



April 20, 2016

Joel D. Christian
Environmental Review Section Manager
Manatee County Building and Development Service Dept.
1112 Manatee Avenue West
Bradenton, Florida 34205

Re: Coastal Processes Review Memorandum – Aqua by the Bay

Dear Joel:

CB&I Coastal Planning & Engineering, Inc. was contracted by Manatee County under WA #15 to perform a coastal processes review of the proposed Aqua by the Bay project, in particular the Estuary Enhancement Area. CB&I's understanding of the project and general findings are presented in the memorandum below. CB&I's review was limited to the influence of the project on the coastal system assuming it was constructed as proposed. The review did not consider the direct impacts of project construction or upland influences of the project (i.e. site development, site drainage, storm water retention, mitigation, building codes, traffic, etc.).

Understanding of the Project

The proposed Aqua by the Bay development project is located in southwestern Manatee County, between El Conquistador Parkway and Sarasota Bay and south of 53rd Avenue West. According to the Large Project Application (dated January 2016) submitted in conjunction with the project,

“The Aqua plan is approximately 529 acres, from which 256.38 acres are considered uplands. The planned residences will be clustered on approximately 146 acres of land, in an effort to further preserve the pristine environmental attributes of the land. The development will include approximately 28 acres of upland parks and open space areas. The applicant plans to also create nearly 30 acres of open water lagoons for recreational purposes...

One of the most exciting components of the project is to create an open water lagoon parallel to the mangrove lined shore to establish a separation buffer between the 2.5 miles of mangroves that line the bay and the site improvements. This separation will limit human intervention with the mangrove areas and should also aid in promoting the health of the bay and seagrass areas. The mangrove lagoon will augment the natural ecological habitats for both flora and fauna.”

The area waterward of the proposed wall at the western edge of the upland development that would separate uplands from the marine environment was termed as the Estuary Enhancement Area and was often referred to as the lagoon throughout the documents. The lagoon was the focus of the review presented in this memorandum.

CB&I's understanding and review of the project was based on, and limited to, documents provided by the County. These documents included the following:



Document Name		Document Type	Document Date
Large Project Application		Text	January 2016
Rezone/General Development Plan		Maps	February 2, 2016
Response to Comments, Version 3, Attachment A		Text	February 2, 2016
Long Bar Pointe Environmental Narrative		Text/Maps	July 2015
Estuary Enhancement Area Cross-Section		Figure	October 5, 2015
Estuary Enhancement Area Map		Map	January 22, 2016
Seagrass Map		Map	January 22, 2016

General Findings

The general findings from our review were organized into three sections to identify ecological and engineering considerations for the proposed lagoon and its influence on the coastal system. The following sections consider the lagoon's ecological enhancement to the coastal system, influences to tidal exchange, and influences on storm surge.

- **Ecological Enhancement Evaluation**

The ecological enhancement and overall net benefits of the lagoon are unclear. Although the lagoon may create estuary habitat, there are limited details to clearly demonstrate how the creation of the lagoon will result in "significant net benefits to the wetlands that are shoreline components of Sarasota Bay". The shoreline components of Sarasota Bay adjacent to the project area include healthy mangrove and seagrass resources. The project application should provide support for the statement that creation of the lagoon will benefit these resources, and further, consider if creation of this lagoon and the connection points to the Bay has the potential for adverse impacts to these resources (see consideration of scouring and sediment deposition below in Tidal Exchange section).

The Environmental Narrative also states that the lagoon will result in "greater ecological value" than the value of the existing highly disturbed exotic wetlands that would be removed. The project includes converting existing upland/wetland to the estuarine environment, which results in an exchange of habitat types and not necessarily an enhancement. The Environmental Narrative referred to a UMAM assessment of the existing wetlands, but the assessment was not described in detail or provided as an attachment. The narrative indicated that detailed UMAM analyses would be provided in future documents. The UMAM assessment for the lagoon will allow for further evaluation of impacts to the degraded wetlands compared to the suggested benefits to existing wetlands and bay.

- **Tidal Exchange**

The coastal system within the project area is influenced by astronomical tides. The system is subject to semi-diurnal tides in which there are generally two high and two low tides in a 24 hour period. These



tides are anticipated to interact with the project as water is exchanged between the proposed lagoon and Sarasota Bay through the mangrove swamp that separates the two water bodies. The exchange of water during the tidal cycle (tidal prism) is important to maintain water quality for fish and other wildlife that may inhabit the area. An insufficient tidal prism may limit flushing of the lagoon, creating stagnant conditions. Conversely, the lagoon may increase the tidal prism which may result in currents through the mangrove swamp exceeding a certain critical velocity causing sediments to be mobilized during the tidal cycle, transported, and redistributed. The mobilization and redistribution of sediments may cause scour undermining the foundation and root systems of the mangrove swamp as well as cause deposition adversely impacting seagrass beds or other sensitive environmental habitats.

The Estuary Enhancement Area Map and the Seagrass Map provided as part of the project's documentation identifies several exchange locations through the mangrove swamp and delineates seagrass areas within Sarasota Bay. The Response to Comments, Version 3, Attachment A provided as part of the project's documentation refers to the exchanges as "potential points of connectivity" and states "the Estuary Enhancement Area will be hydrologically connected to Sarasota Bay by historical mosquito ditches and natural flow pathways." It is unclear whether the exchanges are natural and/or whether they will be modified as part of the project. The size, number, locations, and modifications (if any) of the exchanges and the configuration of the lagoon should be evaluated to identify the potential for currents to mobilize and transport sediments, ecological impacts to environmental habitats (i.e. seagrass beds and mangrove swamps), and effects on water quality standards should they exist as a result of the project.

- **Storm Surge**

The coastal system within the project area is influenced by the passing of nor'easter storms in the winter and tropical systems (i.e. hurricanes) in the summer. The size, intensity, and path of these storms can greatly affect the conditions experienced within the region and at the project area. The effects of the storms are episodic and occur over a short duration (2 to 5 days). The storms are generally accompanied by elevated water levels, high winds, and increased wave action. The combination of these factors affect the magnitude, spatial extents, and severity of a storm's impacts to the coastal system and upland development. In particular, storm surge (elevated water levels above the astronomical tides) within Sarasota Bay is primarily driven by wind speed, direction, and duration of a particular storm event. The magnitude (height) of the surge can be further amplified by the Bay's shallow water depths (on average <6 feet).

The interactions between upland development and storm conditions are complex. Storm surge can damage upland development and cause flooding. Upland development can in turn potentially influence the storm's effects experienced elsewhere by displacing and redistributing surge. The Rezone/General Development Plan and the Estuary Enhancement Area Cross-Section provided as part of the project's documentation identifies a wall separating the project's upland development and lagoon. Landward of the wall the site will be backfilled raising the grade elevation of the development. Seaward of the wall is the proposed lagoon separated from Sarasota Bay by an existing mangrove swamp. Water elevations anticipated during storm conditions should be evaluated to assess the likelihood of storm surge being displaced by the upland development, quantify the volume of surge displaced, and identify potential flow pathways where the displaced surge could be redistributed.



Summary

It is recommended that additional consideration be given to assess the project's influence on the coastal system from an ecological and engineering standpoint including proposed ecological benefits, tidal exchange and storm surge. A summary of the findings and additional considerations are below:

The ecological enhancement and overall net benefits of the lagoon are unclear. In order to further evaluate the ecological enhancement, a UMAM analysis may be used to compare the with-project and without-project scenarios along with details that demonstrate the proposed benefit to the system beyond an exchange of habitat.

Tidal exchange may potentially effect water quality within the lagoon and the redistribution of sediments. Also, storm surge may potentially be displaced and redistributed by the upland development. An assessment of tides and storm surge influences may be initiated by defining the dimensions and capacity of the exchange connections, and tidal and surge interactions between the lagoon, the upland and Sarasota Bay. Further evaluation may be approached with various tools which may include, but are not limited to, analytical calculations or numerical modeling to demonstrate the effects on the coastal system.

The feedback provided in this memorandum to the County is expected to facilitate the County's review of the project. It may also support consultation and permitting with state regulatory agencies, which may include Florida Department of Environmental Protection (FDEP) and/or Southwest Florida Water Management District (SWFWMD). Consultation with the state agencies will include evaluation of impacts to state resources (i.e. Sarasota Bay) associated with the project and may result in specific requirements to demonstrate project influences.

Please feel free to contact me should you have any questions.

Sincerely,

A handwritten signature in blue ink that reads 'Michelle Pfeiffer'.

Michelle R. Pfeiffer, P.E.
Sr. Project Engineer
CB&I Coastal Planning & Engineering, Inc.

cc: Tom Pierro, P.E., CB&I
David Swigler, P.E., CB&I
Lauren Floyd, CB&I