Pond Siting Report

This report documents and justifies the selection of a specific site for the construction of stormwater management facilities for SR 87 Connector Project from the Intersection of SR 87S and US 90 to SR 87N in Milton.

Santa Rosa County
Florida

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Table of Contents

1.0 INTRODUCTION **1**

2.0 DESIGN CRITERIA **3**

2.1 STORMWATER DESIGN CRITERIA 3
2.2 STORMWATER MANAGEMENT FACILITY DESIGN FEATURES 5

3.0 METHODOLOGY **6**

3.1 BASIN DELINEATION 6
3.2 RECOMMENDED SITES 6

4.0 POND ANALYSIS **7**

4.1 BASIN 1 7
4.2 BASIN 2 9
4.3 BASIN 3 10
4.4 BASIN 4 11
4.5 BASIN 5 12
4.6 BASIN 6 13
4.7A BASIN 7A 14
4.7B BASIN 7B 15
4.8 BASIN 8 16
4.9 BASIN 9 17
4.10 BASIN 10 18

5.0 PHOTO LOG **20**

5.1 BASIN 1 20
5.2 BASIN 2 21
5.3 BASIN 3 22
5.4 BASIN 4 23
5.5 BASIN 5 24
5.6 BASIN 6 25
5.7 BASIN 7 26
5.8 BASIN 8 28
5.9 BASIN 9 29
5.10 BASIN 10 31

6.0 CONCLUSION **33**

APPENDIX A - DRAINAGE MAPS **34**

APPENDIX B - PROPOSED TYPICAL SECTIONS **35**

APPENDIX C - CALCULATIONS **36**

APPENDIX D - GEOTECHNICAL INVESTIGATIONS **37**

APPENDIX E - HAZARDOUS WASTE LOCATIONS **38**

APPENDIX F - ENDANGERED SPECIES AREAS **39**

APPENDIX G - CULTURAL RESOURCES **40**

APPENDIX H - UTILITIES 41
APPENDIX I - RIGHT-OF-WAY ESTIMATE TABLE 42

1.0 INTRODUCTION

The primary objective of this ***SR 87 Connector*** project is to extend SR 87S to facilitate north/south traffic movement to more effectively serve freight movement and to provide for a more direct hurricane evacuation route from the coast to areas north in Alabama. It also is the intent to reduce congestion in the City of Milton, and to alleviate travel demand on the section of US 90 currently shared by SR 87. Versions of this project have gone through ETDM screening as ETDM Project # 2861 in 2008. However, that project was much more limited in scope and only evaluated a corridor from SR 87S to Munson Highway. On December 19, 2009, the ***SR 87 Connector*** project was submitted for ETDM review as Project #12597.

This report provides information about the existing drainage conditions, explains proposed drainage improvements, and selects recommended pond sites based on multiple factors.

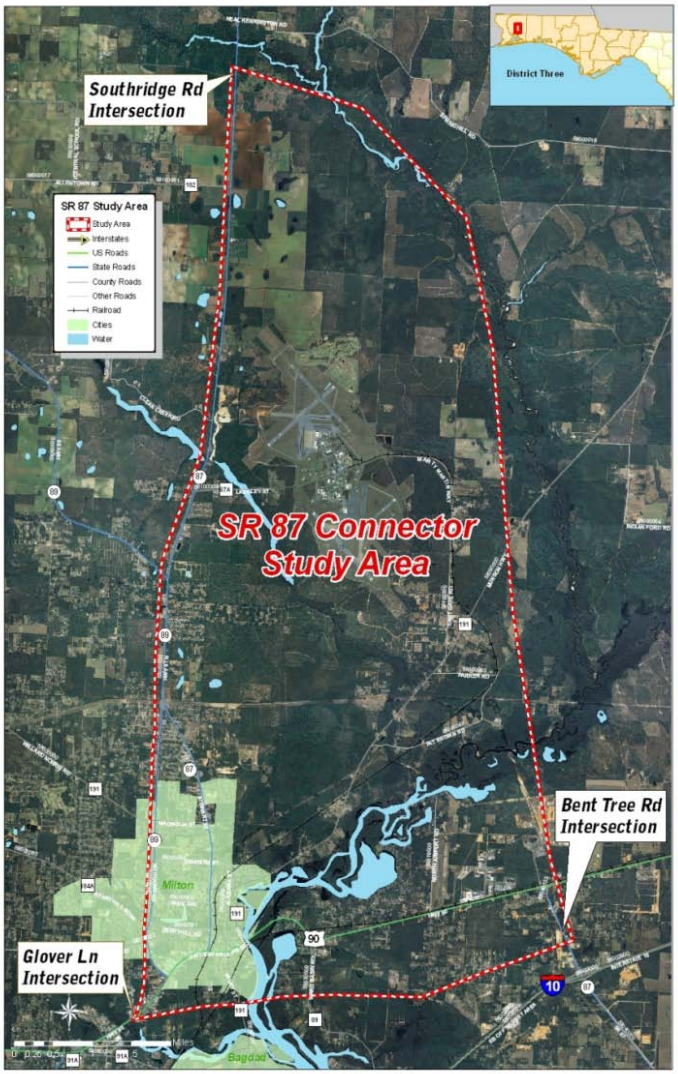


Figure 1: SR 87 Study Area

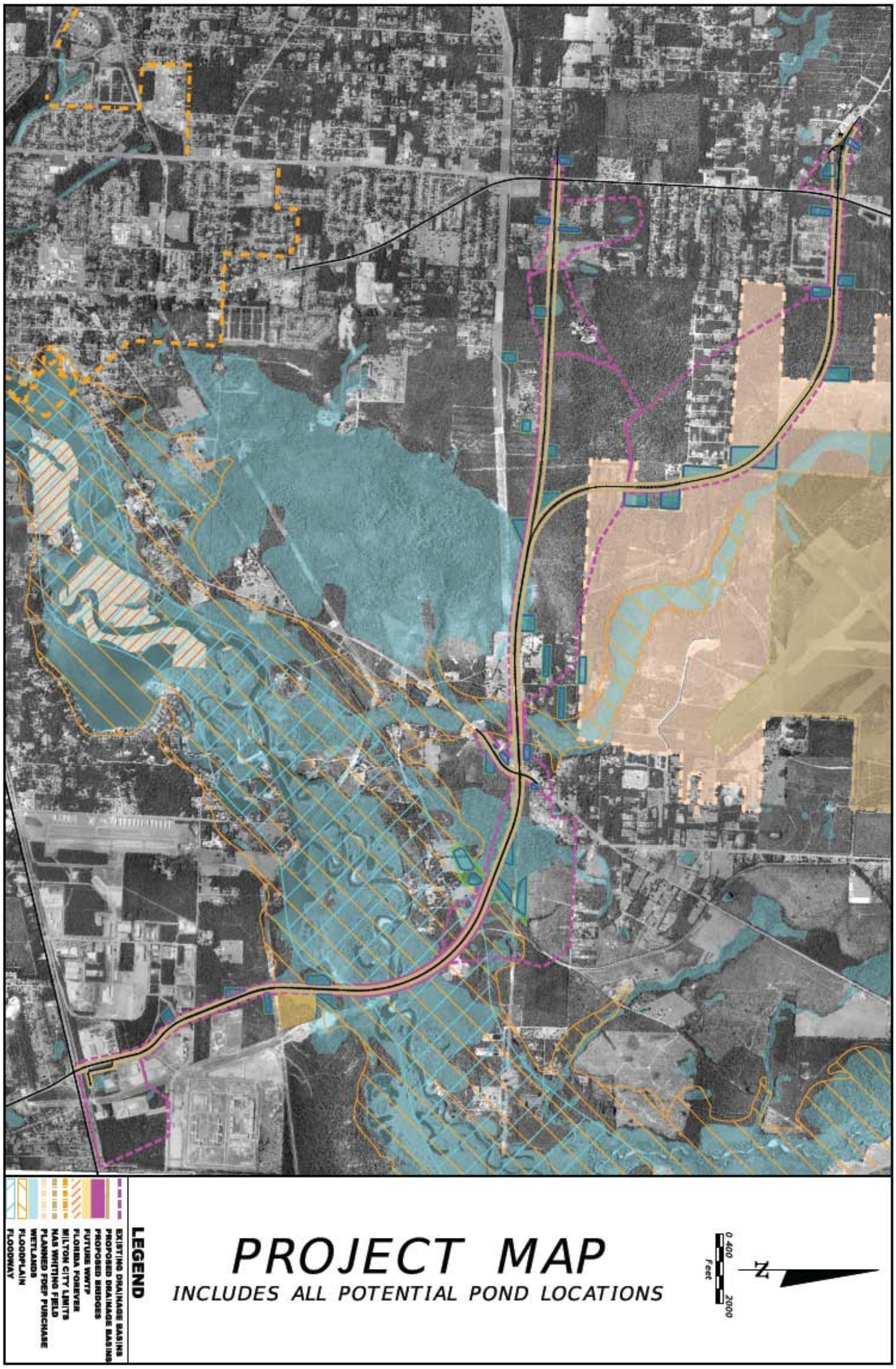


Figure 2: Project Map

2.0 DESIGN CRITERIA

Santa Rosa County, Florida; the Department of Environmental Protection; the Northwest Florida Water Management District (NWFWMD) and the Florida Department of Transportation (FDOT) all have regulations pertaining to the Stormwater Management Facility Design for the SR 87 Connector. Each agency has their own design criteria guidelines and they include the Santa Rosa County's *Land Development Code*, NWFWMD's *Environmental Resource Permit (ERP) Applicant's Handbook Volume II*, and the FDOT's *Drainage Manual* and *Stormwater Management Facility Handbook*.

2.1 Stormwater Design Criteria

The following table outlines each agency's design criteria for required treatment and attenuation of Stormwater Management Facilities.

Regulating Agency	Treatment Requirements		Attenuation Requirements	
	Reference	**Rule**	**Reference**	**Rule**
Santa Rosa County	*Land Development Code - 4.03.06 (F)*	Capacity of facility to retain/detain with filtration at least the first inch of runoff for design storm event.	*Land Development Code - 4.03.06 (F)*	Limit stormwater peak rate and timing to pre-development conditions up to and including 100 yr critical duration storm Drainage systems in areas with no positive drainage outlet shall be designed to include retention of the 100 yr, 24 hr storm with no offsite discharge
FDEP/NWFWMD	ERP Applicant's Handbook Volume II - 5.2 a	Retention Offline systems - First 1/2 inch of runoff from the contributing area	*ERP Applicant's Handbook Volume II - 3.3a*	Rate Control to a stream or open lake watershed - Post-dev not exceed pre-dev rate for 25 yr, 24 hr design storm, using NRCS type III rainfall distribution, amc II
	ERP Applicant's Handbook Volume II - 5.2 b	Retention Online systems - First one-inch of rainfall over the contributing basin with a minimum of 1/2 inch of runoff retained		Rate Control to a stream or open lake watershed - if greater than 50% impervious: Post-dev not exceed pre-dev rate for 2 yr, 24 hr and larger events, using NRCS type III rainfall, amc II if discharging to streambank and must be concurrent with flood control requirements
	ERP Applicant's Handbook Volume II - 5.2	Direct discharge to OFW, retention for an additional 50% of the applicable treatment volume must be provided	*ERP Applicant's Handbook Volume II - 3.3b*	Volume Control for a closed basin/lake: Post-dev not exceed pre-dev volume resulting from 25 yr, 96 hr storm

Regulating Agency	Treatment Requirements		Attenuation Requirements	
	Reference	**Rule**	**Reference**	**Rule**
FDEP/NWFWMD	ERP Applicant's Handbook Volume II - 8.2	Wet detention - one inch from contributing area, direct to OFW, retention for an additional 50% of the applicable treatment volume	*ERP Applicant's Handbook Volume II - 8.6*	Wet detention systems that do not provide a littoral zone shall provide either: a. an additional 50% of the permanent pool volume, or b. pre-treatment of the stormwater prior to entering the wet detention pond
FDOT	Not Applicable as per permitting agency requirements		FDOT Drainage Manual - 5.3.1.2	Watersheds with Positive Outlets: Post-dev discharge rates do not exceed pre-dev for the 2 yr through 100 yr critical duration (1hr through 3 day) storm
			FDOT Drainage Manual - 5.3.1.3	Watersheds without Positive Outlets: Post-dev discharge volumes do not exceed pre-dev for the 2 yr through 100 yr critical duration (1hr through 10 day) storm
			FDOT Stormwater Management Facility Handbook - 5.1.2.2	Open Basins - For a given frequency, post-dev runoff rate for each duration be less than or equal to the pre-dev runoff rate of the corresponding duration. Whichever duration is the closest to the pre-dev is the critical duration
				Closed Basins - For a given frequency, post-dev runoff volumes for each duration cannot exceed the pre-dev runoff volumes of corresponding duration

Secondary treatment shall be incorporated in the pond design located at the south end of the proposed Blackwater River Bridge which discharges near Cooper Basin. The surrounding wetlands are associated with the floodplain of the Blackwater River, an Outstanding Florida Water. Environmental impacts and construction costs associated with the additional treatment shall be evaluated for practicality and feasibility. The required secondary treatment, if any, will be determined in coordination with FDEP, as a condition of the storm water permit. Cooper Basin is an area connected to the Blackwater River, which is a known breeding area for Gulf Sturgeon. To minimize potential impacts to Cooper Basin, discharge from the pond outfall shall be routed to secondary treatment ponds/systems and should be ultimately discharged and routed as far to the north and/or

east as possible. One concept to provide for secondary treatment is at the edge of the floodplain inside the power easement where sediment has collected at depths of up to 4-feet due to clearing and erosion upland along the power easement.

2.2 Stormwater Management Facility Design Features

The regulating agencies provide requirements for treatment and attenuation of runoff, as well as, design features for pond layout. The following design features were taken from the FDOT's Drainage Manual 5.3.4.2, the FDOT's Stormwater Management Facility Handbook 3.1.1, and NWFWMD's ERP Applicant's Handbook Volume II:

Side Slopes - Use a slope of 4:1 (horizontal: vertical) or flatter. For wet detention systems use 6:1 for the littoral zone and no steeper than 4:1 between the control elevation and 2 feet below.

Maintenance Berm - Ponds shall be designed to provide a minimum 20 feet of horizontal clearance between the top edge of the normal pool elevation and the right-of-way line. At least 15 feet adjacent to the pond shall be at a slope of 1:8 or flatter. The berm area shall be sodded.

Corners - Corners of ponds shall be rounded to provide an acceptable turning radius for maintenance equipment. Use a radius of 9 meters (30 feet) or larger for the inside edge of the maintenance berm.

Freeboard - 1 foot of freeboard is required above the maximum design stage. Less freeboard is acceptable when a permanent containment feature such as concrete is provided.

Fencing - Ponds having side slopes steeper than 1:4 shall be provided a protective barrier (e.g., wall, fence, etc.) to prevent unauthorized entry. Gates for maintenance equipment access shall be placed at appropriate locations.

Access Easements - When pond areas are not accessible directly from the road right-of-way, an access easement shall be provided.

Benchmark - Have a benchmark constructed in or near all ponds. It will be used to check critical elevations of the pond and outlet control structure.

Sediment Buildup - Design the pond with a 3 feet deep sediment sump near the inlet to the pond. In retention ponds where the groundwater is close to the pond bottom, the depth of the sump may need to be reduced to avoid exposing the groundwater. The area of the sump should be approximately 20% of the pond bottom area.

Permanent Pool Depth - Should be deep enough to minimize aquatic growth, but shallow enough to maintain an aerobic environment. On average, a minimum of 4 feet and a maximum of 8 feet is acceptable.

3.0 METHODOLOGY

3.1 Basin Delineation

Santa Rosa County provided 10 foot contours which were used to delineate the large existing basins along the project area. This provided evidence that it was not feasible, nor practical, to treat and attenuate all offsite runoff, nor is it required. Two foot contours were provided by LiDAR data of the project vicinity and was used to check the delineation of the basins. The proposed basins were defined as an area of 25 feet on either side of the proposed right-of-way.

Drainage Maps in Appendix A show pre- and post-development basin areas and the location of the outfalls for each basin. Each of the pre-development basins utilize sheet flow to convey the runoff to the outfall locations. The discharge from the post-development and a portion of the off-site runoff (pre-development) will be conveyed to ponds. The stormwater ponds will discharge to the same outfall location and water body as pre-development (i.e., wetland, creek, river).

3.2 Recommended Sites

Once the basin delineation was completed, each basin and surrounding area was evaluated for suitable pond site locations. The FDOT's *Stormwater Management Facility Handbook* recommends providing two to three alternative locations for each basin. Additional pond sites were identified in the very large drainage basins. The recommended pond sites were chosen based on numerous factors: ground water table height, soil permeability, profile grade, pre-development outfall locations, minimizing wetland impacts, avoiding floodplains, parcel owners, minimizing distance to pipe runoff to each pond, and avoidance of threatened and endangered species and cultural resources. The off-site pond locations were also determined based on allowable hydraulics and head loss (how far stormwater could be piped). See **Appendix C** for calculations for the pond options that are a substantial distance from the roadway right-of-way, which are potentially affected by head loss issues. Utilizing the treatment and attenuation volumes needed per watershed (see **Appendix C** for calculations), the ponds were sized and appropriate parcels were selected based on the previous parameters.

In addition, cost was found to not be a substantial factor in choosing pond site locations. It was determined that the ponds in each basin have comparable right-of-way and construction costs per acre, and therefore, only right-of-way costs for recommended ponds were estimated.

4.0 POND ANALYSIS

The following lists each basin and describes the general characteristics which include size, pre- and post-development Curve Number, soils, and pond site options within the basin.

4.1 Basin 1

This basin will serve either Alignment 1 or Alignment 2. It begins at the north side of the intersection of SR 87S and US 90. The SR 87S and US 90 intersection will be re-aligned to provide a smoother alignment. The intersection already has a stormsewer system which will remain to collect runoff from the intersection. The existing stormsewer system will not be connected to the proposed ponds.

Basin 1 is a mixture of industrial and vacant land uses. Santa Rosa County is the major land owner in this Basin; with the Santa Rosa County Sherriff's office located to the east of the proposed alignment.

Proposed Basin Area - 43.02 Acres

Pre-Development Average CN - 63

Post-Development Average CN - 78

Soils - The soils in this area are Bonifay Loamy Sand, Troup Loamy Sand, Troup Orange, Bibb Kinston, Pactolous Loamy and Lakeland Sand. Bonifay, Troup Loamy Sands and Lakeland Sand are Hydrologic Group A, while Troup Orange ranges from A to C, Bibb Kinston ranges from C to D and Pactolous Loamy is C.

Groundwater - Bonifay Loamy Sand (5) - Well drained, 4 to 5 feet to groundwater
Troup Loamy Sand (44) - Somewhat excessively drained, greater than 6 feet to groundwater
Troup Orangeberg (47) - Well drained, greater than 6 feet to groundwater
Bibb Kinston (3) - Poorly drained, groundwater is 0 to 1.5 feet deep
Pactolous Loamy (34) - Moderately well drained, groundwater between 1.5 to 3 feet deep
Lakeland Sand (21) - Excessively drained, groundwater between 4.5 to 6 feet deep

Floodplain - North end of basin

Wetlands - North end of basin

Estimated Required Storage Volume - 566,197 cf or 13.0 ac-ft

Five possible ponds were selected to treat and attenuate the runoff from Basin 1: 1-1, 1-2,1-3, 1-4 and 1-5.

Pond	Lot Size (ac)	Storage Volume (cf)	Storage Volume (ac-ft)	Parcel(s) Owner	Soils*	Type of Pond
1-1	3.38	354,206	8.13	Santa Rosa County	44	Dry
1-2	3.96	355,948	8.17	Santa Rosa County	44	Dry
1-3	**3.59**	**353,920**	**8.12**	**Santa Rosa County**	**44**	**Dry**
1-4	5.68	332,494	7.63	Santa Rosa County	3, 21	Wet
1-5	**5.33**	**292,361**	**6.71**	**Santa Rosa County**	**21, 34**	**Wet**

*Names and descriptions of the soils number can be found in Appendix D - Geotechnical Investigations

Recommendations

All five pond locations are vacant land owned by Santa Rosa County, which make them good candidates. Pond 1-1 is in a growing industrial area near the southern part of Basin 1. Pond 1-2 is toward the middle of Basin 1 and is located behind a shooting range that is utilized by the Santa Rosa County Sheriff's office. Pond 1-3 is located toward the middle of Basin 1 right before the steep grade down to Blackwater River. This location allows for easy conveyance of all the runoff from the beginning of Basin 1. It is also placed along an existing power easement. Ponds 1-4 and 1-5 are located on either side of the proposed roadway near the end of Basin 1. They are both located in upland areas surrounded by wetlands prior to the beginning of the Blackwater River Bridge.

The steep grade as the alignment approaches Blackwater River provides a challenge for conveying the runoff from the end of Basin 1 to Ponds 1-1 through 1-3. Ponds 1-4 and 1-5 were placed to collect the runoff from a portion of the Blackwater River Bridge. However, they are both located in the floodplain, as these locations are the only practical locations not in wetlands for ponds at the north end of Basin 1.

A combination of Pond 1-3, 1-4 or 1-5 is required. The combination of two ponds in this basin will allow for complete capture and treatment of the stormwater runoff. Pond 1-3 is recommended for the higher elevation portion of Basin 1, due to the location and good soils. It is possible to utilize Pond 1-3 for the beginning of the basin and only one of the ponds in the floodplain for the end of the basin. However, it is also possible to only use the two ponds in the floodplain to treat all of Basin 1. Pond 1-4 is close to Cooper Basin, which is known to house Gulf Sturgeon. For this reason, Pond 1-5 is recommended between the two in the floodplain. It is our recommendation to use Pond 1-3 and Pond 1-5.

4.2 Basin 2

This basin will serve either Alignment 1 or Alignment 2. Basin 2 is comprised of the project limits that will encompass a section of the Blackwater River Bridge (same for Alignments 1 and 2). This bridge spans wetlands and floodplains associated with Blackwater River, as well as the river itself. Basin 2 is not developed and consists of either the Blackwater River or timberland.

Proposed Basin Area - 14.12 Acres

Pre-Development Average CN - 80

Post-Development Average CN - 91

Soils - The soils in this area are Bibb Kinston, Pactolous Loamy, Kalmia Loamy, and Rutlege Loamy. Bibb Kinston is either hydrologic group C or D. Pactolous Loamy is hydrologic group C, Kalmia Loamy is group B and Rutlege Loamy is group D.

Groundwater - Bibb Kinston (3) - Poorly drained, groundwater is 0 to 1.5 feet deep
Pactolous Loamy (34) - Moderately well drained, groundwater between 1.5 to 3 feet deep
Kalmia Loamy (19) - Well drained, groundwater greater than 6 feet deep
Rutlege Loamy (40) - Very poorly drained, groundwater between 0 and 0.5 feet deep

Floodplain - Yes, entire basin

Wetlands - Yes, entire basin

Estimated Required Storage Volume - 150,972 cf or 3.5 ac-ft

Three possible ponds were selected to treat and attenuate the runoff from Basin 2: 2-1, 2-2 and 2-3.

Pond	Lot Size (ac)	Storage Volume (cf)	Storage Volume (ac-ft)	Parcel(s) Owner	Soils*	Type of Pond
2-1	**4.88**	**188,559**	**4.33**	**Henry Elliot Jr., Mrs. Pat Brown**	**34, 40**	**Wet**
2-2	2.56	110,902	2.55	Henry Elliot Jr.	34, 40	Wet
2-3	**8.44**	**419,300**	**9.63**	**Mrs. Pat Brown**	**34, 40**	**Wet**

*Names and descriptions of the soils number can be found in Appendix D - Geotechnical Investigations

Recommendations

Ponds 2-1, 2-2 and 2-3 were placed in locations outside of the floodway and the Reticulated Flatwoods Salamander Habitat. They are, however, within the floodplain. Having a pond in the floodplain area will require floodplain compensation to be done to mitigate the effects of the pond if the pond reduces the floodplain capacity. Pond 2-3 was sized to capture all of the runoff from Basins 2 and 3; however, it could be reduced in size

to only capture the runoff from Basin 2. Pond 3-3 (see Basin 3 section) was also sized for Basins 2 and 3. Pond 2-1 and 2-3 are recommended since they are the farthest away from the Salamander Habitat.

4.3 Basin 3

This basin will serve either Alignment 1 or Alignment 2. Basin 3 begins at the north end of the first bridge and follows the proposed alignment to the east of Munson Highway. The basin includes the end of the Blackwater River Bridge, which spans over Blackwater River Heritage Trail and adjacent wetlands. The land use for this basin is residential and timberland.

The south side of this basin starts at the end of the Blackwater River Bridge and then transitions to a rural typical section. The differences between the urban and rural typical include wider right-of-way, 5 foot paved shoulder, ditches and no curb and gutter.

Basin Area - 12.39 Acres

Pre-Development Average CN - 81

Post-Development Average CN - 90

Soils - The soils in this area are Pactolous Loamy, Rutlege Loamy and Albany Loamy. Pactolous Loamy is hydrologic group C, Rutlege Loamy is group D and Albany Loamy is group C.

Groundwater - Pactolous Loamy (34) - Moderately well drained, groundwater between 1.5 to 3 feet deep
Rutlege Loamy (40) - Very poorly drained, groundwater between 0 and 0.5 feet deep
Albany Loamy (1) - Somewhat poorly drained, groundwater between 1 and 2.5 feet deep

Floodplain - No

Wetlands - Yes, throughout entire basin

Estimated Required Storage Volume - 123,560 cf or 2.8 ac-ft

Three possible ponds were selected to treat and attenuate the runoff from Basin 3: 3-1, 3-2 and 3-3.

Pond	Lot Size (ac)	Storage Volume (cf)	Storage Volume (ac-ft)	Parcel(s) Owner	Soils*	Type of Pond
3-1	8.23	504,987	11.59	Henry Elliot Jr.	34, 40	Wet
3-2	5.07	245,538	5.64	Henry Elliot Jr., Henry Long	40	Wet
3-3	**8.04**	**417,190**	**9.58**	**Henry Elliot, Jr.**	**34**	**Wet**

*Names and descriptions of the soils number can be found in Appendix D - Geotechnical Investigations

Recommendations

Each of the pond locations has design challenges. All three ponds are located within soils that have fairly high water tables, and therefore, these three ponds will be wet ponds. Pond 3-3 was sized to capture all of the runoff from Basins 2 and 3; however, it could be reduced in size to only capture the runoff from Basin 3.

Pond 3-3 is recommended. This pond is located outside of wetlands and is off of the proposed right-of-way, which is preferred by the Department.

4.4 Basin 4

Basin 4 is located around the intersection of SR 87 and Munson Highway. This is a relatively small basin and includes a natural high point before sloping down towards Clear Creek to the west and ends at a high point on the Clear Creek Bridge. There is a mixture of land uses including timberland, single family residential and pasture land.

Proposed Basin Area - 15.30 Acres

Pre-Development Average CN - 60

Post-Development Average CN - 72

Soils - The soils in this area are Bonifay Loamy, Lakeland Sand, Bibb Kinston and Albany Loamy. Bonifay Loamy and Lakeland Sand are hydrologic group A, while Albany Loamy is group C. Bibb Kinston is hydrologic group C through D.

Groundwater - Bonifay Loamy (5) - Well drained, groundwater between 4 to 5 feet deep
Lakeland Sand (21) - Excessively drained, groundwater greater than 6 feet deep
Bibb Kinston (3) - Poorly drained, groundwater is 0 to 1.5 feet deep
Albany Loamy (1) - Somewhat poorly drained, groundwater between 1 and 2.5 feet deep

Floodplain - Yes, at the west end of the basin

Wetlands - Yes, throughout entire basin

Estimated Required Storage Volume - 190,990 cf or 4.4 ac-ft

Four possible ponds were selected to treat and attenuate the runoff from Basin 4: 4-1, 4-2, 4-3, 4-4.

Pond	Lot Size (ac)	Storage Volume (cf)	Storage Volume (ac-ft)	Parcel(s) Owner	Soils*	Type of Pond
4-1	5.07	272,242	6.25	Henry Long	1, 5, 14	Wet
4-2	2.87	103,315	2.37	Henry Long	5	Wet, Interconnected (2 ponds total)
4-3	1.32	38,642	0.89	Albert Adams	1	Wet
4-4	**3.53**	**228,125**	**5.24**	**Cassie Findley**	**1, 5, 21**	**Wet**

*Names and descriptions of the soils number can be found in Appendix D - Geotechnical Investigations

Recommendations

Ponds 4-2 and 4-3 are sized too small to completely treat and attenuate all of Basin 4, and therefore both ponds would be required. Pond 4-4 is being recommended as it is located near a low in the roadway profile which would easily convey the runoff.

4.5 Basin 5

Basin 5 includes the project limits that will encompass the western portion of the bridge over Clear Creek and the project limits west. Basin 5 is solely for the project area of Alignment 1.The pond alternatives for Basin 5 were placed to the west of Clear Creek off of the right-of-way. There is a single family rural neighborhood where the three alternatives were chosen, although no homes are impacted or to be relocated due to the ponds.

Proposed Basin Area - 33.08 Acres

Pre-Development Average CN - 67

Post-Development Average CN -82

Soils - The soils in this area are Albany Loamy, Lakeland Sand, Rains Fine Loamy, Pactolous Loamy, Rutlege Loamy and Bibb Kinston. Lakeland Sand is hydrologic group A. Albany Loamy and Pactolous Loamy are hydrologic group C. Rains Fine Loamy is a mixture of groups B/D and Rutlege Loamy is D. Bibb Kinston is groups C through D.

Groundwater - Albany Loamy (1) - Somewhat poorly drained, groundwater depth between 1 to 2.5 feet.
Lakeland Sand (21, 22) - Excessively drained, groundwater greater than 6 feet deep.
Rains Fine Loamy (37) - Poorly drained, groundwater depth between 0 to 1 feet.
Pactolous Loamy (34) - Moderately well drained, groundwater depth between 1.5 to 3 feet.
Rutlege Loamy (40) - Very poorly drained, groundwater depth 0 to 0.5 feet.
Bibb Kinston (3) - Poorly drained, groundwater is 0 to 1.5 feet deep

Floodplain - Yes, at east end of basin.

Wetlands - Yes, entire basin.

Estimated Required Storage Volume - 428,144 cf or 9.8 ac-ft

Three possible ponds were selected to treat and attenuate the runoff from Basin 5: 5-1, 5-2, and 5-3.

Pond	Lot Size (ac)	Storage Volume (cf)	Storage Volume (ac-ft)	Parcel(s) Owner	Soils*	Type of Pond
5-1	**4.75**	**465,524**	**10.69**	**James Peterson**	**21, 22**	**Dry**
5-2	5.24	521,064	11.96	Virginia Daniels	21	Dry
5-3	4.81	507,746	11.66	Maray Enterprises LLC	21, 44	Dry

*Names and descriptions of the soils number can be found in Appendix D - Geotechnical Investigations

Recommendations

All of the Basin 5 pond options are from 750 feet to 1800 feet from the right of way. The longest distanced is Pond 5-3. Pond 5-2 was placed behind an existing house while Ponds 5-1 and 5-3 are adjacent or across the street to existing homes.

Pond 5-1 is recommended due to the proximity of the outfall location at Clear Creek. Since Basin 5 and Basin 6 are essentially the same but for different alignments, the recommended pond for Basin 5 could also be used for Basin 6 and vice versa.

4.6 Basin 6

Basin 6 includes the project limits that will encompass a portion of the bridge over Clear Creek and the project limits west. This bridge is considerably shorter than the Blackwater River Bridge and will span the floodplain and wetlands associated with Clear Creek. Basin 6 is solely for the project area of Alignment 2.The pond sites are located on a single parcel, which is designated timberland. The alignment bisects this parcel.

Proposed Basin Area - 37.99 Acres

Pre-Development Average CN - 61

Post-Development Average CN - 78

Soils - The soils in this area are Albany Loamy, Lakeland Sand, Rains Fine Loamy, Pactolous Loamy, Rutlege Loamy, Bibb Kinston and Troup Loamy. Lakeland Sand and Troup Loamy are hydrologic group A. Albany Loamy and Pactolous Loamy are hydrologic group C. Rains Fine Loamy is a mixture of groups B/D and Rutlege Loamy is D. Bibb Kinston is groups C through D.

Groundwater - Albany Loamy (1) - Somewhat poorly drained, groundwater depth between 1 to 2.5 feet.
Lakeland Sand (21, 22) - Excessively drained, groundwater greater than 6 feet deep.
Rains Fine Loamy (37) - Poorly drained, groundwater depth between 0 to 1 feet.
Pactolous Loamy (34) - Moderately well drained, groundwater depth between 1.5 to 3 feet.
Bibb Kinston (3) - Poorly drained, groundwater is 0 to 1.5 feet deep

Rutlege Loamy (40) - Very poorly drained, groundwater depth 0 to 0.5 feet.
Troup Loamy (44) - Somewhat excessively drained, groundwater between 4.5 and 6 feet deep.

Floodplain - Yes, at east end of basin.

Wetlands - Yes, at east end of basin.

Estimated Required Storage Volume - 559,632 cf or 12.8 ac-ft

Three possible ponds were selected to treat and attenuate the runoff from Basin 6 for both alignments: 6-1, 6-2, and 6-3.

Pond	Lot Size (ac)	Storage Volume (cf)	Storage Volume (ac-ft)	Parcel(s) Owner	Soils*	Type of Pond
6-1	**5.85**	**708,080**	**16.26**	**William Rollo**	**21, 34**	**Dry**
6-2	6.60	754,802	17.33	William Rollo	21, 22	Dry
6-3	6.34	711,624	16.34	William Rollo	21, 44	Dry

*Names and descriptions of the soils number can be found in Appendix D - Geotechnical Investigations

Recommendations
Ponds 6-1, 6-2 and 6-3 are located on the same large parcel. The existing ground elevation of Ponds 6-2 and 6-3 is higher than Pond 6-1. Pond 6-1 is recommended because of the ease of conveyance for the stormwater at an outfall for Basin 6. Pond 6-1 could also be an additional pond option for Basin 5.

4.7a Basin 7a

Basin 7a is solely for Alignment 1. The land uses are timberland and acreage not zoned agriculture. This basin slopes to the east. Basin 7 is broken up into two segments: 7a and 7b. 7a drains to the east while 7b drains to an existing low to the west.

Proposed Basin Area - 7a - 11.25 Acres

Pre-Development Average CN - 50

Post-Development Average CN - 73

Soils - The soils in this area are Troup Loamy, Lakeland Sand, Bonifay Loamy, Rains Fine Loamy and Dothan Fine. Troup Loamy, Lakeland Sand and Bonifay Loamy are hydrologic group A. Dothan Fine is hydrologic group B. Rains Fine Loamy is a mixture of groups B/D.

Groundwater - Troup Loamy (44) - Somewhat excessively drained, groundwater between 4.5 and 6 feet deep.
Lakeland Sand (21) - Excessively drained, groundwater greater than 6 feet deep.
Bonifay Loamy (5) - Well drained, groundwater between 4 and 5 feet deep.
Rains Fine Loamy (37) - Poorly drained, groundwater depth between 0 to 1 feet.
Dothan Fine (9) - Well drained, groundwater depth between 3 and 5 feet.

Floodplain - No

Wetlands - No

Estimated Required Storage Volume - 202,245 cf or 4.6 ac-ft

Two possible ponds were selected to treat and attenuate the runoff from Basin 7a: 7-1 and 7-2.

Pond	Lot Size (ac)	Storage Volume (cf)	Storage Volume (ac-ft)	Parcel(s) Owner	Soils*	Type of Pond
7-1	**3.05**	**315,826**	**7.25**	**Timothy Baxley**	**21, 44**	**Dry**
7-2	2.70	266,828	6.13	Doyle Alan Sparr	44	Dry

*Names and descriptions of the soils number can be found in Appendix D - Geotechnical Investigations

Recommendations

Pond 7-1 is at the beginning of Basin 7a while Pond 7-2 is more towards the middle of the basin. Pond 7-1 is located at the lowest point of Basin 7a . Pond 7-1 is being recommended due to its location within the basin.

4.7b Basin 7b

Basin 7b is solely for Alignment 1. The land uses are timberland and acreage not zoned agriculture. This basin slopes to the east. Basin 7 is broken up into two segments: 7a and 7b. 7a drains to the east while 7b drains to an existing low to the west.

Proposed Basin Area - 7b - 13.50 Acres

Pre-Development Average CN - 50

Post-Development Average CN - 73

Soils - The soils in this area are Troup Loamy, Lakeland Sand, Bonifay Loamy, Rains Fine Loamy and Dothan Fine. Troup Loamy, Lakeland Sand and Bonifay Loamy are hydrologic group A. Dothan Fine is hydrologic group B. Rains Fine Loamy is a mixture of groups B/D.

Groundwater - Troup Loamy (44) - Somewhat excessively drained, groundwater between 4.5 and 6 feet deep.
Lakeland Sand (21) - Excessively drained, groundwater greater than 6 feet deep.
Bonifay Loamy (5) - Well drained, groundwater between 4 and 5 feet deep.
Rains Fine Loamy (37) - Poorly drained, groundwater depth between 0 to 1 feet.
Dothan Fine (9) - Well drained, groundwater depth between 3 and 5 feet.

Floodplain - No

Wetlands - Yes, at west end of basin.

Estimated Required Storage Volume - 243,039 cf or 5.6 ac-ft

Two possible ponds were selected to treat and attenuate the runoff from Basin 7b: 7-3 and 7-4.

Pond	Lot Size (ac)	Storage Volume (cf)	Storage Volume (ac-ft)	Parcel(s) Owner	Soils*	Type of Pond
7-3	3.08	317,838	7.30	Gulf Coast Community Bank	44	Dry
7-4	**3.07**	**316,186**	**7.26**	**Gulf Coast Community Bank**	**5, 9, 44**	**Dry**

*Names and descriptions of the soils number can be found in Appendix D - Geotechnical Investigations

Recommendations

The boundary of Basins 7a and 7b is a high point in the roadway profile. Pond 7-3 is closer to the middle of Basin 7b while Pond 7-4 is at the end of Basin 7b. Pond 7-4 is being recommended due to the location within Basin 7b.

4.8 Basin 8

Basin 8 is the last section of Alignment 1. This basin is from the western part of Basin 7 and goes westward to SR 87/89N, and includes a portion of Oakland Drive on the west side of SR 87/89N. The land uses for this basin include single family rural, cropland and commercial. The roadway typical section transitions from rural to urban in the middle of this basin. Oakland Drive on the west side of SR 87/89N is being proposed to add a left turn lane at that intersection. This widening is included in Basin 8.

Proposed Basin Area - 11.23 Acres

Pre-Development Average CN - 56

Post-Development Average CN - 73

Soils - The soils in this area are Troup Loamy, Bonifay Loamy, Rains Fine Loamy and Dothan Fine. Troup Loamy and Bonifay Loamy are hydrologic group A. Dothan Fine is hydrologic group B. Rains Fine Loamy is a mixture of groups B/D.

Groundwater - Troup Loamy (44) - Somewhat excessively drained, groundwater between 4.5 and 6 feet deep.
Bonifay Loamy (5) - Well drained, groundwater between 4 and 5 feet deep.
Rains Fine Loamy (37) - Poorly drained, groundwater depth between 0 to 1 feet.
Dothan Fine (9) - Well drained, groundwater depth between 3 and 5 feet.

Floodplain - No

Wetlands - Yes, at east end of basin.

Estimated Required Storage Volume - 174,534 cf or 4.0 ac-ft

Three possible ponds were selected to treat and attenuate the runoff from Basin 8: 8-1, 8-2, and 8-3.

Pond	Lot Size (ac)	Storage Volume (cf)	Storage Volume (ac-ft)	Parcel(s) Owner	Soils*	Type of Pond
8-1	2.84	233,442	5.36	Charles Manning	5, 21	Dry
8-2	**2.45**	**223,334**	**5.13**	**Paul Green**	**5, 37, 44**	**Dry**
8-3	2.56	246,890	5.67	Paul Green	44	Dry

*Names and descriptions of the soils number can be found in Appendix D - Geotechnical Investigations

Recommendations

Pond 8-2 is recommended. It is located near a natural low for Basin 8. Pond 8-2 is located on a parcel which also is next to an existing dry stormwater management facility on SR 87N and the location of Pond 8-2 is next to an area of wetlands which would provide a good outfall location to mimic existing drainage patterns.

4.9 Basin 9

Basin 9 is solely for Alignment 2 and begins after Basin 6. It is the largest basin in the project limits. The land uses for this basin are mostly timberland and acreage not zoned for agriculture, with one single family rural parcel. At the end of the basin, the roadway typical section transitions from rural to urban.

Proposed Basin Area - 40.67 Acres

Pre-Development Average CN - 45

Post-Development Average CN - 71

Soils - The soils in this area are Troup Loamy and Lakeland Sand. Troup Loamy and Lakeland Sand are hydrologic group A.

Groundwater - Troup Loamy (44) - Somewhat excessively drained, groundwater between 4.5 and 6 feet deep.
Lakeland Sand (21, 22) - Excessively drained, groundwater greater than 6 feet .

Floodplain - No

Wetlands - No

Estimated Required Storage Volume - 826,243 cf or 19.0 ac-ft

Six possible ponds were selected to treat and attenuate the runoff from Basin 9: 9-1, 9-2, 9-3, 9-4, 9-5 and 9-6.

Pond	Lot Size (ac)	Storage Volume (cf)	Storage Volume (ac-ft)	Parcel(s) Owner	Soils*	Type of Pond
9-1	8.60	1,109,078	25.46	Maray Enterprises, LLC, Mickey Cantner	21	Dry
9-2	8.60	1,113,376	25.56	Jimmie Nell Jarratt	21	Dry
9-3	**9.15**	**1,074,452**	**24.67**	**Maray Enterprises, LLC**	**21**	**Dry**
9-4	8.83	1,096,850	25.18	Santa Rosa County	21	Dry
9-5	**8.50**	**1,056,702**	**24.26**	**Santa Rosa County**	**21, 22**	**Dry**
9-6	8.50	1,078,498	24.76	Skivans Creek LLC	21, 44	Dry

*Names and descriptions of the soils number can be found in Appendix D - Geotechnical Investigations

Recommendations

Ponds 9-3 and 9-5 are equally recommended. Pond 9-3 is adjacent to an existing neighborhood and would provide a nice buffer between the new roadway and that neighborhood. Pond 9-3 is also located on a natural low which will help with stormwater conveyance. Pond 9-5 is located on the east side of the roadway, close to Clear Creek, which would have an ideal outfall location and owned by Santa Rosa County. The ponds have been sized to collect all of Basin 9, so either Pond 9-3 or Pond 9-5 would be a good option.

4.10 Basin 10

Basin 10 is the last basin for Alignment 2. It begins west of Basin 9, goes west across SR 87N, and terminates at SR 89N. Between SR 87N and SR 89N, a two lane rural connector road is proposed and will tie into SR 89 North approximately a half of a mile north of where SR 89N diverges from SR 87N. SR 89N will be redesigned to tie into this connector road.

Proposed Basin Area - 25.94 Acres

Pre-Development Average CN - 48

Post-Development Average CN - 61

Soils - The soils in this area are Troup Loamy, Bonifay Loamy and Lakeland Sand. Troup Loamy, Bonifay Loamy and Lakeland Sand are hydrologic group A.

Groundwater - Troup Loamy (44) - Somewhat excessively drained, groundwater between 4.5 and 6 feet deep.
Lakeland Sand (21) - Excessively drained, groundwater greater than 6 feet deep.
Bonifay Loamy (5) - Well drained, groundwater between 4 and 5 feet deep.

Floodplain - No

Wetlands - No

Estimated Required Storage Volume - 350,472 cf or 8.0 ac-ft

Five possible ponds were selected to treat and attenuate the runoff from Basin 10: 10-1, 10-2, 10-3, 10-4, and 10-5.

Pond	Lot Size (ac)	Storage Volume (cf)	Storage Volume (ac-ft)	Parcel(s) Owner	Soils*	Type of Pond
10-1	4.59	516,416	11.86	Skivans Creek LLC	44	Dry
10-2	**4.54**	**518,154**	**11.90**	**Skivans Creek LLC**	**44**	**Dry**
10-3	4.50	491,680	11.29	Skivans Creek LLC	21, 44	Dry
10-4	4.06	454,148	10.43	LadonDewrell, Lamar Jones	44	Dry
10-5	2.52	227,068	5.21	LadonDewrell	44	Dry

*Names and descriptions of the soils number can be found in Appendix D - Geotechnical Investigations

Recommendations

Pond 10-2 is recommended. It is located at the east side of Basin 10, on the north side of the roadway, which according to the contours, is where the natural flow pattern.

5.0 PHOTO LOG

Aerial photography provided by Bing Maps was used in areas where access for photography was difficult.

5.1 Basin 1

Facing southwest at Pond 1-1.

Facing west at Pond 1-2.

Standing in Power Easement Facing South at Pond 1-3.

Looking North at Ponds 1-4 and 1-5.

5.2 Basin 2

Looking North at Pond 2-1.

Looking North at Pond 2-2.

Looking North at Pond 2-3.

5.3 Basin 3

Facing east at Pond 3-1.

Looking North at Pond 3-2.

A portion of Pond option 3-3.

5.4 Basin 4

Facing east on Wolfe Road at Pond 4-1.

Facing west at Pond 4-2.

Facing east at Pond 4-3.

Facing south at Pond 4-4.

5.5 Basin 5

Facing east at Pond 5-1.

Facing west at Pond 5-2 which is behind structure.

Facing north at Pond 5-3.

5.6 Basin 6

Facing north at Pond 6-1.

Facing south at Pond 6-2.

Facing north at Pond 6-3.

5.7 Basin 7

Facing north at Pond 7-1.

Facing west at Pond 7-2.

Facing north at Pond 7-3.

Facing north at Pond 7-4.

5.8 Basin 8

Facing north at Pond 8-1.

Facing south at Pond 8-2.

Facing northeast at Pond 8-3.

5.9 Basin 9

Facing east at Pond 9-1.

Facing east at Pond 9-2.

Facing west at Pond 9-3.

Facing west at Pond 9-4.

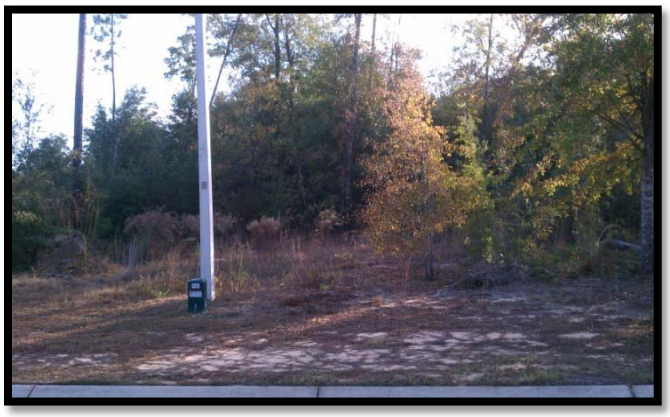
Facing east at Pond 9-5.

Facing west at Pond 9-6.

5.10 Basin 10

Facing east at Pond 10-1.

Facing northwest at Pond 10-2.



Facing south at Pond 10-3.

Facing north at Pond 10-4.

Facing north at Pond 10-5.

6.0 CONCLUSION

This Pond Siting Report outlines potential locations for stormwater management facilities throughout the SR 87 Connector project. The proposed pond designs will need to comply with Santa Rosa County, the Department of Environmental Protection, the NWFWMD and the FDOT design and permitting criteria. The criteria and guidelines for each of these agencies was outlined in Section 2 of this Pond Siting Report.

It is our intent to provide pond locations which are preferred by the FDOT: off of the right-of-way, outside of wetlands, and dry ponds where the water table allows. Several pond options were proposed significantly away from the proposed alignments. However, the majority of the ponds that are rectangular in shape and along a property line, can be adjusted at least 200 feet off of the right-of-way to provide land for desirable roadway frontage. The amount of wetlands throughout the project provided difficulty in finding proposed pond locations. Therefore, some proposed ponds that are recommended are placed within wetlands. Wet ponds are also necessary where the existing seasonal high water table is close to the ground surface. The wet ponds should be designed to avoid using a littoral shelf to reduce the maintenance necessary, which is the FDOT's preference.

The recommended ponds have been summarized in the below table.

Basin	Recommended Pond(s)	Applicable Alignment
1	1-3 and 1-5	1 and 2
2	2-1 or 2-3 or 3-3	1 and 2
3	3-3 or 2-3	1 and 2
4	4-4	1 and 2
5	5-1	1
6	6-1	1 or 2
7a	7-1	1
7b	7-4	1
8	8-2	1
9	9-3 or 9-5	2
10	10-2	2