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Potential Impacts of the Port Dolphin Pipeline on Beach Nourishment Sand Resources on Florida's West Coast

INTRODUCTION

Both Manatee County and the Town of Longboat Key (together with other Florida west coast communities) have active shore protection programs requiring large amounts of beach compatible offshore sand resources for beach nourishment activities. Sand resources undergo extensive and costly mapping and analysis in order to define and permit the most suitable sand for these projects. Unfortunately, these sand resources are limited and will eventually be depleted. Loss of beach compatible sand due to the impact of the proposed Port Dolphin pipeline route through beach quality sand resources will irreparably harm beach preservation and maintenance efforts in Manatee and Sarasota counties, as well as other neighboring communities. Alternatives exist that can minimize impacts to these communities.

MANATEE COUNTY SHORE PROTECTION PROGRAM

Manatee County manages the Anna Maria Island Shore Protection Project, consisting of two separate beach nourishment project areas. The goal of these projects is to provide protection for all of Anna Maria Island's approximately seven miles of coastline. The entire length of Anna Maria Island is considered to be "Critically Eroded" by the Florida Department of Environmental Protection (FDEP), and prior to implementation of the program, was eroded substantially, adversely effecting private and public upland properties (Figure 1).

Anna Maria Island's economy is based on tourism. The single feature that draws thousands of tourists to Anna Maria

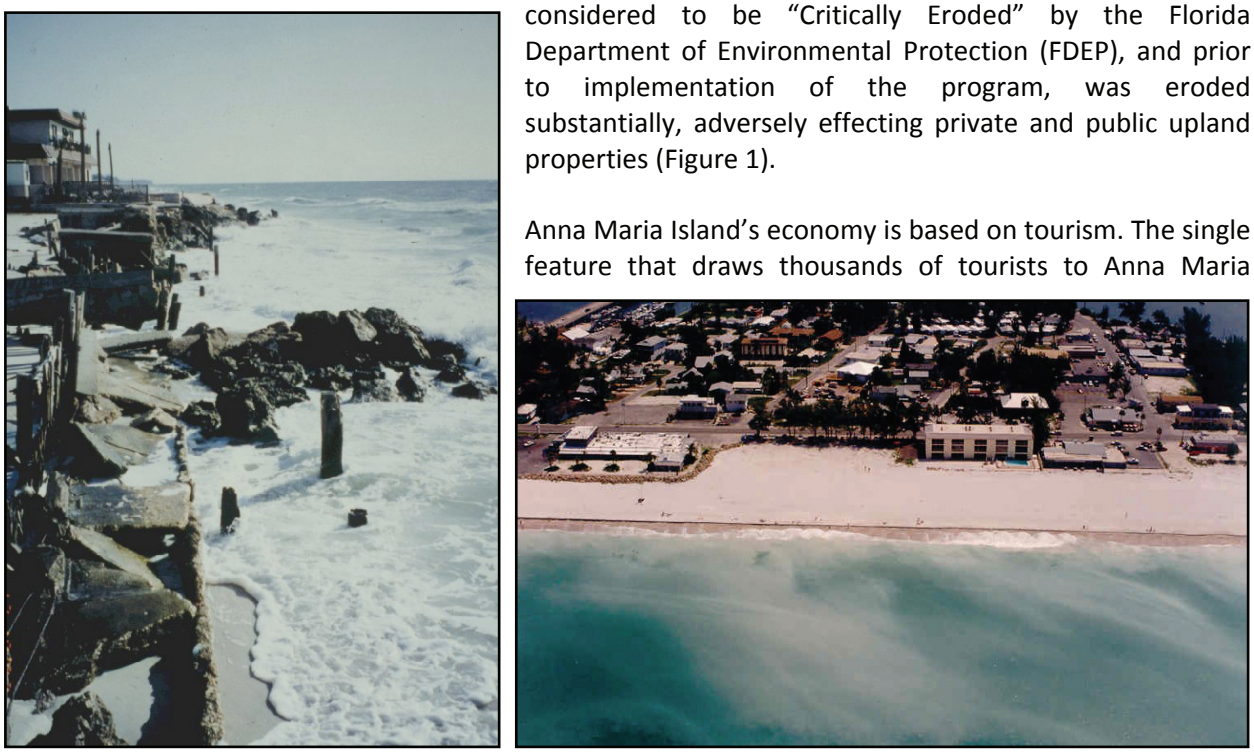

Figure 1. Anna Maria Island before (left) and after beach nourishment (right).

Island is its beautiful white sand beaches. Numerous hotels, motels, rental homes, restaurants, stores and other related businesses depend on the beaches of the Island to survive. However, Anna Maria Island has a serious beach erosion problem that is only addressed through a comprehensive program of periodic beach renourishment. In order to successfully maintain and preserve the beaches of Anna Maria Island, offshore high quality sediment is needed as the material to replace beach sand lost to erosion.

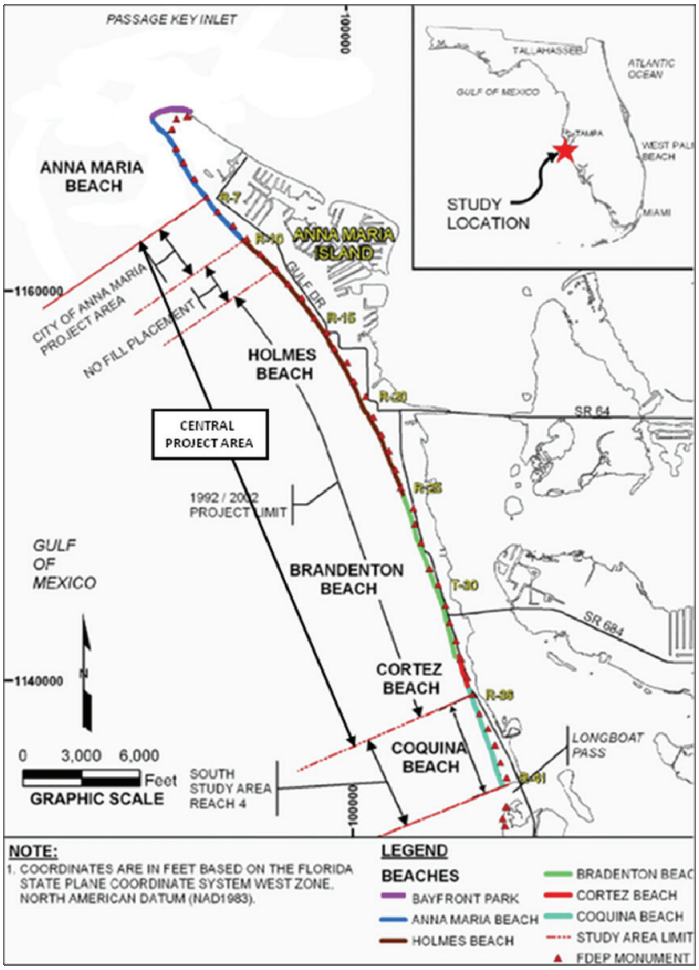

Figure 2. Anna Maria Island Shore Protection Project limits.

The sediment source off of the north end of Anna Maria Island is the only available economical sediment deposit with similar sediment characteristics to that of the Anna Maria Island beach available to Manatee County. It is a source which meets the rigorous requirements of the State of Florida concerning "beach compatible" sediment. Most of the sediment in near vicinity to Anna Maria Island is of marginal quality, or will not meet State requirements. There is one other source of high quality white colored sand located within Longboat Pass, but this source is limited in volume, and is not eligible for permits from the FDEP. Sand resources off the west coast of Florida for beach nourishment are a dwindling resource. As the availability of beach-compatible sands becomes less and less, the regional needs of Manatee County and its neighbors, specifically the Town of Longboat Key and Pinellas County, begin to overlap, causing an increase in competition for the dwindling sand resources. As the sands become more sporadic and competition grows, regional sand management issues become more important. The existing sand resources, therefore, must be available if the beaches south of Tampa Bay are to be maintained. The ebb tidal shoal complex off the north end of Anna Maria Island is a major deposit and is vital to Anna Maria Island.

Manatee County's current sand resource needs for these projects are substantial. The Central Project area requires 1,900,000 cubic yards (cy) of beach compatible offshore sand every ten years (Figure 2). The next nourishment of the Central Project is currently scheduled for sometime between 2011 and 2013. The Coquina Beach Project area requires 420,000 cy of beach compatible offshore sand. The next nourishment of the Coquina Beach Project is currently scheduled for early 2009.

Identification of sand resources for both of these projects is currently underway and is focusing on the ebb tidal shoal complex off the north end of Anna Maria Island (described above), which was utilized for the last two beach nourishment events (Figure 6). This historic Anna Maria Island borrow areas lie immediately south of the proposed pipeline route, within a large shoal offshore the northern tip of Anna

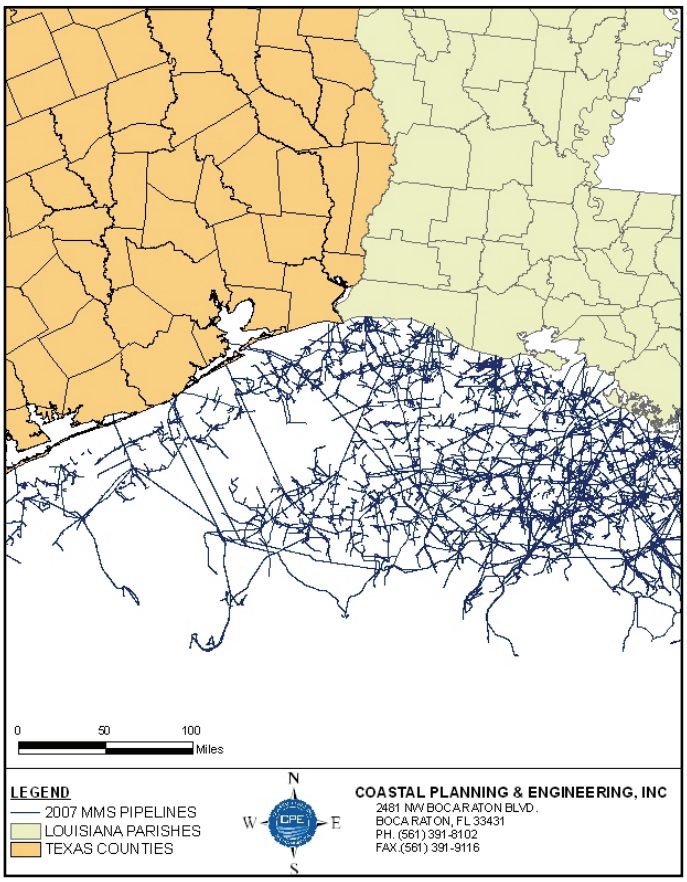

Figure 3. Oil and gas pipeline infrastructure offshore Texas and Louisiana

Maria Island. The sand quality of this shoal has repeatedly proven to be optimal for the beach nourishment needs of Manatee County and is considered to be the long term source of beach nourishment sands for the County. An estimated 18,245,000 cy of beach-compatible material is located within this shoal (Figure 7). The pipeline route is currently proposed to bisect this shoal.

If the pipeline follows the proposed route, any future dredging activities will have to be buffered to prevent impacts to the pipeline. These buffers (as yet undefined by the FDEP) can be quite large. The closest example of oil and gas pipelines impacting proposed sediment resource areas occurs offshore Texas and Louisiana, where substantial (and historically uncoordinated) pipeline construction present extreme difficulties to sediment resource delineation (Figure 3). Recently, the United States Minerals Management Service (MMS) was requesting buffers as large as 1,000 meters (m) around pipeline routes. Therefore, any buffer will greatly impact the volume of available material from this shoal for future use in beach nourishment projects.

As an example, we have calculated an estimate of the impact the proposed pipeline route, in the form of both a 1,000 m and 1,000 foot (ft) buffer, would have on the existing beach-compatible sands available in the shoal offshore the northern tip of Anna Maria Island (Figure 7). When a 1,000 m buffer is placed around the proposed pipeline route, the currently available 18,245,000 cy yards of beach compatible sand is reduced to an estimated 9,654,800 cy, resulting in the loss of 8,590,200 cy of sand for future beach nourishment projects. This figure is the equivalent of approximately four full Anna Maria Island renourishment projects alone (not counting any other regional sand needs). In other words, the current proposed pipeline location, together with a 1,000 m buffer, would result in the loss of 40 years worth of project-compatible sands for the Anna Maria Island Shoreline Protection Project.

If this buffer was reduced to 1,000 ft (a potentially optimistic buffer), the currently available 18,245,000 cy yards of beach compatible sand is reduced to an estimated 16,211,200 cy, resulting in the loss of 2,033,800 cy of sand for future beach nourishment projects, well over the minimum needed for one full Anna Maria Island beach nourishment project. These represent significant volumes of beach compatible material that would become permanently unavailable for future beach nourishment activities. Not only does this impact regional sand management, but it will cause irreparable harm for Manatee County's Shore Protection Program.

The sediment within this area can be excavated by a hydraulic cutterhead dredge because the distance from the sediment deposit to the beach is relatively short. This area has previously been used on two occasions to restore the beaches of Anna Maria Island. In each case, a cutterhead dredge was used to excavate the sediment and pump it to the beach. The use of a cutterhead type dredge resulted in a substantial reduction in construction cost verses the use of other types of dredging technology because cutterhead technology is more efficient. The unit cost to place the sand on the beach is estimated to be half of the cost compared to the use of other types of dredging technology, such as hopper dredges. Cost savings are estimated to be $5 to $7 per cubic yard of placed beach sediment using a cutterhead dredge from the existing sand source verses a hopper dredge mining a slightly more distant sand source. For the Anna Maria Island Beach Renourishment Project, this results in a cost savings of $9,500,000 to $13,300,000 for one 1,900,000 cy project. If Manatee County lost four projects worth of sand from the nearby sand resource (due to a 1,000 m buffer around the pipeline), and had to switch to a different sand source and dredge technology, the County would be looking at a cumulative project cost increase in the neighborhood of $38,000,000 to $53,200,000. This calculation does not include changes in economic conditions such as inflation, the cost of fuel, and availability of dredging contractors for future projects. A cost increase this large could effectively paralyze Manatee County's shore protection efforts.

LONGBOAT KEY SHORE PROTECTION PROGRAM

The Town of Longboat Key administers an extensive shore protection program that actively manages the entire twelve-mile coastline of the Town (Figure 5). This program revolves around an eight year cycle of

Figure 4. Longboat Key Reach 2 before (top left) and after (bottom left) 2005/2006 beach nourishment; and Reach 4 before (top right) and after (bottom right) 2005/2006 beach nourishment.

renourishment for the entire coastline of Longboat Key, all of which is designated "Critically Eroded" by the Florida Department of Environmental Protection (Figure 4).

During the most recent nourishment in 2005/2006, 1,789,332 cy of beach-compatible sand was pumped along 52,000 ft of Longboat Key shoreline. Approximately 1,000,000 cy of this material was dredged from a permitted borrow area within the beach-compatible shoal described above. This borrow area was not fully depleted, and currently has approximately 1,500,000 cy of beach-compatible material available for future beach nourishment events. Unfortunately, as currently proposed, the Port Dolphin pipeline bisects this borrow area (Figure 6). Once buffered, the pipeline will likely prevent use of the remaining sands of the active borrow area in the future. Considerable expense has already been spent to locate, design, and permit this borrow area, and the loss of this borrow area would represent a significant financial, timing, and resource loss to the Longboat Key Comprehensive Beach Management Plan.

Figure 5. Longboat Key Shore Protection Project limits.

If the Town of Longboat Key loses access to the borrow area, it will be required to search for an alternate sand source. Considering the potential loss of a large portion of the nearshore shoal off Anna Maria Island due to the pipeline construction, the likelihood of locating a similar quality borrow area at the same distance or closer to the project area is low. The location of a borrow area further away will result in a substantial increase in cost to the Town in order to construct the next beach nourishment.

For purposes of discussion, the economic impact to the Town can be summarized as follows:

1. Loss of investment of previous sand investigations and analyses for current borrow area ($500,000).
2. Investment cost to locate a new sand resource of similar quality ($500,000).
3. Incremental increase in cost (estimated at $2.00/cy) of transporting sand the additional distance ($3,000,000).
4. Total economic impact to the Town of Longboat Key is $4,000,000.

In addition to bisecting an existing Longboat Key borrow area, the proposed pipeline route impacts several offshore sand hills that are currently being investigated as potential future Longboat Key sand sources. These hills occur along the proposed pipeline route from three to ten nautical miles (nm) offshore of Anna Maria Island (Figure 8). In April, 2008, the Town of Longboat Key initiated a

reconnaissance-level geophysical and geotechnical investigation of those potential resources. The proposed pipeline route, if constructed, would impact large portions of these potential sediment resources, and together with the impact to the nearshore shoal off the northern tip of Anna Maria Island, would constitute a substantial economic impact to all future Longboat Key beach nourishment events.

POTENTIAL ALTERNATIVES

Both Manatee County and the Town of Longboat Key desire to work with Port Dolphin LLC in order to define an alternate pipeline route that satisfies the goals of all interested parties. We feel that there are multiple options that revolve around the existing Gulfstream pipeline that could both preserve a pipeline route for Port Dolphin LLC while avoiding beach-compatible sand resources. The fact that the Gulfstream pipeline has already been constructed automatically creates a pipeline corridor that local communities must avoid while developing and dredging regional sand source areas. It would seem logical to build within this corridor to reduce impacts to sand resources while preserving a pipeline route from the proposed deep-water port facility to Port Manatee. A second alternative would consist of tapping into the Gulfstream pipeline well offshore, thus eliminating the need to traverse potential State of Florida sand resources with a new pipeline.

SUMMARY

Both Manatee County and Longboat Key have major concerns with the proposed Port Dolphin pipeline route. The route, as currently designed, will have major economic and performance impacts on the existing shore protection programs of both communities, resulting in increased project costs (greater than $50,000,000 in direct impacts), most of which is funded by tax-payer dollars. These cost increases may inevitably result in a decrease in project scope, which ultimately decreases shore protection to private and public infrastructure and public safety within these communities. In addition, Pinellas County has expressed concern over the pipeline route and its impact on regional sand management. While the current proposed route does not have direct impacts on Pinellas County, a reduction of regional sand resources can have a potential long-term impact on all regional Shore Protection Programs by creating increased competition for already limited regional sand resources.

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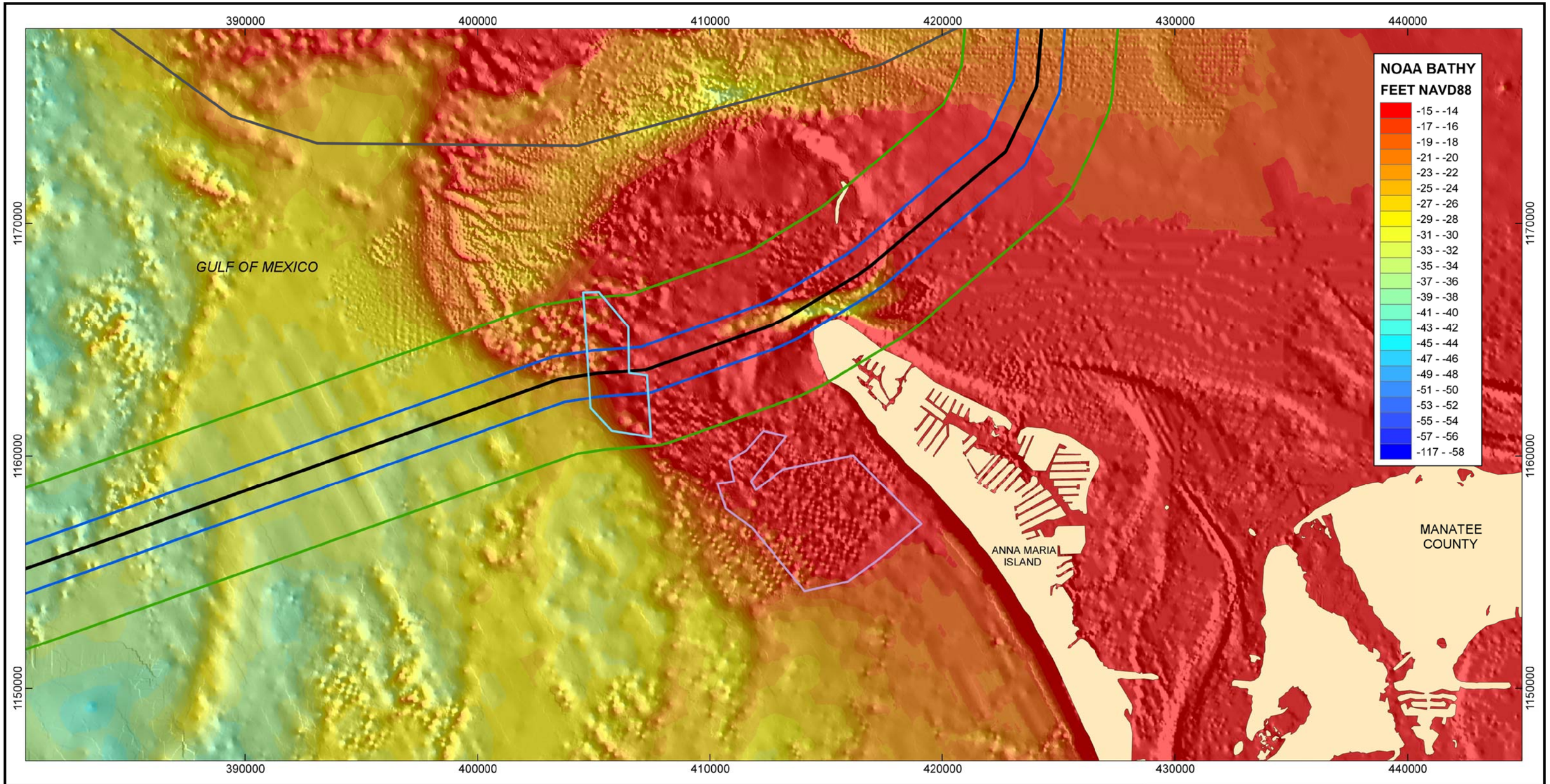

NOTES:

1. COORDINATES ARE IN FEET BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. BATHYMETRY AND TOPOGRAPHY BASED ON REGIONAL ELEVATION GRIDS AND RECENT LIDAR SURVEYS BY USACE, NOAA, AND USGS. DATA WERE GRIDDED AT 25 FT RESOLUTION. ELEVATION IN EACH GRID CELL CALCULATED BASED ON LIDAR SURVEYS, POST CONSTRUCTION BORROW AREA SURVEYS BY USACE, DIGITAL ELEVATION MODELS FROM NOAA AND USGS, AND REGIONAL BATHYMETRIC GRIDS PROVIDED BY NOAA IN NAVD88. THE MOST RECENT DATA SOURCE DETERMINED THE VALUE FOR EACH GRID CELL.
3. GULFSTREAM PIPELINE LOCATION OBTAINED FROM MINERALS MANAGEMENT SERVICE (MMS).

LEGEND:

- EXTENT OF PREVIOUSLY IDENTIFIED ANNA MARIA ISLAND BORROW AREAS
- PREVIOUSLY PERMITTED LONGBOAT KEY BORROW AREA
- GULFSTREAM NATURAL GAS PIPELINE
- PROPOSED PIPELINE LOCATION
- 1000 FOOT BUFFER
- 1000 METER BUFFER

0 0.5 1 Miles

N

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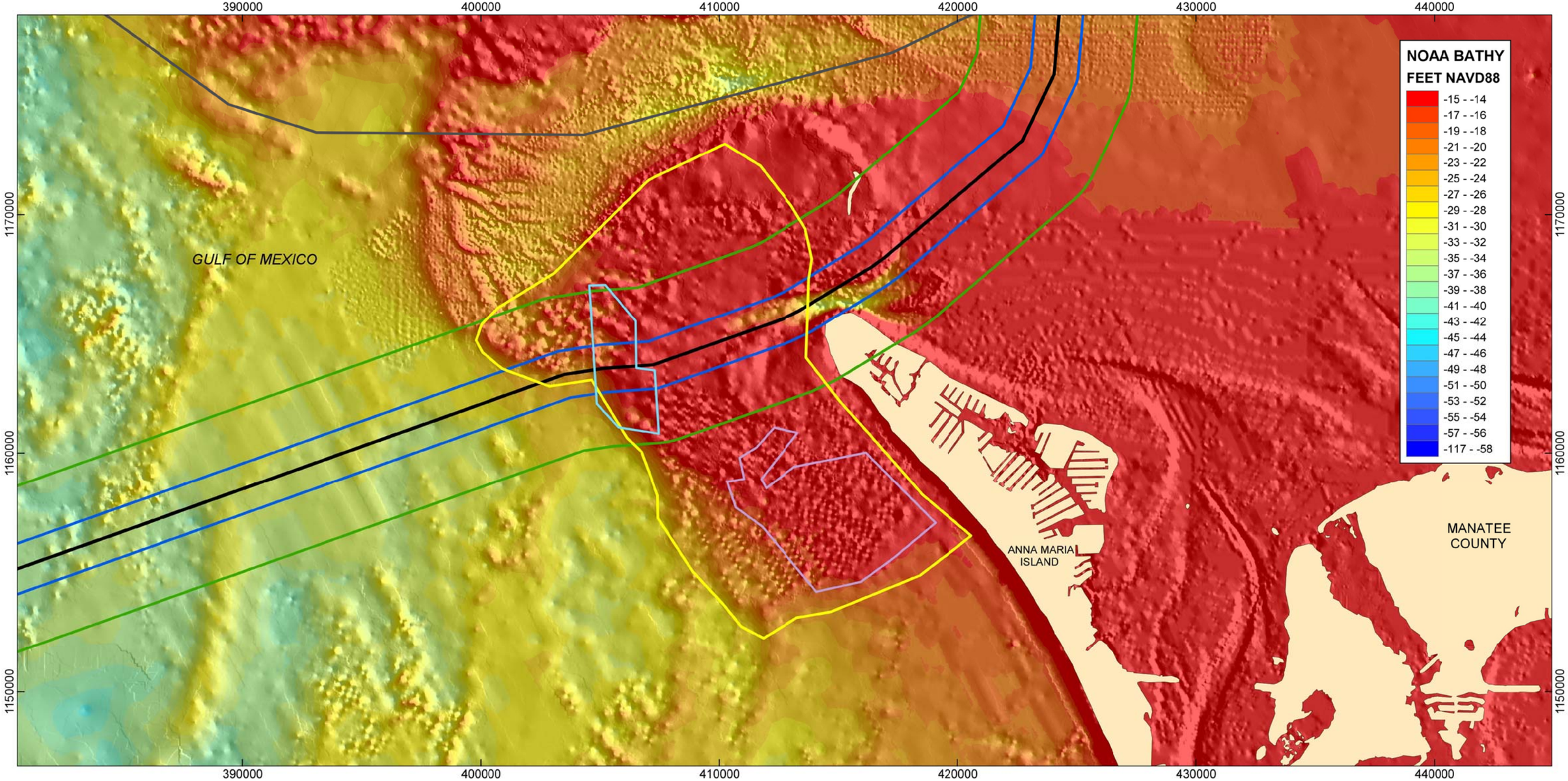
DATE: 04/29/08 | BY: PMB | **FIGURE: 6**

Figure 6. Location of proposed Port Dolphin pipeline (black line) and potential "no-dredge" buffers (1,000 foot buffer is blue 1,000 meter buffer is green) in relation to the existing Longboat Key borrow area (light blue box) and the existing Anna Maria Island borrow areas (lavender box).



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- GULFSTREAM NATURAL GAS PIPELINE
- PROPOSED PIPELINE LOCATION
- 1000 FOOT BUFFER
- 1000 METER BUFFER
- 18,245,000 cu yd SHOAL

0 0.5 1 Miles

N

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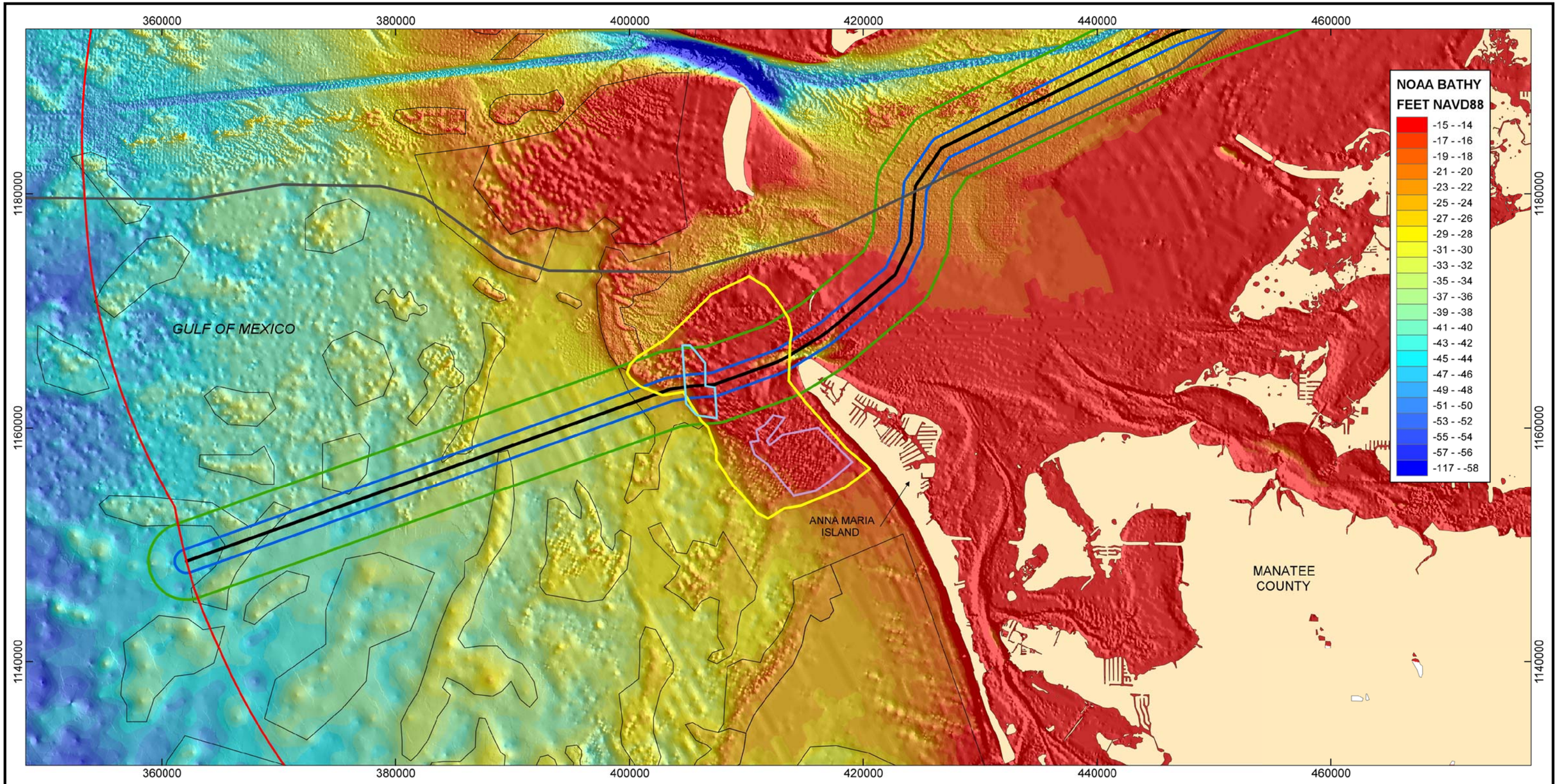
Figure 7. Location of proposed Port Dolphin pipeline (black line) to the beach compatible shoal offshore Anna Maria Island (yellow line) and potential "no-dredge" buffers (1,000 foot buffer is blue 1,000 meter buffer is green) in relation to the existing Longboat Key borrow area (light blue box) and the existing Anna Maria Island borrow areas (lavender box).



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- PREVIOUSLY PERMITTED LONGBOAT KEY BORROW AREA
- GULFSTREAM NATURAL GAS PIPELINE
- PROPOSED PIPELINE LOCATION
- 1000 FOOT BUFFER
- 1000 METER BUFFER
- POTENTIAL SAND RESOURCE AREAS
- 18,245,000 CU YD SHOAL

0 0.9 1.8 Miles

N

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DATE: 05/08/08 | BY: KD | **FIGURE: 8**

Figure 8. Location of proposed Port Dolphin pipeline (black line) to regional shallow bathymetric sand ridges (potential sand resources) offshore Anna Maria Island in Florida State waters, including potential "no-dredge" buffers (1,000 foot buffer is blue 1,000 meter buffer is green).