East Phase No.5 | ERP_024424_004 |
| St. Andrew East Phase No.5 | ERP_024424_005 |

| Project Name | ERP Permit Plans |
|---|---|
| Grand Paradiso Phase 1 | ERP_028393_000 |
| Grand Paradiso Phase 1 | ERP_028393_001 |
| Grand Paradiso Access Road | ERP_028393_002 |
| Grand Paradiso Townhomes - 1 | ERP_028393_005 |
| Grand Paradiso Amenity Center Phase 2 | ERP_028393_006 |
| Grand Paradiso Phase 3 | ERP_028393_009 |
| Grand Paradiso Phase 4A | ERP_028393_011 |
| Grand Paradiso Phase 4B | ERP_028393_012 |
| Grand Paradiso Phase 6 | ERP_028393_013 |
| Grand Paradiso Phase 7 | ERP_028393_014 |
| Grand Paradiso Coach Homes - 2 | ERP_028393_015 |
| Grand Paradiso Phase 8 | ERP_028393_017 |
| Islandwalk Phase 1A | ERP_028524_001 |
| Islandwalk Phase 1C | ERP_028524_004 |
| Islandwalk | ERP_028524_013 |
| Islandwalk | ERP_028524_014 |
| Islandwalk Phase 2B -2E | ERP_028524_015 |
| Islandwalk Phase 2B -2E | ERP_028524_017 |
| Islandwalk | ERP_028524_018 |
| Islandwalk Phase 2B -2E | ERP_028524_019 |
| Islandwalk Phase 2F -2K | ERP_028524_021 |
| Islandwalk Phase 3A, 3B, & 3D-1 | ERP_028524_024 |
| Islandwalk Mass Grading | ERP_028524_026 |
| Islandwalk Phase 4 | ERP_028524_028 |
| Islandwalk Phase 5 | ERP_028524_030 |
| Islandwalk Phase 8 | ERP_028524_035 |
| Islandwalk Phase 6 | ERP_028524_037 |
| River Road and US 41 Intersection | ERP_031462_002 |
| Hospital Road Extension | ERP_031475_000 |
| Hospital Road Improvement | ERP_031475_001 |
| Hospital Road Extension | ERP_031475_002 |
| Hospital Road Extension Modification | ERP_031475_004 |
| West Villages Parkway Intersection | ERP_031475_005 |
| Oasis at West Villages Phase II | ERP_032522_001 |
| Atlanta Braves Spring Training Facility | ERP_032522_005 |
| Preto Boulevard | ERP_032522_007 |
| Carribbean Village | ERP_041711_000 |
| The Preserve | ERP_042148_001 |
| The Preserve Phase 2 | ERP_042148_004 |
| The Preserve Phase 3 | ERP_042148_005 |

| Project Name | ERP Permit Plans |
|---|---|
| The Renaissance at West Villages | ERP_042326_001 |
| The Renaissance at West Villages | ERP_042326_004 |
| The Renaissance at West Villages | ERP_042326_006 |
| The Renaissance at West Villages | ERP_042326_007 |
| Grand Palm Phase 1B (a) | ERP_042731_001 |
| Stoneybrook at Venice | ERP_042923_000 |
| N. River Road Commercial Subdivision | ERP_043386_001 |

Jones Edmunds reviewed the development plans and compared the design elevations and topographic data to the LiDAR. Each development was reviewed for:

- Drainage patterns and catchment delineations
- Hydraulically significant structures
- Elevations and profiles
- Topography
- Initial stages

Based on the review, Jones Edmunds re-delineated the model catchments, incorporated new or revised hydraulic structures and parameterized the watershed model according to the design data. In areas adjacent to the new development, Jones Edmunds updated curve numbers (CN), impervious areas, time-of-concentrations (Tc), storage, overland weirs, and cross sections.

Table 3 summarizes the differences between the previous version of the model (existing model) and the updated version of the model.

**Table 3 Comparison of Existing and Updated Model Elements**

| Model Element | Existing Model (count) | Updated Model (count) |
|---|---|---|
| Catchments | 2,444 | 2,651 |
| Node | 2,614 | 2,981 |
| Drop Structure | 154 | 253 |
| Pipe | 500 | 690 |
| Channel | 299 | 289 |
| Weir | 3,917 | 4,115 |
| Rating Curve | 13 | 13 |
| Watershed Area | 64,573.835 acres | 64,309.14 acres |

## 2.3 WATERSHED BOUNDARY UPDATE

Since the previous update of the Lower Myakka Watershed Management Plan, there have been updates to other adjacent watershed models in the County. Surrounding watersheds that have been updated included Upper Myakka, Dona Bay, Roberts Bay, and Lemon Bay. These updates required that the boundaries along the Lower Myakka Watershed also be updated to be consistent with the adjacent watersheds to represent the interflow between the areas more accurately. Jones Edmunds revised the Lower Myakka Watershed boundary catchments to be consistent with the new LiDAR and surrounding watersheds. The revisions included updating the storage, CNs, and Tc characteristics of the newly revised catchments.

Jones Edmunds also ensured that the hydraulic connections were also consistent between the watershed models (i.e., a conduit leaving one watershed is connected to the appropriate node of the adjacent watershed and the parameter data is identical). Boundary condition data (i.e., boundary stages or inflows) will be updated once all the watersheds are combined to run the simulations to represent the inter-boundary flows between the watersheds more accurately.

## 2.4 QUALITY ASSURANCE / QUALITY CONTROL

Jones Edmunds develops watershed models using defined procedures for quality assurance. Many of the tasks associated with model development and/or model conversion are captured in our Standard Operating Procedures to ensure consistency and accuracy. We also have many tools to aid in quality control of watershed products, including tools for parameterization, automated checks of model inputs and floodplain delineation tools that meet FEMA standards for floodplain mapping.

Jones Edmunds performed a quality control check of the input parameters to ensure that the information from the previous model was accurately represented. While checking the model inputs for reasonableness, Jones Edmunds identified and corrected several issues in the model. These issues included:

- The maximum area in the stage-storage data exceeded the basin area.
- Initial stages were revised to eliminate unintended initial flows in pipes.

# 3 SUMMARY

The ICPR4 Comparator report is provided to document all the revisions made to the Lower Myakka model. Jones Edmunds simulated the 100-year/24-hour storm event and mapped the level pool floodplains to assist in reviewing the results of the updated model. The updated model produces reasonable results.

In future tasks, Jones Edmunds will combine all the watershed models and update the 500-year connections along the boundary.