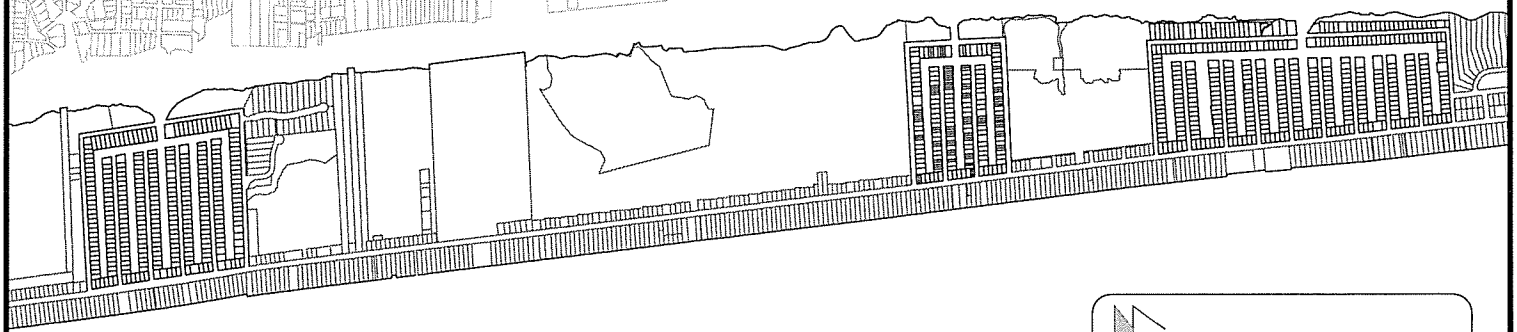
Canal Maintenance Dredging Master Plan

Town of Holden Beach

Brunswick County ~ North Carolina



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CANAL MAINTENANCE DREDGING MASTER PLAN
TOWN OF HOLDEN BEACH
BRUNSWICK COUNTY, NORTH CAROLINA

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CANAL MAINTENANCE DREDGING MASTER PLAN

TOWN OF HOLDEN BEACH

BRUNSWICK COUNTY, NORTH CAROLINA

1. THE STUDY AND THE REPORT

1.1. STUDY PURPOSE AND SCOPE

The purpose of this study and Master Plan is to define the need and methods to maintain safe, reliable and efficient navigation in established canals within the following neighborhoods in Holden Beach, North Carolina: Holden Beach Harbor, Heritage Harbor and Harbor Acres.

1.2. STUDY AUTHORITY

This study and prescribed actions are authorized under Section 107 of the Rivers and Harbors Act of 1960, as amended.

1.3. LOCATION AND DESCRIPTION OF THE AREA

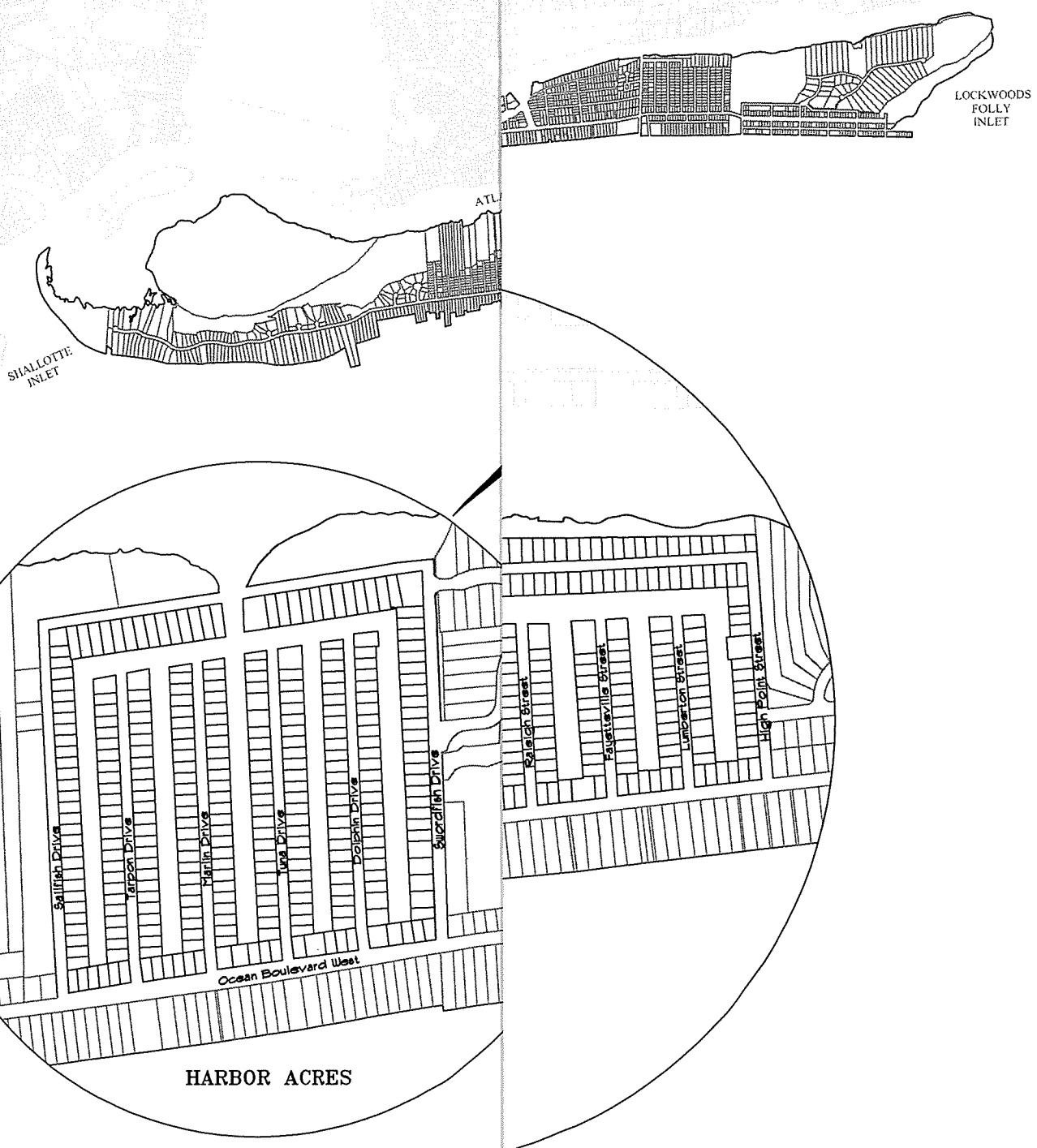
The project areas are established neighborhoods with canal access within the Town of Holden Beach, North Carolina. For each neighborhood, the canal entrance opens from the Atlantic Intracoastal Waterway. (See Figure 1.) Holden Beach is a residential community with a small commercial presence. The primary use of the canals is by small, privately-owned, non-commercial watercraft. The ability to safely come and go on the water, and to dock private boats at each residence, contributes to the appeal and value of the property in these neighborhoods.

In Holden Beach Harbor there are 10,300 linear feet of canals serving approximately 350 lots. In Heritage Harbor, 4,800 linear feet serves approximately 312 lots; while 7,100 linear feet serves approximately 301 lots in Harbor Acres.

1.4. PROJECT HISTORY

In June, 2008, resolutions were adopted to establish fee-supported dredging districts for each of the three subdivisions. The resolutions: No. 08-20 for Holden Beach Harbor, No. 08-21 for Heritage Harbor and No. 08-22 for Harbor Acres are included in the Appendix. These resolutions enable the Town of Holden Beach to act as administrator of the districts, to assess and collect fees as necessary to adequately maintain the subdivision canals.

The most recent dredging project was completed in April, 2009. For Holden Beach Harbor and Heritage Harbor all canals were dredged, whereas only the entrance channel was dredged in Harbor Acres because it was the only portion of that system



CANAL MAINTENANCE DREDGING MASTER PLAN
TOWN OF HOLDEN BEACH
BRUNSWICK COUNTY NORTH CAROLINA

LOCATION
MAP

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(910) 251-8544 FAX (910) 251-2208

DATE: 3/31/10
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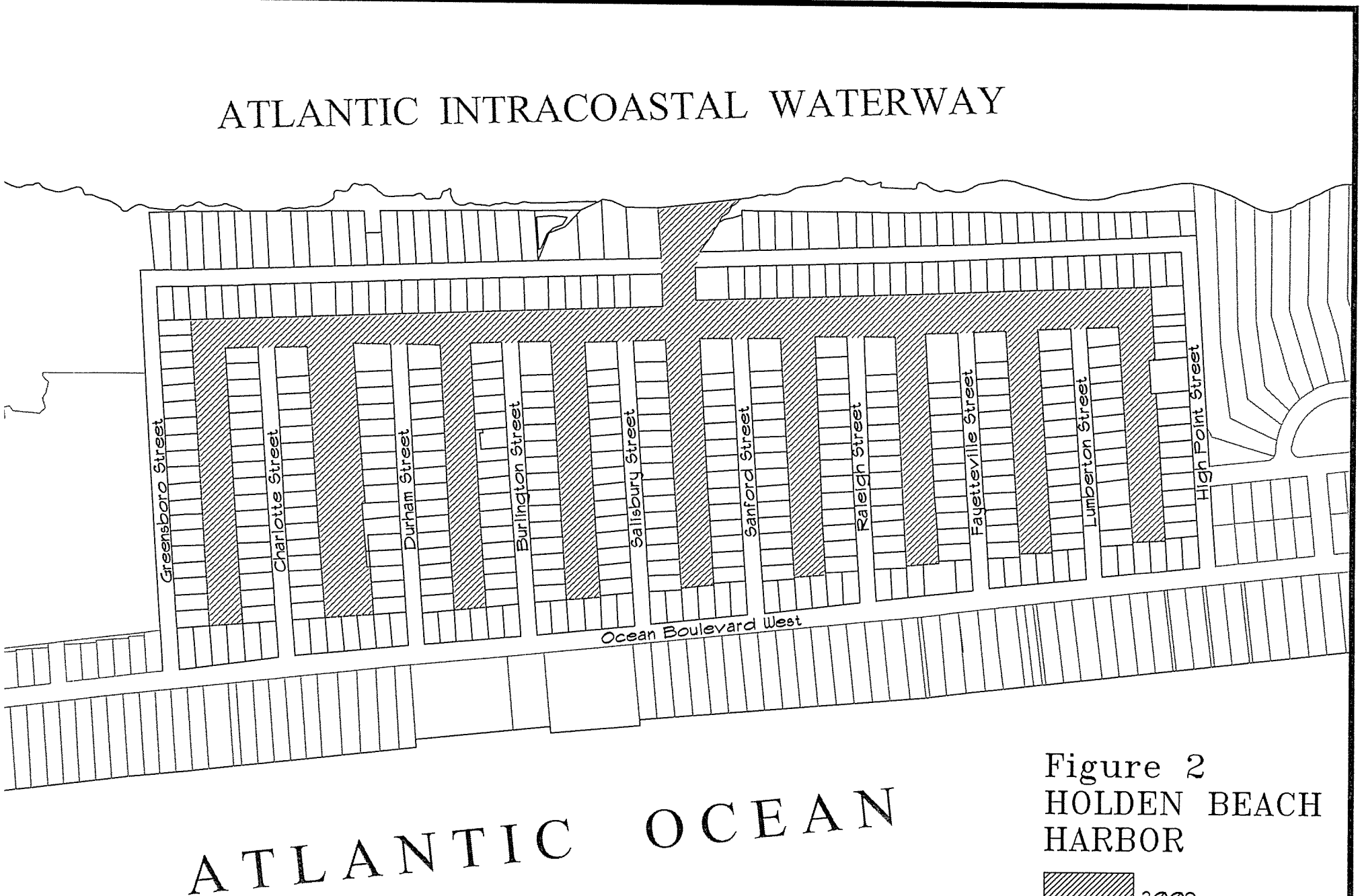
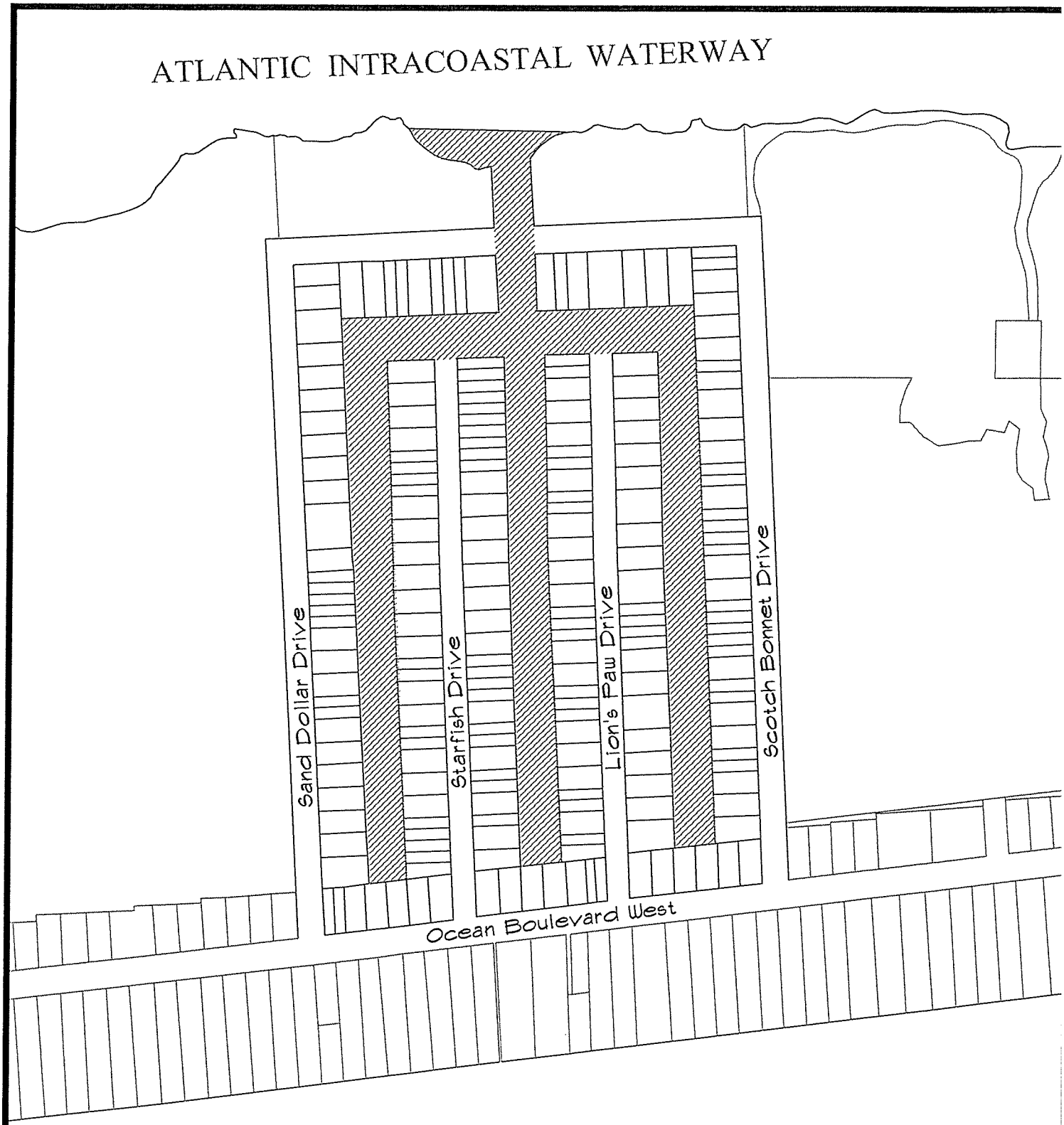


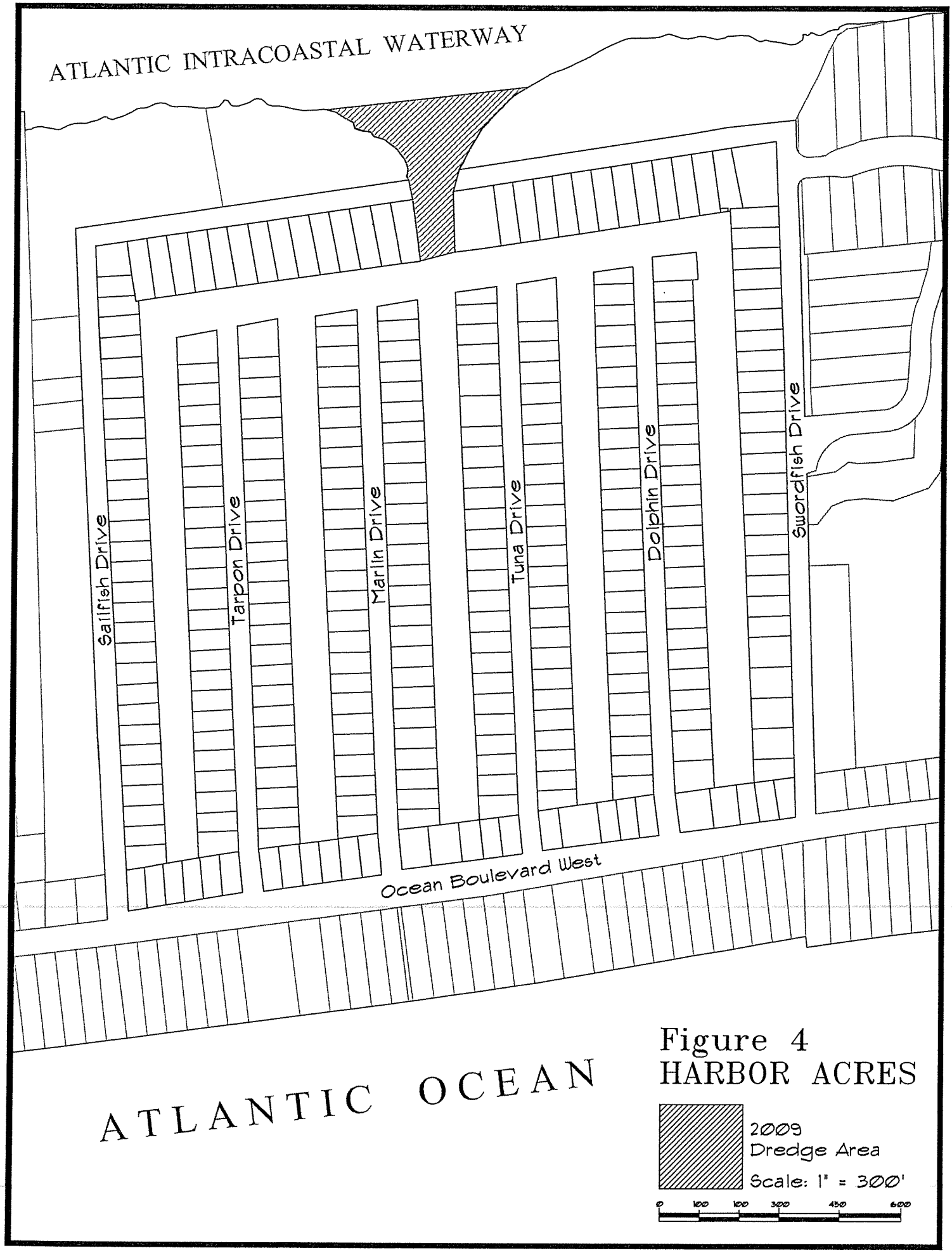
Figure 2
HOLDEN BEACH HARBOR

2009 Dredge Area

Scale: 1" = 400'

0 200 400 600 800


ATLANTIC INTRACOASTAL WATERWAY
Sand Dollar Drive
Starfish Drive
Lion's Paw Drive
Scotch Bonnet Drive
Ocean Boulevard West
ATLANTIC OCEAN
Figure 3
HERITAGE HARBOR
2009
Dredge Area
Scale: 1" = 300'
0
100
200
300
450
600


ATLANTIC INTRACOASTAL WATERWAY
Sailfish Drive
Tarpon Drive
Marlin Drive
Tuna Drive
Dolphin Drive
Swordfish Drive
Ocean Boulevard West
ATLANTIC OCEAN
Figure 4
HARBOR ACRES
2009
Dredge Area
Scale: 1" = 300'
0
100
100
300
450
600

where access was impaired. Depths of -6 MLW were achieved in entrance and transfer canals. The interior canals were dredged to -5 MLW. (See Figures 2-4.)

Below is a table for each subdivision showing the dredge history.

Holden Beach Harbor

Year	Cost	Material Removed (cu. yds.)	Notes
2004	$213,027	10,227	Alderman Brothers
2009	$250,496	16,500	Row Boat Dock & Dredge

Heritage Harbor

Year	Cost	Material Removed (cu. yds.)	Notes
~1994			All canals
2003	$8,200	1,000	Entrance only
2009	$195,111	12,500	Row Boat Dock & Dredge

Harbor Acres

Year	Cost	Material Removed (cu. yds.)	Notes
1984	$91,500	64,400	Roberts & Roberts Dredging
1990	$15,000	unknown	Entrance only, G&G Dredging (Gene Evans)
1994	$85,273	15,059	Bald Head Island Transportation
2004	$213,027	10,227	Alderman Brothers
2009	$85,348	1,600	Entrance only, Row Boat Dock & Dredge

As illustrated in the tables above, the canals in Holden Beach Harbor, Heritage Harbor and Harbor Acres have been periodically dredged over the past 25 years to combat the adverse effects shoaling has on navigation. The shoaling, or filling in, of the canals is a natural result of erosion and longshore drift caused by wave and current action and can be increased due to storm events.

Provisions for the canal dredging capital projects were included in the Town of Holden Beach Budget Ordinance Fiscal Year 2008/2009 as follows:

Section Five. Holden Beach Harbor Canal Dredging Capital Project Fund

Fund Balance Appropriation	$ 123,567.00
Assessments	211,370.00
Interest	1,000.00
Total Revenues Holden Beach Harbor CDCP Fund	$ 335,937.00

"In accordance with North Carolina General Assembly Session Laws 2004-104 and 2005-90, a canal dredging fee of $800 per lot for Holden Beach Harbor is hereby established."

Section Six. Heritage Harbor Canal Dredging Capital Project Fund

Fund Balance Appropriation	$ 172,209.00
Assessments	129,561.00
Interest	500.00
Total Revenues Holden Beach Harbor CDCP Fund	$ 302,270.00

"In accordance with North Carolina General Assembly Session Laws 2004-104 and 2005-90, a canal dredging fee of $420 per lot for Heritage Harbor is hereby established."

Section Seven. Harbor Acres Canal Dredging Capital Project Fund

Fund Balance Appropriation	$ 27,304.00
Assessments	58,896.00
Interest	200.00
Total Revenues Holden Beach Harbor CDCP Fund	$ 86,400.00

"In accordance with North Carolina General Assembly Session Laws 2004-104 and 2005-90, a canal dredging fee of $200 per lot for Harbor Acres is hereby established."

2. PLAN FORMULATION

2.1. Problem Description

As illustrated in the tables above, the canals in Holden Beach Harbor, Heritage Harbor and Harbor Acres have been periodically dredged over the past 25 years to combat the adverse effects shoaling has on navigation. The shoaling, or filling in, of the canals is a

natural result of erosion and longshore drift caused by wave and current action and can be increased due to storm events.

2.2. Controlling Depth and Channel

Primary usage of the canals is by residents with recreational watercraft not exceeding 25 feet in length. The depths of six feet in the entrance and transfer channels, and five feet in the interior channels achieved by previous dredge operations has proven to be adequate for safe, reliable navigation. These depths provide adequate allowance for shoaling between dredge operations.

2.3. Disposal Sites

Sampling has established that spoil material from dredge operations in these communities is not desirable beach fill due to small particle size. Four disposal locations are currently maintained by the US Army Corps of Engineers. (See Figure 5.) One of these properties, DA 292, is owned by The Town of Holden Beach.

Consent agreements with the Corps and the owners of the disposal properties are required for each use of these sites.

Based on field survey and estimation, Disposal Area (DA) 293 has a remaining 58,616 cubic yards (cy) availability; DA 292 has 138,131 cy; DA 191 has 48,632 cy and DA 290 has 85,747 cy. This information is presented in table form along with a location map on Figure 5.

2.4. Environmental Conditions

According to a diagram generated in 2004 by the Planning Branch of the Basinwide Planning Program Unit of NCDENR, the use support rating for the majority of the Atlantic Intracoastal Waterway between Lockwoods Folly Inlet and Shallotte Inlet was "Supporting" while stretches at the mouth of both Holden Beach Harbor and Harbor Acres, as well as the canals of all three subdivisions, were rated "Impaired". (See Figure 6.) The "Impaired" status is assigned in Class SA waters when shellfish harvesting is prohibited or conditionally approved due to bacteria levels that do not reach the area standard. NCDENR's strategies for improving water quality include "reducing runoff, resolving septic system impacts and working more closely with other state and local agencies to address all pollution impacts to SA waters."

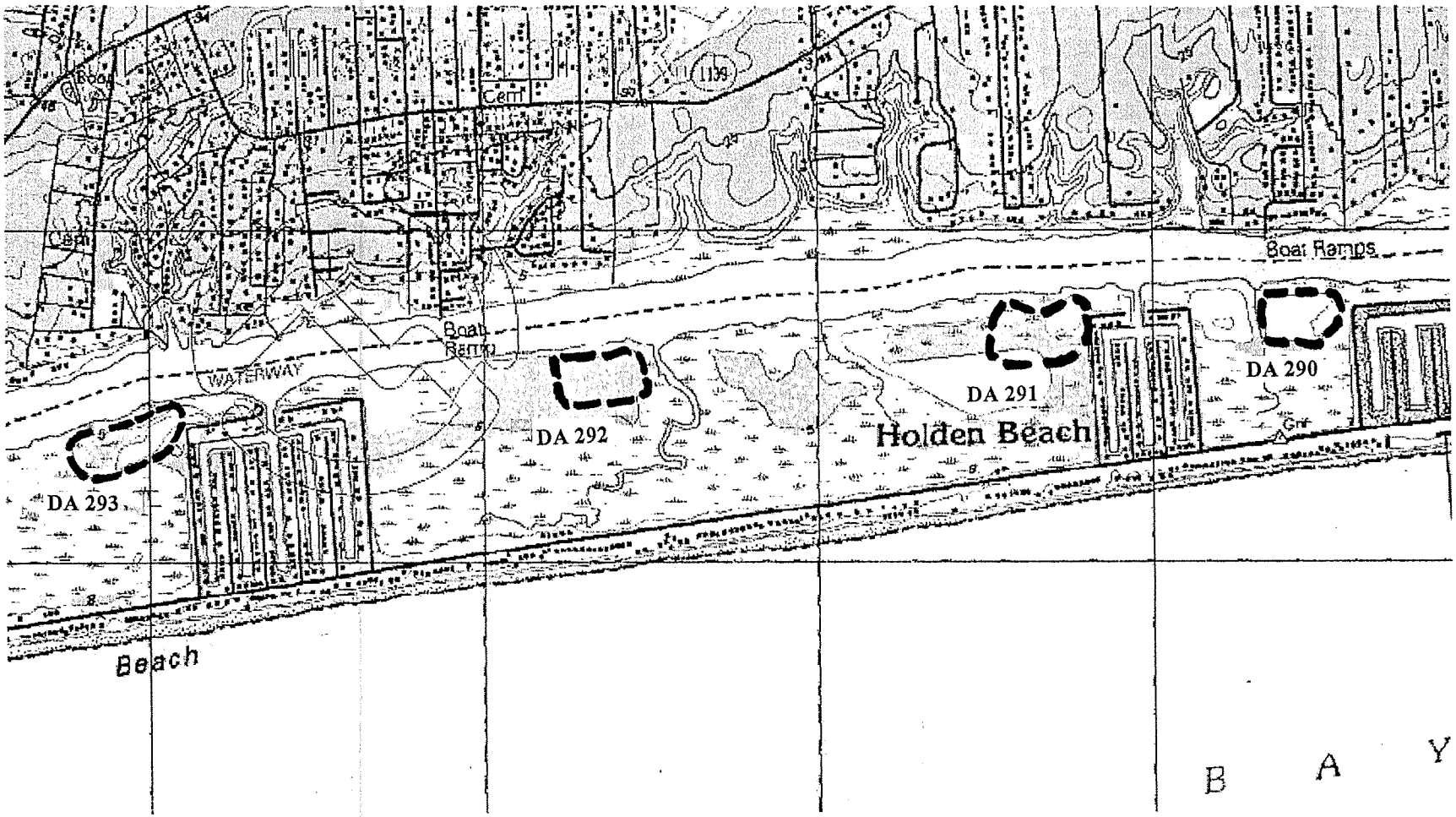
2.5. Existing Conditions at Harbor Acres

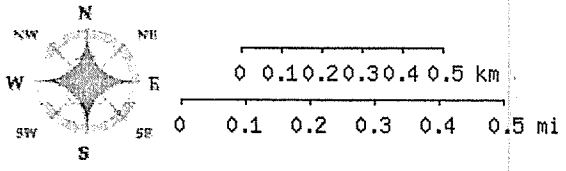
As explained in Section 1.4, in 2009, only the entrance canal was dredged at the Harbor Acres Subdivision. In March, 2009, a survey was conducted to determine the amount of shoaling which had occurred since the last full dredge operation in 1994. The resulting cross-sections show that over 50% were filled one foot or more above the design depth of -5 and -6 MLW.

3. DESIGN CONSIDERATIONS

3.1. Channel Design

Primary usage of the canals is by residents with recreational watercraft not exceeding 25 feet in length. The depths of six feet in the entrance and transfer channels, and five





Disposal Area (DA)	293	292	291	290
Space Available in cubic yards	58,616 *	138,131 **	48,632 *	85,747 *

* Based on actual field survey. ** Based on field estimation.

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FIGURE 5

HOLDEN BEACH MAINTENANCE DREDGING MASTER PLAN

DISPOSAL AREA LOCATIONS AND QUANTITIES

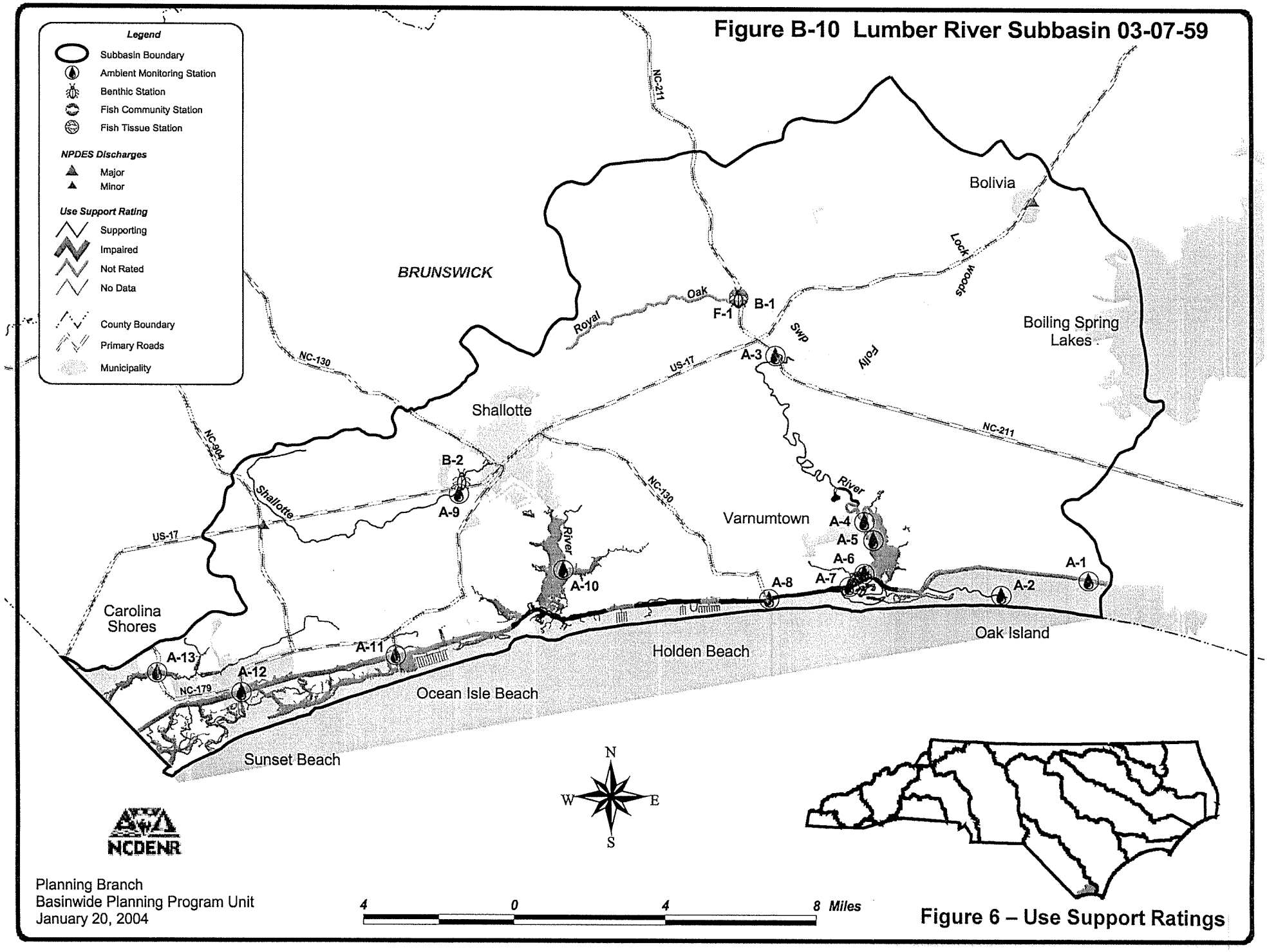


Figure B-10 Lumber River Subbasin 03-07-59
Legend
Subbasin Boundary
Ambient Monitoring Station
Benthic Station
Fish Community Station
Fish Tissue Station
NPDES Discharges
Major
Minor
Use Support Rating
Supporting
Impaired
Not Rated
No Data
County Boundary
Primary Roads
Municipality
BRUNSWICK
Bolivia
Boiling Spring Lakes
Shallotte
Varnumtown
Carolina Shores
Holden Beach
Oak Island
Ocean Isle Beach
Sunset Beach
NC-211
NC-130
US-17
NC-904
NC-179
Royal
Oak
Lockwoods
Swp
Folly
Shallotte
River
B-1
F-1
A-3
B-2
A-9
A-10
A-4
A-5
A-6
A-7
A-8
A-1
A-2
A-11
A-12
A-13
N
S
E
W
NCDENR
Planning Branch
Basinwide Planning Program Unit
January 20, 2004
4 0 4 8 Miles
Figure 6 – Use Support Ratings

feet in the interior channels achieved by previous dredge operations has proven to be adequate for safe, reliable navigation. These depths provide allowance for shoaling between maintenance dredge operations.

The typical cross-section of the dredged canal features a 40-foot wide bottom at a depth of five or six feet, depending on the location of the canal, with 3:1 side slopes.

The Town of Holden Beach will maintain the 40-foot wide channel while it is the homeowner's responsibility to maintain individual access to the channel.

3.2. Shoaling Rates

Based on quantities removed from the canals in the past, the average shoaling rate was determined to be approximately 0.2 cubic yards per linear foot of canal per year.

3.3. Dredging Quantities

Following the formula above, Holden Beach Harbor with 10,300 linear feet of canals would generate 2,060 cubic yards each year; Heritage Harbor with 4,800 linear feet, 960 cubic yards per year and Harbor Acres with 7,100 linear feet of canals would generate 1,420 cubic yards per year.

Based on a March 2009 survey, 50% of the canals in Harbor Acres have filled in one foot or more above the design depth of -5 and -6 MLW. It is estimated that 27,873 cy of material should be removed to bring the Harbor Acres canals back to the design depth. Based on prior dredging events this number seems to be high. Pre-dredge surveys performed just prior to work will determine actual contract quantities.

3.4. Geotechnical Considerations

Each canal subdivision will need to have the proposed dredge sediments sampled and analyzed for permitting disposal through the Corps of Engineering and CAMA. This data must be collected within a year of the permitting application so timing should be carefully planned.

The sediment sampling should meet the current requirement of the Corps of Engineers and CAMA at the time. The samples typically will be analyzed for grain size using the Unified Soil Classification System to determine compatibility with materials deposited in Disposal Areas. Also, the samples will have to be analyzed for total solids, total organic carbon, petroleum hydrocarbons, pesticides, and pollutant metals. These analyses shall be conducted by a certified North Carolina Laboratory and meet all necessary reporting standards.

3.5. Disposal Plan

Several points must be considered in development of a disposal plan: proximity of the disposal site to the dredge project; capacity of the disposal site and costs involved in transport of the spoil material as well as fees paid to the landowner of each disposal site.

Based on quantity calculations in Section 3.3 above, if each community's spoil was deposited at the closest disposal site, Holden Beach Harbor might use DA 290 for up to 40 years; Heritage Harbor may expect 50 years of service from DA 291; while Harbor Acres would have up to 40 years of use from DA 293 – providing that no other dredging

operations are vying for those disposal sites. Disposal Area 292 has estimated capacity of 138,131 cubic yards. Although it is more remote from each community, this site is owned by the Town of Holden Beach, so transport costs could be offset by the fact that disposal fees would not be owed. If DA 292 were used for the two closest communities, Heritage Harbor and Harbor Acres, it may be serviceable for nearly 60 years.

3.6. Environmental Effects

Although increased turbidity is a likely result of dredging projects, it is a temporary condition confined primarily to the immediate construction area. Measures which will be taken to keep sediment disturbance to a minimum include outlet control structures at disposal areas and turbidity curtains will be used when outside the dredging window.

Adverse environmental impacts at the disposal sites are minimized using dikes to prevent erosion into the waterway and by conducting operations during months when shore birds, turtles and other wildlife are not nesting. The deposit of spoil material may provide improved habitat for nesting colonies of waterbirds.

The following table includes the threatened and endangered species found in Brunswick County which would possibly occur within the dredge or deposit areas. This information is derived from the U.S. Fish and Wildlife website for North Carolina.

Common Name	**Scientific name**	**Federal Status**	**Record Status**
American alligator	*Alligator mississippiensis*	T (S/A)	Current
Bald eagle	*Haliaeetus leucocephalus*	BGPA	Current
Green sea turtle	*Chelonia mydas*	T	Current
Kemp's (=Atl.) ridley sea turtle	*Lepidochelys kempii*	E	Current
Leatherback sea turtle	*Dermochelys coriacea*	E	Current
Loggerhead sea turtle	*Caretta caretta*	T	Current
Piping plover	*Charadrius melodus*	T	Current
Shortnose sturgeon	*Acipenser brevirostrum*	E	Current
West Indian manatee	*Trichechus manatus*	E	Current
Wood stork	*Mycteria americana*	E	Current
Seabeach amaranth	*Amaranthus pumilus*	T	Current

E indicates an endangered species.
T indicates a threatened species.
T (S/A) indicates a species listed due to its similarity of appearance to another listed species.
BGPA indicates the Bald and Golden Eagle Protection Act

The American alligator is listed only due to it's similarity to the threatened crocodile which is not expected to appear in Brunswick County.

The bald eagle would be found in the work area only as an occasional migrant and would not be effected by the project.

Green sea turtles may be found in the area but prefer open sloping beaches for nesting. Kemp's ridley sea turtle has not been observed in Brunswick County within the past 20 years. The leatherback sea turtle generally remains in the open water of the

ocean and the loggerhead turtle, which is well-known in this vicinity, prefers oceanside beaches for nesting.

The types of dredges used in maintenance operations are not known to take sea turtles, so neither nesting habitat nor the turtles themselves should be threatened by the project. Mechanical dredging using the bucket-to-barge method may be permitted at all times during the year, however hydraulic dredge operations must be completed each year by April 1st in order to prevent disruption of sea turtle nesting.

The piping plover breeds in early spring and inhabits its nesting area until early September. Breeding birds in North Carolina generally are found north of Cape Lookout, however North Carolina is the northern boundary of their winter range when they are primarily coastal and prefer areas with expansive sand or mudflats near a sandy beach. Due to these preferences, it is not expected that the project would impair piping plover habitat.

The shortnose sturgeon is found in brackish and salt water in lower sections of larger rivers and coastal waters, though it moves upstream to spawn in fresh water. Though this fish may occur in the project area, it would be able to avoid contact with dredge equipment. Any impacts would be temporary as the fish could return to the area after completion of dredge operations.

The West Indian manatee, also known as the Florida manatee, has been an infrequent visitor along the North Carolina coast, primarily between June and October. The U.S. Fish and Wildlife Service has established Precautionary Measure Guidelines which can be found at *http://www.fws.gov/nc-es/es/countyfr.html* and give detailed information on steps to take if a manatee is sighted.

Although the wood stork might migrate through the project area, it's primary habitat is cypress or mangrove swamps. And since they prefer to feed in freshwater marshes, narrow tidal creeks and flooded tide pools, it is not expected that the project would impact this species.

Seabeach amaranth is a plant which occurs on beaches of barrier islands. Its main habitat is overwash flats at the accreting ends of islands, lower foredunes and upper strands of non-eroding beaches. Because dredge fill will not be placed in these areas, habitat for the seabeach amaranth should not be disturbed.

3.7. Permitting Requirements

The following permits are required each time maintenance dredging activities are performed: an active Major CAMA permit, NCDENR 401 Water Quality Certification, NCDENR Stormwater approval; and consent agreements with the Army Corps and each individual disposal site landowner. National Pollutant Discharge Elimination System (NPDES) may be required for some dredge operations. To obtain these permits, canal dredge survey, disposal area survey and sediment sampling is required and must be less than one year old. Following are tables indicating the status of permits or most recent activity for each of the communities.

Due to the current slow economy, the North Carolina General Assembly passed the Permit Extension Act of 2009 which suspends the running time of permits required for development for current and valid permits during the period beginning January 1, 2008

and ending December 31, 2010. Where relevant, the new expiration dates are indicated below and marked with an asterisk (*).

Mechanical dredging using the bucket-to-barge method may be permitted at all times during the year, however hydraulic dredge operations must be completed each year by April 1st in order to prevent disruption of sea turtle nesting.

Holden Beach Harbor

Permit Specifics	Issue/Expiration Dates	Notes
CAMA #40-05	Renewed 4-13-2009 Expires 12/31/2010 *	
NCDENR 401 Water Quality Certification		Expires with CAMA or 404 permit
NCDENR Stormwater		
US Army Corps Consent		Fees paid 9-22-2008
Property Owner Consent	Consent granted 11-20-2008	
NPDES		Not required for this project

Heritage Harbor

Permit Specifics	Issue/Expiration Dates	Notes
CAMA #164-08	Issued 11-20-2008 Expires 12/31/2011*	
NCDENR 401 Water Quality Certification	Issued 10-17-2008	Expires with CAMA or 404 permit
NCDENR Stormwater		SW #8 081018 exemption
US Army Corps Consent	Expires 10-15-2010	
Property Owner Consent	Consent for winter/spring 2007-2008	
NPDES		Not required for this project

Harbor Acres		
Permit Specifics	**Issue/Expiration Dates**	**Notes**
CAMA #128-90	Renewed 4-13-2009 Expires 12/31/2013 *	
NCDENR 401 Water Quality Certification		Less than 0.5 acres open water covered by General WQ Certificate #3351
NCDENR Stormwater		
US Army Corps Consent		Fees paid 9-22-2008
Property Owner Consent	Consent granted August 1, 2002	
NPDES		Not required for this project

4. PROJECT COSTS

4.1. Construction Cost Estimate

ITEM	UNITS	# OF UNITS	UNIT COST	TOTAL
Mobilization	LS	1	$300,000	$300,000
Hydraulic Dredging Holden Beach Acres	CY	17,000	$15	$255,000
Hydraulic Dredging Heritage Harbor	CY	13,000	$15	$195,000
Hydraulic Dredging Harbor Acres	CY	16,000	$15	$240,000
Booster Pump	LS	1	$100,000	$100,000
Entrance Canal Dredging Holden Beach Acres	CY	800	$15	$12,000
Entrance Canal Dredging Heritage Harbor	CY	1,800	$15	$27,000
Entrance Canal Dredging Harbor Acres	CY	1,400	$15	$21,000
Disposal Area Maintenance Cost	EA	1	$150,000	$150,000
Corps of Engineers Disposal Fees	CY	50,000	$3	$150,000
Property Owner Disposal Fees	CY	50,000	$3	$150,000
			TOTAL CONSTRUCTION COST:	**$1,600,000**

4.2. Project Cost

1	CONSTRUCTION COST	$1,600,000
2	LEGAL AND ADMINISTRATIVE	$45,000
3	ENGINEERING PROJECT	
A.	ADMINISTRATION	$25,000
B.	DESIGN / CONSTRUCTION MANAGEMENT	$120,000
C.	CONSTRUCTION INSPECTION	$40,000
D.	CANAL SURVEYS, DISPOSAL AREA SURVEYS, SEDIMENT SAMPLING, & ENVIRONMENTAL ISSUES/PERMITTING	$86,000
4	CONTINGENCIES @ 10% OF CONSTR. COST	$160,000
5	LAND AND RIGHTS-OF-WAY	$10,000
	SUBTOTAL =	**$2,086,000**
	ESTIMATED TOTAL PROJECT COST: (Rounded to nearest thousand)	**$2,086,000**

4.3. Annual Costs

We recommend that canal surveying be conducted every two years to assess the shoaling conditions. This is estimated to cost $30,000, or $15,000 annually.

4.4. Projected Annual Revenues Required

Revenues were calculated based on overall project costs and annual costs combined, then divided among land owners in each subdivision based on the ratio of linear feet of canal for each subdivision. The following table shows the projected annual assessment per land owner.

		Annualized Period	Annualized Dredge Cost			
Total Dredging Project Cost=	**$2,086,000**	8	$260,750			
Annual Surveying Cost=	**$15,000**					
Total Annual Cost=	**$275,750**					
Subdivision	**Number of Riparian Residences**	**Percent of Canal LF Overall**	**Portion of Annual Dredge Cost**	**Portion of Annual Survey Cost**	**Total Annual Cost**	**Required Annual Assessment**
Holden Beach Harbor	350	46.2%	$120,523	$6,933	$127,456	$364
Heritage Harbor	312	21.9%	$57,149	$3,288	$60,436	$194
Harbor Acres	301	31.9%	$83,079	$4,779	$87,858	$292

5. CONCLUSIONS AND RECOMMENDATIONS

Based on historical dredge cycles and the estimated shoaling rate, it appears that eight year dredge cycles would be appropriate to maintain navigable water depths. Construction costs were estimated for all three subdivisions and based upon estimated construction costs and annual costs, the annual individual property owner assessment should be: Holden Beach Harbor - $364 per lot; Heritage Harbor - $194 per lot; and for Harbor Acres - $292 per lot.

The outlet structure for the Harbor Acres disposal area is in need of repair and it is recommended that these repairs be completed before letting of the 2012-2013 dredge contract.

Shoaling rates, surveying and dredge frequency are all subject to dynamic coastal conditions. Care should be taken by the Town of Holden Beach to assess yearly localized events and bi-annual canal monitoring surveys should be implemented.

Appendix

Resolution No. 08-20 ..... **Holden Beach Harbor**

Resolution No. 08-21 ..... **Heritage Harbor**

Resolution No. 08-22 ..... **Harbor Acres**

CAMA Permit 40-05 ..... **Holden Beach Harbor**

CAMA Permit 164-08 ..... **Heritage Harbor**

CAMA Permit 128-90 ..... **Harbor Acres**

RESOLUTION NO. 08-20

RESOLUTION ESTABLISHING A HOLDEN BEACH HARBOR SUBDIVISION

FEE-SUPPORTED CANAL DREDGING DISTRICT

WHEREAS, that subdivision of land commonly referred to as "Holden Beach Harbor" is a platted subdivision within the corporate limits of the Town of Holden Beach NC; and,

WHEREAS, Holden Beach Harbor is more accurately depicted on those maps titled "Canal Layout Holdens Beach East, Holden Beach Realty Corp." prepared by Greer-McHenry, Reg. Surveyors, dated July 30, 1962, recorded in the office of the Brunswick County Register of Deeds at Map Book 7, page 24 and "Proposed Canal Layout Holdens Beach East, Holden Beach Realty Corp." prepared by Gerrit C. Greer, Reg. Surveyor, dated Jan 15, 1963, recorded in the office of the Brunswick County Register of Deeds at Map Book 7, page 22; attached hereto and included by reference.

NOW THEREFORE, BE IT RESOLVED by the Board of Commissioners of the Town of Holden Beach, North Carolina that in accordance with North Carolina General Assembly Session Laws 2004-104 and 2005-90; a fee supported canal dredging district for the Holden Beach Harbor Subdivision is hereby created; said district's boundary to encompass those properties depicted on the maps previously aforementioned and intended to be coincidental with boundaries of same.

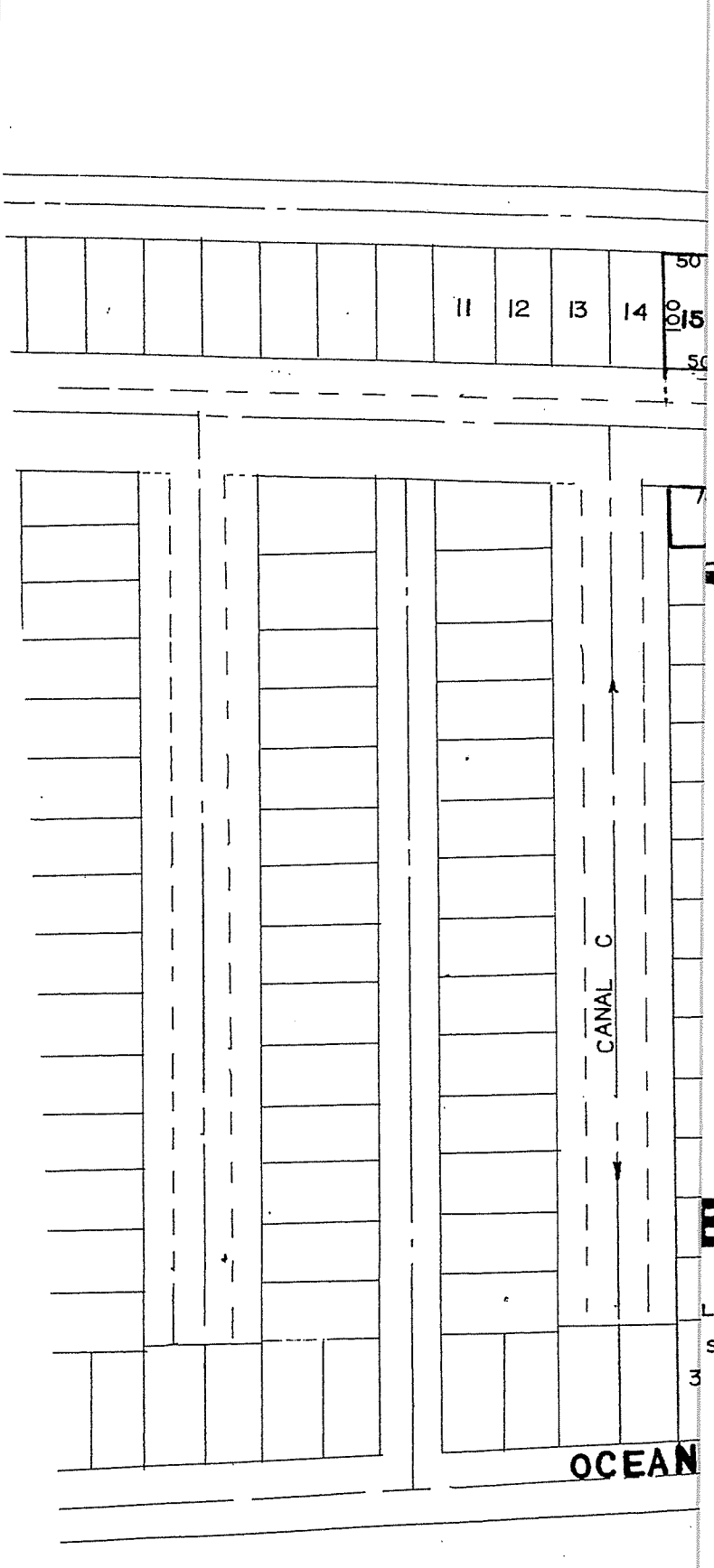
Adopted this the 24th day of June, 2008.

J. Alan Holden, Mayor

ATTEST:

Heather Finnell, Town Clerk

TOWN OF HOLDEN BEACH SEAL ESTABLISHED FEBRUARY 14, 1969 HOLDEN BEACH, NC



RESOLUTION 08-20

PROPOSED

CANAL LAYOUT

HOLDENS BEACH EAST

BEACH REALTY COR

LOCKWOODS FOLLY TWN. BRUNSWICK CO.

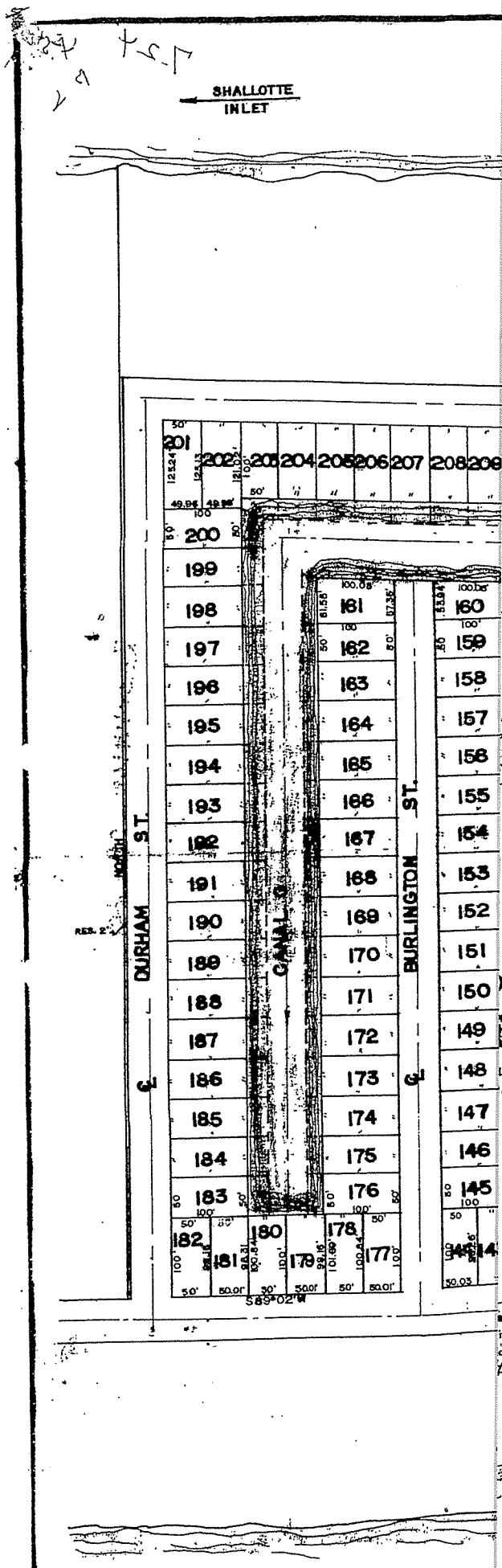
SCALE 1" 100' JAN 15, 1963

GERRIT C. GREER
REG. SURVEYOR
SOUTHPORT N.C.
REG. NO. L-813

NOTE:
ALL STREETS ARE 50' EXCEPT OCEAN HWY. WHICH IS 60

SUBSCRIBED AND SWORN TO BE

7022



AN VIEW HWY.

I GERRIT C GREER OR ROBERT B. McHENRY CERTIFY THAT THIS MAP WAS DRAWN FROM AN ACTUAL SURVEY MADE BY THEM THAT THE ERROR OF CLOSURE AS CALCULATED BY LATITUDES AND DEPARTURES IS 1:5000. THAT THIS MAP WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED WITNESS MY HAND AND SEAL. THIS 30th DAY OF July 1962.

Robert B. McHenry
REG. LAND SURVEYOR

A BRUNSWICK CO.

PEARED BEFORE ME GERRIT C. GREER OR NRY N.C. REG. LAND SURVEYOR BEING DULY S MAP IS TRUE AND CORRECT TO THE BEST LEDGE AND BELIEF.

CLERK SUPERIOR COURT

RESOLUTION 08-20

CANAL LAYOUT

LDENS BEACH EAST

ACH REALTY CORP.

DS FOLLY TWN. BRUNSWICK CO.

= 100' MARCH 3, 1962

GREER-McHENRY
REG. SURVEYORS
SOUTHPORT N.C.

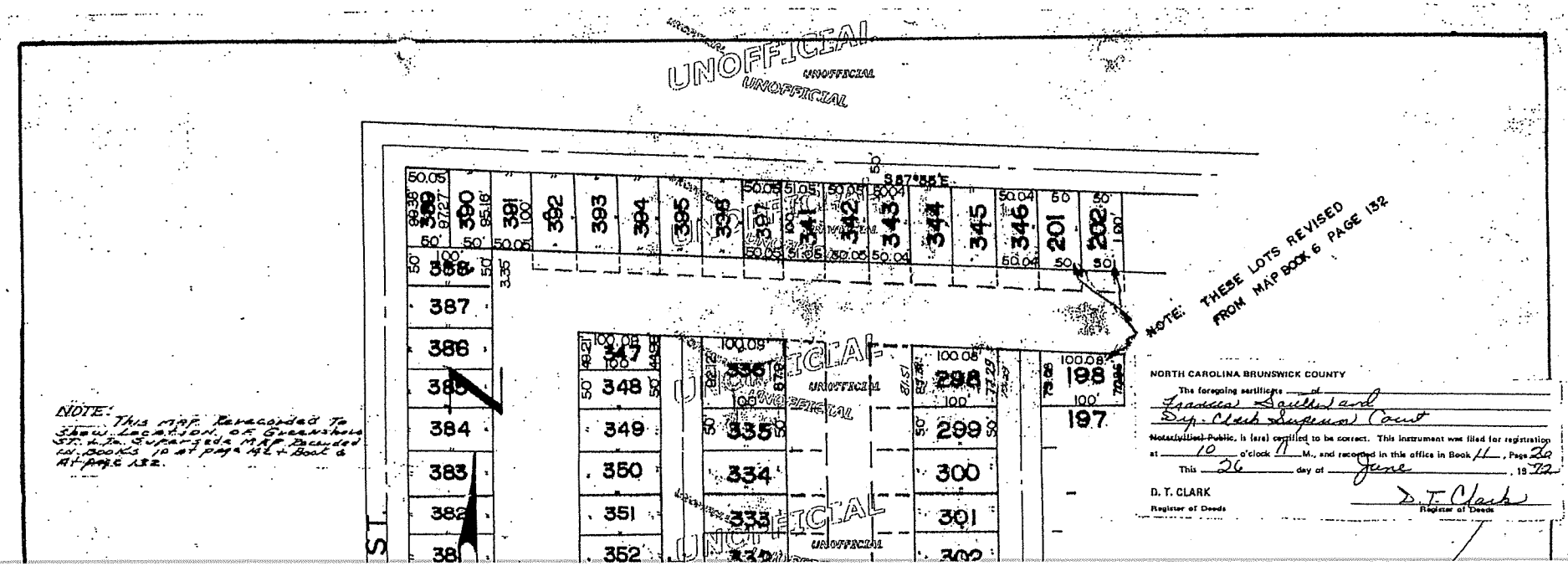
STATE OF NORTH CAROLINA
BRUNSWICK COUNTY

The foregoing certificate of Victoria L Aldridge Asst C.S.C. ~~a Notary Public~~ of Brunswick County, State of North Carolina, is adjudged to be correct. Let the instrument, with the certificates, be registered. Witness my hand and official seal this 24 day of May A. D. 1963

J. E. Brower
Clerk Superior Court

REGISTER OF DEEDS
TRUE COPY
Register of Deeds

7C 24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ST.
NOTE: THESE LOTS REVISED FROM MAP BOOK 6 PAGE 132
NOTE: This MAP Rerecorded To Show Location of Greenshore ST. & To Supersede MAP Recorded in Books 10 at page 142 + Book 6 At page 132.
NORTH CAROLINA BRUNSWICK COUNTY
The foregoing certificate of Frances Saulter and Dep. Clerk Superior Court
~~Notary(ies) Public~~, is (are) certified to be correct. This instrument was filed for registration at 10 o'clock 11 M., and recorded in this office in Book 11, Page 20
This 26 day of June, 1972
D. T. CLARK
Register of Deeds
D. T. Clark
Register of Deeds

RESOLUTION NO. 08-21

RESOLUTION ESTABLISHING A HERITAGE HARBOR SUBDIVISION

FEE-SUPPORTED CANAL DREDGING DISTRICT

WHEREAS, that subdivision of land commonly referred to as "Heritage Harbor" is a platted subdivision within the corporate limits of the Town of Holden Beach NC; and,

WHEREAS, Heritage Harbor is more accurately depicted on that map titled "Map of Heritage Harbor" prepared by H.L. Willis, R.L.S., dated October 1, 1968, recorded in the office of the Brunswick County Register of Deeds at Map Book 9, page 87; attached hereto and included by reference.

NOW THEREFORE, BE IT RESOLVED by the Board of Commissioners of the Town of Holden Beach, North Carolina:

1. In accordance with North Carolina General Assembly Session Laws 2004-104 and 2005-90; a fee supported canal dredging district for the Heritage Harbor Subdivision is hereby created; said district's boundary to encompass those properties depicted on the map previously aforementioned and intended to be coincidental with boundaries of same.
2. Resolution No 06-16 of the Town of Holden Beach NC is hereby revoked and rescinded.

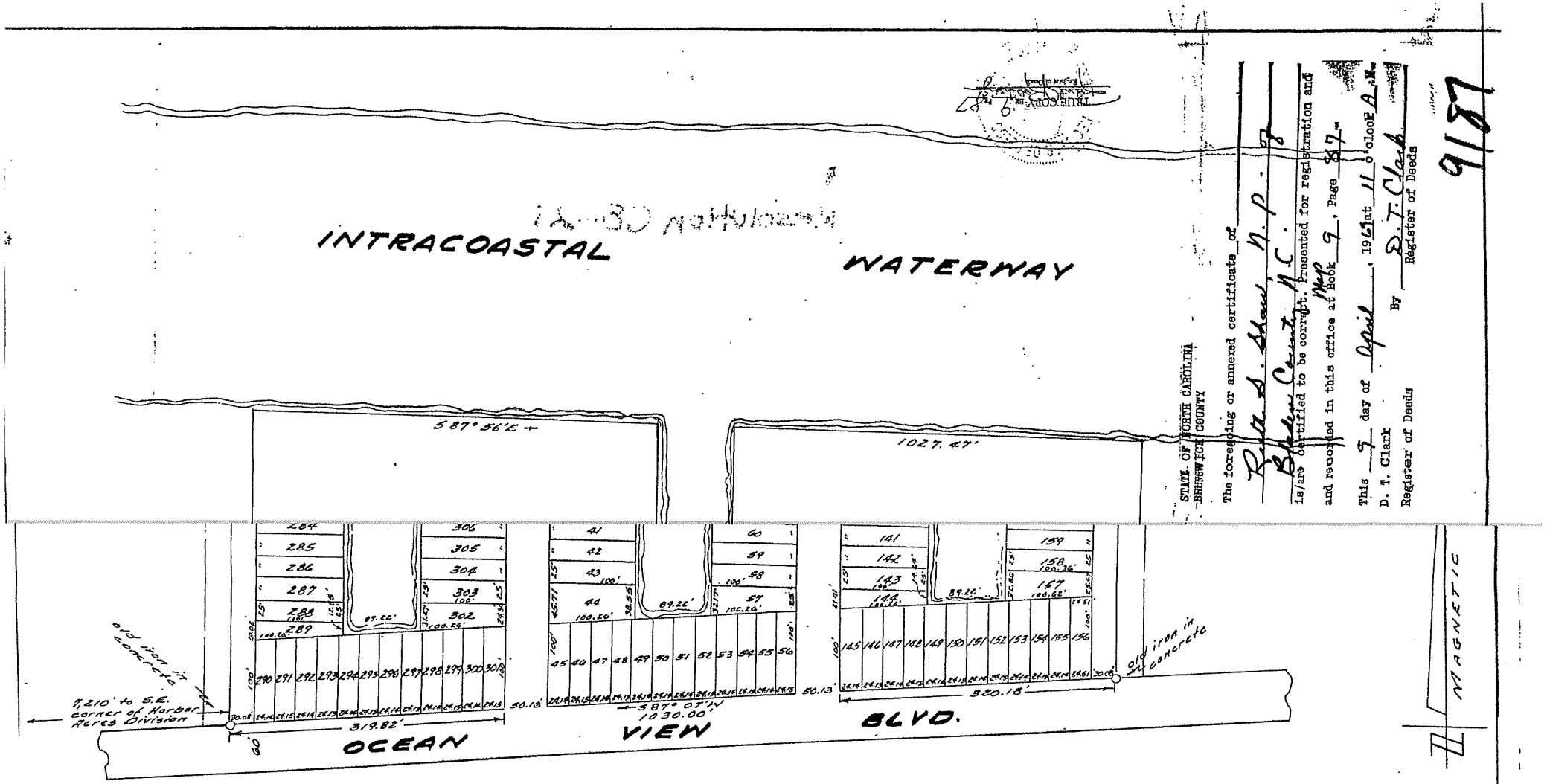
Adopted this the 24th day of June, 2008.

J. Alan Holden, Mayor

ATTEST:

Heather Finnell, Town Clerk

TOWN OF HOLDEN BEACH SEAL ESTABLISHED FEBRUARY 14, 1969 HOLDEN BEACH, NC



STATE OF NORTH CAROLINA
BRUNSWICK COUNTY

The foregoing or annexed certificate of Rita A. Shaw, N.P. - B
is/are certified to be correct. Presented for registration and
and recorded in this office at Book 9, Page 87
This 7 day of April, 1961 at 11 o'clock A.M.
D. T. Clark
Register of Deeds By D. T. Clark
Register of Deeds

9187

MAP OF HERITAGE HARBOR

HOLDENS BEACH, NORTH CAROLINA
LOCKWOOD FOLLY TWP - BRUNSWICK CO, N.C.

October 1, 1968 Scale: 1"=100'

H. L. Willis Jr.
Reg. Surveyor
Elizabethtown, N.C.

RESOLUTION 08-21

REFERENCE:
A portion of tract no. 1 of R. P. Robinson Beach as recorded in Map Book 4 at Page 12. Brunswick Co.

RESOLUTION NO. 08-22

RESOLUTION ESTABLISHING A HARBOR ACRES SUBDIVISION

FEE-SUPPORTED CANAL DREDGING DISTRICT

WHEREAS, that subdivision of land commonly referred to as "Harbor Acres" is a platted subdivision within the corporate limits of the Town of Holden Beach NC; and,

WHEREAS, Harbor Acres is more accurately depicted on that map titled "Map of Harbor Acres" prepared by C.B. Berry, R.L.S., dated July 30, 1965, recorded in the office of the Brunswick County Register of Deeds at Map Book 8, page 13; attached hereto and included by reference.

NOW THEREFORE, BE IT RESOLVED by the Board of Commissioners of the Town of Holden Beach, North Carolina that in accordance with North Carolina General Assembly Session Laws 2004-104 and 2005-90; a fee supported canal dredging district for the Harbor Acres Subdivision is hereby created; said district's boundary to encompass those properties depicted on the map previously aforementioned and intended to be coincidental with boundaries of same.

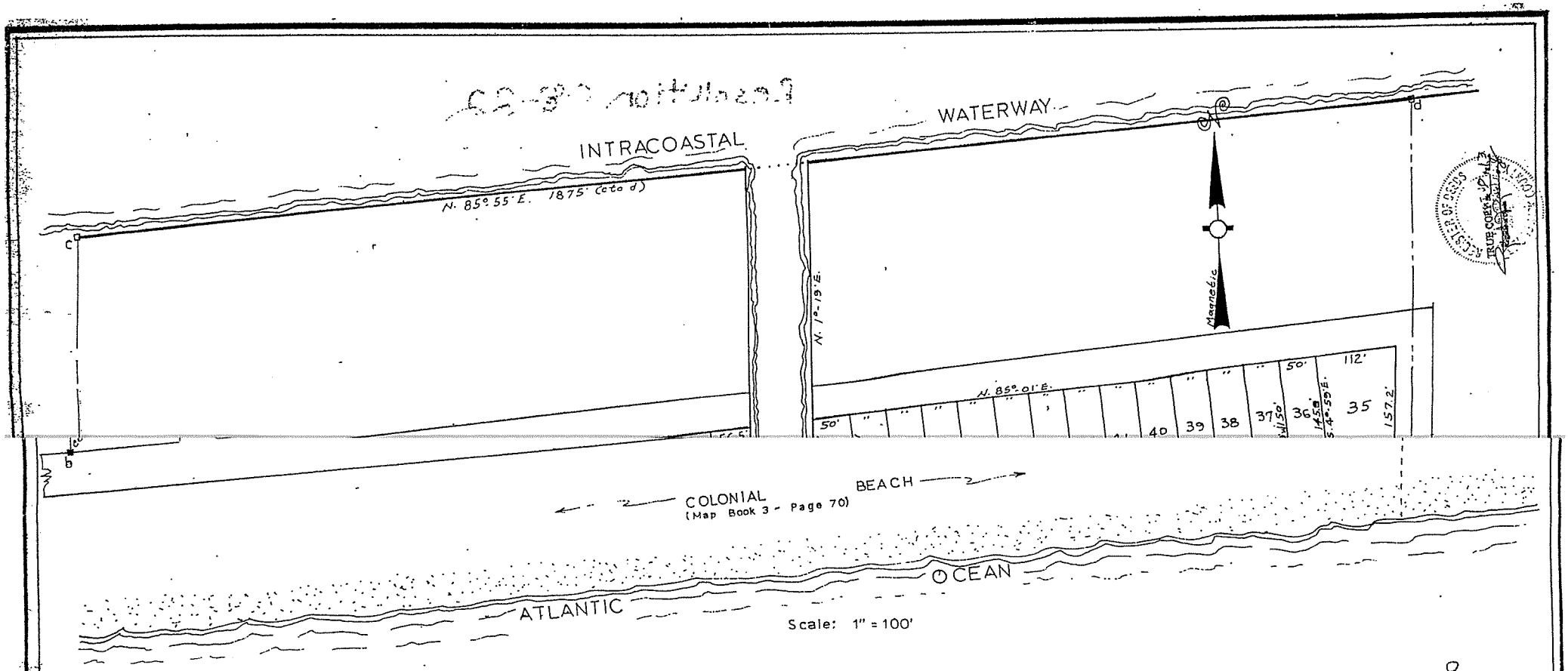
Adopted this the 24th day of June, 2008.

J. Alan Holden, Mayor

ATTEST:

Heather Finnell, Town Clerk

TOWN OF HOLDEN BEACH SEAL ESTABLISHED FEBRUARY 14, 1969 HOLDEN BEACH, NC



I, C. B. BERRY, CERTIFY THAT THIS MAP WAS DRAWN FROM AN ACTUAL SURVEY MADE BY ME, THAT THE ERROR OF CLOSURE, AS CALCULATED BY LATITUDES AND DEPARTURES, IS 1:5000; THAT THIS MAP WAS PREPARED IN ACCORDANCE WITH G. S. 47-30 AS AMENDED.
WITNESS MY HAND AND SEAL THIS 30TH. DAY OF JULY 1965.

SEAL C. B. Berry SURVEYOR

SOUTH CAROLINA HORRY COUNTY
PERSONALLY APPEARED BEFORE ME C. B. BERRY, REGISTERED LAND SURVEYOR, WHO BEING DULY SWORN, SAYS THAT THIS MAP IS TRUE AND CORRECT TO THE BEST OF HIS KNOWLEDGE AND BELIEF AND IS THE RESULT OF AN ACTUAL SURVEY MADE BY HIM.
SWORN BEFORE ME THIS 30TH DAY OF JULY 1965

SEAL Carolyn Hardwick NOTARY PUBLIC FOR SOUTH CAROLINA
MY COMMISSION EXPIRES AT THE PLEASURE OF THE GOVERNOR.

8 C 13

Map of

HARBOR ACRES

A Subdivision at Holden Beach
Lockwood Folly Township - Brunswick County, N. C.
Owned by

Coastal Development Corporation

RESOLUTION 08-22

C. B. Berry, R. L. S.
Crescent Beach, S. C.
July 30, 1965

This was registered on the 9 day of August, 1965 at 11 o'clock a.M., and duly registered in the office of Register of Deeds of Brunswick County, N. C., in Book No. 8, Page 13
U. I. Clark
Register of Deeds

STATE OF NORTH CAROLINA
BRUNSWICK COUNTY

The foregoing certificate of Carolyn Hardwick a Notary Public of Horry County, State of South Carolina, is adjudged to be correct. Let the instrument, with the certificates, be registered. Witness my hand and official seal this 9 day of Aug A. D. 1965
Justine James Dep.
Clerk Superior Court

Permit Class
TRANSFER
RENEWAL

Permit Number
40-05

STATE OF NORTH CAROLINA
Department of Environment and Natural Resources
and
Coastal Resources Commission

Permit

COPY

for

X Major Development in an Area of Environmental Concern pursuant to NCGS 113A-118

X Excavation and/or filling pursuant to NCGS 113-229

Issued to **Town of Holden Beach, 2869 Holden Beach Road, Holden Beach, NC 28462**

Authorizing development in Brunswick County at man-made canal system adjacent to the AIWW, Holden Beach , as requested in the permittee's application dated 8/31/04, including attached the workplan drawings (7), dated 1-7 of 7 all dated 7/27/04

This permit, issued on **April 13, 2009** , is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

Excavation

1) In order to protect juvenile shrimp and finfish populations, no excavation shall be permitted between April 1 and September 30 of any year without the prior approval of the Division of Coastal Management, in consultation with the Division of Marine Fisheries.

2) Excavation shall not exceed -5 feet below the normal low water level. In no case shall the depth of excavation exceed the depth of connecting waters.

3) No excavation shall take place at any time in any area outside of the alignment indicated on the attached workplan drawing(s).

(See attached sheets for Additional Conditions)

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date. An appeal requires resolution prior to work initiation or continuance as the case may be.

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.

Any maintenance work or project modification not covered hereunder requires further Division approval.

All work must cease when the permit expires on

December 31, 2010

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signed by the authority of the Secretary of DENR and the Chairman of the Coastal Resources Commission.

Doug V Huggett

James H. Gregson, Director
For Division of Coastal Management

This permit and its conditions are hereby accepted.

Signature of Permittee

ADDITIONAL CONDITIONS

Spoil Disposal

4) Prior to the initiation of any dredging activities authorized by this permit, the permittee shall notify the Division of Environmental Health, Shellfish Sanitation Section at 252-726-6827 so that a temporary shellfish closure can be made adjacent to the disposal area. This notification shall take place a minimum of 24 hours prior to the initiation of dredging. The permittee shall also notify the Shellfish Sanitation Section immediately upon completion of the permitted project.

5) All excavated materials shall be confined above normal high water level and landward of regularly or irregularly flooded marsh behind adequate dikes or other retaining structures to prevent spillover of solids into any marsh or surrounding waters.

6) The disposal area shall be inspected and approved by a representative of the Division prior to the initiation of any dredging activities.

7) The disposal area effluent shall be contained by pipe, trough, or similar device to a point at or beyond the normal high water level to prevent gully erosion and unnecessary siltation.

8) The terminal end of the pipeline shall be positioned at or greater than 50 feet from any part of the dike and a maximum distance from spillways to allow settlement of suspended sediments.

9) A water control structure shall be installed at the intake end of the effluent pipe to assure compliance with water quality standards.

10) The diked disposal area shall be constructed a sufficient distance from the normal high water level or any vegetated wetlands to eliminate the possibility of dike erosion into surrounding wetlands or waters.

Sedimentation and Erosion Control

NOTE: An Erosion and Sedimentation Control Plan will be required for this project. This plan must be filed at least thirty (30) days prior to the beginning of any land disturbing activity. Submit this plan to the Department of Environment and Natural Resources, Land Quality Section, 127 Cardinal Drive Extension, Wilmington, NC 28405.

11) Appropriate sedimentation and erosion control devices, measures or structures shall be implemented to ensure that eroded materials do not enter adjacent wetlands, watercourses and property (e.g. silt fence, diversion swales or berms, etc.).

General

12) No vegetated wetlands shall be excavated or filled.

13) The temporary placement or double handling of fill materials within waters or vegetated wetlands is not authorized.

ADDITIONAL CONDITIONS

14) The permittee understands and agrees that, if future operations by the United States requires the removal, relocation, or other alteration of the structure or work authorized by this permit, or if in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to free navigation of the navigable waters, the permittee shall be required, upon due notice from the Corps of Engineers, to remove, relocate or alter the structural work or obstructions caused thereby, without expense to the United States or the state of North Carolina. No claim shall be made against the United States or the state of North Carolina on account of any such removal or alteration.

15) This permit does not authorize the interference with any existing or proposed Federal project, and the permittee shall not be entitled to compensation for damage to the authorized structure or work, or injury which may be caused from existing or future operations undertaken by the United States in the public interest.

16) No attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work.

17) The authorized structure and associated activity shall not cause an unacceptable interference with navigation.

18) The permittee shall comply with all applicable requirements of the attached list of United States Coast Guard regulations.

19) The federally endangered West Indian manatee (*Trichechus manatus*), has been reported in North Carolina waters. In order to protect the manatee, all work should be done between November 1 and May 31. If work must be done outside of this time frame, the permittee shall adhere to enclosed guidelines, entitled "Precautions for General Construction in Areas Which May Be Used by the West Indian Manatee in North Carolina".

NOTE: This permit does not eliminate the need to obtain any additional state, federal or local permits, approvals or authorizations that may be required.

NOTE: Future development of the permittee's property may require a modification of this permit. Contact a representative of the Division at (910) 395-3900 prior to the commencement of any such activity for this determination. The permittee is further advised that many non-water dependent activities are not authorized within 30 feet of the normal high water level.

NOTE: The N.C. Division of Water Quality has authorized the proposed project under General Water Quality Certification No. 3400 (DWQ Project No. 042032), which was issued on 1/11/05.

NOTE: The U.S. Army Corps of Engineers has assigned the proposed project COE Action Id. No. 200500282.

COAST GUARD REGULATIONS APPLICABLE TO DREDGE OPERATIONS

Below is a list of regulations which are applicable to dredge operations in the COTP Wilmington zone. This list is not all inclusive. We encourage dredge companies to schedule a meeting with members of the USCG staff, in order to be provided amplifying information or answers to any questions that may exist. We also strongly encourage all Uninspected Towing Vessels (UTV) associated with each dredging operation to participate in the USCG's Voluntary Commercial Dockside Examination program. Please contact LT Dave Brown of the USCG staff at (910) 815-4895, extension 108, to coordinate a meeting or dockside exam.

1. Lights on dredge pipelines (33 CFR 88.15)
2. Lights on barges at a bank or dock (33 CFR 88.13)
3. Lights and Shapes (33 CFR 84.11-13)
4. Mooring Buoys (33 CFR 62.35)
5. Special Marks (33 CFR 62.31)
6. Uninspected Towing Vessel's (UTV) Licensing Requirements (46 CFR 15.910 & 15.815)
7. UTV Drug Testing Requirements (33 CFR 4.06 & 4.03-2)
8. UTV Marine Radar Requirement (33 CFR 164.01(b) & 164.72)
9. UTV Certificate of Documentation (33 CFR 173.21)
10. UTV Marine Casualty Reporting Criteria (46 CFR 4.05-1)
11. Dredge or UTV Advance Notice of Transfers (33 CFR 156.118)

Permit Class
NEW (Express Permit Program)

Permit Number
164-08

STATE OF NORTH CAROLINA
Department of Environment and Natural Resources
and
Coastal Resources Commission

Permit

for

X Major Development in an Area of Environmental Concern pursuant to NCGS 113A-118

X Excavation and/or filling pursuant to NCGS 113-229

Issued to Town of Holden Beach, 110 Rothschild Street, Holden Beach, NC 28462

Authorizing development in Brunswick County at adj. to the AIWW, within the "Heritage Harbor" canal system, Holden Beach, NC as requested in the permittee's application dated 8/14/08 (MP-1) & 6/23/08 (MP-2), including the attached workplan drawings referenced in Condition No. 1 of this permit.

This permit, issued on November 20, 2008, is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

Maintenance Excavation

1) Unless specifically altered herein, all work shall be done in accordance with the permittee's application and work plan drawings (7), dated 7/17/08 (sheet K1), 6/09/08 (sheets 1-5 of 5) and 7/28/08 (sheet D-1).

2) In order to protect juvenile fish and shrimp populations, no excavation shall take place between April 1 and September 30 of any year without prior approval from the Division of Coastal Management, in consultation with the N.C. Division of Marine Fisheries and the U.S. Army Corp of Engineers.

(See attached sheets for Additional Conditions)

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date. An appeal requires resolution prior to work initiation or continuance as the case may be.

This permit shall be accessible on-site to Department personnel when the project is inspected for compliance.

Any maintenance work or project modification not covered hereunder requires further Division approval.

All work shall cease when the permit expires on

December 31, 2011

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signed by the authority of the Secretary of DENR and the Chairman of the Coastal Resources Commission.

James H. Gregson, Director
Division of Coastal Management

This permit and its conditions are hereby accepted.

Signature of Permittee

ADDITIONAL CONDITIONS

3) Unless specifically altered herein, this permit authorizes only the land disturbing activities associated with the maintenance excavation of the finger canals and entrance channel, all as expressly and specifically set forth in the permit application and depicted on the attached work-plat drawings. A representative from the Division of Coastal Management (DCM) shall evaluate any additional excavation activities on a case-by-case basis, to determine additional permit requirements. Contact a representative of the Division at (910) 796-7215 prior to the commencement of any such activity for this determination.

4) No vegetated wetlands shall be excavated and/or filled, even temporarily.

5) No excavation shall take place outside of the area indicated on the attached workplan drawing(s).

6) No excavation shall take place within 10 feet of any area of Coastal Wetland.

7) The temporary placement, or double handling of excavated or fill materials within waters or vegetated wetlands, is not authorized.

8) Excavation shall not exceed –5.0 feet below the elevation of normal low water within the footprint of the finger canals and –6.0 feet below the elevation of normal low water within the footprint of the entrance channel. In no case shall the depth of excavation exceed the depth of the connecting waters.

Spoil Disposal

9) All excavated materials shall be confined above normal high water and landward of regularly or irregularly flooded wetlands behind adequate dikes or other retaining structures to prevent spillover of solids into any marsh or surrounding waters.

10) The terminal end of the pipeline from the dredge area into the diked retention area shall be positioned at or greater than 50 feet from any part of the dike and a maximum distance from spillways to prevent dike erosion and to allow adequate settlement of suspended solids.

11) A water control structure shall be installed at the intake end of the effluent pipe leading from the retention area in order to ensure maximum settlement of suspended solids.

12) The disposal area effluent shall be contained by pipe, trough, or similar device to a point at or beyond the normal low water level to prevent gully erosion and unnecessary siltation.

13) The permittee shall contact a representative from the Division of Coastal Management, Wilmington Office at (910) 796-7215, and a representative of the US Army Corp of Engineers, Wilmington Field Office at (910) 251-4634, at least two weeks prior to commencement of dredging activities to schedule an inspection of the disposal area.

14) The disturbed areas shall be properly graded and provided a ground cover sufficient to restrain erosion within 30 working days of project completion.

Permit Class
3rd RENEWAL
MAINTENANCE 5
TRANSFER

Permit Number
128-90

STATE OF NORTH CAROLINA
Department of Environment and Natural Resources
and
Coastal Resources Commission

COPY

Permit

for

X Major Development in an Area of Environmental Concern pursuant to NCGS 113A-118

X Excavation and/or filling pursuant to NCGS 113-229

Issued to Town of Holden Beach, 2869 Holden Beach Road, Holden Beach, NC 28462

Authorizing development in Brunswick County at the AIWW, canal system off of, in Holden Beach, as requested in the permittee's application dated 5/1/90, including the att'd workplan drawings 1 of 4 dated rec'd 7/6/90, 2 of 4 dated 5/1/90, 3 & 4 of 4 dated revised 7/6/90

This permit, issued on April 13, 2009, is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

1) In order to protect juvenile shrimp and finfish populations, no excavation or filling will be permitted between April 1 and September 30 of any year without the prior approval of the Division of Coastal Management, in consultation with the Division of Marine Fisheries.

2) Excavation will not exceed –6 feet below normal low water in the access channel and –5 feet below normal low water in the finger canals.

3) No marsh grass will be excavated and/or filled.

4) The temporary placement or double-handling of excavated or fill materials within waters or vegetated wetlands is not authorized.

(See Attached Sheet for Additional Conditions.)

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date. An appeal requires resolution prior to work initiation or continuance as the case may be.

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.

Any maintenance work or project modification not covered hereunder requires further Division approval.

All work must cease when the permit expires on

December 31, 2013

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signed by the authority of the Secretary of DENR and the Chairman of the Coastal Resources Commission.

Dave V Huggett

for James H. Gregson, Director
Division of Coastal Management

This permit and its conditions are hereby accepted.

David W. Hewett

Signature of Permittee

ADDITIONAL CONDITIONS

5) All excavated materials will be confined above mean high water and landward of regularly or irregularly flooded marsh behind adequate dikes of other retaining structures to prevent spillover of solids into any marsh or surrounding waters.

6) The disposal area effluent will be contained by pipe, trough, or similar device to a point at or beyond the mean low water level to prevent gully erosion and unnecessary siltation.

7) The terminal end of the pipeline will be positioned at or greater than 50 feet from any part of the dike and a maximum distance from spillways to allow settlement of suspended sediments.

8) A water control structure will be installed at the intake end of the effluent pipe to assure compliance with water quality standards.

Maintenance Clause

9) The Division of Coastal Management shall be notified in writing at least two (2) weeks in advance of any maintenance work authorized by this permit, and such notification shall include:
   - A. The number of the original permit.
   - B. A statement that no dimensional changes are proposed.
   - C. A copy of the original permit plans with cross-hatching indicating the area to be maintained, the area to be used for spoil disposal, and the estimated amount of material to be removed. The location, design and holding capacity of the spoil disposal site must be approved by a representative of the Division prior to the initiation of any maintenance dredging activities.
   - D. The date of map revision and the permittee's signature shown anew on the original plan.