

Report on Estuary

John B. Smith, March 17, 2019

Revised March 23, 2019

Revised March 28, 2019

Revised April 2, 2019

Revised Second Time April 2, 2019

Revised April 8, 2019

1. Invasive Species and Noxious Weeds - Removal of Brazilian pepper trees and other invasive species from areas where mangroves are trimmed and areas where mangroves are not trimmed are a concern. The conservation easement allows the cutting of nuisance and exotic plants. The 2017 permit does not require the removal of these plants; however, the conservation easement requires the estuary to be maintained and remain predominately in the vegetative state at the time of the easement, which implies that they need to be removed on a periodic basis. The original 1993 permit, which is referenced in all subsequent permits, required Brazilian pepper trees and Australian pines to be removed from a few specific areas. Brazilian pepper trees were observed within the mangroves surrounding the Oak Harbor golf course. Jennifer Smith, the director of the southeast office of the Florida DEP, stated that this clause meant that non-native plants, invasive species, exotic plants, and weeds should be removed. The wording in the easement mirrors the wording suggested by the Florida DEP for conservation easement areas. **A legal opinion is needed and this issue needs to be turned over to GHCA.**
2. Silting up of culverts connecting various portions of estuary is a concern. Culverts run under roadways. It wasn't possible to assess the condition or flow rate through any culvert; however, the conservation easement requires the conservation area to be retained and maintained predominantly in the natural hydrological condition. Does this requirement seemingly means that the water flow must remain the same? The conservation easement requires the estuary to be maintained and remain predominantly in the hydrological state at the time of the easement. Jennifer Smith, the director of the southeast office of the Florida DEP, stated that this clause meant the water flow and water quality should be maintained and that dredging might be needed to keep water flow the same. At least one of the flushing channels was found in the past to have inadequate flow and had to be dredged. **This issue needs to be turned over to the GHCA.**
3. Silting up of waterway within estuary. Does it need to be dredged? How frequently? Are permits required? Does the water flow meet the requirement in the conservation easement to be retained and maintained predominantly in the natural hydrological condition? Deb Fletcher is on the greens committee for the Grand Harbor Golf Course. She stated that a golf cart path bridge close to the Indian River on River 14 had previously silted up and Dr. R. Grant Gilmore was consulted on having it dredged. He helped obtain the permit for dredging. On River 14 the bridge connecting the two portions of the fairway, which is separated with trimmed mangroves, has evidence of silting to the west of the bridge. It appears that the silting is impairing water flow and tidal flushing. **It is recommended that the consulting engineers check the flow within the waterways. If the flow is not adequate then the issue needs to be resolved by the GHCA.**
4. Pollutants - Introduction of pollutants, fertilizer, pesticides, insecticides, etc. into estuary from golf course, community association landscaping, HOA/POA land. Should this be a concern?

5. Prior Contamination - Prior contamination of estuary from orchard operations (or other activity) before the existence of Grand Harbor? Should this be a concern?
6. Encroachment of landscaping - is there any? The north side of Wood Duck has landscaping and lawn which might encroach onto area within the conservation easement. The west side of the fairway of River 15 appears to encroach on the conservation easement area and near Harbor Drive this part of the conservation easement area appears to be landscaped rather than remaining in the natural vegetative condition as required in the conservation easement. Aerial photographs of the conservation easement area from 1993 show this area in what appears to be sand or grass like the grass on the golf greens in the same photo. Private photographs from 1999, 2000, and 2001 show this area as landscaped or in grass. **It is recommended that the boundaries of the conservation easement be surveyed wherever it abuts HOA/POA, golf course (OH and GH), or GHCA property to check for encroachment. Any boundary issues that are discovered need to be resolved by the GHCA prior to turnover.**
7. Vegetation Buffer - What can be done in the vegetation buffer surrounding the mangroves/estuary? What has been done? It appears that there are various plants, bushes, lawn, and ornamental grass in some of these areas. Why do some areas adjacent to the conservation easement have no designated vegetative buffer zone? **After review of the conservation easement, mangrove trimming permit, various Florida statutes, and various FDEP requirements these questions could not be answered. The GHCA needs to determine the requirements/restrictions for the buffer zones adjacent to the conservation easement.**
8. Landscaping maintenance - Landscaping maintenance at edges of estuary where GHCA conservation easement land abuts the golf course, other GHCA land, OH land, or various HOA/POA land are a concern. In many places it appears that there are unmaintained areas where the conservation easement abuts golf course, HOA/POA, or GHCA property. Examples of this can be seen at Saint Josephs and the east side of the green on River 16. **These issues need to be turned over to GHCA for resolution.**
9. Retaining Walls - Are all retaining walls at the edge of the estuary dedicated to an HOA, POA, GH golf course, OH golf course, OH, or GHCA? At minimum River holes 12, 13, and 14 have retaining walls abutting the estuary. Are these dedicated to the golf course? Some of the retaining walls not in the golf course are within the vegetation buffer zone and some are not. **Ownership of each retaining wall needs to be determined.**
10. Permits - Are there permits for wooden bridges/cart paths within the estuary? Bridges exist in River holes 10/11, 13, 14, 15, 16. Golf cart paths might be in the estuary for River holes 10, 11, and 16. Golf cart paths appear to be in the estuary for River holes 12, 13, 14, and 15. The conservation easement prohibits unauthorized use of golf cart paths. Is a permit for the golf cart paths and/or an easement required for these areas? Do they exist? Where golf cart path bridges go through tall, untrimmed mangroves there is evidence of mangrove trees being cut to keep them from blocking the passage of golf carts. Is a permit required for the removal of these mangroves? **These bridges go through the conservation easement. Plats of the conservation easement, FLDEP photos of the conservation easement, and 1993 mangrove trimming permit all show or mention the golf course or recreation facilities; thus, use as a golf course including cart paths and bridges seem approved either explicitly or implicitly. Ask Legal whether GHCA needs to document that this is a permitted use.**
11. Mangroves Outside Conservation Easement - Does the conservation easement specifically include or exclude the area between GH houses and the Indian River in areas not shaded purple on the plat? These areas are outside the conservation easement. There are trimmed mangroves in these areas but these areas are not part of

the conservation easement. What permit covers it? There is one dock through the mangroves to the Indian River within the area. **These areas appear to be outside of the conservation easement; however, GHCA should produce the permits for trimming the mangroves in these areas.**

12. Weir connection to Estuary - East of River 13, just south of the beginning of the fairway there is single culvert connecting a lake to the estuary. Visible through a storm grate is a concrete wall with a rectangular weir. The outlet and the weir were observed to be working on April 2, 2019.
13. Connection to Estuary? - There is a possible connection of the lake to the north of Saint Davids to the conservation easement area to the south of Harbor Links. North of the back tees for Harbor 18 there is a mound with a circular grate on top. Inside there is water and something making a mechanical sound. I thought I saw an impeller with a vertical shaft but I can't be sure. I could not find or see an intake from the lake or outlet to the estuary. The water level within the grate appeared to be the same as the water level of the lake and higher than the water in the estuary. Inside the grate I could not see any concrete wall with a weir - it did not look like the other connection I found between the estuary and a lake at River 13. **GHCA should confirm all connection of the lakes to the estuary.**
14. Trimming Permits - Are there permits for all of the mangrove areas currently being trimmed? How about for mangroves blocking carts on golf cart bridges? **The latest permit on the FDEP website was dated April 2017 with another one requested in February 2019. Both refer to the original 1993 permit to trim the mangroves. It seems to give permission to trim any of the mangroves within the conservation easement with very specific restrictions on the percentage of height which may be trimmed from a mangrove tree each year and restrictions on total removal, et al; however, the 1993 permit is very specific about which mangroves may be trimmed and the final, trimmed height. The original permit allows for trimming of mangroves blocking the passage of golf carts.**
15. Requirements for Buffer Zone - A number of areas show an upland wetland buffer for areas abutting the estuary. What are the requirements for these areas? Not all areas adjacent to the conservation easement area have an upland wetland buffer. The platted buffer zones vary in width and description. **Should the areas without buffer zones have buffer zones added? GHCA should resolve.**
16. Oak Harbor Part of Estuary - Part of the Oak Harbor golf course is within the estuary area shaded purple; this is the portion towards the east end of 45th Street near the Gifford Dock. Three holes of the OH golf course are within or abut the conservation easement area. **A survey is recommended to ensure the golf course is not encroaching on the conservation easement.**
17. Slough - There are a few sloughs in the OH golf course which appear to have small drains connecting them to the estuary and the sloughs may or may not be within the conservation easement. **The sloughs appear to be outside of the conservation easement area; however, a survey is recommended.** There is one deteriorated retaining wall in the OH golf course for a golf cart turnaround abutting the estuary. The OH golf cart path bridge over the estuary has rotted timbers. **Confirm that this issue is not a GHCA responsibility.**
18. Wood Duck - North of the back tee for River 11 what appears to be a fringe area of the conservation easement looks like some of the vegetation was removed and is more manicured than it should be. **The boundary for the conservation easement should be checked in this area.**
19. Saint Andrews - Lots 10 through 23 bordering conservation easement have 25 foot drainage and estuarine buffer. Lot 24 has 32 foot easement for drainage, estuarine

buffer, and golf cart path. Lot 1 has no estuarine buffer even though it abuts the conservation easement area.

20. Harbor Links - Lots 1 through 8 abut the conservation area but there is no estuarine buffer.
21. Harbor Links Phase II - Lots 9A through 16A have a 10 foot wide upper buffer transition zone.
22. River Village - Lot 1 and Tract E have a 10 foot wetlands/upland buffer transition zone.
23. River Village Tract C - The Tract C stormwater management area has a 10 foot wetlands/upland buffer transition zone.
24. Lauguna Village - Lots 18-23 abut the conservation area (Tract 5) with a 10 foot wetlands/upland buffer transition zone. There is a wall which appears to be a concrete seawall in this area. The buffer zones shows it as Tract C recreation and landscape. The 10 foot wetlands/upland buffer transition zone is shown on the River Village Plat.
25. Oak Harbor Master Plat - Shows Estuarine areas Tracts 4 and 5 (but they are not included). Estuarine Tract 4 has a hard line between it and Water management Tract 4 west of South Harbor Drive just a little north of Saint Catherines Drive. **Is there a storm water flow control device connecting the water management area to the estuary?**
26. Saint Annes - Lots 20 through 30 abut the conservation easement area and have a 25 foot wide estuary buffer/setback.
27. Hamilton - Lots 1 through 9 abut the conservation easement area and have a 25 foot wide estuary buffer/setback.
28. Saint James - Lots 43, 44, 52, 53, and OH golf course between Lots 44 and 52 abut conservation easement, estuarine Tract 4, and have a 25 foot wide estuary buffer/setback.
29. Clogged Culvert? - At the south east end of River 11 there is a pair of culverts which were very difficult to locate. It appears that there might be silt partially blocking water flow.
30. Sulfur Smell - At the bridge connecting River 16 and River 17 and at the mangroves to the east of Saint Davids there is a smell of sulphur, possibly indicating the water in this area is stagnant. **Water flow in the area needs to be checked to determine whether it meets the requirements of the conservation easement.**
31. Brazilian Red Pepper Trees - A number of Brazilian red pepper trees were found at the fringes of the estuary, many in the fringe areas of back nine holes of the River golf course where it abuts the estuary and many in the fringe areas of Oak Harbor. **GHCA needs to resolve this issue as the conservation easement requires the area to remain in its natural vegetative state. The original 1993 permit to trim the mangroves specifically required the removal of Brazilian pepper trees and Australian Pines in certain areas.**
32. Questions:
 - a. The original plan for the salt marsh rehabilitation required removal of noxious invasive species of plants. Can it be assumed the permit requires to remove any new ones? **The 1993 permit only address removal of these plants in certain areas. Since this permit is referenced in current permits, it seems as if these species must be removed in at least these areas.**
 - b. The original plan required the excavation of three connections between the salt marsh and the removal of flap-gated culverts to improve tidal flushing. The conservation easement requires the hydrology to be maintained. What is the minimum rate of water flow for acceptable flushing? How often should it be measured? What must be done to re-establish adequate flow when the flow rate is too low? What was the flow rate at various spots in the conservation easement at the time it was established? **These questions could not be**

answered. Note that one 1989 plat showed four flushing channels from the conservation easement area.

- c. What amount of tidal flushing is needed to control mosquitos? What is the backup plan for mosquito control? The Indian River County Mosquito Control District should have a copy. A mosquito management plan dated July 18, 1986 stated the concept to control mosquitos by increasing the amount of water, increasing the movement of water, and to decrease standing water. Flow rates are not given in the report. **This question could not be answered. GHCA should answer.**
- d. A condition of the initial develop plan required a detailed estuarine monitoring/research plan approved by the FDER, now the Florida Department of Environmental Protection. What is the current plan? What are the requirements of the plan? **Turn over to GHCA.**
- e. What is the designed flow of water within the conservation easement area? The initial plan shown in Exhibit III of Application 4-061-0061AC shows water being discharged at two places from the yacht basin and four places from the conservation easement area - one near the Gifford Dock, two at the River 14 golf hole, and one north of Saint Andrews. It is not clear in this plan the direction of the water flow within the conservation easement area. It appears that the plan was modified slightly after the aforementioned exhibit to add two sections of conservation easement within Oak Harbor in place of lakes. The exhibit showed two salinity dams connecting those lakes to the conservation easement area. It should be checked whether there is any connection of the existing smaller lakes in Oak Harbor to the conservation easement area. **One possible connection was found; however, it only is a grate sized depression in a bank between a lake and nearby estuary within Oak Harbor.**

33. Connection to Estuary 1? - At the southeast corner of Osprey Point there is a storm drain with a discharge pipe running toward the conservation easement. The only inlet appears to be the top grate which is located in a water impoundment area. The termination of the outlet could not be located within the estuary. No weir or other control device could be seen.

Engineers need to evaluate.

34. Connection to Estuary 2? - There are two drain grates on the west side of the River 11 green, north of the sidewalk and at the low spot in a water impoundment area. The outlet within the grate could not be seen. **Engineers need to evaluate.**

35. Connection to Estuary 3? Across the street (south) from Hamilton Court there are three drains, one slightly east within the cart path and two slightly west with one in the cart path and another nearby. The outlets (or maybe they are inlets) head east toward the conservation easement area but it could not be determined where these drain pipes terminate.

36. Connection to Estuary 4? North of Saint Annes Lane and slightly east of the end of the lake there is a depression in the top of the lake bank near the close by golf cart path. the depression is close to both the lake and a finger of the conservation easement area. The depression should be checked to determine whether it is the location of a connection between the lake and the estuary. A further inspection on April 2, 2019 showed that at least one of these drains discharges into the estuary. **Engineers need to evaluate**

37. Ditch connected to Estuary - On the south side of the Harbor Drive Circle south of Saint Philips there are two cuts in the ditch to direct water to the conservation easement area.

Engineers need to evaluate.

38. Connection to Estuary at St. Andrews - The grate with an inlet leading to a lake east of Saint Andrews and south of the River 14 golf hole must be connected to the estuary as the water was much higher today, at high tide, than was observed during low tide. Repeated inspections including one on April 2, 2019 indicate that this grate houses a connection between the Saint Andrews Lake and the estuary but that the connections are blocked. Numerous times the level of water observed inside the grate was at a higher level than either the lake to the west or the estuary to the east. **Engineers need to evaluate.**

39. Permit - A review of the permit, signed in April 2017, to trim mangroves does not indicate which part of the mangroves in the conservation easement may be trimmed; however, the permit does reference the original permit from 1993 which is very explicit in which areas may be trimmed. **Clarification of what gets trimmed and the trimming schedule should be sought from Island Arbor, GHCA, or Florida DEP.**

40. Submerged Land - A review of Florida DEP correspondence revealed that there is or was a submerged land easement from the state for sovereign land in the Indian River Lagoon and that GHCA pays (or paid) the state for this easement. The last correspondence mentioned the state wanted \$150,000 for the easement but the time period it covered was not stated. **This easement needs to be investigated with the developer or GHCA; however, a letter dated July 12, 2011 from the Florida DEP gave consent to use the land pursuant to Chapter 253.77 of the Florida Statutes without paying for the easement. The flushing channels must be maintained.**

41. Flushing Channels - A review of Florida DEP correspondence showed one drawing of the Grand Harbor which noted five flushing channels. Four appear to be for the conservation easement area and one for the marina. It did not include the entrance channel for the marina. A review of satellite photos shows possibly two flushing channels near the Gifford Dock; whereas, plans show one. **The engineers should confirm the number of flushing channels from the estuary.**

42. Herbicide Use – On the west side of South Harbor Drive and east of Osprey Point it appears that an herbicide might have been used to kill all of the vegetation on the bank which is the edge of the estuary. **The bank probably needs to be revegetated for stabilization to avoid damage to the roadway. The landscaping maintenance crew responsible for this area needs to be advised what herbicides, if any, may be used in close proximity of the estuary.**

43. Exposed Electrical Wire – On the south side of South Harbor Drive and east of the Grand Harbor Pool, there is an exposed wire almost under the guard rail. It appears to be a 12/2 or 14/2 wire without a ground. It runs at least 100 feet. Whether it is live or why it was there was not determined. **The use of the wire needs to be determined by the GHCA then, pending its use, change to a proper wire and both properly bury and protect it.**

44. Use by Watercraft – Kayaks have been observed in the open water within the conservation easement to the south of Saint Josephs and other areas. The open water south of Saint Josephs is easily accessible from the Indian River, only requiring a kayaker to duck under one golf cart bridge. The conservation easement prohibits surface use except for purposes that permit the land or water areas to remain predominately in its natural condition. **Are kayaks or other watercraft permitted? If yes, may people who are not residents use the lake or waterways? If non-residents may not use the waterways, does this include the water from the Indian River to the golf cart bridges on River 14 or River 15?**

The following was added on April 8, 2019.

45. Connection to Estuary at River 11? – A white box with a faded Indian River County logo is located on the east side of the cart path bridge going from the River 11 tees to the River 11 fairway. The box has a roughly a 6 inch diameter PVC pipe connecting it to the waterway beneath the bridge and in the conservation easement. The box has a lid but the function of the components inside is not understood. **The function of the box needs to be checked.**

46. Ditch to Estuary – North of the sluice gate in the lake between the clubhouse and Harmony AND north of South Harbor Drive, there are remains of a ditch from the edge of the conservation easement to the open water south of Saint Josephs. Look for a bit of somewhat open water near the edge of the mangroves. A solitary ibis and egret often is seen in this water. **This “ditch” should lead to the outlet from the lakes to the estuary.**

47. Resolution 86-89 - On Monday October 20, 1986 there was a public hearing on a proposed Grand Harbor Estuarine plan which resulted in Indian river County Resolution 86-89. Highlights of the changes are as follows:

- a. The estuarine waterway shall provide for adequate flushing within the system.
- b. The estuarine waterway shall be constructed to a maximum depth of minus 4 feet mean low water south of marina Basin 1. **Available plans show minus 4 feet at this location.**
- c. It shall provide for, and detail, all plans for construction and management of wetland habitats. **The management plan must be the maintenance agreement between Grand Harbor and the county.**
- d. As a minimum, the estuarine waterway and flushing channels shall include a fully vegetated littoral zone. As a minimum, 30 square feet of vegetated littoral zone shall be established per lineal foot of estuarine waterway shoreline which occurs. The littoral zone shall consist entirely of native vegetation. **This plan must have been modified later as the plants show a differently sized vegetation buffer and no buffer in some areas bordering the estuary.**
- d. The development plan which includes the vegetative mitigation plan, must be approved by Indian River County... **It is not clear what the plan requires. Could it be the vegetation plan shown on drawings?**