ENVIRONMENTAL ASSESSMENT

of Modifications to the

RAW WATER STORAGE IMPOUNDMENT

APPENDIX G: WETLAND MITIGATION PLAN

SAVANNAH HARBOR EXPANSION PROJECT

Chatham County, Georgia and Jasper County, South Carolina

September 2013

US Army Corps of Engineers
Savannah District
South Atlantic Division

WETLAND MITIGATION PLAN

CONSTRUCTION AND OPERATION OF A RAW WATER STORAGE IMPOUNDMENT FOR THE CITY OF SAVANNAH AS A MITIGATION FEATURE FOR THE SAVANNAH HARBOR EXPANSION PROJECT

1.0 INTRODUCTION

Unavoidable adverse impacts to wetlands would be mitigated through purchase of credits from an approved wetland bank.

A mitigation bank is "a site, or suite of sites, where resources (e.g., wetlands, streams, riparian areas) are restored, established, enhanced, and/or preserved for the purpose of providing compensatory mitigation for impacts authorized by DA permits. In general, a mitigation bank sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the mitigation bank sponsor. The operation and use of a mitigation are governed by a mitigation banking instrument" (33 CFR Part 332.2).

Use of the proposed site for the Raw Water Storage Impoundment (RWSI) would require the non-Federal sponsor (NFS) of the Savannah Harbor Expansion Project (SHEP) to request that an existing Corps Section 404 wetlands permit be amended to remove a restrictive covenant on 2.1 acres of forested wetlands. Mitigation for this action to include purchasing of credits from a commercial mitigation bank would be the responsibility of the non-Federal sponsor.

In addition, constructing the proposed RWSI would require the Corps and the non-Federal sponsor to provide compensatory mitigation for loss of 13.5 acres of freshwater wetlands. Mitigation for this action, i.e. the purchase of credits from a commercial mitigation bank, would be purchased according to cost-share procedures as outlined in the SHEP General Re-evaluation Report. Currently, only one wetland bank in the project's primary service area (AA Shaw) has sufficient wetland credits available to cover the needs of the RWSI mitigation plan. Two wetland banks in the project's secondary service area (Black Creek and Yam Grandy) also have sufficient wetland credits if the primary service area bank became unavailable.

2.0 PROJECT DESCRIPTION

The City of Savannah operates and maintains a raw water pipeline between Abercorn Creek and its Industrial and Domestic Water Treatment Plant in Port Wentworth, Georgia (Figure 1). The pipeline delivers raw water that the City treats and then uses primarily as a water supply for local industries for specific plant processes, but also for drinking water to residences in west Savannah, Pooler, and south Effingham County.

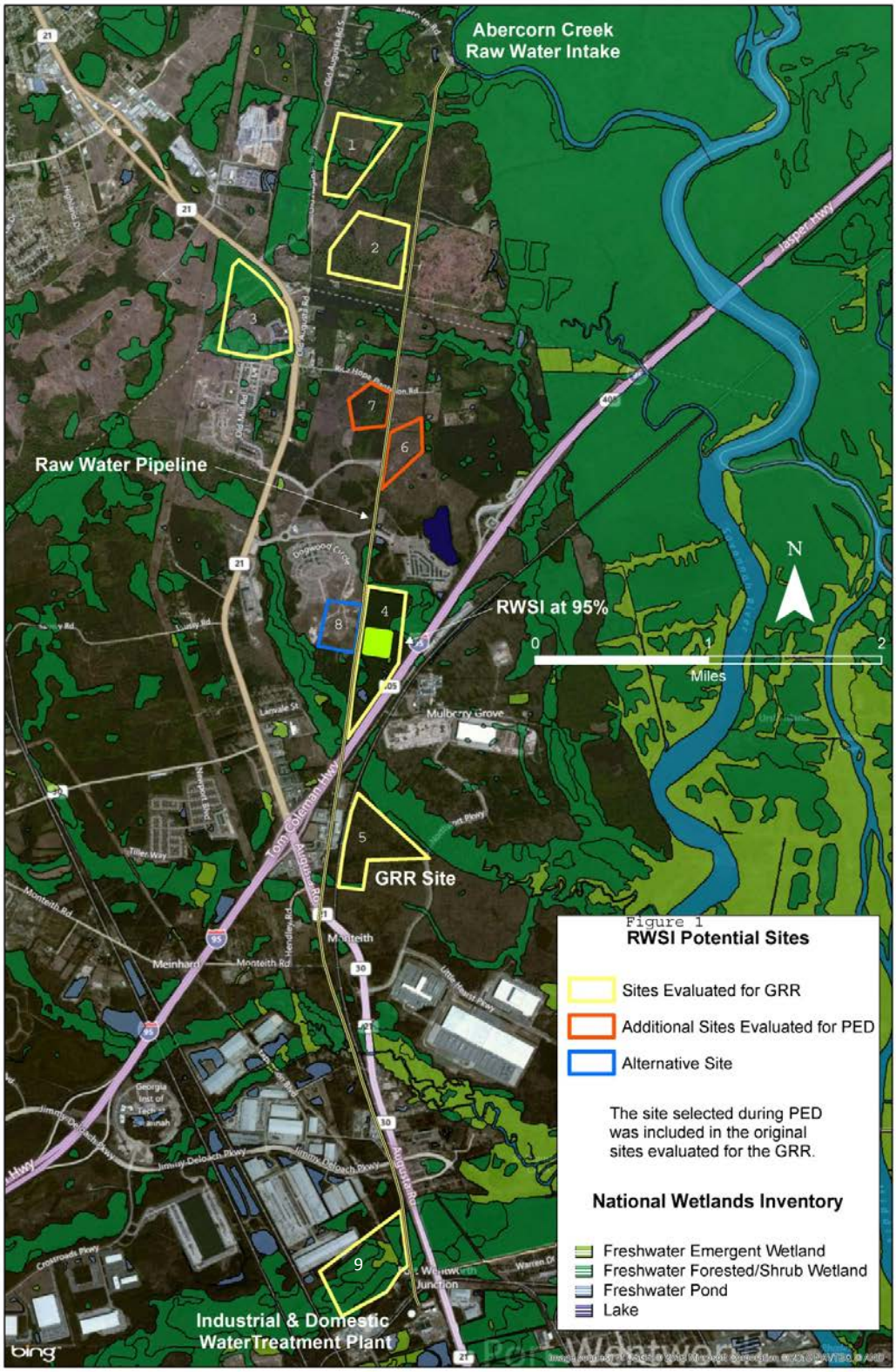

Figure 1 - Location of 9 Potential Sites for RWSI (see EA Appendix A for larger map)

After SHEP was approved, Savannah District began detailed engineering and environmental design studies as part of its preparation of contract drawings and specifications. As those studies progressed, it became apparent that alternate locations should be considered to minimize environmental effects and maximize the efficiency of the RWSI. The following table summarizes the changes that are proposed as a result of the detailed studies:

Changes in RWSI from 2012 SHEP EIS

Issue	SHEP EIS	RWSI EA
Project Purpose	Mitigate chloride impacts to City of Savannah Abercorn Creek water intake	Unchanged
Location	Parcel 3 of GPA's Savannah International Trade Park near Mulberry Grove	New location (Site 4)
Threatened & Endangered Species	No effect	Unchanged
Wetlands	Potential for impacts to small amount of wetlands	Impacts to 13.5 acres (2.1 acres under restrictive covenant)
Size	Approximately 35 acres	33 acres
Cultural Resources	No effect	Unchanged

The primary changes to the approved design are its location and the extent of wetland impacts that would occur.

The RWSI is now proposed for construction at a site between the City of Savannah's raw water pumping station at Abercorn Creek and its Industrial and Domestic Water Treatment Plant in Port Wentworth, Georgia. The selected parcel of land (117 acres) is between the City's raw water pipeline and Interstate 95. The property would be acquired by the non-Federal sponsor (NFS) for SHEP and used to construct and operate an above-ground raw water storage impoundment on approximately 33 acres of the property. A 3,300-foot access road (1.7 acres) located on top of the existing raw water pipeline is included in the proposed action. Borrow material will be required for the construction of the earthen dikes around the impoundment and will be obtained from an off-site source.

The 33-acre RWSI facility includes an earthen dike surrounding the impoundment that is approximately 3,400 feet in total length, with a maximum height of 29 feet, requiring a total material volume of approximately 440,000 cubic yards. The impoundment would have a maximum storage capacity of 62.5 Million Gallons per Day (MGD). It includes the placement of a High Density Polyethylene (HDPE) liner; associated piping and valves; a mechanical

mixing system; a 1 megawatt generator with fuel storage; a pump station and electrical building; a powdered activated carbon system with a silo and feed equipment; a groundwater well, a hydropneumatic tank, and fencing around the entire facility. Influent and effluent pipelines will be required between the impoundment and the existing City of Savannah water lines. The proposed action also includes upgrades to 19 existing pipeline air release valves and construction of 3 new valves (most from 6 to 8 or 10 inches) on the City of Savannah's existing raw water pipeline. Although USACE Civil Works activities are not governed by the USACE Section 404 regulatory permitting process, upgrades to existing valves (and new valves that may be required) that occur within wetlands within the pipeline right of way would be performed with in the Nationwide Permit 12 (Utility Line Activities). After construction of the RWSI and associated features is completed, the facility would be turned over to the City of Savannah for operations and maintenance.

3.0 LOCATION OF THE PROPOSED ACTION

The proposed impoundment is sited within a large tract of timberland whose current and historical land use is silviculture, and includes jurisdictional wetlands, excavated ponds and ditches (EA Appendix A; Figure 4). Some of the timber has been recently harvested in clear cuts and the pine timber is naturally regenerating from seed in these areas. Some of the existing timber stands were planted and some were naturally produced. The topography of the subject site ranges from 7 to 17 feet above mean sea level (msl) at the following coordinates: Latitude 32 degrees, 12 minutes, 15 N seconds; Longitude 81 degrees, 11 minutes, 10 W seconds. The site is located in the Lower Savannah watershed (HUC 03060109).

The City's raw water pipeline is located in northern Chatham County between Georgia Highway 21 and I-95 (Figure 1). The intake is on Abercorn Creek, a tributary of the Savannah River, and the pipeline runs southward 7.25 miles to the Industrial and Domestic Water Treatment Plant in Port Wentworth, Georgia.

4.0 DESCRIPTION OF ALTERNATIVES CONSIDERED

During the feasibility phase, six potential sites (Figure 1) for the RWSI were identified and screened for suitability, environmental impacts, and costs to design and construct. As scoping for design progressed, three additional sites were identified and included in this screening process.

4.1 Screening Criteria

- Soils and constructability (hydric vs. non-hydric soils, suitability for use in constructing dams/levees, depth to water table, subsurface condition risk)
- Hydrology on site (flooding frequency)
- Wetlands (likelihood of presence, potential impacts and mitigation required)
- Presence of restrictive covenants and impacts of altering these

- Endangered species (likelihood of impacts)
- Cultural resources (likelihood of impacts)
- Noise and visibility impacts
- Environmental liability risks (contamination)
- Land use compatibility (zoning, proximity to inhabited structures)
- Flood risk to adjacent properties
- Risk to infrastructure (roadways, railways, utility lines)
- Availability of the site for purchase
- Proximity to city's raw water pipeline
- Proximity to city's water plant
- Design and construction costs
- Schedule risks
- Uncertainty

The nine potential alternative sites were chosen for investigation by examining satellite imagery and/or aerial photos and identifying land areas that were undeveloped and located in between the city's raw water intake and the water treatment facility. After examining imagery, site visits were conducted to ascertain if the sites appeared buildable and acceptable for further investigation. Each site was screened for practicability and reasonableness using the criteria listed above. At critical points during the feasibility phase, the design and layout of the facility changed considerably. Initial plans called for a much larger impoundment than the one that was eventually included in the SHEP report documents and approved for construction. Alternative sites were screened and evaluated as the design progressed; therefore, more detailed data were available for sites screened later in the process (Phase 2). In addition, as part of the Phase 2 analysis, new sites were considered that were not previously available during Phase 1. A summary of the criteria affecting site selection are discussed in the narrative below.

4.2 Phase I Alternative Analysis

Alternative Sites Eliminated from More Detailed Analysis (Figure 1 shows the location of sites evaluated in both phases of alternatives analysis). The sites eliminated in Phase I were deemed not to be practicable due to a variety of constraints, including human health and safety, risk to infrastructure, poor constructability, distance to/from the city's raw water pipeline, and land use compatibility/proximity to residential development.

Alternative Site 9: This 144-acre site is almost entirely wetland, with only a small portion of upland. Use of this site would require extensive mitigation for impacts to wetlands. The Natural Resources Conservation Service (NRCS) Soil Resource Report for this site lists the water table at the ground surface, inhibiting constructability.

Two cemeteries lie within or near the upland portion of site 9. These cemeteries limit the amount of upland available for developing the RWSI on this site since preliminary investigation indicates that most of this tract is classified as wetlands. Detailed wetland and cultural resource

surveys would be required for this property. There is good potential for some prehistoric occurrences to exist on the higher ground margins of this particular site. The closest site eligible for listing on the National Register of Historic Places (NRHP) is the railroad corridor. In addition, a natural gas line runs through the site.

Site 9 was eliminated from further consideration on the basis of the large acreage of wetland impacts, high probability of impacting cultural resources, risk to infrastructure, and reduced constructability due to high water table.

Alternative Site 5: This 76-acre site is bounded on the west by a railroad line/corridor that has been previously determined as a National Register-eligible historic property. Site 5 has been previously surveyed for cultural resources (Braley 2005). Several historic and prehistoric sites are recorded within the tract. Many of the recorded sites have undetermined NRHP status and would require further evaluation if the RWSI could not be designed to avoid impacting the sites.

Since this is an active railroad track, there is a risk of contaminated soil and/or groundwater associated with the railroad track impacting the proposed site.

Notably, constructing the RWSI on this site would require installation of four 36-inch supply and return water pipelines that would pass underneath the railroad track. A rail or pipeline accident in this vicinity could interrupt both city water supply and rail access. In a worst-case scenario, a rail accident could damage or release a contaminant into the city's water supply, or a rupture or failure in the high pressure water line could compromise the railroad bed. Either of these results would endanger human health and safety. In addition, it is unknown when USACE could obtain the required approvals from the railroad. Based on previous interactions with the railroad, the decision process would take an indeterminate amount of time but not less than two years after design is complete.

Site 5 was eliminated from further consideration on the basis of the difficulty of approval and time required to install water supply pipelines underneath the rail line, risk of existing contamination (environmental liability), risk of impacting significant cultural resources, and risk of a railway accident or pipeline rupture endangering human health and safety and infrastructure.

Alternative Site 3: This 128-acre site straddles the Chatham-Effingham County line and is located on the west side of Georgia Highway 21. Preliminary data based on the NRCS Soil Resource Report for this site indicates the water table at the ground surface, which could inhibit constructability. The National Wetland Inventory (NWI) maps identify over half of this site as wetlands. The southern half of the site (in Chatham County) has been developed for single and multi-family residential developments. Wetlands in this portion of the site have been filled. Recent aerial photography (Google Earth Pro) shows 10 apartment buildings and several single-family homes on site. If the RWSI is built on the undeveloped portion of this site, it would be located in wetlands in the northern half of the site, 700 feet from the residential development.

Noise, visibility, and the potential risk to human health and safety should the impoundment's dike break poses a considerable risk.

Site 3 is located a distant 4,000 feet from the city's raw water pipeline and 6.5 miles from the city's water plant, greatly increasing cost of construction and operation. Optimally, the site would be located adjacent to the existing raw water pipeline and as close as possible to the city's municipal and industrial water treatment facility, thereby maximizing the use of the existing pumps at Abercorn Creek and minimizing new pipeline and pumping costs. Location of the RWSI at Site 3 would also require construction of a pipeline that would cross Georgia State Highway 21. This presents a risk of service interruption or contamination of the city's water supply in the event of an accident that damaged or ruptured the pipeline and could also compromise the highway road bed.

Site 3 was eliminated from further consideration on the basis of proximity to the raw water pipeline, risk to infrastructure, risk to human health and safety, cost to run a pipeline nearly 1 mile and under a major highway, and the proximity to residential development, and reduced constructability due to high water table.

Alternative Site 1: This 110-acre site is located 1,700 feet from the city's raw water pipeline and 7.4 miles from the city's water plant. The distance from the water plant would increase cost of construction and operation. The NRCS Soil Resource Report for this site shows the water table at the ground surface, inhibiting constructability.

Site 1 was eliminated from further consideration based on distance to the raw water pipeline and to the city's water plant, the additional costs needed to run ½ mile pipeline to the existing raw water pipe, and reduced constructability due to high water table.

Alternative Site 2: This 132-acre site is located adjacent to the city's raw water pipeline but is 6.2 miles from the city's water plant, greatly increasing cost of construction and operation. Site 2 is the furthest proposed site from the water treatment plant, along the pipeline. Compared to other potential sites, approximated 100 additional horsepower would be needed in pump capacity to deliver the water, increasing construction and operations and maintenance costs. The NRCS Soil Resource Report for this site shows the water table at the ground surface, inhibiting constructability.

Site 2 was eliminated from further consideration based on distance to the city's water plant, increased costs compared to other alternatives, and reduced constructability due to high water table.

Alternative Site 7: This 31-acre site is adjacent to the raw water pipeline but is 5.2 miles from the city's water plant, greatly increasing cost of construction and operation. This site is barely large enough to contain the proposed 30-acre RWSI. It affords no opportunity to reconfigure or move the RWSI within the site to minimize adverse impacts, and no room for a buffer between

the RWSI and adjacent properties. For instance, although NWI shows no wetlands on the site, 100% of the site has hydric or partially hydric soils, suggesting that wetlands may be present. If this is the case, the small size of the site would preclude reconfiguring the design to avoid wetlands.

Although the site is 1,400 feet from the nearest occupied dwelling, it is zoned Residential Single Family, and a tract bordering this site is being developed for a subdivision. Should the RWSI be located on this site, there is a high risk that future land use compatibility and noise/visibility impacts could become significant with this planned development. In addition, a Phase I Cultural Resource Survey would be required prior to development of this property.

Site 7 was eliminated from further consideration based on distance to the city's water plant, and design constraints imposed by the small size of the site relative to the size of the proposed RWSI.

Alternative Site 6: This 34-acre site is adjacent to the raw water pipeline but is 5.0 miles from the city's water plant, greatly increasing cost of construction and operation. This site is barely large enough to contain the proposed 30-acre RWSI. It affords no opportunity to reconfigure or move the RWSI within the site to minimize adverse impacts, and no room for a buffer between the RWSI and adjacent properties. For instance, although NWI shows no wetlands on the site, 100% of the site has hydric or partially hydric soils, suggesting that wetlands may be present. If this is the case, the small size of the site would preclude reconfiguring the design to avoid wetlands. Although the site is 1,100 feet from the nearest occupied dwelling, it is zoned Residential Single Family, and a tract bordering this site is being developed for a subdivision. Should the RWSI be located on this site, there is a high risk that future land use compatibility and noise/visibility impacts could become significant with this planned development.

This 34-acre site was included in the Georgia Department of Transportation's NaviGAtor System for Hurricane Evacuation project archaeological assessment (No author, N.D.). No cultural resources sites were recorded within the site; however, the survey did not entail intensive field investigations (Phase I Cultural Resource Survey). A Phase I Cultural Resource Survey would be required prior to development of this property.

Site 6 was eliminated from further consideration based on distance to the city's water plant, and design constraints imposed by the small size of the site relative to the size of the proposed RWSI.

4.3 Phase II Alternative Analysis

After completion of the feasibility phase of the SHEP, the remaining optimal site alternatives (Phase I) were further screened based on more detailed engineering design criteria for the RWSI. In addition, a new site that was not previously available (Site 8) was evaluated. A summary of the criteria affecting site selection are discussed in the narrative below; and Figure 2 below shows the location of sites evaluated in this phase.

Alternative Site 4: This 117-acre site is adjacent to the raw water pipeline and 3.8 miles from the city's water plant. A 65% design has been prepared that places the 33-acre impoundment footprint within the site. Wetlands have been delineated in the field on the entire 117-acre tract. The RWSI footprint as currently designed would encroach on a total of 13.5 acres of wetlands. The total mitigation cost is estimated to be $666,330. This figure includes mitigation for two actions affecting wetlands: 1) amending an existing Section 404 permit to remove a restrictive covenant on 2.1 acres of forested wetlands and 2) placement of fill into 13.5 acres of forested and recently clear-cut wetlands. The first action is the sole responsibility of the non-Federal sponsor for SHEP; the second action would be cost-shared between the Corps and the non-Federal sponsor as outlined in the SHEP General Re-evaluation Report.

The entire site has been cleared for presence of cultural resources, endangered species, and other environmental liabilities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The NRCS Soil Resource Report for this site and field investigations show the water table at approximately 1 foot or below within the footprint of the impoundment, which would not significantly reduce constructability. There are no known subsurface condition risks since the site is under natural conditions (planted pines, mixed pine-hardwoods). The current footprint places the RWSI 1,330 feet from the nearest residential dwellings. Therefore, the potential adverse impacts from noise and aesthetics (visibility) from the proposed facility are not significant and would result in better land use compatibility when compared to other site alternatives.

No increase in design or construction costs or schedule would be incurred for this alternative.

Alternative Site 4 Reconfigured: This alternative moves the 33-acre RWSI footprint 500 feet southward in the 102-acre Site 4 tract so that the footprint does not encroach on the wetlands protected by restrictive covenant. As with the original configuration for Site 4, this alternative places the RWSI adjacent to the raw water pipeline and 3.8 miles from the city's water plant. This alternative would impact approximately 14 acres of wetlands. The entire site has been cleared for presence of cultural resources, endangered species, and other environmental liabilities. The proposed footprint places the RWSI 1,500 feet from the nearest residential dwellings, so noise/visibility present low risk for adverse impacts and land use compatibility is acceptable when compared to other site alternatives.

This alternative would place the southern portion of the RWSI on wetlands that include water-filled borrow pits from the construction of Interstate 95. These borrow pits present increased design and construction costs. The tract narrows between the water pipeline and Interstate 95, preventing shifting the southern embankment to higher ground. Construction cost to fill the borrow pits would be much higher than using the current design for Site 4. The design footprint

for this alternative would encroach into the 100-year floodplain, conflicting with Executive Order 11988: Floodplain Management.

Design costs would increase by $400,000, construction costs would increase by $1.0 to $4.0 million, and the schedule would lengthen by 4 months if this alternative is pursued.

Alternative Site 8: This alternative would place the 33-acre RWSI on an adjacent property immediately west of Site 4. As with the original configuration for Site 4, this alternative places the RWSI adjacent to the raw water pipeline and 3.8 miles from the city's water plant. The site is part of a planned subdivision that was never completed. Approximately 16 acres within the 33-acre footprint are wetlands that were filled in 2005 for construction of the subdivision. The quality of fill that was used is unknown and would require investigation during the design phase, if this alternative was implemented. This alternative would impact approximately 0.9 acres of wetlands that were not filled in 2005. Additionally, construction of the impoundment on this site, which is higher in elevation, could save approximately $2.5 to $4 million in construction costs, assuming the embankment height (and consequently amount of fill required) would decrease.

The NRCS Soil Resource Report (USDA 2013) for this site shows the water table on the site prior to placement of fill at approximately 1 foot or below within the footprint, which would not significantly reduce constructability. There are subsurface condition risks since the fill material used is of unknown quality. This alternative would place the 30-foot high RWSI dike 170 feet from the nearest residential development, posing a higher risk to human health and safety due to flooding in the event of a failure of that structure. The State of Georgia Safe Dams Program administered by GAEPD requires failure flood analysis to be done. It is unknown at this time unless additional dike failure flood analysis modeling is performed, whether this site would pose more threat in the event of dike failure. If constructed, increased permitting and monitoring requirements may be required. The closer proximity of the RWSI to the Rice Hope residential development poses a potentially unacceptable land use compatibility with a high risk for impacts associated with noise/visibility.

Site 8 was included in the Georgia Department of Transportation's NaviGAtor System for Hurricane Evacuation project archaeological assessment (No author, N.D.). No cultural resources sites were recorded within the site; however, the survey did not entail intensive field investigations. Although USACE has not surveyed for cultural resources and endangered species, both resources are considered to have a low probability of occurrence on the site based on work performed by the previous land owner/Section 404 permittee. A Phase I Cultural Resource Survey would be required prior to development of this property.

Design costs would increase by $1.0 to $1.5 million and the schedule would lengthen by 8 months if this alternative is pursued.

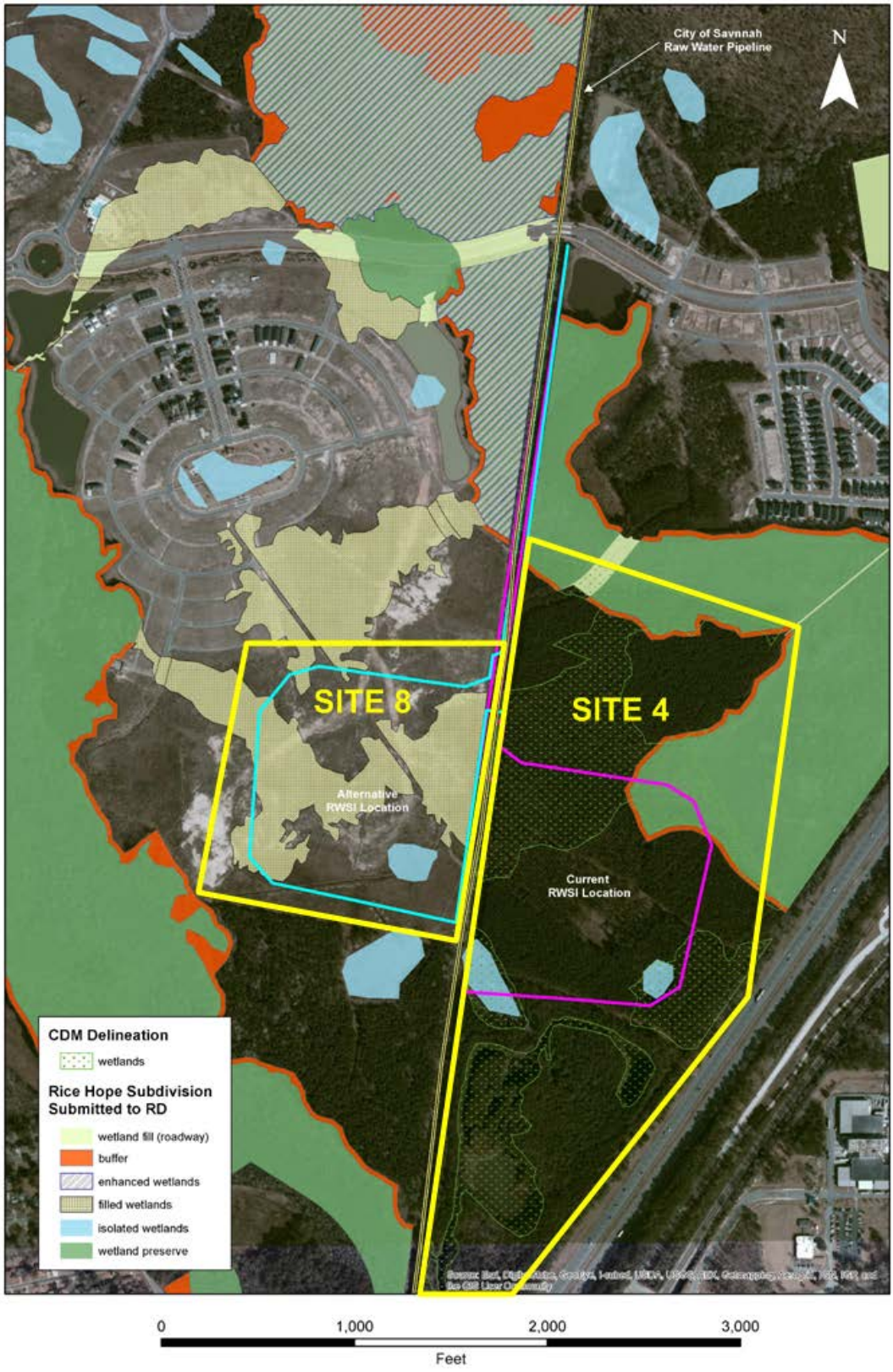

Figure 2 - Location of Phase 2 Alternatives Analysis (Sites 4 and 8)

4.4 Final Alternative Analysis

Through refinement of the alternative screening process and progress in the design phase of the project, Site 4, Site 4 Reconfigured, and Site 8 emerged as viable alternatives. A more detailed accounting of the pros and cons for these three alternatives is listed below.

4.4.1. Neutral Factors

The factors below showed no significant difference among the three sites:

- Soils very limited in use for dikes/levees – fill would need to be brought in
- Hydric and partially hydric soils predominate (pre-fill on Site 8)
- Environmental Assessment needed for any site

4.4.2. Site 8 Pros and Cons

Using the criteria in Table 1 and additional considerations, the pros and cons for Site 8 are summarized below:

Cons:

- Increased possibility of flood damage to residential dwellings if an impoundment fails
- Requires additional Georgia Safe Dams coordination and review and dam failure flood analysis to be performed. In the event GAEPD classifies as Category I, additional permitting and monitoring would be required.
- Noise and visibility impacts to nearby residential area would be an issue – impoundment site is 170 feet from an existing residential development
- No design has been developed – adds 8 months to schedule and $1.0 – $ 1.5M in design costs
- Environmental Baseline Survey (EBS) needed but the expected risk is moderate
- Subsurface investigation needed to characterize the material used to fill wetlands and address any constructability issues
- Soils data (suitability for use for dikes/levees, depth to water table, etc.) no longer apply to filled portions of the site

Pros:

- No restrictive covenant issues
- Most wetlands already filled and mitigated; additional $38,000 in mitigation required
- Would save $2.5 - $4.0M in construction costs

4.4.3. Site 4 Pros and Cons

Using the criteria in Table 1 and additional considerations, the pros and cons for Site 4 are summarized below:

Cons:

- Restrictive covenant must be modified
- Wetland mitigation costs estimated at $666,330

Pros:

- Reduced possibility of flood damage to residential dwellings if impoundment fails
- Noise and visibility and impacts less likely to be an issue – impoundment is 1,330 feet from inhabited dwellings
- No changes in design costs or schedule required
- No change in construction cost
- EBS, endangered species, cultural surveys completed -- no effect
- Available soils data is accurate
- Subsurface conditions not likely to be a problem

4.4.4. Site 4 Reconfigured Pros and Cons

Using the criteria in Table 1 and additional considerations, the pros and cons for Site 4 Reconfigured are summarized below:

Cons:

- Presence of borrow pits increases design and construction costs.
- Affects floodway for spillway by decreasing flow area. Additional hydraulic modeling would be required.
- Wetland mitigation costs are estimated to be between $462,000 and $840,000
- No design has been developed – adds 4 months to schedule and $400,000 in design costs
- Would add $1.5 - $4.0M to construction costs
- Encroaches into 100-year floodplain conflicting with Executive Order 11988: Floodplain Management.

Pros:

- Reduced possibility of flood damage to residential dwellings if an impoundment fails
- Noise and visibility and impacts less likely to be an issue – impoundment is 1,500 feet from inhabited dwellings
- No need to modify restrictive covenant
- EBS, endangered species, cultural surveys completed -- no effect
- Available soils data is accurate

4.5 Proposed Action at Site 4 (Preferred Alternative)

After completion of the alternatives analysis, USACE identifies Site 4 as the most practicable site for construction of the RWSI. Environmental impacts for construction at that location that

can be mitigated to an acceptable level. Relative to all the other sites considered, construction of the RWSI at Site 4 minimizes lessens the acres of wetlands impacts, minimizes potential land use compatibility issues, and minimizes risk to human health and safety due to flooding while optimizing the engineering design criteria of being adjacent to the existing raw water pipeline and relatively close to the city's municipal and industrial water treatment facility. Relative to the three sites considered during the second phase of the alternatives analysis, construction of the RWSI on Site 4 is further from residential developments thereby minimizing risk to human health and safety due to flooding and minimizing the adjacent land use compatibility considerations. In addition, it should be noted that construction of the RWSI on Site 4 Reconfigured or Site 8 would result in an additional $1.0 to $1.5 million impact to design costs and delay project construction schedule by four to eight months. Site 4 Reconfigured would also be inconsistent with EO 11988 because there is a practicable alternative (Site 4) to siting in a floodplain.

This 117-acre site is adjacent to the raw water pipeline and 3.8 miles from the city's water plant. A 95% design has been prepared that places the 33-acre impoundment footprint within the site. Wetlands have been delineated in the field on the entire 117-acre tract. The RWSI footprint as currently designed would encroach on a total of 13.5 acres of wetlands. The total mitigation cost is estimated to be $666,300, to be cost-shared between the Corps and the non-Federal sponsor for SHEP as described in Section 4.3 above, and the required credits would be purchased prior to putting the RWSI in operation, including any additional credits associated with potential impacts along the pipeline that may result from improvement or construction of air valves. The entire site has been cleared for presence of cultural resources, endangered species, and other environmental liabilities under CERCLA.

The NRCS Soil Resource Report for this site and field investigations show the water table at approximately 1 foot or below within the footprint of the impoundment, which would not significantly reduce constructability. There are no known subsurface condition risks since the site is under natural conditions (planted pines, mixed pine-hardwoods). The current footprint places the RWSI 1,330 feet from the nearest residential dwellings, so noise/visibility present low risk for adverse impacts and land use compatibility is acceptable and advantageous when compared to other site alternatives.

No increase in design or construction costs or schedule would be incurred for this alternative. This alternative is located in between and adjacent to other infrastructure such the raw water pipeline and Interstate 95; is compatible with existing land use; and would most efficiently provide the necessary raw water impoundment facility for the mitigation needs of SHEP.

Site 4 (Preferred Alternative) is located 1,500 feet from the nearest residential development to the north and 1,330 feet to the northwest. Site 8 is located adjacent to the nearest residential development (Rice Hope) to the northwest (Rice Hope). Site 8 is also in a land use zone classified as "Residential Single Family". A portion of Site 4 is classified as "Undeveloped

Land" and part is classified as "Residential Single Family" in the Port Wentworth Comprehensive Plan.

5.0 SECTION 404 IMPACTS OF THE PREFERRED ALTERNATIVE

The RWSI footprint as currently designed would encroach on a total of 13.5 acres of wetlands. The total mitigation cost is estimated to be $666,330. This includes mitigation for removing a restrictive covenant on 2.1 acres of forested wetlands (responsibility of the non-Federal sponsor for SHEP) and placement of fill into 13.5 acres of forested and clear-cut wetlands (responsibility of the Corps and the non-Federal sponsor under the SHEP cost-share agreement).

5.1 Consideration of the USEPA/USACE Mitigation Rule

The Corps has evaluated the proposed project mitigation with respect to the Mitigation Rule-entitled "Compensatory Mitigation for Losses of Aquatic Resources", 33 CFR Part 332 (and also 40 CFR Part 230) (jointly established by the USEPA and USACE and published in the Federal Register on April 10, 2008) (referred to herein as the Mitigation Rule). The Mitigation Rule applies to Clean Water Act Section 404 permits, not Corps civil works projects such as the RWSI. Nevertheless, the Corps has attempted in good faith to consider and follow the Mitigation Rule to the extent practicable.

5.2 Proposed Compensatory Mitigation

Construction of the proposed RWSI would require fill to be placed in jurisdictional wetlands including 2.1 acres of wetlands that are part of a 375-acre preserved wetland area under a restrictive covenant that was part of the mitigation package for a privately-owned residential development permitted in 2004. Prior to any placement of fill into these restrictive covenant wetlands, the restrictive covenant must be removed on the 2.1-acre portion and mitigation for the original wetland impacts must be calculated. Second, the Corps must calculate mitigation required to fill a total of 13.5 acres of wetlands, including the 2.1 acres currently under a restrictive covenant, and include this in its mitigation calculations for the project moving forward.

For calculating the mitigation requirements of removing 2.1 acres of preserved wetlands from the restrictive covenant, the Corps used the Mitigation Worksheet for preservation found in the Regulatory Standard Operating Procedures (SOP), which have been adopted by the natural resources agencies in Georgia to evaluate impacts and calculate compensatory mitigation on projects requiring Section 404 permits. When running the SOP for altering the restrictive covenant, the following preservation mitigation values were used for the 2.1 acres of forested wetlands to be removed from the restrictive covenant:

- Degree of Threat 0 (none).
- Kind 0.6 (in-kind)

- Control 0.1 (restrictive covenant)

The number of total preservation credits generated by running the SOP for the 2.1 acres is then multiplied by a factor of 2.0 to generate the total mitigation credits that would be required to compensate for this acreage to be removed from the restricted covenant. The SOP worksheet for altering the restrictive covenant in this fashion is presented below.

SHEP RAW WATER STORAGE IMPOUNDMENT

PRESERVATION MITIGATION FACTORS

Factor	Options				
Degree of Threat	None	Low	Moderate	High	
	0	0.1	0.3	0.5	
Kind	Category 2	Category 1			
	0.2	0.6			
Control	N/A	Private with RC	POA with RC	RC + CE	Public Ownership
	0	0.1	0.2	0.4	0.5

PROPOSED PRESERVATION MITIGATION WORKSHEET

Factor	Area 1	Area 2	Area 3	Area 4	Area 5
	Restricted Covenant				
Threat	0.0				
Kind	0.6				
Control	0.1				
Sum of m Factors	0.7	0.0	0.0	0.0	0.0
Mitigation Area	**2.10**	0			
M X A	1.47	0.00	0.00	0.00	0.00

Total Preservation Credits = SUM (M X A) = 1.47

Total Preservation Credits X 2 = 2.94

For impacts to 13.5 acres of wetlands from construction of the RWSI, the Corps used the Required Mitigation Worksheet for adverse impacts found in the SOP. Although the SOP was developed by the interagency Mitigation Banking Review Team for actions permitted through the Corps' Regulatory Division, it can also serve as a framework to quantify impacts from civil works projects such as this. In brief, the SOP uses several factors to quantify the ecological impacts and benefits expected from various project actions. For impacts, these factors include the type of impact, the duration of the impact, the type of vegetation being impacted, and the preventability of the impact.

The SOP considers several factors in its calculations of the ecological extent of a project's impact.

When running the SOP for RWSI impacts, the following adverse impact factor values were used for the 11.4 acres of recently clear-cut wetlands:

- Dominant Effect 2 (fill).
- Duration of Effects 2 (7+ years).
- Existing Condition 0.5 (Class 4 – major adverse impacts to aquatic function and substantial enhancement would be necessary to regain lost aquatic functions).
- Lost Kind 1.5 (Kind B – non-riverine forested wetlands).
- Preventability 0.5 (low – there are no known alternatives which satisfy the purpose, are practicable, and are less damaging).
- Rarity Ranking 0.1 (common).

When running the SOP for RWSI impacts, the following adverse impact factor values were used for the 2.1 acres of intact forested wetlands to be impacted by the project:

- Dominant Effect 2 (fill).
- Duration of Effects 2 (7+ years).
- Existing Condition 2.0 (Class 1 – fully functional).
- Lost Kind 1.5 (Kind B – non-riverine forested wetlands).
- Preventability 0.5 (low – there are no known alternatives which satisfy the purpose, are practicable, and are less damaging).
- Rarity Ranking 0.1 (common).

The SOP worksheet for calculating impacts for constructing the RWSI in this fashion is presented below.

SHEP RAW WATER STORAGE IMPOUNDMENT

Adverse Impact Factors

Factor	Options						
Dominant Effect	Fill	Dredge	Impound	Drain	Flood	Clear	Shade
	2.0	1.8	1.6	1.4	1.2	1.0	0.5
Duration of Effects	7+ years	5-7 years	3-5 years	1-3 years	< 1 year		
	2.0	1.5	1.0	0.5	0.1		
Existing Condition	Class 1	Class 2	Class 3	Class 4	Class 5		
	2.0	1.5	1.0	0.5	0.1		
Lost Kind	Kind A	Kind B	Kind C	Kind D	Kind E		
	2.0	1.5	1.0	0.5	0.1		
Preventability	High	Moderate	Low	None			
	2.0	1.0	0.5	0.0			
Rarity Ranking	Rare	Uncommon	Common				
	2.0	0.5	0.1				

† These factors are determined on a case-by-case basis.

REQUIRED MITIGATION CREDITS WORKSHEET

Factor	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 6
	Clear-cut Wetlands	Intact Forested Wetlands					
Dominant Effect	2.0	2.0					
Duration of Effect	2.0	2.0					
Existing Condition	0.5	2.0					
Lost Kind	1.5	1.5					
Preventability	0.5	0.5					
Rarity Ranking	0.1	0.1					
Sum of r Factors	6.6	8.1	0.0	0.0	0.0	0.0	0.0
Impacted Area	11.40	2.10					
R X AA =	75.24	17.01	0.00	0.00	0.00	0.00	0.00

Total Required Credits = SUM (R X AA) = 92.25

Total preservation mitigation credits required to remove the restrictive covenant on 2.1 acres of wetlands (2.94) must be added to the total mitigation credits for proposed future impacts (92.25) to generate the total mitigation credits required for constructing the RWSI on the proposed site (95.19).

The Corps and the SHEP non-Federal sponsor propose the purchase of 95.19 credits from a commercial wetland bank as compensatory mitigation for removing the restrictive covenant on 2.1 acres of intact wetlands and placement of fill into 13.5 acres of intact forested wetland and clear-cut wetlands that would be required in constructing the RWSI. Cost of these credits is estimated to be $666,330. The purchase of these credits would be shared between the Corps and the non-Federal sponsor in accordance with the SHEP cost share agreement.

Should any additional wetland impacts be identified during finalization of the design process, additional credits will be calculated and purchased using the methods outlined above.