

Wildlife Refuge visitors center to discuss the FIND dredged material management program for the ICWW and its relation to other Federal and State interests in the area. All parties present recognized the mutual benefits of comprehensive management of the natural resources and environment of the Mosquito Lagoon, the Indian River, the Merritt Island Wildlife Refuge, and the Canaveral National Seashore. They also recognized that the Intracoastal Waterway in this area constitutes an important component of these resources. Based upon these discussions it was then mutually acknowledged that the FIND study, which is documented by this report, would include Federally owned and managed lands in the Cape area as part of the site selection process for the ICWW in Brevard County. Final approval of the use of these lands for dredged material disposal would of course reside with the Federal government, specifically the USFWS and NASA. The inclusion of these properties in the site selection process greatly facilitated the performance of this study.

Preliminary estimates were also made of the maximum disposal capacity of the candidate sites identified. Tracings of the initial delineation of useable upland area of each site were made using the 1" = 800' black and white aerials. A capacity analysis was then performed, based on the most realistic dike configuration attainable within the delineated upland. This was accomplished using a set of relationships (APPENDIX A) which expressed the required volume of dike material, the volume of dike material available on-site, and the resulting disposal capacity as functions of the dike crest elevation above grade, mean site elevation, depth of excavation, dike side slope, width of dike crest, and required minimum freeboard. During Phase II of the project, dike geometry will be specific to each site. However, for the purposes of this preliminary evaluation, a standard dike geometry was applied to all sites. Selected parameter values are within the range of standard practice for similar sites used for previous maintenance events. These included a 15.0 ft. crest elevation above grade, a 1V:3H side slope, a 12.0 ft. crest width, an excavated grade elevation of +4.0 ft. NGVD., and a minimum freeboard plus ponding allowance of 4.0 ft. Calculations were based on a realistic dike configuration (i.e., a 3 to 5 sided polygon), specific to each site, which utilizes the maximum available upland area as delineated by photo-interpretation. The mean grade elevation for each site was estimated from survey transects, if available, or from U.S. Geological Survey Quadrangle maps.

This preliminary disposal capacity analysis was done to insure that each site possessed sufficient capacity to satisfy the requirements of the reach it was intended to serve. Thus, within each reach the total capacity of the candidate sites greatly exceeded the corresponding disposal requirement. These overages in capacity were retained to provide the greatest flexibility prior to final site selection. Also, it was expected that subsequent field inspection of the sites would result in the total elimination of some sites, and a reduction in the usable acreage of others. The site inspection procedure is discussed in the following section.

3.5 Site Inspections

Field inspections of all candidate sites were performed to document site environmental characteristics, as well to assess their general suitability for disposal site development. Specific objectives included preliminary delineation of wetlands, and the initial assessment of vegetation communities, habitat, and environmental constraints including the presence of protected wildlife. Also noted during the site inspections were surrounding land uses, topography, general soil conditions, existing or potential road access, and possible pipeline routes. Twenty-four of the 25 candidate sites were visited by a team consisting of a biologist and an engineer during the period July to September, 1989. The Rockledge Site now being acquired by the FIND (Section 2.2) was not visited.

Within each site, ecological conditions were assessed by combined photographic aerial interpretation and ground-truthing as necessary to identify and map vegetation communities. Aerial coverage included 1985 1" = 800' black and white photography, 1983-84 1" = 2000' color infrared photography, and in some cases, 1986 blue-line aerials at a scale of 1" = 400'. Ground-truthing was carried out using 4-wheel-drive vehicles accessing adjacent roads or on-site dirt roads and trails, combined with pedestrian surveys. Dominant or significant photographic signatures were identified on aerials and visited by truck or on foot. Within Reach III, candidate sites BV-7 and BV-8 were approached by boat, then covered on foot. Maps were prepared in the field by drawing on acetate overlays on the 1" = 800' black and white aerial photographs. Other sources of information, such as USGS 7.5' quadrangles and U.S. Fish and Wildlife Service Wetland Inventory Maps and soil surveys, were checked to aid in the interpretation of site conditions. Observations of significant

wildlife species were also noted when encountered on-site. This included the presence or sign of State or Federally protected wildlife species.

Following each site inspection, the original site tracings were modified to exclude sensitive areas. The most common modification was to withdraw from areas possessing wetland or transitional vegetation. Specifically excluded were those wetland and transitional areas contiguous with the Waterway or its tributaries. Because of this latter consideration which establishes the jurisdiction of DER permitting authority, all drainage features were examined for evidence of this contiguity. Isolated wetlands or drainage features, which still fell within the permitting jurisdictional authority of the St. Johns River Water Management District (SJRWMD), were excluded where feasible, but not if their exclusion made an otherwise viable site unusable.

A second analysis of maximum potential disposal capacity was then performed for each site based on its field-verified configuration. Results of this analysis are presented in Table 3-3. Again, the total potential capacities of the candidate sites exceed the disposal requirement for each reach. During the final site evaluation, described in the following section, these parameters were brought into agreement.

TABLE 3-3: CANDIDATE SITES
BREWARD COUNTY

| Reach | Site | Location ICMW Mileage | Total Acreage | Disposal Acreage | Disposal Capacity (c.y.) | Depth of Excavation (ft) | Dike Material Shortfall (c.y.) |
|-------|------|-----------------------------|------------------|---------------------|-----------------------------|-----------------------------|-----------------------------------|
| I | BV-1 | 123.04 | 220.8 | 152.4 | 2,660,800 | 2.1 | ----- |
| | 2 | 127.98 | 394.5 | 243.1 | 4,239,300 | 2.4 | ----- |
| | 3 | 132.80 | 187.6 | 90.1 | 1,571,100 | 2.2 | ----- |
| | 26A | 123.85 | 81.4 | 40.9 | 713,532 | 1.6 | ----- |
| | 27A | 130.50 | 237.8 | 120.0 | 2,093,100 | 2.2 | ----- |
| II | 4 | 135.16 | 96.6 | 65.3 | 1,138,100 | 2.2 | ----- |
| | 5 | 143.63 | 336.6 | 228.9 | 4,014,600 | 1.4 | ----- |
| | 27 | 136.63 | 120.0 | 33.6 | 583,500 | 2.6 | ----- |
| | 28 | 140.07 | 126.4 | 114.2 | 1,996,400 | 1.7 | ----- |
| III | 7 | 146.65 | 100.5 | 29.6 | 449,400 | 3.0 | 57,800 |
| | 8 | 147.34 | 69.7 | 27.3 | 419,900 | 3.0 | 48,000 |
| | 10 | 149.93 | 59.2 | 38.5 | 662,100 | 4.5 | ----- |
| | 11 | 149.88 | 76.5 | 53.4 | 924,200 | 3.3 | ----- |
| | 12 | 151.94 | 80.8 | 52.1 | 904,500 | 2.9 | ----- |

| Reach | Location | Site | ICMW Mileage | Total Acreage | Disposal Acreage | Disposal Capacity (c.y.) | Depth of Excavation (ft) | Dike Material Shortfall (c.y.) |
|-------|----------|------|--------------|---------------|------------------|--------------------------|--------------------------|--------------------------------|
| IV | | R | 162.08 | 79.97 | 20.7 | 761,191 | --- | --- |
| | | 15 | 161.04 | 212.1 | 101.9 | 1,780,600 | 1.9 | --- |
| V | | 16 | 167.66 | 213.2 | 120.0 | 2,094,800 | 2.1 | --- |
| | | 17 | 169.66 | 91.0 | 71.1 | 1,234,100 | 2.8 | --- |
| | | 18 | 171.78 | 107.1 | 69.4 | 1,200,000 | 3.7 | --- |
| VI | | 22 | 182.84 | 84.9 | 62.9 | 1,092,100 | 2.8 | --- |
| | | 23 | 183.96 | 216.9 | 134.9 | 2,360,700 | 1.7 | --- |
| | | 24 | 187.60 | 225.8 | 108.4 | 2,105,900 | 1.6 | --- |
| | | 25 | 192.79 | 154.0 | 120.3 | 2,104,700 | 1.7 | --- |
| | | 28A | 188.58 | 144.2 | 80.8 | 1,408,135 | 2.3 | --- |
| | | 29 | 194.88 | 223.6 | 63.7 | 1,107,897 | 1.9 | --- |

4.0 ESTABLISHMENT OF SITE BANK

The final evaluation of the 25 candidate sites was accomplished by assessing the ability of each site to satisfy a standard set of evaluation criteria, and by the consideration of comments and suggestions provided by the project sponsor and advisory committee members throughout the course of the study. Through this process a group of 14 sites was selected to form a site bank serving the six channel reaches comprising the Intracoastal Waterway within the study area. The site bank consists of 7 primary and 7 secondary sites which, as their names imply, represent first and second choice options for the long term disposal and management of dredged material removed from ICWW channels.

A standard set of criteria were used to perform the final site evaluation. However, no attempt was made to quantify the relative merits of each evaluation criterion, using what is sometimes referred to as matrix analysis. Although such an approach is sometimes very useful it was not felt to be necessary in this particular case. Therefore, the decision was made to evaluate the sites using the criteria as a wholistic standard and to take into consideration specific information pertinent to a particular criterion when it was available.

The remaining portions of Section 4.0 describe the evaluation procedure and the results obtained from it, including the criteria used, the agency input considered, and the primary and secondary sites comprising the site bank.

4.1 Evaluation Criteria

Each site was evaluated by its ability to satisfy criteria in three broad areas:

- o Engineering/Operational Considerations
- o Environmental Considerations
- o Socioeconomic or Cultural Considerations

Individual criteria considered in each of these areas are described below.

4.1.1 Engineering/Operational Considerations

A primary objective of this study was to identify suitable sites of adequate capacity to meet the projected fifty-year disposal requirements of the Waterway in the study area. Therefore, the potential disposal capacity of a site was included as an evaluation criterion. In keeping with the concept of centralized disposal, all alternative sites were selected and existing sites were retained based on their ability to provide adequate capacity with a minimum number of sites. Typically, a single site within each reach is required. However, within Reach II, two sites have been designated to serve jointly as primary sites. Similarly, two sites have been designated to jointly function as secondary sites within both Reaches I and IV. As will be discussed later, these decisions were primarily based on considerations of pumping distance and operational efficiency.

Closely related to site capacity is the availability of adequate dike material on-site to construct the containment basin employed in the disposal capacity analysis (APPENDIX A). It is possible to circumvent an insufficient on-site supply by trucking in additional material, or by using dewatered material from a previous disposal operation to incrementally build the dikes to design elevation. However, the expense of transporting material from off-site sources, the uncertainties of dredging and disposal frequency, and the possible unsuitability of the dewatered dredged material for dike construction, make an adequate on-site supply of material preferable.

Pumping distance from the area to be dredged to the disposal site is also a criterion affecting site selection. The availability of add-on boosters can extend pumping distances as needed. However, this increased distance is achieved through a reduction in dredging efficiency and a significant increase in the cost of operation. Therefore, it is desirable to choose a site which is either centrally located within the reach it is to serve, or one that is located adjacent to the area requiring the highest maintenance. However, the lengths of the channel reaches and the limited availability of centrally located sites necessitated the designation of two primary sites located near the ends of Reach II, and two secondary sites within Reaches I and VI.

A site which affords the greatest ease of pipeline access from the Waterway to the disposal area, as well as the return of effluent to the Waterway, is also preferred. Apart from the environmental concerns which will be discussed later, problems related to difficult pipeline access, such as convoluted routes, significant elevation changes, or the crossing of road or railroad right-of-ways add to mobilization-demobilization costs, and decreased operating efficiency. Moreover, the need to acquire additional pipeline easements increases the cost of site development.

Upland access, with existing or potential road service, is desirable for initial site construction, and is required if the site is to be managed as a permanent operating disposal facility. It should be noted that this criterion was a condition for the selection of candidate sites.

Soil properties (e.g. foundation loading, resistance to piping, etc.), as well as the depth of the water table below grade, are additional factors which should be included as criteria for site evaluation. However, these determinations require field testing not included in the initial phase of the project. Data supporting site soil properties and geohydrology will be obtained during Phase II. Visual observations made during the field inspections revealed no obvious areas of concern.

4.1.2 Environmental Considerations

The environmental criteria used for site evaluation are intended to minimize adverse impacts to sensitive estuarine and upland areas, within the constraint of providing adequate disposal capacity to serve the needs of the Waterway. The resulting criteria may be organized under two categories reflecting the desire to restrict disposal to upland sites only: (1) criteria for the avoidance of wetland areas to the greatest extent possible; and (2) criteria for minimizing the unavoidable impacts to upland areas.

Avoidance of wetlands was a primary consideration throughout the site selection process, and by use of the USFWS Wetlands Inventory maps and the color-infrared photography this has largely been achieved. However, where a question remained, or where avoidance of isolated or transitional wetland areas would have precluded the use of a site, several specific criteria were used to weigh the relative success in

minimizing wetland impacts.

All estuarine wetland areas exhibiting salt or brackish water characteristics, particularly those judged to be contiguous with State waters, are recognized by all state and federal agencies to be an extremely valuable resource. Therefore, the degree to which a site succeeds in eliminating the impacts to estuarine wetlands is obviously a crucial criterion in site selection. However, within significantly disturbed areas, such as abandoned citrus groves, which contain channelized drainage with hydrologic or vegetative connection to State waters, the relocation of drainage ditches was considered an acceptable impact if the existing ditch would preclude the use of a site. It is anticipated that the various regulatory agencies concerned with this project would also be amenable to such action.

Isolated freshwater wetlands are also a valuable biological community, and in addition can afford a system of filtering run-off and recharging groundwater supplies. However, such wetlands are not given the same degree of protection under joint Corps of Engineers and DER permitting criteria although they may fall under the jurisdiction of the SJRWMD. The presence of these isolated wetlands was considered in the evaluation of a particular site, and their disruption was avoided wherever possible. However, agency comments received during the previous Nassau-Duval study tend to support the position that the sacrifice of small isolated areas possessing wetland vegetation may be acceptable if required to provide an adequate disposal area. Somewhat independent of the areal extent of an interior wetland is the quality of the habitat which it may afford, or the unusual vegetation assemblages it may support. Thus, the quality of impacted wetlands was also a criterion of site selection.

The use of upland disposal areas minimizes the impact to wetlands; however, restricting disposal site development to upland areas requires the removal of existing upland biota within the diked area. Again, the quality of the impacted upland communities can vary widely, and therefore considerations which reflect the existing ecological value of a potential disposal area are useful site evaluation criteria. Specifically, these include the quality of habitat afforded by a particular site as determined by field inspection and ecological categorization; the value, uniqueness, maturity, and aesthetic quality of the existing vegetation (e.g., mature hardwood canopy vs. second-growth scrub); and the extent to which a

site was disturbed by previous activities.

Also considered as a criterion was the ability of a site to provide a buffer zone of undisturbed vegetation outside of the containment area while still maintaining adequate disposal capacity. The potential benefits of such a buffer, beyond its primary function as a visual barrier, can include the preservation of areas of particular environmental value such as maritime hammock or transitional wetlands. Moreover, the preservation of a buffer region within a dedicated conservation easement may mitigate the impact of containment basin construction, as well as the assessment of the impact during the permitting process.

The final environmental evaluation criterion addresses potential groundwater impacts; specifically the possibility of residential well contamination. The confined upland disposal of dredged material should have no impact on the geologically isolated Floridan Aquifer from which private residential wells may obtain potable water. However, the possibility exists that within residential areas adjacent to a disposal site, private irrigation wells tapping the shallow aquifer may experience elevated chloride levels or saltwater intrusion as a result of disposal and dewatering operations. Nutrient enrichment or other contamination is less likely to occur. To minimize the possibility of such occurrences, the sediment to be dredged will undergo analysis including elutriate testing prior to the commencement of dredging and disposal operations. Moreover, the quality of local groundwater will be monitored before, during, and after disposal. Nevertheless, the potential for residential well contamination as measured by the proximity of residential development was a criterion in site evaluation. As such, this criterion is closely related to the issue of adjacent land use, to be addressed in the following section.

4.1.3 Socioeconomic or Cultural Considerations

The third major category of site evaluation criteria considers the socioeconomic or cultural issues of on-site or adjacent land use, site ownership, and the presence of archeological or historical resources. Every effort was made during the initial identification of candidate sites to select areas of minimal existing development. Agricultural areas, however, were not excluded from consideration and twelve candidate sites containing areas of fallow, marginal, or active citrus groves were

chosen. Moreover, areas having evidence of previous disturbance (e.g., earth-moving operations, artificial or channelized drainage) were given priority because of their reduced environmental value. Subsequent discovery of existing on-site residential or commercial development resulted in modifying the configuration of the site if possible, or eliminating the site from further consideration if insufficient acreage remained. Adjacent land use conflicts were not so easily resolved, and in areas in which upland acreage was limited, such conflicts remain. To the maximum extent possible, these conflicts were mitigated by the recommendation of a buffer zone to separate the disposal area from residential or commercial development.

Site ownership was investigated and established for all but three candidate sites so that authorized access for the purpose of site inspection could be obtained where necessary. As an evaluation criterion, site ownership was only considered peripherally in those cases in which slight modification of the site boundaries significantly reduced the number of individual property owners involved. No consideration was given to the identities of the property owners.

The presence of a documented archeological site, common to upland regions within the study area, was an additional evaluation criteria. To apply this to the disposal sites under consideration, a request for a records search was forwarded to the Division of Historical Resources, Florida Department of State, so that potential conflicts with documented archeological or historical sites listed in the National Register of Historical Places or the Florida Master site file could be identified. This search has not yet been completed. The presence of a verified archeological or historical site may necessitate a site survey or documentation effort prior to containment area construction, or it may require the limitation of excavation during construction activities. However, it should not preclude the use of an otherwise viable site for dredged material disposal.

4.2 Site Bank

Following the final evaluation of all candidate sites, a total of 14 sites were selected to form a site bank. Of these, seven sites represent primary or first choice disposal options. The remaining seven were included to provide backup secondary disposal options in the event utilization of one or more of the primary sites proved not to be feasible. As their names imply, these 14 sites represent the

seven best and seven second best disposal options to serve the Intracoastal Waterway channels in the Brevard County area after the consideration of all engineering, operational, environmental, socioeconomic, and cultural factors influencing site selection. These sites are identified in Figure 4-1.

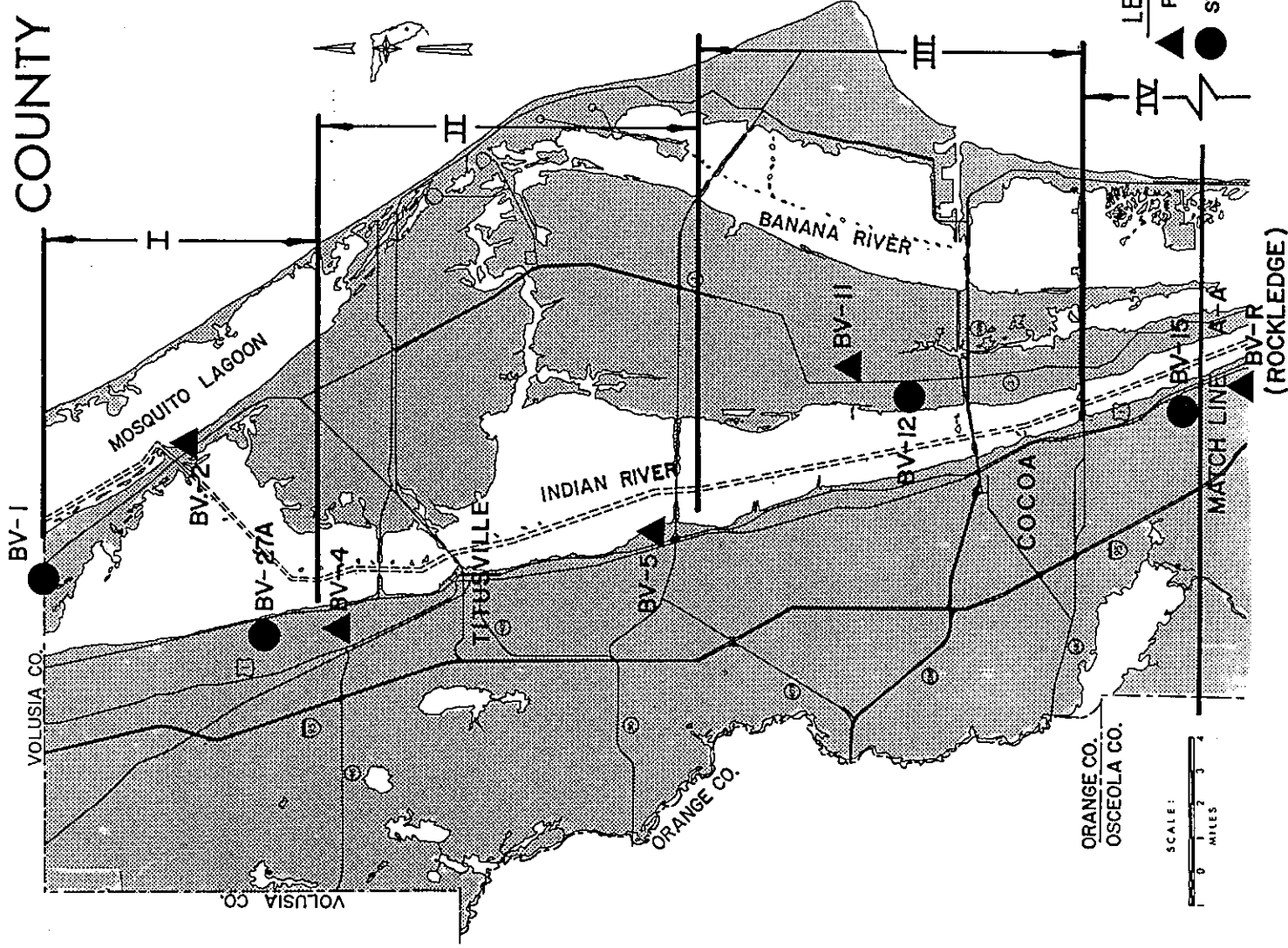
Each of the six channel reaches has been assigned at least one primary and one secondary site. As discussed previously, within three project reaches considerations of operational efficiency, primarily pumping distance and to a lesser extent site capacity, dictated the designation of two sites to serve in combination as either primary sites (Reach II) or secondary sites (Reaches I and VI). All remaining reaches each have a single primary and secondary site.

Site BV-2 has been designated to serve as the primary site for Reach I, with Sites BV-1 and BV-27A to serve as joint secondary sites. This decision was based on several considerations. First, BV-2 is the most centrally located site within a reach possessing very limited upland within its central portion. Second, BV-2 contains adequate capacity to receive the entire projected 50-year disposal requirement of the reach (3.66 m.c.y.). Third, the site is a highly disturbed area, and has on it a series of dead end finger canals connected at their seaward end to Mosquito Lagoon. The acceptance of the permitting agencies of the filling of these canals has yet to be determined. The filling of these canal would be required for efficient site development. However, this action is viewed as a potential environmental benefit of the project.

Should the use of Site BV-2 not prove to be feasible, Sites BV-1 and BV-27A have been designated as the secondary, or second choice option for Reach I. Located at opposite ends of the reach, these sites together provide adequate capacity for the reach's disposal requirement. Site capacities are based on the maximum utilization of the available upland in Site BV-27A, with the remainder of the reach requirement allocated to Site BV-1.

Within Reach II, both Sites BV-4 and BV-5 have been designated as primary choices based on considerations of operational efficiency and capacity. Site BV-5 has more than enough capacity to serve the entire reach. However, its location at the extreme southern end of the reach suggests a modified approach using Site BV-4, which is located at the northern end of the reach, as a part of the primary site

BREVARD COUNTY



LEGEND
 ▲ PRIMARY SITES
 ● SECONDARY SITES

SCALE:
 0 1 2 3 4
 MILES

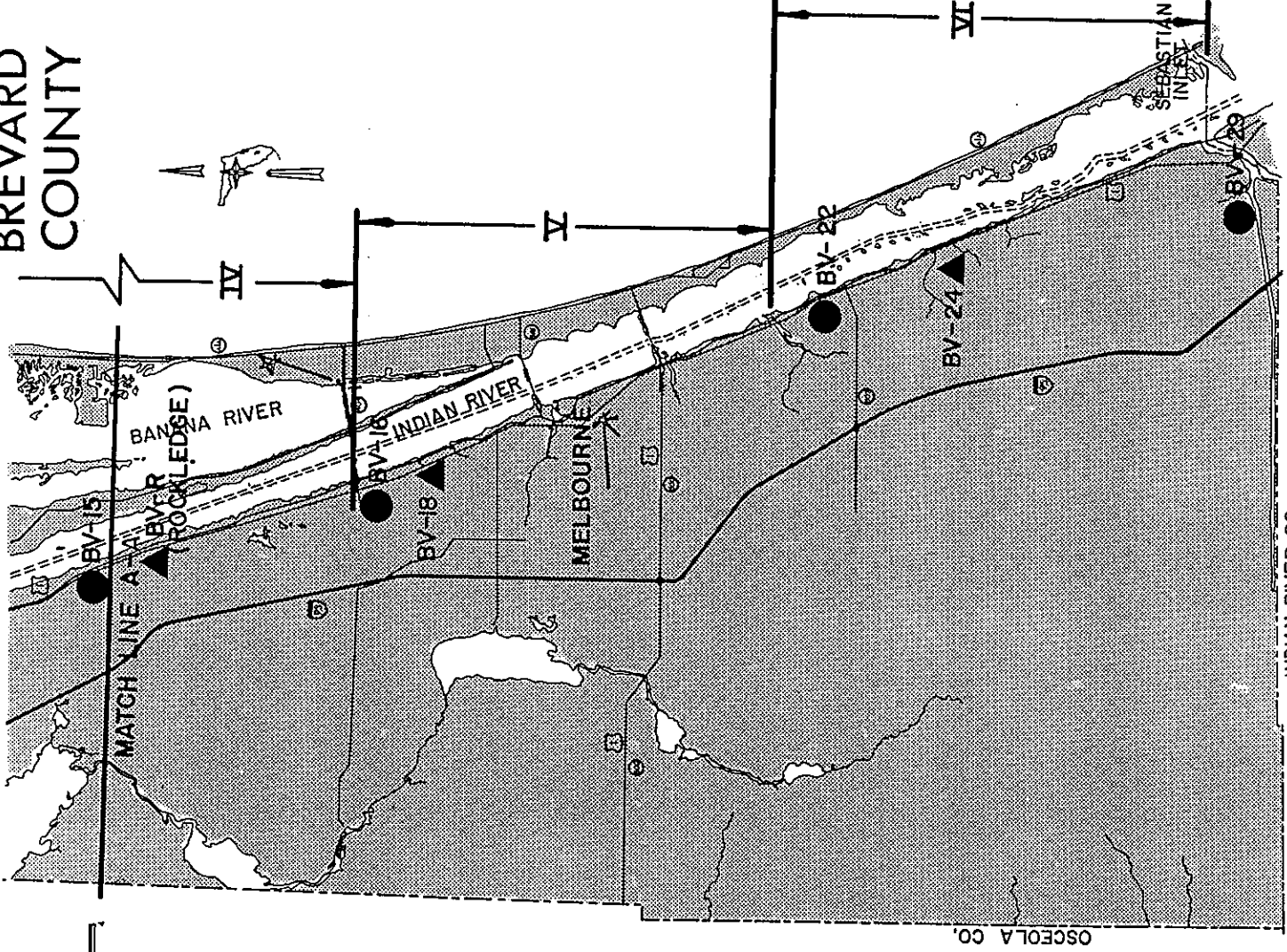
SOURCE: JACKSONVILLE DISTRICT, U.S. ARMY CORPS OF ENGINEERS

TAYLOR ENGINEERING INC
 9086 CYPRESS GREEN DRIVE
 JACKSONVILLE FLORIDA 32216

Figure 4-1a: Site Bank, Dredged Management Plan, Intracoastal Waterway, Brevard County, Florida

| | |
|----------|---------|
| PROJECT | C8906 |
| REVISION | |
| DATE | 9/30/89 |

BREVARD COUNTY



LEGEND

- ▲ PRIMARY SITES
- SECONDARY SITES

SOURCE: JACKSONVILLE DISTRICT, U.S. ARMY CORPS OF ENGINEERS

TAYLOR ENGINEERING INC
 9086 CYPRESS GREEN DRIVE
 JACKSONVILLE FLORIDA 32216

Figure 4-1b: Site Bank, Dredged Management Plan, Intracoastal Waterway, Brevard County, Florida

| | |
|----------|---------|
| PROJECT | C8906 |
| REVISION | |
| SHEET | |
| DATE | 9/30/89 |

selection. This combination significantly reduces reach pumping distances. The sole use of Site BV-5 represents the secondary, or second-best disposal option.

Sites BV-12 and BV-11 were selected to serve as the primary and secondary sites, respectively, for Reach III. Both sites contain adequate capacity for the requirements of the reach. Site BV-12 is preferred because of its more central location within the reach, and its potential for providing a more appropriate buffer area.

Within Reach IV, the Rockledge site presently being acquired by the FIND (Section 2.2) has been designated as the reach primary site. Although the configuration of this site limits the efficiency of its use, it still retains more than adequate capacity for the reach (Appendix B). Therefore, it was retained as the primary site for Reach IV, with Site BV-15 as a secondary disposal option.

Site BV-18 was designated as the primary disposal site for Reach V, a choice which was largely dictated by the rapid encroachment of development and competing land use. This site was selected over the secondary site, BV-16, based on its more central location and greater potential for an ample buffer area to separate the containment basin from adjacent residential development.

The southernmost reach, Reach VI, is the longest reach within the project area. Site BV-24 was chosen to be the primary site for this reach based on its central location, and its ability to provide adequate capacity within a single site. Two sites, BV-22 and BV-29, were designated to serve as secondary sites. Although Site BV-29 provides sufficient capacity in itself, its location at the extreme southern end of the reach and distance from the Waterway would result in unacceptably long pumping distances. Therefore, Site BV-22, located near the opposite end of the reach, was selected to function jointly with Site BV-29. Capacities of these secondary sites were based on the maximum utilization of Site BV-22, with Site BV-29 fulfilling the remaining disposal requirement as needed.

Additional site specific information for each primary and secondary site is presented in Appendix B. A map of each site is included showing the initial site boundaries, and major vegetation communities and land use categories as verified by field inspection under the FLUCFCS (Florida Land Use, Cover and Forms Classification

System, Florida Department of Transportation, 1985). Approximate acreages of each vegetation and land use category are presented in tabular form. Accompanying site narratives summarize pertinent characteristics of each site including general physiographic and environmental conditions, vegetative communities, and observed plant species which typify these communities. Also discussed are considerations relevant to specific evaluation criteria such as adjacent land use, possible buffer area configurations, potential or existing road access, and pipeline access routes.

Preliminary acreage requirements, disposal capacities, and operational factors for each site in the site bank are summarized in Table 4-1. The final determination of these parameter values will be made during Phase II of the project. However, the preliminary estimates presented here are felt to be both realistic and conservative. In all cases, site disposal capacities are sufficient to meet the projected disposal requirements of the reach to be served. Referring to Table 4-1, the required disposal acreage for each site represents the area within a realistic dike configuration necessary to contain the stated disposal capacity for that site. For all sites the required dike configuration lies wholly within the delineation of useable upland (i.e., the initial site acreage). The total required acreage corresponds to the required disposal acreage plus an appropriate buffer surrounding the diked containment basin. Where possible, an upland buffer of 300 foot minimum width is provided. However, in several cases as will be discussed in Appendix B, it was necessary to slightly reduce the buffer area width, or utilize adjacent confining wetland areas to serve as buffer.

The total required primary site acreage for the 70.61 miles of channel within the Brevard County study area is approximately 799 acres. This includes 439 acres of active disposal area and 360 acres of buffer region. The corresponding required secondary site area is 854 acres, of which 478 acres are active disposal area and 376 acres are buffer.

TABLE 4-1: SITE BANK, INTRACOASTAL WATERWAY,
BREVARD COUNTY, FLORIDA

DISPOSAL SITES

| Reach | Site Designator | Initial Acreage | Total Required Acreage | Average Disposal Required | Disposal Capacity (c.y.) | Length of Road Easement (mi) | Maximum Pumping Distance (mi) | Pipeline Basement Length (mi) | Comments |
|----------------------------------------------------------|-------------------------------|-----------------|------------------------|---------------------------|--------------------------|------------------------------|-------------------------------|-------------------------------|------------------------------------------------------------------------------|
| I: County Line to Mims; ICMW Mile 123.75 to 134.07 | BV-2 (P) ICMW Mile 127.98 | 394.5 | 345.8 | 211.1 | 3,670,500 | 0.0 | 6.09 | 0.0 | Sized to provide capacity for entire reach |
| | BV-1 (S) ICMW Mile 123.04 | 220.8 | 207.5 | 119.1 | 2,068,142 | 0.0 | 11.03 | 1.42 | Combined capacities of both secondary sites meet reach requirements |
| II: Mims to NASA Parkway; ICMW Mile 134.07 to 146.01 | BV-4 (P) ICMW Mile 135.16 | 96.6 | 80.4 | 31.2 | 538,693 | 0.0 | 12.21 | 0.36 | Site capacity based on efficient use of available area |
| | BV-5 (P) ICMW Mile 143.63 | 336.6 | 145.7 | 87.5 | 1,528,329 | 0.0 | 11.04 | 0.0 | Serves as a primary site in combination with BV-4, as a secondary site alone |
| III: NASA Parkway to S.R. 520 ICMW Mile 146.01 to 159.08 | BV-12 (P) ICMW Mile 151.94 | 80.8 | 62.4 | 29.2 | 499,969 | 0.0 | 7.43 | 0.36 | Adequate capacity to meet reach requirement |
| | BV-11 (S) ICMW Mile 149.88 | 76.5 | 59.4 | 29.2 | 499,969 | 0.0 | 9.14 | 0.25 | Adequate capacity to meet reach requirement |

P - Primary site choice for reach

S - Secondary site choice for reach

65
23

41

DISPOSAL SITES

| Reach | Site Designator | Initial Acreage | Total Required Acreage | Required Disposal Acreage | Disposal Capacity (c.y.) | Length of Road Basement (mi) | Maximum Pumping Distance (mi) | Pipeline Basement Length (mi) | Comments |
|----------------------------------------------------------------------|-----------------------------------------|-----------------|------------------------|---------------------------|--------------------------|------------------------------|-------------------------------|-------------------------------|----------------------------------------------------------------------------------|
| IV: S.R. 520 to Rockledge Site (P) | ICWM Mile 162.08 | 79.97 | 79.97 | 20.67 | 761,191 | 0.0 | 6.95 | 0.47 | Presently being acquired by F.I.N.D. Provides adequate capacity for entire reach |
| | Pineda Cswy: ICWM Mile 157.08 to 168.18 | 212.1 | 71.4 | 32.7 | 563,655 | 0.09 | 8.66 | 0.85 | Provides adequate capacity for entire reach |
| V: Pineda Cswy to Turkey Creek; ICWM Mile 171.78 to 168.18 to 180.87 | BV-18 (P) | 107.1 | 61.5 | 25.0 | 428,372 | 0.0 | 9.58 | 1.06 | Sized to meet disposal req't for entire reach |
| | BV-16 (S) | 213.2 | 58.8 | 25.1 | 430,170 | 0.0 | 13.92 | 2.39 | Provides adequate capacity for entire reach |
| VI: Turkey Creek to Sebastian Inlet; ICWM Mile 180.87 to 194.36 | BV-24 (P) | 225.8 | 103.5 | 65.4 | 1,138,127 | 0.61 | 7.27 | 0.51 | Provides adequate capacity for entire reach |
| | ICWM Mile 187.60 | 84.9 | 69.5 | 24.8 | 423,289 | 0.0 | 12.85 | 0.47 | Combined capacities of secondary sites meet req't for entire reach |
| | BV-22 (S) | 223.6 | 110.7 | 63.7 | 1,107,899 | 0.34 | 16.03 | 0.04 | for entire reach |
| P - Primary site choice for reach | BV-29 (S) | | | | | | | | |
| | ICWM Mile 194.88 | | | | | | | | |
| S - Secondary site choice for reach | | | | | | | | | |

5.0 RECOMMENDED SCOPE OF WORK

Task I: Preparatory Documentation

The purpose of this task is to obtain all of the information and authorizations necessary to facilitate the detailed documentation of site conditions and facilities design in Task II; and to document public record information concerning land use and zoning restrictions, taxes and assessed values, easements, and property ownership. This will be done for all primary and secondary sites subject to property acquisition proceedings. Specific sub-tasks are outlined below.

- A. Public Information - From County tax rolls and related public records, verify and update, as necessary, site ownership and tax information including parcel size, boundaries, and assessed value. This information will be provided to the FIND at the earliest possible date to facilitate the FIND obtaining from all relevant property owners appropriate written permission as required for site access, survey work, field testing, and data collection.
- B. Zoning - Determine existing zoning classification and permitted uses under that classification.
- C. Other Site Encumbrances - Identify other restrictions which may limit the use of the site such as local or regional planning constraints, right-of-ways, easements, adjacent property constraints, or potential damages to adjacent properties.
- D. Site Reconfiguration - Modify site boundaries, as necessary. Eliminate unusable or unnecessary acreage and finalize site configuration for performance of boundary survey.

Task II: Site Conditions

Obtain necessary engineering and environmental site information required for preliminary engineering design and permitting of primary sites only as modified by results of Task I.

A. Engineering Topographic Survey - Provide site topographic information necessary for site planning, permitting, and design purposes. Horizontal and vertical control of data should include reference to established bench marks and all elevations should be referenced to NGVD. This task will be performed by the Jacksonville District, Corps of Engineers.

B. Subsurface and Soils Survey - This task will be performed by the Jacksonville District, Corps of Engineers.

1. Soils Survey - By means of core borings and analysis, document site soil characteristics including boring logs, grain size distributions, specific gravity, organic content, Atterberg limits (where appropriate), shear strength, compaction, and consolidation.
2. Groundwater - Obtain groundwater table elevations at a sufficient number of locations to provide estimates of water table potential surface elevations on-site referenced to NGVD.

C. Environmental Survey - Perform field survey and data collection efforts to provide the following:

1. Detailed documentation of site vegetation communities, including species frequencies of occurrence, and the delineation of wetlands and transitional areas using state approved methods.
2. Detailed documentation of on-site animal species, including endangered or threatened species, and pertinent habitat information.
3. Documentation of existing vegetation communities and species habitats along proposed pipeline access and return drainage routes.

Task III: Preliminary Design and Analysis

Using data obtained from Task II, develop site documentation, and complete preliminary design necessary to prepare permit drawings.

- A. Environmental - Using information obtained from Task II-C prepare the following:

1. Detailed site maps showing vegetation communities, species locations and habitats, revised usable boundaries, and wetland areas.
2. Detailed written text supporting 1. above.
3. Specific mitigation measures as required.
4. Archeological site locations as recorded in published records available from the Division of Historic Resources, Florida Department of State.
5. Recommend pipeline access and return water routes.

B. Engineering - Using information obtained in Task II prepare the following:

1. Site Capacity Analysis - Recalculate estimated site capacity and dike material requirements.
2. Site Topographic Map - Prepared by Jacksonville District, Corps of Engineers.
3. Engineering Report on Subsurface and Soils Conditions - Prepared by Jacksonville District, Corps of Engineers.
4. Preliminary design calculations and permit drawings of:
 - o Location Map
 - o Site Plan
 - o Pipeline Access and Return Routes
 - o Inlet Works
 - o Outlet Works
 - o Dike Section
 - o Internal Structures
 - o Equipment Ingress and Egress Features
 - o Vegetation and Buffer Area Plan
 - o Site Drainage Plans
5. Detailed written text supporting (1) - (4) above.

C. Agency Co-ordination - Obtain from the Florida Department of Environmental Regulation (DER) the following:

1. A binding statement defining the on-site extent of DER jurisdiction, based on site inspection by agency representatives as needed to delineate jurisdictional areas, as well as additional environmental

information provided to the agency by Taylor Engineering, Inc.

2. A preliminary statement on the acceptability of the proposed site plans, based on the site engineering narrative, permit drawings, and environmental report, as well as the above statement of agency jurisdiction.

Task IV: Site Management Plans

Prepare a site management plan for each primary site in the Site Bank as modified by the results of Task I. Each plan will address the following:

A. Design Features - Brief description of all site design features as they relate to the long term operation of the site and the management of dredged material.

B. During-Dredging Procedures

1. Outlet Operations
2. Inlet Operations
3. Ponding Depth
4. Material Distribution
5. Monitoring

C. Post-Dredging Procedures

1. Dewatering
2. Surface Water Management
3. Material Handling/Reuse
4. Monitoring

Task V: Cost Considerations

For all primary sites, the following cost considerations will be evaluated:

- A. Site Improvement Costs
- B. Site Operation Costs
- C. Site Maintenance Costs

Task VI: Documents and Deliverables

The following project documents will be prepared and submitted for each primary site:

- A. Permit drawings and accompanying engineering narrative
- B. Subsurface and soils report, prepared by Jacksonville District, Corps of Engineers.
- C. Environmental Report
- D. Site Management Plan
- E. Cost Report