BIG BEND STATION
NORTH AND SOUTH ECONOMIZER ASH PONDS
HAUL ROAD DRAINAGE REPORT

Prepared for

Tampa Electric Company

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1.0 INTRODUCTION

Tampa Electric Company (TEC) is planning to excavate and either dispose of offsite or beneficially reuse the existing coal combustion residuals (CCRs) from the impoundments known as the Economizer Ash and Pyrites Pond System (EAPPS) at the Big Bend Station located at 13031 Wyandotte Road, Apollo Beach, Florida. This project is being performed in accordance with the federal CCR Rule under the provisions of 40 CFR Part 257.101(c) for "closure by removal" of CCRs. The plans and specifications for the main portion of the project were posted on TEC's CCR Website (tampaelectric.com/environment/) and notice of this posting provided to the Department on April 2, 2019. This proposal is being provided as an amendment to those plans and specifications. To enhance project efficiency and facilitate traffic control and safety, TEC intends to construct a temporary ramp, haul road and ditch crossing between the northeast corner of the project area and Big Bend Road to the north to create a one-way exit for trucks hauling CCRs offsite from the project. Ingress for empty returning trucks will be provided by the existing entrance road at the northwest corner of the EAPPS closure project. The purpose of this report is to evaluate the proposed changes to the existing drainage system for any adverse offsite impacts as a result of the proposed ditch crossing in the location shown on **Figure 1** below.

Figure 1 – Project Location

2.0 EXISTING CONDITIONS

The overall drainage direction for the project area is from southeast to northwest. A ditched conveyance system from Jackson Branch flows northwest along the east and north boundaries of the ash pond compartments. (Note: Runoff from the ash ponds will be completely contained throughout the project and will not contribute flow to the study area until restoration of the project area to approximate natural grade is complete.) This conveyance then crosses through a piped connection under the existing entrance road at the northwest corner of the closure project area before discharging into another ditch. This conveyance system acts as the primary means of discharge for the project area.

3.0 PROPOSED CONDITIONS

The proposed temporary haul road alignment crosses the Jackson Branch ditch near the northeast corner of the North Economizer Ash Pond (NEAP). Two 24-inch RCP culverts are proposed at this crossing to convey flow under the road. Additional grading along the east berm of the NEAP is proposed for the ramp to the temporary haul road.

4.0 HYDROLOGIC AND HYDRAULIC ANALYSIS

4.1 Computational Model Selection

The project area falls within the Bull Frog Creek Watershed. The Hillsborough County and Southwest Florida Water Management District (SWFWMD)-approved Bull Frog Creek Watershed SWMM5 model, updated by Atkins in 2016, was used as the starting point to represent the existing conditions onsite. This existing condition model (ECM) was then refined to the area of interest and revised to more accurately represent the current conditions onsite. This revised-existing condition model (RECM) was then updated with the proposed temporary haul road grading and drainage to develop the proposed condition model (PCM).

4.2 Digital Elevation Model (DEM) Development

A 2017 DEM provided by Hillsborough County was used to compute stage-area relationships for RECM basins which were modified from the ECM. To accurately compute the stage-area for the PCM, the proposed grading changes were incorporated into the DEM. This updated DEM was used to calculate stage-area relationships for PCM basins, which were updated from the RECM. **Figures 2a, 2b, and 2c** show a comparison between the ECM, RECM, and PCM basins and DEMs within the immediate project area. It should be noted that the DEM used in the ECM was not obtained, as the stage-area relationships were already defined in the approved model and left unchanged.

Figure 2a – ECM Basins and DEM

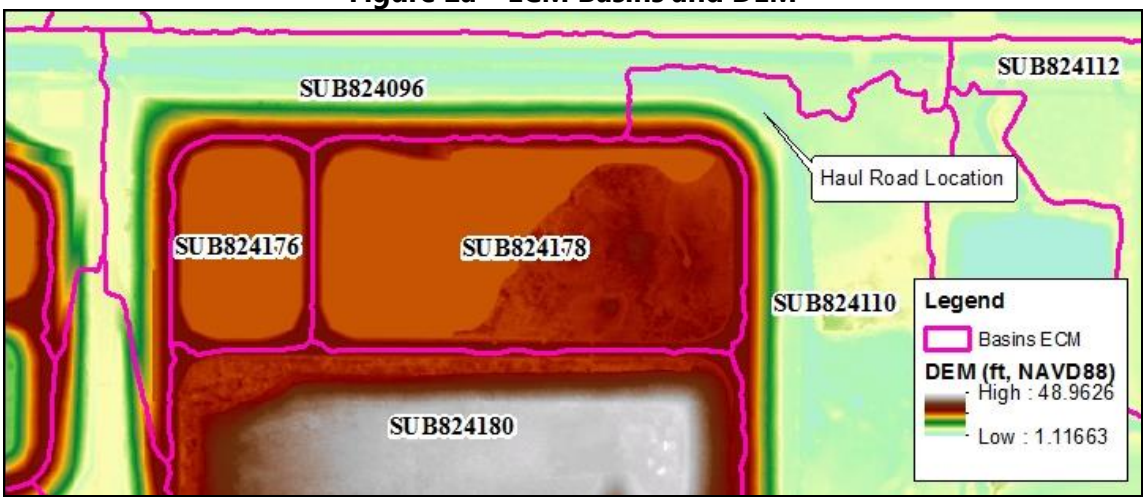


Figure 2b – RECM Basins and DEM

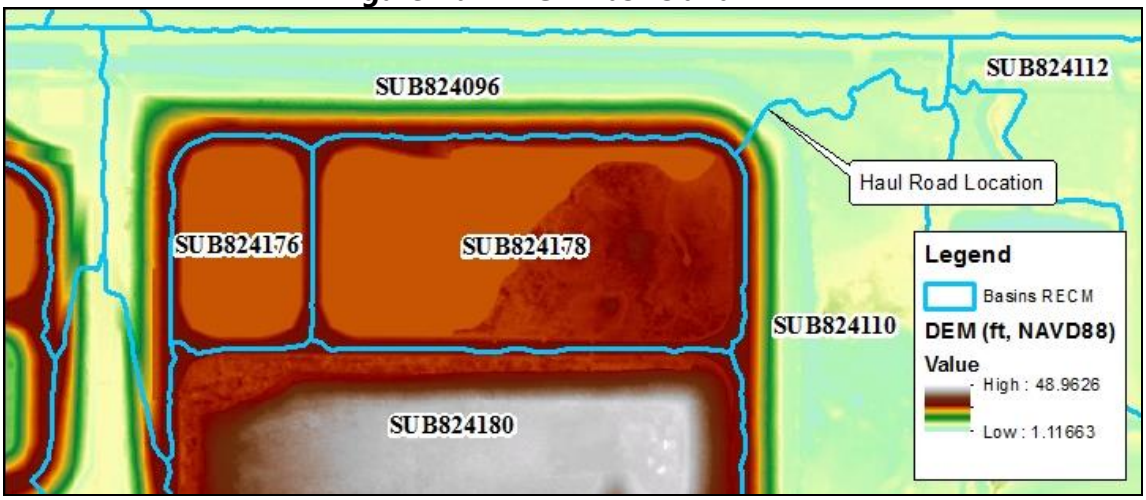
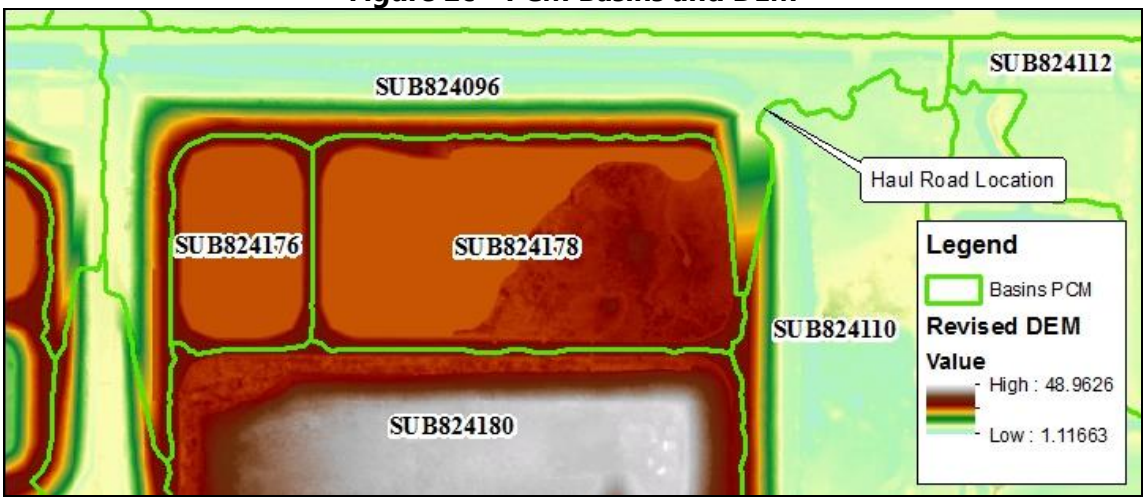


Figure 2c – PCM Basins and DEM



4.3 Model Hydrologic Parameterization

Basin boundaries in the temporary haul road area were updated between the ECM, RECM, and PCM to facilitate the accurate representation of the proposed design features. RECM basins boundaries were delineated along divides where proposed hydraulic features were to be placed, allowing for a parallel comparison between the RECM and PCM. Basins were then updated between the RECM and PCM only in areas where the proposed grading plan necessitated. **Figures 2a, 2b, and 2c** show the differences between the ECM, RECM, and PCM basin boundaries.

Curve numbers were updated for RECM and PCM basins which had boundaries changed. The curve number methodology was kept consistent with the original Bull Frog Creek Watershed model. The soil and land use coverages used in computing the curve numbers were also obtained from the Bull Frog Creek Watershed model data. Time of concentration (TC) values were left unchanged from the ECM, because in each case, the longest hydraulic flow path was preserved.

4.4 Model Hydraulic Parameterization

For basins which were modified in the RECM and PCM, new node stage-area relationships were developed using ArcGIS Arc Hydro Tools and the respective model DEMs. For the PCM, the channel link representing Jackson Branch ditch was split at the temporary haul road crossing, and a pipe link was inserted. Two junction nodes with negligible stage-areas were incorporated into the model at this location to facilitate this addition. An overland weir was also added in the PCM to represent potential flow over the temporary haul road surface. **Figures 3, 4,** and **5** show the ECM, RECM, and PCM model networks, respectively. **Tables 1** and **2** show the specific hydrologic and hydraulic changes made between the ECM, RECM, and PCM models. Additional hydrologic parameterization assumptions and methods are listed below:

- Initial water levels were kept consistent with the ECM for all models.
- RECM and PCM boundary inflows were specified as inflow time series at appropriate model nodes. Time series information was obtained from the ECM for these nodes.
- The downstream boundary condition for the RECM and PCM was set as a time/stage boundary. Time series information was obtained from the ECM for this node (Node 824082).

Figure 3 – ECM Model Network

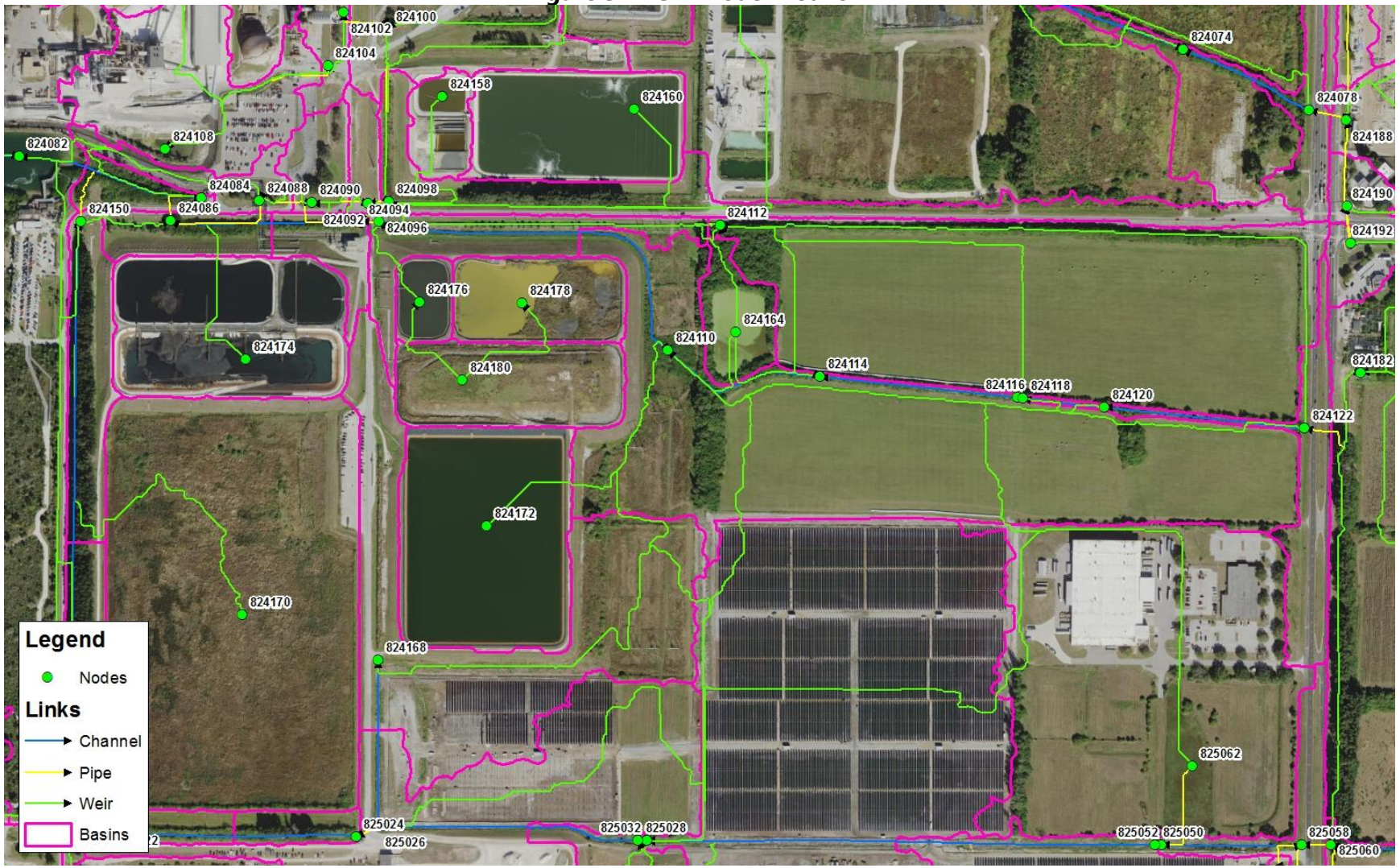


Figure 4 – RECM Model Network

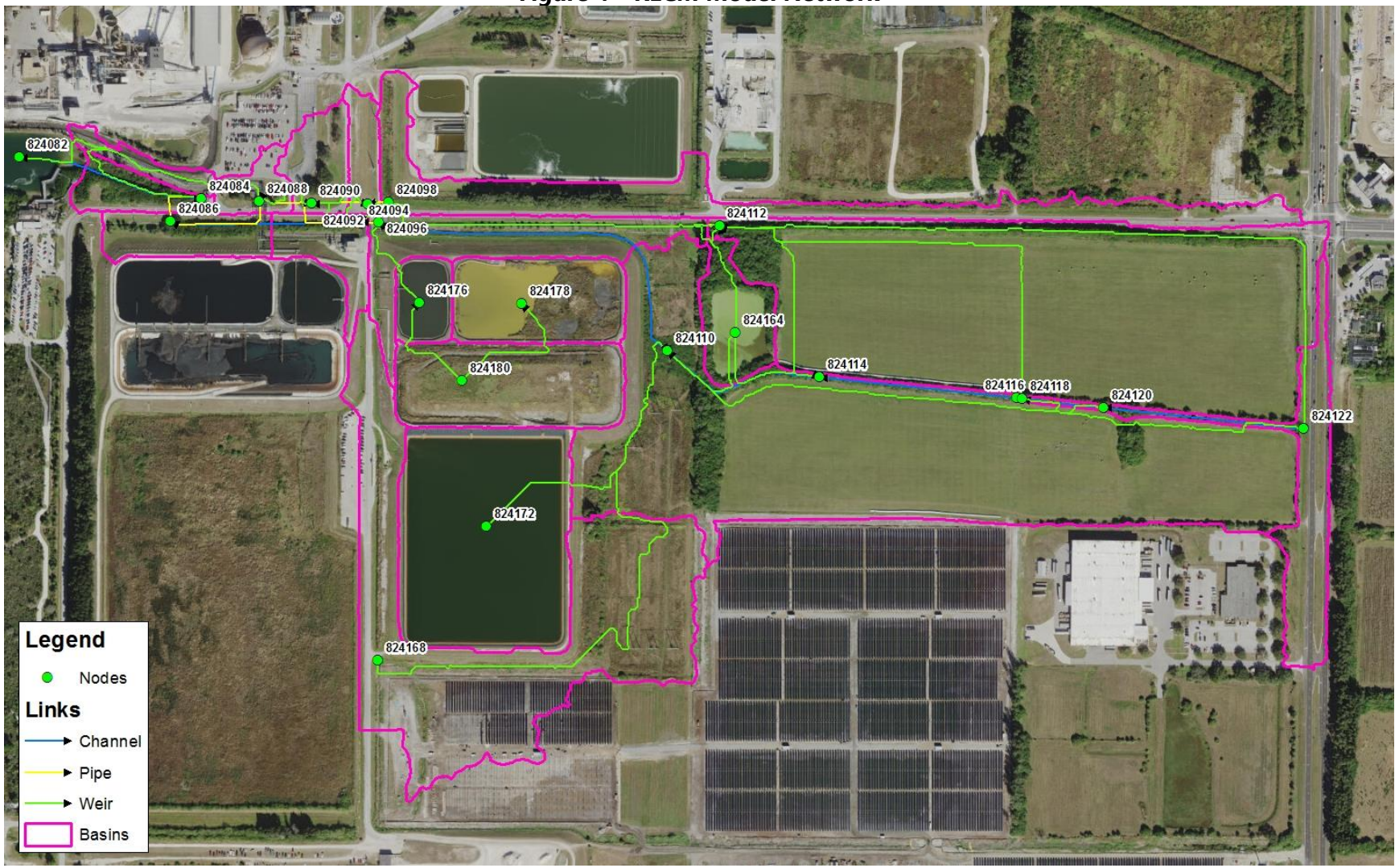


Figure 5 – PCM Model Network

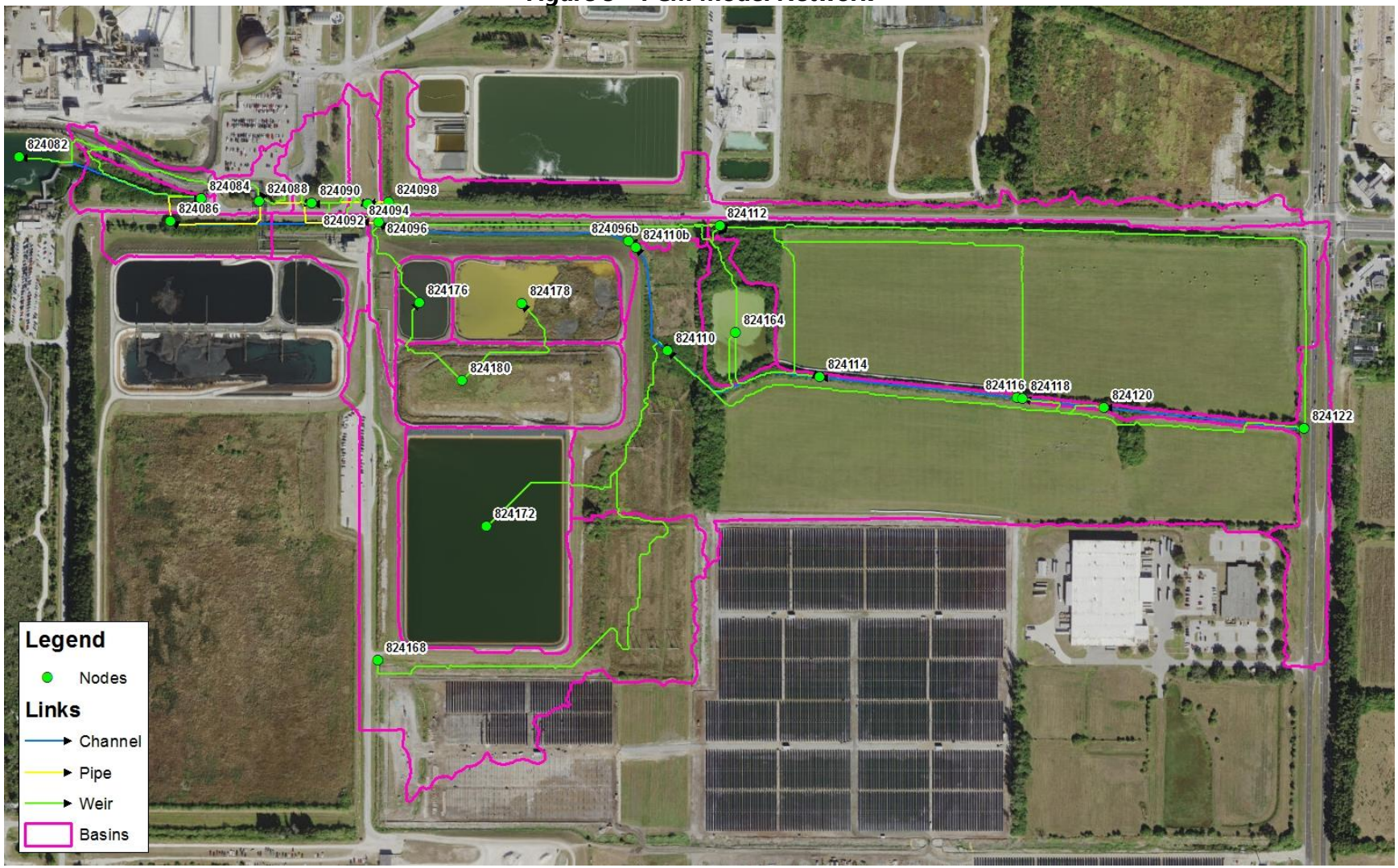


Table 1 – Model Updates Between ECM and RECM

Hydrologic Changes
Basins SUB824096 and SUB824110 boundaries updated.
Basins SUB824096 and SUB824110 curve numbers updated.
Basins SUB824096 and SUB824110 areas updated.
Hydraulic Changes
Nodes 824096, 824110, and 824082 stage/area tables updated.
Outfall BOUND added.
Conduit BOUND_CHAN added.
Miscellaneous Changes
ECM model was refined to create a sub-model for the area of interest.

Table 2 – Model Updates Between RECM and PCM

Hydrologic Changes
Basins SUB824096, SUB824110, and SUB824178 boundaries updated.
Basins SUB824096, SUB824110, and SUB824178 curve numbers updated.
Basins SUB824096, SUB824110, and SUB824178 areas updated.
Hydraulic Changes
Nodes 824096b and 824110b added.
Nodes 824096, 824110, and 824178 stage/area tables updated.
Conduit C824110 deleted.
Conduits C824110a, C824110b, and P824110b added.
Weir W824110b added.

4.5 Model Results

Peak node stages, peak offsite discharge rate, and total offsite discharge volume were analyzed to evaluate for potential adverse offsite impacts arising from the proposed design modifications. The design storm used for this analysis was a 25-year, 24-hour design storm with an SCS-Type II Florida Modified distribution.

Peak Stage Comparison

A comparison of peak node stages between the ECM, RECM, and PCM is shown in **Table 3**. The peak stage increases between the ECM and RECM are most likely a result of the model refinements made between the ECM and RECM. Peak stage increases between the ECM and RECM are not considered adverse offsite impacts because the RECM represents the current conditions.

Five peak stage increases resulted between the RECM and PCM from the proposed haul road modifications. The maximum increase in the peak stage between these two models was 0.02 ft,

and all increases are located within the general project area. Peak stage increases do not continue to propagate upstream from these locations.

Table 3 – Peak Node Stage Comparison

Node	ECM Max Stage (ft)	RECM Max Stage (ft)	PCM Max Stage (ft)	Stage Increase (ft)	
				RECM - ECM	PCM - RECM
824082	1.80	1.80	1.80	0.00	0.00
824084	3.38	3.85	3.81	0.47	-0.04
824086	4.65	5.46	5.40	0.81	-0.06
824088	4.36	4.48	4.47	0.12	-0.01
824090	6.29	6.51	6.50	0.22	-0.01
824092	6.29	6.51	6.50	0.22	-0.01
824094	4.87	5.64	5.58	0.77	-0.06
824096	6.57	6.60	6.60	0.03	0.00
824096b	NA	NA	6.61	NA	NA
824098	6.29	6.51	6.51	0.22	0.00
824110	6.60	6.64	6.66	0.04	0.02
824110b	NA	NA	6.65	NA	NA
824112	6.61	6.65	6.66	0.04	0.01
824114	6.62	6.65	6.67	0.03	0.02
824116	7.27	7.29	7.29	0.02	0.00
824118	7.55	7.57	7.57	0.02	0.00
824120	8.00	8.01	8.01	0.01	0.00
824122	8.49	8.49	8.49	0.00	0.00
824164	6.61	6.64	6.66	0.03	0.02
824168	6.60	6.64	6.66	0.04	0.02
824172	9.03	9.03	9.03	0.00	0.00
824176	28.76	28.76	28.76	0.00	0.00
824178	28.30	28.30	28.30	0.00	0.00
824180	25.32	25.32	25.30	0.00	-0.02
BOUND	NA	1.80	1.80	NA	0.00

Peak Offsite Discharge Rate

Peak offsite discharge rates were also compared between the RECM and PCM to evaluate for potential adverse offsite impacts. The ultimate outfall for the RECM and PCM is Node 824082. To evaluate the peak offsite discharge rates between the RECM and PCM, flows were compared for model link BOUND_CHAN, which connects Node 824082 to the downstream model boundary condition.

The RECM peak flow through this link is 158.7 cfs, while the PCM peak flow is 153.9 cfs. This corresponds to a decrease in offsite peak flow of approximately 3%.

Total Offsite Discharge Volume

The total outflow volumes, as per model link BOUND_CHAN, for the RECM and PCM are 11,215,877 ft^3 and 11,215,580 ft^3, respectively. This corresponds to an approximately 0.00% decrease in total offsite discharge volume.

Based on the analysis presented in this report, the proposed modifications to the existing conveyance system do not create any adverse impacts outside of the project area.