Interim Report to the Maryland General Assembly concerning Implementation of the Dredged Material Management Act of 2001

December 2001

Maryland Port Administration
Maritime Center II
2310 Broening Highway
Baltimore, Maryland 21224-6621

March 6, 2002

Ms. Jenn Aiosa
Staff Scientist
Chesapeake Bay Foundation
Merrill Environmental Center
6 Herndon Avenue
Annapolis, Maryland 21403

Dear Ms. Aiosa:

The next meeting of the Maryland Dredged Material Management Program (DMMP) Management Committee is scheduled for Wednesday, March 27th at 10:00 AM. This meeting will be held in Conference Room A at our Point Breeze offices, 2310 Broening Highway, Baltimore, Maryland. The draft minutes from the January 2002 meeting and proposed agenda are enclosed for your review. Also included in this mailing is the final version of the Interim Report, Appendices A and B, Preliminary Technical Results Interim Report of the Bay Enhancement Working Group, and ranking information from the Bay Enhancement Working Group.

Please notify Katrina Jones of my staff at (410) 631-1102 or kjones1@mdot.state.md.us to confirm your attendance. If you have any questions, please free to contact me. We look forward to seeing you on the 27th.

Sincerely,

Frank Hamons, Deputy Director
Harbor Development

FLH/kyj
enclosures

DRAFT
SUMMARY OF THE DREDGED MATERIAL MANAGEMENT PROGRAM MANAGEMENT COMMITTEE MEETING
January 16, 2002, 10:00 AM
2310 Broening Highway, Conference Room A
Baltimore, Maryland

Attendees:

Chesapeake Bay Foundation (CBF): Jenn Aiosa
Coastal and Watershed Resources Advisory Committee (CWRAC): Greg Kappler
Gahagan & Bryant Associates (GBA): Carlton Bryant, Richard Thomas, Dennis Urso
EA, Engineering, Science, and Technology (EA): Frank Pine
Facilitator: Fran Flanigan
Maryland Department of Natural Resources / Maryland Geological Survey (MGS): Jeff Halka
Maryland Environmental Service (MES): Robert Miller, Wayne Young, Cece Donovan, Rebecca Halloran
Maryland Pilots Association: Randall Bourgeois, Joe Smith
Maryland Port Administration (MPA): Richard Sheckells, Frank Hamons, Dave Bibo, Stephen Storms, Bill Lear, John Vasina, Katrina Jones
National Ocean and Atmospheric Association/ National Marine Fisheries (NOAA/NMFS): Tim Goodger
US Army Corps of Engineers, Baltimore District (CENAB): Scott Johnson, Dan Bierly
US Army Corps of Engineers, Philadelphia District (CENAP): Chip DePrefontaine
US Fish and Wildlife Service (FWS): Jason Miller
University of Maryland, Wye Research Center: Ken Staver

Action Items:

1. Arrangements for a tour of Poplar by the Management Committee will be made by MPA when the weather is more conducive to a tour.

Statements for the Record:

1. Ms. Jenn Aiosa, CBF, made a statement for the record regarding the process of ranking and prioritizing the placement options under consideration for further study. Her statement was that the manner in which the rankings are taking place at this point in the process is not optimum in that it requires looking at each option in a vacuum instead of using an approach which compares options collectively i.e., a natural resource approach. The trade-offs then can't be discussed for the options in relation to each other. However, once this exercise is undertaken, then different scenarios can be done to balance the tradeoffs in coming up with a plan. (This statement was made during agenda topic 5.0 – Update on the BEWG)

2. Rick Sheckells, MPA, asked about the options ranking process to the entire Management Committee, i.e.: does the Management Committee feel this is the right approach at this time? The Management Committee declined to respond.

1.0 Introductions

Mr. Hamons welcomed everyone to the meeting. Mr. Hamons informed the attendees that Management Committee meetings will be held at the Point Breeze facility, instead of the World Trade Center, until further notice.

2.0 Approval of Meeting Summary

Captain Bourgeois made a motion to accept the meeting summary from the previous meeting of November 28, 2001. Mr. Halka seconded the motion and the motion passed unanimously.

Mr. Hamons gave a review of the action items from the previous meeting. He indicated that the Poplar Island tour would be arranged when the weather gets warmer. The Interim Report to the Maryland General Assembly has been revised per recommendations at the previous meeting and the final version was handed out to the Committee members for their review and comment.

Mr. Sheckells spoke about the different changes that had been made within the report. Due to other items that are coming before the Legislature, the Final Interim Report had been distributed to DNR and to the Governor's office, but had not yet been distributed to the Legislature.

3.0 Update on the Executive Committee

Due to the absence of Dr. Boesch, Mr. Sheckells gave an update on the Executive Committee meeting. The most important matter to come before the Executive Committee was the Interim Report to the Maryland General Assembly. All people in attendance at that meeting came to the conclusion that they were comfortable with the content of the report and that the report should be submitted. The Committee also decided to rename the Dredging Needs/Placement Options Program (DNPOP) to the Dredged Material Management Program (DMMP).

Mr. Sheckells continued with a description of a letter that was faxed to Dr. Boesch from Mr. John Wolflin of the US Fish and Wildlife Service (FWS). The letter indicated that there was some concern that the strategic plan options should be reprioritize, and that the FWS was opposed to the expansion of Poplar Island modification as the only high priority short-term implementation option. Dr. Boesch had responded to Mr. Wolflin emphasizing that changes could occur to the prioritization, but any changes would be accomplished through the DMMP process that has been established. Both the letter from FWS and Dr. Boesch's response letter were handed out to the Committee members.

Mr. Kappler state that the "dredging needs" issue was raised at the Executive Committee meeting and that the committees will receive a report on dredging needs in the future. Mr. Sheckells stated that Sec. Fox indicated that in order to submit the Final Legislative Report to the General Assembly by December 2002, the 2002 report recommendations need to come from the current options. This doesn't mean that future recommendations for options will no longer be considered, just that there will not be time to adequately investigate them for the report to the General Assembly. The Executive Committee will meet again in late April 2002.

4.0 Update on the Citizens' Committee

Mr. Kappler gave an update on the Citizens' Advisory Committee. Mr. Mendelsohn from the Baltimore Army Corps of Engineers, gave a presentation to the citizens on the Corps' planning process. Mr. Kappler also indicated that there were many new members that had joined the Citizens' Committee, and the new members bring more diversified points of view.

5.0 Update on the BEWG

Mr. Halka gave an update on the Bay Enhancement Working Group (BEWG). Considerable time was spent on the ranking process with additional updates on the different options, such as Barren Island and Sharps Island. Mr. Pine explained that the ranking matrix has been revamped after a number of spirited discussions, and the new reports will be handed out shortly. This report will be looked at more closely at the next BEWG meeting on January 22, 2002. He continued with a very detailed description of how the changes were developed. At the next BEWG meeting, the intent is to look more closely at the weighting factors.

Mr. Pine's final assessment was that the process is moving ahead. But at the same time, it is a very complicated process. Mr. Thomas continued with a description of the widely varied components that go into the ranking process. Mr. Sheckells and Mr. Hamons both echoed the thought that time is short, but that the MPA is committed to conducting the process in an open manner and to meet the obligation to the Legislature.

Ms. Aiosa then made her statement for the record, listed above, and indicated that while time is short, once the report is finished, then the Working Group can focus more time on the top four or five options. While Ms. Aiosa did not state that the process should be changed, she wanted to point out the inherent difficulty in the evaluations being performed.

Mr. Pine echoed Ms. Aiosa's point of view that discussion shouldn't be cut off at any point in the process. The Committee and various members continued with a rather lengthy discussion of the ranking process and time frames. Mr. Sheckells asked if the Committee would be willing to concur with the statement that the process was one that would ultimately move forward to enable consideration of a state placement plan under NEPA. There were no disagreements, but the committee members did not choose to take a vote on concurrence.

6.0 Update on Agricultural Use

Dr. Ken Staver presented a report on agricultural research funded by MPA, which was previously presented to the Citizens' Committee. This project began in 1998 at the Wye Research Center in Queen Anne's County. The purpose of the study was to look at dredged material as an opportunity to enhance agricultural soils or to restore topsoil. The research looked closely at the water quality, and at the movement of salts, contaminants and water through the soil system. The dredged material used in this study came from the Courthouse Point placement site.

Early in the study, researchers spent considerable time developing the logistics of working with the dredged material. Dr. Staver showed slides of container and field studies conducted over two growing seasons. He presented preliminary conclusions on the experiments, saying they were

quite positive concerning the potential to use dredged material to amend sandy agricultural soils. Mr. Hamons asked about the application and how many times a field might be reapplied. Dr. Staver answered that their tests involved some high application rates. In fact, they have a 50/50 mixture in the top layer of the soil, with 1,000 cubic yards (cy) of material applied over a one-acre area. Given the purpose, to improve a sandy soil through addition of fine-grained silts and clays, a one-time application has been sufficient to improve soils to the point that further application is not necessary. Ms. Donovan relayed that Dr. Staver's demonstration shows that between 200,000 and 500,000 cy of material can be applied over a 200 to 500 acre area. Mr. Young brought forth the fact that this process is not only important to the MPA, but it is also very important to the agricultural community.

7.0 Update on Poplar Island

Mr. Carlton Bryant of Gahagan & Bryant Associates presented a report on the Poplar Island wetland and upland beneficial use project, which was previously presented to the Citizens' Committee. His talk was supported by a slide presentation. He opened with a historical review of the site. He focused on the beneficial use of Poplar Island, with a historical description of the original site. Construction of the Poplar Island restoration project began back in 1997. The project's prime objective was to restore that site. He continued with a description of how the restoration process developed.

To date, six million cubic yards (mcy) have been placed at the site. 850,000 tons of stone have been brought in to create the dikes. This site will have 50% wetlands and 50% uplands by area. He described how the material is brought to the site by scow, and then pumped into a cell. Parts of the site were developed to enhance wildlife. The dike surrounding the site protects the bird population. The goal is for the site to become a self-sustaining wetlands and upland habitat site.

He showed a graphic of what Poplar Island is expected to look like in about ten years. Mr. Bryant indicated that they are trying to develop a cover crop in the test wetland cell for this coming spring. Mr. Young noted that there is overfilling on the upland cell. However, for the wetland cells, there is no overfilling. There is a tremendous amount of effort that the USACE and the MPA have sponsored to get the wetland cells right, using the most current technology.

He then gave the present day site description of both the wetlands and the upland sections, and how the fill material is brought to the site, and then pumped into the cells.

8.0 Update on Cox Creek/Innovative Use

Mr. Lear presented a brief report on innovative reuse projects. Mr. Lear indicated that the Evaluation Committee had met in December to rank the results that had been submitted by the five companies regarding innovative use. After the results had been approved by the procurement officer, the Committee reconvened to select the firms that will be invited to participate in Phase II.

9.0 Update on Existing/Strategic Plan Sites

Ms. Donovan began by reminding the Committee that the FWS email and Internet capabilities

had been down for a while, therefore, faxes and/or phone calls are the best means of communication with committee members from this agency.

Ms. Donovan gave an update on the status of the strategic plan proposed options. Two hard copy updates, one on existing sites, one on strategic plan options, were handed out to the Committee members. For Poplar Island modification, the reconnaissance studies are underway, and the geotechnical borings were completed two weeks ago. The lab results for the borings are expected in the near future. The geotechnical borings for the Inner Harbor sites (Sollers Pt, Deadship Anchorage, and Hawkins Pt/Thoms Cove) will probably get underway within a week. The first phase of the reconnaissance study for James Island is nearing completion. The second phase field studies are underway.

The Task Force Legislative Report is currently being prepared for Parsons Island and Lower Eastern Neck Island. The Parsons Island and Lower Eastern Neck Island Task Force met twice; once in October and again in November. A meeting was held in December with the resource agencies to discuss potential alignments for each site. The resource agencies agreed on three potential alignments for Parsons Island and one potential alignment for Lower Eastern Neck Island. The alignments still need to be reviewed by the Task Force and the Bay Enhancement Working Group. The Task Force endorsed both projects as viable alternatives, with a habitat restoration objective for both sites.

Holland Island and Barren Island are on a similar study schedule. Draft reports are being reviewed for both sites. The Barren Island consolidated report should be finalized by March 2002. The Holland Island consolidated report should be finalized by April 2002. The Sharps Island studies are underway. The geotechnical borings have been initiated. Two preliminary alignments have suggested for study.

Mr. Young stated that MES has several additional studies in the planning process, including revisiting the Ocean Placement conceptual report prepared by GBA in May 2000. There have been changes regarding mobilization costs and the MPA requested that the study be updated. MES is also looking into performing a general reconnaissance study for APG. This study would be aimed at the UXO issues to get a better understanding of their distribution and the environmental situation in the water. The 1992 Sparrows Point conceptual study is also being revisited.

Mr. Young stated that bids are being received for the Cox Creek project for various construction projects. High-density slurries are being considered for mechanical unloading. Hart-Miller Island inflow has been delayed until the spring, crust management is occurring in the interim.

10.0 Next Meeting

The next meeting, originally scheduled for March 20, 2002, will be held on March 27, 2002 due to scheduling conflicts.

MD's Dredged Material Management Program Management Committee Meeting

March 27, 2002 at 10:00 AM
Point Breeze - Conference Room A
2310 Broening Highway

AGENDA

Meeting Called to Order	Frank Hamons, Facilitator
Approval of Minutes	
Review of Action Items	
Update on Executive Committee	Rick Sheckells
Report on Citizens Committee Meeting	Greg Kappler, Citizens Committee Liaison
Presentation on Bay Enhancement Working Group	Jeff Halka, MD Geological Survey
Presentation on Environmental Screening Criteria	Frank Pine, EA Engineering
Program Options Update	EA & MES Staff
Next Meeting	May 22, 2002

Thanks For Coming!

To Frank Pine – EA Engineering
Melissa Slatnick – MES
CC Rick Sheckells – MPA
Theresa Pierno - CBF

From Jenn Aiosa – CBF
Date 2/20/2002

Re Bay Enhancement Work Group ranking process

I am writing this letter to express my concerns regarding the use of this matrix and how a ranking factor value is determined for each site.

1) The ultimate utility of this ranking tool is still a primary concern. The potential exists for it to be used inappropriately to represent to individuals outside of the workgroup, and even within the DMMP process, an overly simplified summation of options that advance or do not advance to further study. Several specifics which reinforce this concern include:

A – As described in "Description of the Parameters", positive ranking factors are to be attributed to parameters even where a parameter is not applicable to a specific site, or for which there is no associated impact – positive or negative. By assuming that a "Not applicable" equates with a net positive impact, many options will receive inflated scores, thereby misrepresenting the differences between truly beneficial options and options that were skewed by this scoring. It is simply inappropriate to associate a positive score to a disposal option that, at best, maintains the status quo. It should be scored as neutral, as it neither impairs nor improves existing conditions in the Chesapeake Bay.

Instead, a score of +1 should be reserved for those parameters that would be positively impacted by the action. For example, for several of the sites listed, "Terrestrial and Wildlife Habitat" will be positively impacted by placement of dredged materials. This is clearly a case where a score of +1 is appropriate. In a situation where a factor is not applicable, or where no impact – positive or negative – is anticipated, the score should be a zero. Finally, for factors where there is an anticipated negative impact, a factor of –1 should be assigned. For example, several sites would result in the loss of shallow water habitat; even though other habitat types may replace the shallow bottom, this factor will be negatively impacted.

This idea for scoring may generally yield smaller values, however, the associated impacts will be more accurately qualified one site relative to another. It also better represents which options may improve the status quo and contribute to meeting Bay program goals for the Chesapeake Bay, as well as those that likely will do little or perhaps even take backward steps toward those goals.

B) This matrix also fails to differentiate between a slight negative (or positive) impact and a dramatic impact. For example, early configurations proposed for Parsons Island may well have resulted in 50-100 acres of SAV loss. More recent proposed alignments will still result in SAV impacts, though the impacts would be substantially reduced. Within this matrix as designed, no distinction can be made between these impacts. Similarly, an option that would result in the restoration of hundreds of acres of upland island habitat could not be distinguished from an option that results in the creation of a much smaller number of upland acres.

Matrix sensitivity could be improved by expanding the range of values, perhaps from –2 to +2. This simple change, when combined with established weighting factors, could at least add one level of differentiation between greater and lesser impacts to the same environmental parameter.

2) In addition to the concerns listed above, several of the parameters weights should be revisited. The BEWG has been repeatedly directed to focus only on environmental and technical considerations when considering options. Therefore, it is questionable why parameters like "Recreational Value", "Cultural Resources" and "Aesthetics and Noise" are included in this ranking matrix. These may play a role in the NEPA analysis, but they should be removed from this matrix and recommendations made to the Management Committee to consider them in conjunction with other factors such as economic and political issues.

Similarly, it is questionable why some of the relative weights were changed, or not changed, during the last workgroup meeting. Why is a factor such as "Fossil Shell Mining", which is not applicable to many sites on the list, ranked as high or higher than parameters such as "Beneficial Use – Uplands", "Terrestrial Habitat Value", "Waterfowl Use", "Wading and Shorebird Use" or "Erosion Control"? If beneficial uses, especially in the creation of aquatic and avian habitat, are to be prioritized throughout this process, the relative weights assigned to such factors should adequately reflect this priority.

Once again, I recognize the time sensitivity associated with meeting the MPA's legislative deadline, but we must ensure that our work adequately represents the attributes of each option and that the products from this ranking exercise can be supported by workgroup members.

Thank you.

22 February 2002

MEMO TO: Jenn Aiosa - CBF

FROM: Frank Pine, Jane Boraczek

SUBJECT: Response to Your Comments about the Ranking Matrix

Jenn: Thanks so much for taking the time to review the information MES forwarded to the BEWG. We received your memo and understand your concerns. We wanted to bring you up to date on the ranking matrix. We sent this out in order to show the BEWG the results using the originally agreed upon format. On Monday we will be introducing a new approach for discussion and approval. This will address your first concern in that any time that a parameter is not applicable (because it has no potential to exist on the site) it will be scored with a neutral score (0) and shaded. To differentiate between those conditions were there will be a genuine neutral effect or not enough information versus when a parameter is not applicable, the scores will be normalized by dividing the final score by the total number of applicable parameters. We will have examples of this approach ready for the discussions on Monday.

Some other approach changes that we have been considering and will present to the group involve adding terrestrial parameters, grouping the options, and potentially adding a factor related to the expected probability of success of beneficial use. We will present these ideas and specifically addressing any associated concerns at the meeting. However, we thought that it would be best to bring up any potential changes in the meeting rather than sending them out ahead of time for two reasons. We did not want anyone who has been involved in the process thus far to think that we took a different direction without their input and we felt that seeing a product that might make some believe that the proposed changes are a done deal. To us, it is important that the BEWG be involved in deciding how to proceed rather than feeling as if they are not part of the process. I think that you will see that we are recommending an approach that will be much more even handed and will respect the inherent differences among option types.

With respect to your concern about the magnitude of impacts not being reflected in the matrix, other BEWG members have also expressed this concern and we are sensitive to it. We do have a concern that we may get bogged down in conflicting opinions of the magnitude of impact for some parameters and at some sites. We can and will discuss this approach with the group on Monday to see if the members feel that we will be able to reach reasonable consensus on the magnitude of impacts for each parameter at each site. Ultimately the regulators and other experts in the group are going to have to feel comfortable guiding the scoring or relative impacts with screening level data (in most cases) in order for this approach to work.

Regarding the factors such as "Recreational Value", "Cultural Resources" and "Aesthetics and Noise", we were directed to add these factors during the BEWG process for the Upper Bay Islands. The intent was to have the parameters back fit into the NEPA process and was probably originally suggested by the Corps. We have included these parameters specifically because they do relate to NEPA requirements and this process will need to be tracked to and through the NEPA process. They relate also to certain concerns brought up in the past by citizens groups and in public meetings. We need to be sure that we are responding to these concerns. If any play a critical role beyond the inclusion in the matrix, they can be considered by the Management Committee separately also. We will bring this concern and your suggestion up on Monday to see if the group feels that the "Human environment" parameters should be deleted or shifted elsewhere.

Regarding the relative weights: all were changed (or not) by group consensus at the last meeting. Thanks.

SUMMARY OF RANKING FACTORS

Environmental Ranking Scores

COL.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ROW			WATER QUALITY						AQUATIC INV.			WETLANDS		AQUATIC BIOLOGY - FINFISH/SHELLFISH						
2		Weighting Factor	3	3	3	4	5	3	3	4	4	4	4	4	4	6	3	4	4	4
3	Option No.	OPTION NAME	Dissolved Oxygen	Nutrient Enrichment	Turbidity	Salinity	Ground Water	Surface Water	Benthic Community	Shallow Water Habitat	SAV	Tidal Wetlands	Non-tidal Wetlands	Finfish Spawning Habitat	Finfish Rearing Habitat	Larval Transport	Essential Fish Habitat (EFH)	Commercially Harvested Species and Habitat	Thermal Refuge	Recreational Fishery
4	1	Aberdeen Proving Grounds	0	-1	1	1	0	0	0	-1	-1	-1	-1	-1	-1	1	1	-1	1	-1
5	2	Agricultural	1	1	1	1	-1	-1	1	1	1	1	1	1	1	1	1	1	1	1
6	3	Barren Island	-1	-1	1	1	1	1	-1	-1	-1	1	1	1	1	1	-1	-1	1	0
7	4	Cox Creek Innovative	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	5	Dead Ship Anchorage	1	-1	0	1	0	-1	-1	-1	0	-1	-1	1	-1	1	1	1	0	0
9	6	Furnace Bay	-1	-1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1
10	7	Hawkins Point/Thoms Cove	1	-1	0	1	0	-1	-1	-1	0	-1	-1	1	-1	1	1	1	1	0
11	8	Holland Island	-1	-1	1	1	1	1	-1	-1	-1	1	1	1	1	1	-1	-1	1	0
12	9	James Island	-1	-1	1	1	1	1	-1	-1	0	1	1	1	0	1	-1	-1	1	0
13	10	Lower Eastern Neck Island	-1	-1	1	1	1	1	-1	-1	0	-1	1	1	0	1	-1	-1	1	-1
14	11	Mines and Quarries	0	0	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1	1
15	12	Ocean Placement	-1	-1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0
16	13	Parsons Island	-1	-1	1	1	0	1	-1	-1	-1	-1	1	1	1	1	-1	0	1	0
17	14	Poplar Island Modification	-1	-1	1	1	1	1	-1	0	0	1	1	1	0	1	-1	-1	1	-1
18	15	Sollers Point	1	-1	0	1	1	-1	-1	-1	0	-1	1	1	-1	1	1	1	0	0
19	16	Sharps Island	-1	-1	1	1	1	1	-1	-1	1	1	1	1	0	1	-1	-1	1	-1
20	17	Sparrows Point	-1	-1	0	1	1	1	-1	1	1	1	1	1	-1	1	1	1	0	0
21	18	Wetland Thin Layering	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22	19	1 - Tolchester West	-1	-1	-1	0	1	1	-1	1	1	1	1	1	-1	0	1	-1	1	-1
23	20	2 - Tolchester/Brewerton Angle	1	-1	-1	0	1	1	1	1	1	1	1	1	1	0	1	-1	0	1
24	21	3 - Swan Point West	1	-1	-1	0	1	1	1	1	1	1	1	1	1	0	1	-1	-1	1
25	22	3S - Swan Point West	1	-1	-1	0	1	1	1	1	1	1	1	-1	1	0	1	-1	-1	1
26	23	4a - Pooles Island	-1	-1	1	0	1	1	-1	-1	1	1	1	-1	-1	0	1	-1	-1	-1
27	24	4b - Pooles Island	-1	-1	1	0	1	1	-1	-1	-1	-1	1	-1	-1	0	1	-1	1	-1
28	25	4br - Pooles Island	-1	-1	1	0	1	1	-1	1	1	1	1	-1	0	0	1	-1	1	1
29	26	Site 170 (Mouth of Patapsco)	1	-1	-1	0	-1	1	1	1	1	1	1	1	-1	0	1	-1	1	-1
30	27	MD - C&D Placement Sites (6)	1	1	1	1	-1	-1	1	1	1	1	-1	1	1	1	1	1	1	1
Totals		27	--																	

Note: Shading indicates that parameter is not applicable.

SUMMARY OF RANKING FACTORS
Environmental Ranking Scores

COL.	1	2	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	40	
ROW			*SPECIAL*		*WILDLIFE*			*PHYSICAL PARAMETERS*					*OTHER*				*BENEFICIAL ATTRIBUTES*					ROW
1																						1
2		Weighting Factor	5	5	3	3	2	3	4	4	5	3	2	2	4	3	3	2	2	1		2
3	Option No.	OPTION NAME	Protected Species (RTE) (SSPRA)	Habitat of Particular Concern (HAPC)	Waterfowl Use	Wading and Shorebird Use	Terrestrial Habitat and Wildlife	Substrate Composition	Hydrodynamics	Contaminants	CERCLA/UXO Potential	Fossil Shell Mining	Recreational Value	Aesthetics and Noise	Cultural Resources	Navigation	Beneficial Use Wetlands	Beneficial Use Uplands	Beneficial Use - Adjacent Habitat Enhancement	Shoreline Protection	Total Environmental Score	Option No.
4	1	Aberdeen Proving Grounds	-1	0	-1	-1	-1	0	1	1	-1	1	1	1	0	1	1	1	1	1	-7	1
5	2	Agricultural	0	1	1	1	1	1	1	1	1	1	1	1	1	1	-1	-1	-1	-1	88	2
6	3	Barren Island	-4	-1	-1	-1	1	-1	0	1	1	1	1	1	1	1	1	1	1	1	16	3
7	4	Cox Creek Innovative	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-1	-1	-1	-1	109	4
8	5	Dead Ship Anchorage	0	1	0	0	0	0	0	1	-1	1	0	1	0	1	-1	-1	-1	1	5	5
9	6	Furnace Bay	0	1	1	1	1	1	1	1	1	1	1	1	1	1	-1	1	-1	-1	88	6
10	7	Hawkins Point/Thoms Cove	1	1	-1	-1	0	0	0	1	-1	1	0	1	0	1	-1	-1	-1	1	8	7
11	8	Holland Island	-2	-1	-1	-1	1	-1	0	1	1	1	1	1	0	1	1	1	1	1	22	8
12	9	James Island	-2	-1	-1	-1	1	-1	0	1	1	1	0	1	1	1	1	1	1	1	24	9
13	10	Lower Eastern Neck Island	-2	0	-1	-1	-1	-1	0	1	1	1	-1	-1	-1	1	1	-1	1	1	-5	10
14	11	Mines and Quarries	0	1	1	1	1	0	1	0	0	1	1	1	1	1	-1	1	-1	-1	71	11
15	12	Ocean Placement	0	0	0	1	1	1	1	1	1	1	1	1	1	1	-1	-1	-1	-1	70	12
16	13	Parsons Island	1	-1	-1	-1	-1	-1	0	1	1	1	0	1	1	1	1	1	1	1	26	13
17	14	Poplar Island Modification	1	1	-1	1	1	-1	0	1	1	1	-1	1	1	1	1	1	1	1	53	14
18	15	Sollers Point	1	1	0	0	0	0	0	1	1	1	0	1	1	1	-1	-1	-1	1	37	15
19	16	Sharps Island	0	1	-1	1	1	-1	0	1	1	1	-1	1	1	1	1	1	1	-1	46	16
20	17	Sparrows Point	1	1	0	-1	0	0	1	1	0	1	0	1	1	1	1	1	1	1	67	17
21	18	Wetland Thin Layering	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-1	1	-1	119	18
22	19	1 - Tolchester West	1	1	1	1	1	-1	1	1	1	-1	-1	1	1	1	1	1	1	-1	49	19
23	20	2 - Tolchester/Brewerton Angle	1	1	1	1	1	-1	1	1	1	1	-1	1	1	-1	1	1	1	-1	73	20
24	21	3 - Swan Point West	1	1	1	1	1	-1	1	-1	1	1	-1	1	1	1	1	1	1	-1	67	21
25	22	3S - Swan Point West	1	1	1	1	1	-1	1	-1	1	1	-1	1	1	1	1	-1	1	-1	55	22
26	23	4a - Pooles Island	1	1	-1	-1	-1	-1	-1	1	-1	-1	-1	1	-1	-1	1	1	1	-1	-17	23
27	24	4b - Pooles Island	-1	1	-1	-1	-1	-1	-1	1	-1	1	-1	1	-1	-1	1	1	1	-1	-29	24
28	25	4br - Pooles Island	1	1	1	1	1	-1	-1	1	-1	1	-1	1	1	-1	1	1	1	-1	41	25
29	26	Site 170 (Mouth of Patapsco)	1	1	1	1	1	0	-1	0	1	1	-1	-1	1	-1	1	1	1	-1	38	26
30	27	MD - C&D Placement Sites (6)	-1	1	0	0	0	1	1	0	1	1	-1	1	1	1	-1	-1	-1	-1	59	27
Totals		27																				

Note: Shading indicates that parameter is

DMMP - 20 Years - January 2003 Thru December 2022

SUMMARY OF RANKING FACTORS

Technical and Cost

COL.	A	B	C	D	E	F	G
ROW 1			TECHNICAL FACTORS				
2							
3	Option No.	OPTION NAME	Level of Documentation	Type	Size, (Acres)	Annual Capacity, (Mcy)	Program Capacity Thru 2022, (Mcy)	Total Capacity, (Mcy)
4	1	Aberdeen Proving Grounds	Concept	Wetland	200	0.5	1	1
5	2	Agricultural	Concept	Land Application	9,000	0.5	3.5	25
6	3	Barren Island	Reconnaissance	Island/Wetland	2,000	3.5	35	77.4
7	4	Cox Creek Innovative	Concept	Upland/Innovative	NA	0.5	2.5	N/A
8	5	Dead Ship Anchorage	Reconnaissance	Upland	56	0.5	3.5	6.7
9	6	Furnace Bay	Reconnaissance	Upland/Innovative	70	0.5	3	13.6
10	7	Hawkins Point/Thoms Cove	Reconnaissance	Upland	195	0.5	3.5	5
11	8	Holland Island	Reconnaissance	Island/Wetland	1,639	3.5	28	53.9
12	9	James Island	Reconnaissance / Feasibility	Island/Wetland	2,200	3.5	35	81.6
13	10	Lower Eastern Neck Island	Reconnaissance	Island/Wetland	505	1.8	5.1	5.1
14	11	Mines and Quarries	Concept	Upland/Innovative	N/A	2	10	N/A
15	12	Ocean Placement	Concept	Ocean	N/A	3.5	45.5	N/A
16	13	Parsons Island	Reconnaissance	Island/Wetland	184	0.5	4.5	6.7
17	14	Poplar Island Modification	Reconnaissance / Feasibility	Island/Wetland	1,130	2	28	44
18	15	Sollers Point	Reconnaissance	Upland	226	0.5	3.5	4
19	16	Sharps Island	Concept / Reconnaissance	Island/Wetland	2,000	3.5	24.5	60
20	17	Sparrows Point	Concept	Wetland	300	1.1	6.6	10.3
21	18	Wetland Thin Layering	Concept	Wetland	N/A	0.3	1.8	N/A
22	19	1 - Tolchester West	Reconnaissance	Island	1,060	3.5	28	80
23	20	2 - Tolchester/Brewerton Angle	Reconnaissance	Island	1,195	3.5	28	80
24	21	3 - Swan Point West	Reconnaissance	Island	1,065	3.5	28	80
25	22	3S - Swan Point West	Reconnaissance	Submerged Isl.	3,000	3.5	28	80
26	23	4a - Pooles Island	Reconnaissance	Island	1,475	3.5	28	80
27	24	4b - Pooles Island	Reconnaissance	Island	1,125	3.5	28	80
28	25	4br - Pooles island	Reconnaissance	Island	780	2.7	21.6	40
29	26	Site 170 (Mouth of Patapsco)	Reconnaissance	Island	1,600	3.5	28	80
	27	MD - C&D Placement Sites (6)	Concept	Upland				

NOTES: Existing Sites Available 2003 to 2009 == 28 Mcy (4 mcy/year Maintenance)
New Options Required 2010 to 2022 = 52 Mcy (4 mcy/year Maintenance)
"Annual Capacity" based on 3 ft lift bulked 1.4 times the cut volume over the surface area
"Program Capacity - 2022" = dredged material capacity during DMMP 20 Year Prog.
"Total Capacity" = dredged material capacity during total useful life

DMMP - 20 Years - January 2003

SUMMARY OF RANKING FACTOR

Technical and Cost

COL.	A	B	H	I	J	K	L	M	N
ROW			Implementation Time						Useful Life
3	Option No.	OPTION NAME	Initial Studies (Months)	Institution Delays Demo. Clean Up (Months)	Feasibility through Design (Months)	Construct (Months)	Total Implement (Years)	Date Available	Program Life Thru 2022, (Years)	Total Useful Life, (Years)	Capacity Reached
4	1	Aberdeen Proving Grounds	24	48	96	24	16.0	2019-Jan	2.0	2.0	2021-Jan
5	2	Agricultural	24	24	96	12	13.0	2016-Jan	7.0	50.0	2066-Jan
6	3	Barren Island	6	0	96	24	10.5	2013-Jul	10.0	22.1	2035-Aug
7	4	Cox Creek Innovative	24	36	96	24	15.0	2018-Jan	5.0	12.0	2030-Jan
8	5	Dead Ship Anchorage	6	36	96	24	13.5	2016-Jul	7.0	13.4	2029-Nov
9	6	Furnace Bay	24	24	96	24	14.0	2017-Jan	6.0	27.2	2044-Mar
10	7	Hawkins Point/Thoms Cove	6	36	96	24	13.5	2016-Jul	7.0	10.0	2026-Jul
11	8	Holland Island	6	24	96	24	12.5	2015-Jul	8.0	15.4	2030-Nov
12	9	James Island	6	0	96	24	10.5	2013-Jul	10.0	23.3	2036-Oct
13	10	Lower Eastern Neck Island	6	0	96	24	10.5	2013-Jul	2.8	2.8	2016-May
14	11	Mines and Quarries	24	36	96	24	15.0	2018-Jan	5.0	12.0	2030-Jan
15	12	Ocean Placement	24	36	24	0	7.0	2010-Jan	13.0	20.0	2030-Jan
16	13	Parsons Island	12	0	96	24	11.0	2014-Jan	9.0	13.4	2027-May
17	14	Poplar Island Modification	0	0	48	24	6.0	2009-Jan	14.0	22.0	2031-Jan
18	15	Sollers Point	6	36	96	24	13.5	2016-Jul	7.0	8.0	2024-Jul
19	16	Sharps Island	12	24	96	24	13.0	2016-Jan	7.0	17.1	2033-Feb
20	17	Sparrows Point	24	24	96	24	14.0	2017-Jan	6.0	9.4	2026-May
21	18	Wetland Thin Layering	24	36	96	18	14.5	2017-Jul	6.0	12.5	2030-Jan
22	19	1 - Tolchester West	0	24	96	24	12.0	2015-Jan	8.0	22.9	2037-Nov
23	20	2 - Tolchester/Brewerton Angle	0	24	96	24	12.0	2015-Jan	8.0	22.9	2037-Nov
24	21	3 - Swan Point West	0	24	96	24	12.0	2015-Jan	8.0	22.9	2037-Nov
25	22	3S - Swan Point West	0	24	96	24	12.0	2015-Jan	8.0	22.9	2037-Nov
26	23	4a - Pooles Island	0	24	96	24	12.0	2015-Jan	8.0	22.9	2037-Nov
27	24	4b - Pooles Island	0	24	96	24	12.0	2015-Jan	8.0	22.9	2037-Nov
28	25	4br - Pooles island	0	24	96	24	12.0	2015-Jan	8.0	14.8	2029-Oct
29	26	Site 170 (Mouth of Patapsco)	0	24	96	24	12.0	2015-Jan	8.0	22.9	2037-Nov
	27	MD - C&D Placement Sites (6)	24	12	48	12	8.0	2011-Jan			2011-Jan

NOTES:

DMMP - 20 Years - January 2003

SUMMARY OF RANKING FACTOR

Technical and Cost

COL.	A	B	W	X	Y	Z				
ROW			Useful Life Costs, $million							ROW
1										1
2										2
3	Option No.	OPTION NAME	First Cost	Annual Cost	Habitat Development Cost	Dredging, Transport and Placement Cost	Contingency @ 15%	Total Useful Life Cost	Capacity Cost, $/cy	Option No. 3
4	1	Aberdeen Proving Grounds								1 4
5	2	Agricultural								2 5
6	3	Barren Island								3 6
7	4	Cox Creek Innovative								4 7
8	5	Dead Ship Anchorage								5 8
9	6	Furnace Bay								6 9
10	7	Hawkins Point/Thoms Cove								7 10
11	8	Holland Island								8 11
12	9	James Island								9 12
13	10	Lower Eastern Neck Island								10 13
14	11	Mines and Quarries								11 14
15	12	Ocean Placement								12 15
16	13	Parsons Island								13 16
17	14	Poplar Island Modification								14 17
18	15	Sollers Point								15 18
19	16	Sharps Island								16 19
20	17	Sparrows Point								17 20
21	18	Wetland Thin Layering								18 21
22	19	1 - Tolchester West								19 22
23	20	2 - Tolchester/Brewerton Angle								20 23
24	21	3 - Swan Point West								21 24
25	22	3S - Swan Point West								22 25
26	23	4a - Pooles Island								23 26
27	24	4b - Pooles Island								24 27
28	25	4br - Pooles island								25 28
29	26	Site 170 (Mouth of Patapsco)								26 29
	27	MD - C&D Placement Sites (6)								27 30

NOTES:

Table 5-1 First Sort by Total Environmental Score

First of Five Progressive Sorts by Environment, Date Available, Annual Capacity, Program Capacity and Unit Cos

Option No.	OPTION NAME	Total Environmental Score	Date Available	Annual Capacity, (Mcy)	Program Capacity Thru 2022 (Mcy)	Program Life Thru 2022 (Years)	First Cost	Total Useful Life Cost	Capacity Cost, $/cy	Option No.
27	Wetland Thin Layering	119	2017-Jul	0.3	1.8	6				27
12	Cox Creek Innovative	109	2018-Jan	0.5	2.5	5				12
10	Agricultural	88	2016-Jan	0.5	3.5	7				10
14	Furnace Bay	88	2017-Jan	0.5	3	6				14
2	2 - Tolchester/Brewerton Angle	73	2015-Jan	3.5	28	8				2
20	Mines and Quarries	71	2018-Jan	2	10	5				20
21	Ocean Placement	70	2010-Jan	3.5	45.5	13				21
3	3 - Swan Point West	67	2015-Jan	3.5	28	8				3
26	Sparrows Point	67	2017-Jan	1.1	6.6	6				26
19	MD - C&D Placement Sites (6)	59	2011-Jan							19
4	3S - Swan Point West	55	2015-Jan	3.5	28	8				4
23	Poplar Island Modification	53	2009-Jan	2	28	14				23
1	1 - Tolchester West	49	2015-Jan	3.5	28	8				1
24	Sharps Island	46	2016-Jan	3.5	24.5	7				24
7	4br - Pooles island	41	2015-Jan	2.7	21.6	8				7
8	Site 170 (Mouth of Patapsco)	38	2015-Jan	3.5	28	8				8
25	Sollers Point	37	2016-Jul	0.5	3.5	7				25
22	Parsons Island	26	2014-Jan	0.5	4.5	9				22
17	James Island	24	2012-Jan	3.5	35	10				17
16	Holland Island	22	2015-Jul	3.5	28	8				16
11	Barren Island	16	2013-Jul	3.5	35	10				11
15	Hawkins Point/Thoms Cove	8	2016-Jul	0.5	3.5	7				15
13	Dead Ship Anchorage	5	2016-Jul	0.5	3.5	7				13
18	Lower Eastern Neck Island	-5	2013-Jul	1.8	5.1	3				18
9	Aberdeen Proving Grounds	-7	2019-Jan	0.5	1	2				9
5	4a - Pooles Island	-17	2015-Jan	3.5	28	8				5
6	4b - Pooles Island	-29	2015-Jan	3.5	28	8				6

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Table xx Page xx

NOTES:

Total Environmental Score is based on ranking score dated

Date Available is the estimated date for initial placement of dredged material

Annual Capacity is computed based on surface area (typically upland only) 3 foot lift and 1.4 bulking

Program Capacity - 2022 = dredged material capacity during DMMP 20 Year Prog.

Program Life - 2022 = dredged material placement years during DMMP 20 Year Prog.

First Cost includes Studies, Feasibility, EIS, NEPA, PED and Construction

Total Useful Life Cost includes First Cost + annual, habitat and dredging

Capacity Cost is computed as Total Useful Life Cost divided by Total Capacity

Table x-x, Environmental Parameters To Be Considered For The Site Ranking

Column #	Parameter	Factors resulting in +1	Factors resulting in 0	Factors Resulting in -1
3	Dissolved oxygen (DO)	• Existing periods of low DO OR • No potential for impact to DO from project	• Not enough/inconclusive data OR • Already impacted but some additional short-term degradation possible from project	• High existing DO AND • Potential for impact to DO from project
4	Nutrient enrichment	• No potential for nutrient enrichment to the Bay from project	• Not enough/inconclusive data	• Potential for increased nutrient enrichment to the Bay from project
5	Turbidity	• Area subject to elevated natural turbidity OR • No potential for increase in turbidity from project	• Not enough/inconclusive data OR • Already impacted but some additional short-term degradation possible from project	• Site lies outside of the turbidity maximum or has low existing turbidity AND • Potential increase in turbidity from project
6	Salinity	• No changes to regional salinity expected	• Not enough/inconclusive modeling results	• Changes to regional salinity expected from project
7	Groundwater	• Groundwater contaminated or quantity/recharge poor OR • No potential effect on groundwater from project OR • Project provides a buffering potential (e.g. to acid mine drainage)	• Not enough/inconclusive data OR • Already impacted but some additional degradation possible from project	• Presence of high quality groundwater AND • Potential impact on groundwater from project
8	Surface Water	• No effects upon surface water or runoff quality from project OR • Project provides a buffering potential (e.g. to acid mine drainage)	• Not enough/inconclusive data	• Presence of high quality surface water AND • Potential impacts to surface water from project
9	Benthic Community	• Existing benthic community stressed/degraded OR • No potential to degrade the benthic community from project development	• Not enough/inconclusive data	• Existing high quality benthic community AND • Impacts to benthos expected from project
10	Shallow Water habitat	• No Shallow water lies within or adjacent to the site OR • Shallow water habitat will not be impacted by project	• Not enough/inconclusive data	• Shallow water exists within the site AND • Potential for impact to or conversion of Shallow Water Habitat from project

Key for Base Evaluation: +1=resource already impacted or no impact expected; -1+=high quality existing resource or projected impact to resource; 0=not enough or conclusive evidence to make definitive evaluation or evidence is ambiguous or somewhat affected already and little further impact expected.; NA indicates that there is no potential for the resource to occur at the site.

Table x-x, Environmental Parameters To Be Considered For The Site Ranking

Column #	Parameter	Factors resulting in +1	Factors resulting in 0	Factors Resulting in -1
11	SAV	• No SAV occurs within or immediately adjacent to project OR • No SAV impacts are expected from project	• Not enough/inconclusive data	• SAV known to occur within site currently or historically AND • Potential for impact to SAV from project
12	Tidal Wetlands (Existing)	• No natural tidal wetlands occur within or immediately adjacent to site OR • No potential impacts to natural tidal wetlands from project	• Not enough/inconclusive data	• Presence of natural tidal wetlands within or immediately adjacent to site AND • Potential for impact or alterations to natural tidal wetlands from project development
13	Non-tidal Wetlands (Existing)	• No natural non-tidal wetlands occur within or immediately adjacent to site OR • No potential impacts to natural non-tidal wetlands from project	• Not enough/inconclusive data	• Presence of natural non-tidal wetlands within or immediately adjacent to site AND • Potential for impact or alterations to natural non-tidal wetlands from project development from project
14	Finfish spawning habitat	• No anadromous fish spawning habitat known to exist within existing footprint OR • No impacts to anadromous fish spawning predicted from project	• Not enough/inconclusive data	• Anadromous fish spawning habitat directly within proposed footprint or in immediate vicinity of the proposed placement facility AND • Impacts to anadromous fish spawning predicted from project
15	Finfish rearing habitat	• No anadromous fish rearing habitat known to exist within existing footprint OR • No impacts to young of anadromous species or forage species predicted from project	• Not enough/inconclusive data	• Anadromous fish rearing habitat directly within proposed footprint or in immediate vicinity of the proposed placement facility AND • Impacts to anadromous fish or forage species rearing predicted from project
16	Larval Transport	• Site does not lie within or will not influence an area critical to up-Bay Migration of young of marine/high mesohaline species or down-Bay migration of early lifestages of	• Not enough/inconclusive data or modeling	• Potential disturbance of Up-bay migration of young of marine/high mesohaline species or Down- bay migration of early lifestages of anadromous species from

Key for Base Evaluation: +1=resource already impacted or no impact expected; -1+=high quality existing resource or projected impact to resource; 0=not enough or conclusive evidenc
o make definitive evaluation or evidence is ambiguous or somewhat affected already and little further impact expected.; NA indicates that there is no potential for the resource to occur a
he site.

Table x-x, Environmental Parameters To Be Considered For The Site Ranking

Column #	Parameter	Factors resulting in +1	Factors resulting in 0	Factors Resulting in -1
		anadromous species		project
17	Essential Fish Habitat (EFH)	• Site does not constitute EFH (as defined by the Magnuson-Stevens Act) for regionally important marine species OR • No potential for impact to EFH or forage species from project	• Not enough/inconclusive data	• Site lies within an area that provides EFH for regionally important marine species AND • Potential for impact to EFH or forage species OR population-level effects on regionally important marine species from project
18	Commercially Harvested Species and Habitat (fish and shellfish)	• No commercial harvesting exists in the site and there are no shellfish beds adjacent to the site OR • No impacts to commercial harvesting areas are predicted from project	• Not enough/inconclusive data	• Current/existing commercial finfish or shellfish harvesting areas within or immediately adjacent to project AND • Existence of natural or historical oyster beds within or immediately adjacent to project • Potential impacts to commercial harvesting expected from project
19	Thermal Refuge	• Site does not provide finfish or blue crab overwintering habitat OR • No impacts to overwintering habitat expected from project		• Site provides thermal refuge or overwintering habitat for finfish or blue crabs AND • Potential for impacts to overwintering habitat from project
20	Recreational Fishery	• Little or no recreational fishing occurs OR • No impacts to recreational fishing expected from project	• Not enough/inconclusive data	• High use recreational area AND • Impacts to angler utilization expected from project
21	Protected species (RTE)	• No RTE known to occur within site OR • RTE are transients to site OR • No impacts to RTE or critical habitats expected from project	• Not enough/inconclusive data	• Presence of shortnose sturgeon OR • Presence of other federally designated RTE OR • Within a DNR designated Sensitive Species Project Review Area (SSPRA) OR • Colonial waterbird nesting sites on site AND

Key for Base Evaluation: +1=resource already impacted or no impact expected; -1+=high quality existing resource or projected impact to resource; 0=not enough or conclusive evidenc
o make definitive evaluation or evidence is ambiguous or somewhat affected already and little further impact expected.; NA indicates that there is no potential for the resource to occur a
he site.

Table x-x, Environmental Parameters To Be Considered For The Site Ranking

Column #	Parameter	Factors resulting in +1	Factors resulting in 0	Factors Resulting in -1
				• Potential for impacts to RTE from project
22	Habitat of Particular Concern (HAPC)	• Site does not constitute HAPC (as defined by the Magnuson-Stevens Act) for regionally important marine species (specifically summer flounder) OR • No potential for impact to HAPC from project	• Not enough/inconclusive data.	• Site lies within an area that provides HAPC (as defined by the Magnuson-Stevens Act) for regionally marine important species (summer flounder) AND • Potential for impact to HAPC or population level effects on regionally important marine species from project
23	Waterfowl use	• Site not a waterfowl (duck/goose) concentration area OR • No influence to waterfowl use expected from project	• Not enough/inconclusive data	• Area is a waterfowl concentration area known to be utilized for feeding/refuge/nesting OR • Historically used for feeding/refuge/nesting AND • Potential impacts to waterfowl use from project
24	Wading and Shorebird Use	• Site not known as a wading or shorebird utilization area OR • No influence to wading or shorebird use expected from project	• Not enough/inconclusive data	• Areas known to be utilized for feeding/refuge/nesting OR • Historically used for feeding/refuge/nesting AND • Potential impacts to wading or shorebird use
25	Terrestrial habitat and wildlife	• No natural upland habitats/communities exist on site OR • No impacts to sensitive natural terrestrial habitats expected from project	• Not enough/inconclusive data	• Infringement on natural upland habitats/communities by project AND • Effects to other sensitive natural wildlife habitats from project
26	Substrate composition	• No potential for changes to sediment composition from project	• Not enough/inconclusive data	• Potential for alterations in sediment composition from project
27	Hydrodynamic effects (physical)	• Area is eroding or filling currently OR • No detrimental increases to erosion or sedimentation from project OR	• Not enough/inconclusive modeling results	• Changes to currents and/or benthic characteristics in critical areas (e.g. SAV beds, increased erosion) from project

Key for Base Evaluation: +1=resource already impacted or no impact expected; -1+=high quality existing resource or projected impact to resource; 0=not enough or conclusive evidence to make definitive evaluation or evidence is ambiguous or somewhat affected already and little further impact expected.; NA indicates that there is no potential for the resource to occur at the site.

Table x-x, Environmental Parameters To Be Considered For The Site Ranking				
Column #	**Parameter**	**Factors resulting in +1**	**Factors resulting in 0**	**Factors Resulting in -1**
		• Beneficial decreases to erosion or sedimentation from project OR • No changes in hydrodynamics from project		
28	Contaminants	• Existing sediments have toxic contamination OR • Site development would not result in toxic contaminant impacts	• Not enough/inconclusive data	• Existing sediments are free of toxic contaminants AND • Potential for toxic contamination of sediments from project
29	CERCLA/ UXO Potential	• No potential for presence of UXO AND • Not within APG controlled area (an NPL site) or Navy controlled areas AND • No potential presence of HTRS AND • No potential for CERCLA liability	• Not enough/inconclusive data	• Potential for presence of UXO OR • Within or immediately adjacent to APG controlled area (an NPL site) or Navy controlled area OR • Potential presence of HTRS OR • Potential CERCLA liability
30	Fossil shell mining	• No infringement on fossil shell or buried shell resources	• Not enough/inconclusive data	• Infringement on fossil shell or buried shell resources
31	Recreational value	• Site does not support recreation (not including fishing) OR • No recreation impacts expected from project development	• Not enough/inconclusive data	• Recreational boating (other than fishing) occurs on or immediately adjacent to site or site supports other activities: swimming, birding, wildlife viewing AND • Potential for impacts to recreation from project
32	Aesthetic and Noise	• Site lies within an industrial area or does not lie within immediate proximity to a population center, dwellings, or managed natural areas OR • No potential for noise or visual impacts from project	• Not enough/inconclusive data	• Adjacent to population centers or dwellings or within or adjacent to managed natural area(s) AND • Potential for noise or visual impacts from project
33	Cultural resources	• No historical or cultural resources exist on the site OR • Site has no cultural/archaeological value OR • No impacts to cultural resources expected	• Not enough/inconclusive data	• Presence of archeological sites or sites of historical significance AND • Potential for impacts to cultural resources from project

Key for Base Evaluation: +1=resource already impacted or no impact expected; -1+=high quality existing resource or projected impact to resource; 0=not enough or conclusive evidence o make definitive evaluation or evidence is ambiguous or somewhat affected already and little further impact expected.; NA indicates that there is no potential for the resource to occur a he site.

Table x-x, Environmental Parameters To Be Considered For The Site Ranking

Column #	Parameter	Factors resulting in +1	Factors resulting in 0	Factors Resulting in -1
		from project		
34	Navigation	• Does not lie within or immediately adjacent to charted navigation channels OR • No potential for increased currents in navigation channels from project OR • No increase in potential for environmental disaster, ship collisions or groundings from project development.	• Not enough/inconclusive modeling results	• Lies within or immediately adjacent to charted navigation channels OR • Potential for increased currents in navigation channels OR • Increased potential for environmental disaster, ship collisions or groundings from project development
35	Beneficial Use - Wetland	• Wetland habitat restoration or enhancement will result from project from project	• Not enough/inconclusive data	• No wetland habitat enhancement expected from project
36	Beneficial Use - Upland	• Upland habitat restoration or enhancement will result from project	• Not enough/inconclusive data	• No upland habitat enhancement expected from project
37	Beneficial Use – Adjacent habitat enhancement	• Post construction adjacent habitat enhancement (i.e. SAV, shallow water habitat, fish nursery) has high potential as a result of the project	• Not enough/inconclusive data	• No adjacent habitat enhancement expected from project
38	Shoreline Protection	• Project will protect existing shorelines and properties	• Not enough/inconclusive data	• Project has no shoreline protection component

Interim Report To The Maryland General Assembly

concerning

Implementation of the Dredged Material Management Act of 2001

December 2001

Executive Committee
Maryland Dredged Material Management Program
State of Maryland

TABLE OF CONTENTS

I. INTRODUCTION

This document reports progress on the implementation of the dredged material management law enacted by the 2001 Maryland General Assembly and signed by Governor Glendening on May 18, 2001. The law took effect on October 1, 2001.

The law created an Executive Committee to provide oversight in the development of the State of Maryland's plans for dredged material management. The Executive Committee, as constituted in the law, met on December 7, 2001 and agreed to submit this interim report, as recommended by the stakeholders in the dredged material management process.

Mandate:
The mandate of the Executive Committee is to review and recommend to the Governor:

- Dredged material placement options, including, but not limited to, the placement sites identified in the October 1, 2000 Report to the Maryland General Assembly regarding the Governor's Strategic Plan for Dredged Material Management, (Appendix C, available upon request) to fill short-term capacity needs ....;

- Elements, as part of a continuous and long-term strategic plan for dredged material management, including changes to the plan; and

- Dredged material disposal sites for long-term dredged material management placement capacity based on the following hierarchy:

  I. Beneficial use and innovative reuse;
  II. Upland Sites and other environmentally sound confined capacity;
  III. Expansion of existing dredged material disposal sites other than Hart Miller Island and (existing) Pooles Island (open water placement sites); and
  IV. Other dredged material placement options to meet long-term placement needs, except for redepositing dredged material in an unconfined manner.

Reports Required:
- December 31, 2001 on the implementation of this Act
- December 31, 2002 on recommendations for a strategic long-term dredged material management plan for Maryland.

The information included in this report provides an overview of the progress being made in achieving the mandate of the Executive Committee. The information covers these key areas:

1. Improvements in administering the process;
2. Challenges that face the Executive Committee in meeting its mandate;
3. A summary of the 24 sites under active consideration (Appendix A); and
4. New technical information about seven of the 24 sites under consideration that was not available in October 2000 (date of the most recent report to the Maryland General Assembly regarding dredged material placement in Maryland) (Appendix B).

II. PROGRAM CHALLENGES

The Maryland Port Administration (MPA) is charged by Maryland law to enhance maritime commerce in the state of Maryland. As part of that responsibility, the MPA coordinates maintenance of the Port of Baltimore's channel system, and identifies, coordinates and implements a program of channel system improvements needed to preserve and improve the Port's competitive capability within the international maritime community.

MPA is equally obligated to a strong environmental stewardship role. Consistent with the principles and goals of the Chesapeake Bay Agreement signed in June 2001, the State of Maryland elected to phase out open water placement of dredged material. That new direction fundamentally altered the 1996 Governor's Strategic Plan for Dredged Material Management, which included new options for open water placement of dredged material. The loss of new open water options reduced the Plan's capability to accommodate dredged material from 20 years to a maximum of nine years.

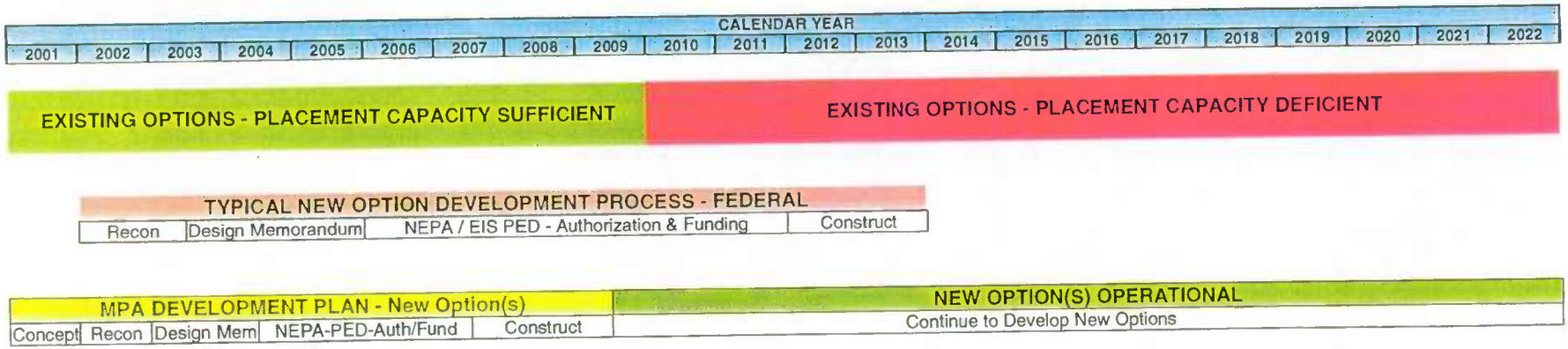
The Problem:
Stakeholders in this process accept the need to keep the Port of Baltimore competitive as a strong economic engine for Maryland's economy. Maintaining that competitiveness requires an ongoing program of maintenance and improvements to channels leading to the Port.

Historical data over the past 30 years shows that sedimentation of existing channels generates an average of approximately 4 million cubic yards of dredged material each year. This is an average number that can vary with a number of factors. Wet years increase the amount of sediments carried into Chesapeake Bay by rain flows. Dry years reduce that amount. This can increase or decrease the rate of sedimentation in channels. Weather anomalies, such as hurricanes or tropical storms, can greatly affect the average. The ability of the Susquehanna River dams to impound sediments, an issue that has received much attention in recent years, is greatly diminished and will likely add to maintenance loads in the coming decades.

In addition, the Maryland Port Administration (MPA) is advocating a series of channel improvements (new dredging work) as a critical element in support of its strategic business plans. These improvements are currently projected to generate an additional 23 million cubic yards of dredged material between now and July 2008. Currently, available dredged material placement capacity is not adequate to accommodate both the anticipated maintenance dredging as well as these new work dredging projects beyond July 2009. As explained by the MPA and the U.S. Army Corps of Engineers, this situation occurs because the normal timeframe required to move a new project through the state and federal regulatory, authorization, and appropriation process (concept through construction) averages 12 years.

While stakeholders generally agree with the need to maintain channels to authorized depths, some question the need for and timing of the proposed new dredging work. The MPA feels strongly that these improvements are needed for its strategic business plan and the competitiveness of the Port of Baltimore. Private sector maritime interests express a strong sense of urgency for channel maintenance and new dredging work. Other stakeholders are focused on minimizing adverse impacts to natural resources. Nonetheless, with or without all the proposed improvements, existing capacity will be taxed if not exceeded within the normal 12-year time frame from concept through construction, emphasizing the urgency of decisions concerning major placement options. This report recognizes the existence of differing views among stakeholders and reflects MPA's commitment to address these differences in the development of the final plan.

DEVELOPMENT OF NEW PLACEMENT OPTIONS
NEED TO EXPEDITE TO MEET DREDGING NEED



III. COMMITTEES

The State's Dredged Material Management Program includes three committees - - the executive committee, the management committee and the citizens committee - - and various technical workgroups (see committee structure diagram). The roles of the committees and work groups have been defined as the following:

The **executive committee** was legislatively created to provide oversight in the development of the State of Maryland's plans for dredged material management. The committee reviews and recommends dredged material placement options to the Governor and the legislature as part of a strategic plan for dredged material management.

The executive committee consists of the Secretary of the Maryland Department of Transportation, the Secretary of Maryland Department of Natural Resources, the Secretary of the Maryland Department of the Environment, the District Engineer of the U. S. Army Corps of Engineers Baltimore District, the District Engineer of the U. S. Army Corps of Engineers Philadelphia District, a representative of the Chesapeake Bay Foundation, a representative of the management committee and a citizen representative (appointed by the Governor).

On December 7, 2001 the executive committee met and approved the Study Recommendations of the Bay Enhancement Work Group Regarding the Prioritization of Dredged Material Management Options Toward A 20-Year Plan, as shown on the chart by that name on page 13 of this report. In addition, the committee approved the MDOT/MPA Interim Report to the Maryland General Assembly, December 2001.

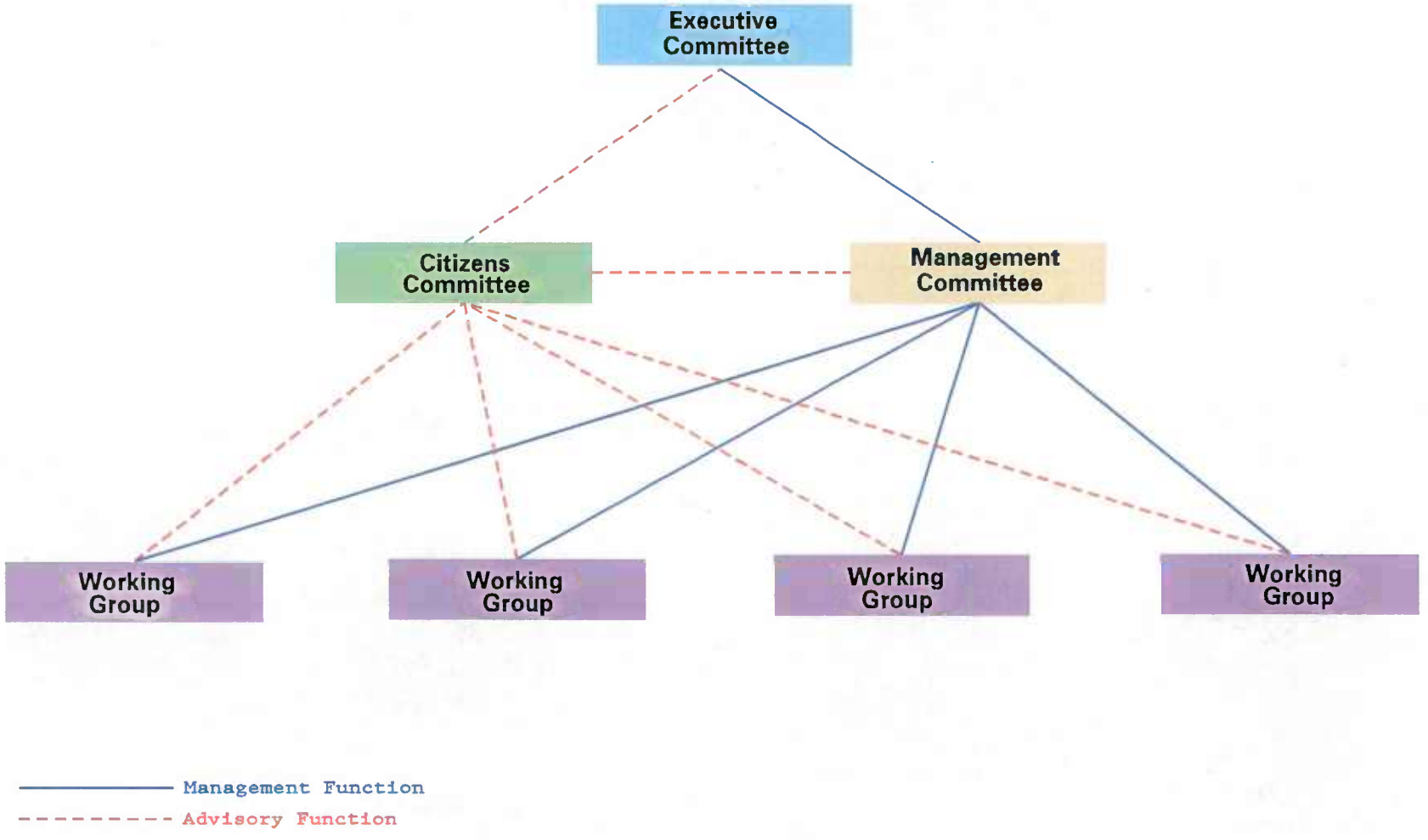
The administratively established **management committee** consists of representatives of state and federal resource management and regulatory agencies which review, regulate, investigate or evaluate dredged material placement activities, and two environmental organizations. The member organizations of the management committee provide professional staff to the technical work groups. The management committee reviews and recommends placement options and a strategic, long-term plan to the executive committee.

The administratively established **citizens committee** consists of representatives of civic, community, conservation and other organizations and associations, and local governments with vested interests in the affects of dredged material placement activities on the environment. The citizens committee reviews, considers and recommends options and a strategic, long-term plan to the management and executive committees.

Administratively established technical **work groups** are formed with core membership coming from agencies and organizations represented on the management committee, and includes citizens committee representation. The work groups propose, evaluate, develop and recommend for further consideration, options to the management and citizens committees.

The committee structure for this program is designed to provide for open access between all of the various functioning groups, i.e., executive, management and citizens committees and technical work groups.

Dredging Needs Placement Options Program
Committee Structure Diagram
October 2001



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COMMITTEE STRUCTURE DIAGRAM

IV. RENEWING THE PROCESS

In April 2001, based on extensive stakeholder input, Governor Glendening's Chesapeake Bay Cabinet recommended a number of steps to renew the process through which dredged material placement options are considered. Those recommendations are identified in the April 18, 2001 Report to the Governor's Chesapeake Bay Cabinet regarding the Dredging Needs Placement Options Program, and are intended to:

- make the process more accessible to the public;
- ensure consideration of divergent stakeholders views; and
- generally re-establish a collaborative attitude among all invested participants.

The Maryland Port Administration was charged with implementing these process improvement steps under the oversight of the Executive Committee established in October 2001. As of the date of this report, the following steps have been taken to implement the recommendations of the Chesapeake Bay Cabinet:

PROCESS IMPROVEMENTS

- Review existing membership to ensure appropriate representation, and increase outreach for public participation. More than 100 letters inviting participation in the Citizens Advisory Committee have been mailed to environmental and community organizations.
- A new mission statement has been adopted by the Citizen Advisory Committee.
- With concurrence of stakeholders, increased frequency of committee meetings.
- Improved cross reporting among various committees and technical working groups by encouraging a committee representative to attend meetings of other committees.
- Engaged an independent facilitator for the Citizen Advisory Committee.
- Improved reporting of technical studies to citizen members by reducing redundant technical detail and improving summary information in presentations.
- Improved documentation of meeting discussions and opinions by engaging a professional stenographer to record and transcribe proceedings.
- Improved dissemination of meeting information through more timely e-mail distribution.
- Developing a timeline for the completion of necessary work tasks that will lead to recommendations for a strategic, long-term plan by December 2002.
- Improving consensus development among various scientific stakeholders.

V. OPTIONS UNDER CONSIDERATION

Appendix A provides a summary view of the 24 options currently under consideration. This is not a closed list. The stakeholders are open-minded about consideration of additional options not identified herein. Nor is the list in any way representative of a final selection of sites for construction. The prioritization table on page 13 is related only to further study efforts as defined above.

Study phases which are referenced in this section can be explained as follows:

- Concept Phase - An analysis based upon existing data, may include field visits, but does not include field sampling programs during which possible project location and configurations are developed and proposed. Can last from one month to about one year.

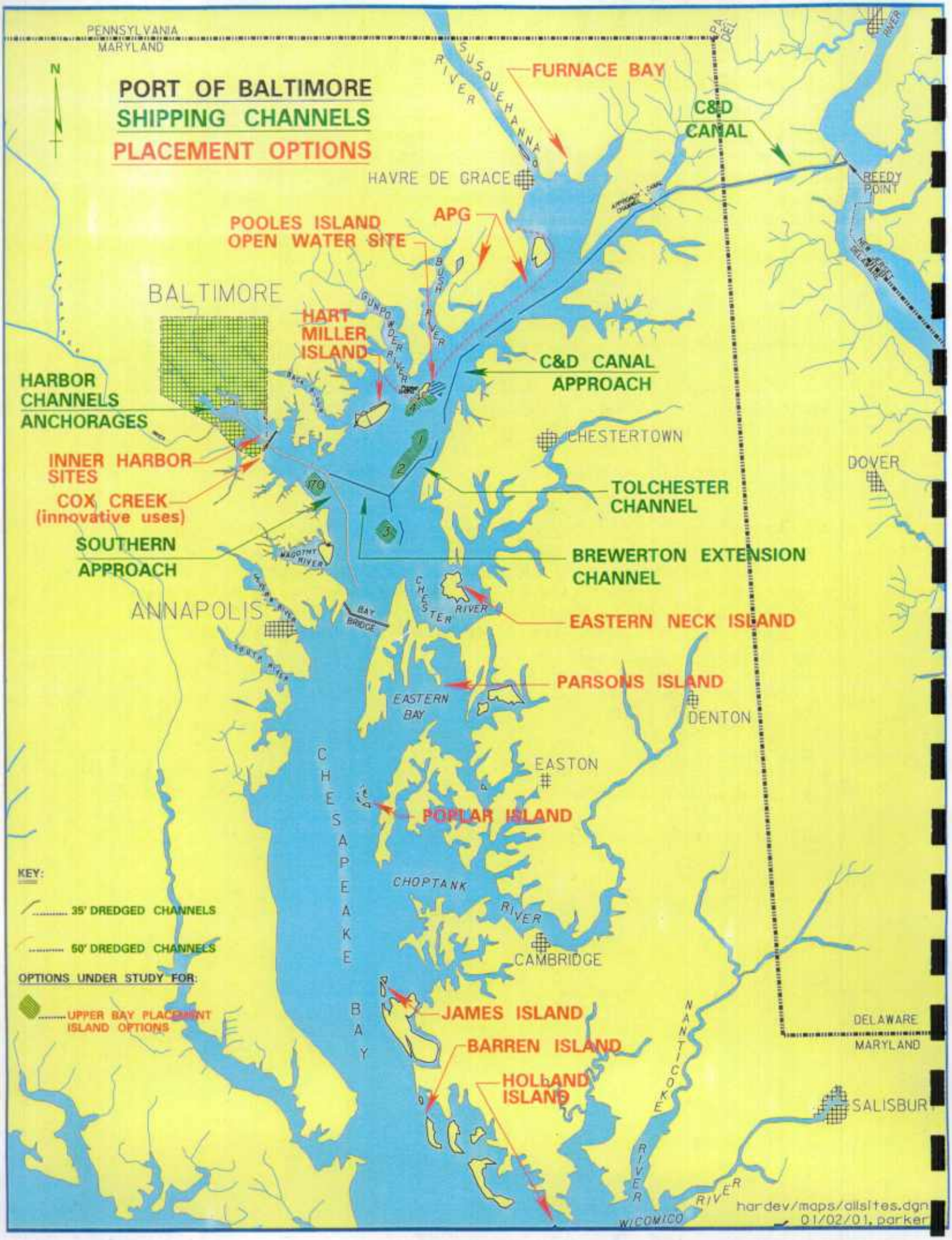
- Reconnaissance (Prefeasibility) - A first look, fatal flaw analysis lasting approximately one year, designed to determine if there are any serious, quickly identifiable problems, such as severe environmental risks, physical site constraints or others which would prevent a proposed concept from progressing into feasibility studies. May include a minimal field sampling program, depending upon existing data, to characterize the area.

- Feasibility Studies - In depth analyses of all aspects of a proposed project - - physical, chemical, biological and social, designed to meet the criteria of the National Environmental Protection Act (NEPA) and to evaluate all requirements necessary for permitting, construction, and ultimately, operation of a project. In addition to environmental and engineering characteristics, this phase also considers issues such as effects on view sheds, property values and microhydrodynamic changes such as effects on circulation in nearby creeks. If successful, this phase produces an Environmental Impact Statement (EIS) report and leads to engineering and design studies for the project.

- Engineering and Design - Final phase prior to construction, during which site specific plans and specifications are developed to be used for project construction.

- Construction and Operation

All cost and capacity numbers presented in this report are planning numbers based on limited and varying amounts of information by option. As such, they are subject to significant change as additional information is developed, and should not be viewed as final costs or capacities.


PENNSYLVANIA
MARYLAND
N
PORT OF BALTIMORE
SHIPPING CHANNELS
PLACEMENT OPTIONS
SUSQUEHANNA RIVER
FURNACE BAY
C&D CANAL
HAVRE DE GRACE
REEDY POINT
POOLES ISLAND OPEN WATER SITE
APG
BALTIMORE
HART MILLER ISLAND
GUNPOWDER RIVER
BUSH RIVER
C&D CANAL APPROACH
HARBOR CHANNELS ANCHORAGES
CHESTERTOWN
DOVER
INNER HARBOR SITES
COX CREEK (innovative uses)
TOLCHESTER CHANNEL
SOUTHERN APPROACH
BREWERTON EXTENSION CHANNEL
MAGOTHY RIVER
ANNAPOLIS
CHESTER RIVER
EASTERN NECK ISLAND
BAY BRIDGE
PARSONS ISLAND
EASTERN BAY
DENTON
EASTON
CHESAPEAKE BAY
POPLAR ISLAND
CHOPTANK RIVER
CAMBRIDGE
KEY:
35' DREDGED CHANNELS
50' DREDGED CHANNELS
OPTIONS UNDER STUDY FOR:
UPPER BAY PLACEMENT ISLAND OPTIONS
JAMES ISLAND
BARREN ISLAND
HOLLAND ISLAND
DELAWARE
MARYLAND
SALISBUR
NANTICOKE RIVER
WICOMICO RIVER
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STUDY RECOMMENDATIONS OF THE BAY ENHANCEMENT WORK GROUP REGARDING PRIORITIZATION OF DREDGED MATERIAL MANAGEMENT OPTIONS TOWARD A 20-YEAR PLAN

This table presents an initial draft prioritization for study of potential options for dredged material management, as part of the process to meet the legislative mandate to provide a long-term plan by December 31, 2002.

HIGH PRIORITY FOR STUDY	LOWER PRIORITY FOR STUDY	NOT FEASIBLE AT THIS TIME
Near Term • POPLAR ISLAND MODIFICATION		
Mid Term • INNOVATIVE USE Cox Creek Mines and Quarries Agricultural	Mid Term • PARSONS ISLAND • FURNACE BAY • LOWER EASTERN NECK ISLAND • OCEAN PLACEMENT	
Long Term • INNER HARBOR Hawkins Pt./ Thoms Cove Dead Ship Anchor. Sollers Point • JAMES ISLAND	Long Term • UPPER BAY ISLAND (8 Options) • BARREN ISLAND • HOLLAND ISLAND	Long Term • ABERDEEN PROVING GROUNDS • SPARROWS POINT

NOTE:

NEAR TERM OPTIONS COULD BE OPERATIONAL IN 1 TO 6 YEARS
MID TERM OPTIONS COULD BE OPERATIONAL IN 7 TO 12 YEARS
LONG TERM OPTIONS COULD BE OPERATIONAL IN MORE THAN 12 YEARS.

Interim Report to the Maryland General Assembly
concerning

Implementation of the Dredged Material
Management Act of 2001

December 2001

APPENDIX A

OPTIONS OVERVIEW

Executive Committee
Maryland Dredged Material Management Program
State of Maryland

All cost and capacity numbers presented in this report are planning numbers based on limited and varying amounts of information by option. As such, they are subject to significant change as additional information is developed, and should not be viewed as final costs or capacities.

HIGH PRIORITY PROJECTS FOR STUDY
Near Term – could be operational in 1 to 6 years.

1. Poplar Island Modification

Estimated total capacity: 48 – 69 mcy.

Estimated total cost (in $000's): $545,000 - $908,000
(Federal - $409,000 - $681,000; State - $136,000 - $227,000)

Estimated cost/cy: $11.00 - $14.00
(Federal - $8.00 - $11.00; State - $3.00+)

Study Status: Conceptual phase based on extensive existing database. Reconnaissance study is underway; five potential alignments are under review.

HIGH PRIORITY PROJECTS FOR STUDY
Mid Term - could be operational in 7 to 12 years.

2. Cox Creek Innovative Use

Estimated total capacity: Indefinite, minimum goal 5 kcy/yr, target goal 2 mcy/yr.

Estimated total cost (in $000's): $13,000 - $30,000

- estimate reflects costs per year
- estimated costs per cubic yard exclude transportation costs
- costs for development of operational of Innovative Use systems can exceed $100 million (example: New Jersey experience)

Estimated cost/cy: $25.00 - $35.00 minimum (current example: $50.00 - $100.00)
(Federal - $19.00+; State $6.00+)

Study Status: Phase I (Bench Scale) vendor performance evaluation is nearing completion. Five vendors are participating. Vendors could have the option of moving to Phase II (Pilot Phase), or Phase III (Demonstration Phase) with multi-agency evaluation committee approval. MPA is also preparing an RFP emphasizing innovative use of clean material.

HIGH PRIORITY PROJECTS FOR STUDY - (Con't)
Mid Term - could be operational in 7 to 12 years.

3. Mines and Quarries Innovative Use

Total Capacity: Variable with site. Project is also connected to 2. Cox Creek Innovative Use, minimum goal 5 kcy/yr., target goal 2 mcy/yr.

Estimated total cost (in $000's): $6,000 - $190,000 annually.

- estimated total costs do not include certain site specific costs that will be added when sites are identified.

Estimate cost/cy: $12.00 - $95.00

Study Status: Field investigation of potential sites underway.

4. Agricultural Innovative Use

Total Capacity: Target goal is 0.5 mcy applied annually on 1,000 acres of agricultural land;

Estimated total cost (in $000's): $3,000 - $10,000

Estimated cost/cy: $5.00 - $20.00

- estimated costs are based on one application (50/50 mix of agricultural soil and dredged material)

Study Status: Field tests underway to determine, evaluate potential procedures and methodologies.

HIGH PRIORITY PROJECTS FOR STUDY
Long Term - could be operational in more than 12 years.

5. Hawkins Point / Thoms Cove Containment Facility

Total Capacity: up to 5 mcy.

Estimated total cost (in $000's): $58,000 (Federal - $44,000; State - $14,000)

Estimated cost/cy: $12.00 (Federal -$8.00; State - $4.00)

- Estimated cost per cubic yard depends on actual construction costs, size of the project, project characteristics and type of habitat.

Study Status: Conceptual phase beginning.

6. Dead Ship Anchorage Containment Facility

Total Capacity: up to 5 mcy

Estimated total cost (in $000's): $58,000 (Federal - $44,000; State - $14,000)

Estimated cost/cy: $9.00 (Federal - $6.00; State - $3.00)

- Estimated cost per cubic yards depends on actual construction costs, size of the project, project characteristics and type of habitat.

Study Status: Conceptual phase beginning.

7. Sollers Point Containment Facility

Total Capacity: up to 4 mcy

Estimated total cost (in $000's): $42,000 (Federal - $31,000; State - $11,000)

Estimated cost/cy: $10.00 (Federal - $7.00; State - $3.00)

- Estimated cost per cubic yards depends on actual construction costs, size of the project, project characteristics and type of habitat.

Study Status: Conceptual phase beginning.

HIGH PRIORITY PROJECTS FOR STUDY (Con't)
Long Term - could be operational in more than 12 years.

8. James Island

Estimated total capacity: 24 to 82 mcy

Estimated total cost (in $000's): $372,000 - $1,221,000
(Federal - $279,000 - $916,000; State - $93,000 - $305,000)

1. Cost comparable to Poplar Island.
2. Estimated total cost reflects location of the site; approx. 12 -15 miles past Poplar Island adds $1.50 to transportation costs per cubic yard.

Estimated cost per cy: $15.00 - $16.00
(Federal - $11.00 – $12.00; State $4.00+)

Study Status: Conceptual study nearing completion.
Reconnaissance study underway.

LOWER PRIORITY PROJECTS FOR STUDY
Mid Term - could be operational in 7 to 12 years.

9. Parsons Island

Estimated total capacity: 4.4 to 11.5 mcy

Estimated total cost (in thousands): $99,000 - $222,000
(Federal - $74,000 – 167,000; State - $25,000 – 55,000)

Estimated cost per cy: $19.00 - $ 22.00
(Federal - $14.00 – $17.00; State - $5.00+)

Study Status: Conceptual study nearing completion. Study completion by spring 2002.

10. Furnace Bay Upland Innovative Use

Total Capacity: 7 - 13.6 mcy.

Estimated total cost (in $000's): $10,000 (Federal - $7,000; State - $3,000)

Estimated cost/cy: $24.00 - $25.00
(Federal $18.00 - $19.00; State $6.00+)

Study Status: Reconnaissance study completed.

LOWER PRIORITY PROJECTS FOR STUDY (Con't)
Mid Term - could be operational in 7 to 12 years.

11. Lower Eastern Neck Island

Estimated total capacity:	3.5 to 5.1 mcy.
Estimated total cost (in $000's):	$92,000 - $121,000 (Federal - $69,000 - $91,000; State - $23,000 - $30,000)
Estimated cost/cy:	$23.00 - $26.00 (Federal - $17.00 - $20.00; State - $6.00+)
Study Status:	Conceptual study nearing completion. Study completion by spring 2002.

12. Ocean Placement

Total Capacity:	Not limited.
Estimated total cost (in $000's):	$31,000 (Federal - $23,000; State - $8,000)
Estimated cost/cy:	$21.00 (Federal - $16.00; State $6.00)
Study Status:	Reconnaissance study underway.

UPPER BAY ISLAND (8 OPTIONS # 13 THROUGH # 20)

13. Tolchester West

Total Capacity:	80 mcy.
Estimated total cost (in $000's):	$685,000 (Federal - $514,000; State - $171,000)
Estimated cost/cy:	$9.00 (Federal - $6.00; State $3.00)
Study Status:	Reconnaissance study completed.

LOWER PRIORITY PROJECTS FOR STUDY (Con't)
Mid Term - could be operational in 7 to 12 years.

14. Tolchester / Brewerton Angle

Total Capacity: 80 mcy

Estimated total cost (in $000's): Total Cost: $796,000 (Federal - $597,000; State - $199,000)

Estimated cost/cy: $10.00 (Federal - $7.00; State - $3.00)

Study Status: Reconnaissance study completed.

15. Swan Point West

Total Capacity: 80 mcy.

Estimated total cost (in $000's): $946,000 (Federal - $709,000; State - $237,000)

Estimated cost/cy: $12.00 (Federal - $9.00; State - $3.00)

Study Status: Reconnaissance study completed.

16. Swan Point West (Submerged Island)

Total Capacity: 80 mcy.

Estimated total cost (in $000's): $805,000 (Federal - $603,000; State - $202,000)

Estimated cost/cy: $10.00 (Federal - $7.00; State $3.00)

Study Status: Reconnaissance study completed.

17. (Pooles Island) Site 4a
18. (Pooles Island) Site 4b
19. (Pooles Island) Site 4br

Total Capacity: 80 mcy.

Estimated total cost (in $000's): $930,000 (Federal - $697,000; State - $233,000)

Estimated cost/cy: $12.00 - $13.00 (Federal - $8.00 - $9.00; State $3.00 - $4.00)

Study Status: Reconnaissance study completed.

LOWER PRIORITY PROJECTS FOR STUDY (Con't)
Mid Term - could be operational in 7 to 12 years.

20. Site 170 – Mouth of Patapsco

Total Capacity: 80 mcy

Estimated total cost (in $000's): $888,000 (Federal - $666,000; State - $222,000)

Estimated cost/cy: $11.00 (Federal - $8.00; State $3.00)

Study Status: Reconnaissance study underway; completion expected early 2003.

LOWER PRIORITY PROJECTS FOR STUDY
Long Term - could be operational in more than 12 years.

21. Barren Island

Estimated total capacity: 22 to 74 mcy

Estimated total cost (in $000's): $370,000 – $1,217,000
(Federal - $277,000 - $913,000; State - $93,000 - $304,000)

Estimated cost/cy: $16.00 - 17.00
(Federal - $12.00 – $13.00; State - $4.00+)

Study Status: Conceptual study in progress, completion by summer 2002.

22. Holland Island

Estimated total capacity: 22 - 63 mcy

Estimated total cost (in $000's): $413,000 – 1,129,000
(Federal - $310,000-$847,000; State - $103,000-$282,000)

Estimated cost/cy: $18.00 - $19.00
(Federal - $14.00 - $14.00; State - $4.00 - $5.00)

Study Status: Conceptual study in progress, completion by summer 2002.

PROJECTS NOT FEASIBLE AT THIS TIME
Long Term - could be operational in more than 12 years.

23. Aberdeen Proving Ground - APG

Total Capacity:	Uncertain
Estimated total cost (in $000's):	$46,000 (Federal - $34,000; State - $11,000) / mcy 1. Estimated costs are based on 1.0mcy 2. Potential mitigation costs could increase total costs from $50,000 to $150,000 per acre.
Estimated cost/cy:	$46.00+ (Federal $34.00+; State $12.00+)
Study Status:	Inactive at this time.

24. Sparrows Point

Total Capacity:	10.3 mcy.
Estimated total cost (in $000's):	$126,000 (Federal - $94,000; State - $32,000)
Estimated cost/cy:	$12.00 (Federal - $9.00; State $3.00)
Study Status:	Inactive at this time.

Interim Report to the Maryland General Assembly
concerning

Implementation of the Dredged Material
Management Act of 2001

December 2001

APPENDIX B

UPDATED OPTIONS ONLY

Executive Committee
Maryland Dredged Material Management Program
State of Maryland

APPENDIX B

UPDATED OPTIONS ONLY

Appendix B contains information only on options where study progress to date has produced significant changes in potential site configuration and/or cost from that reported in the JCR report, October 2000 (Appendix C), attached.

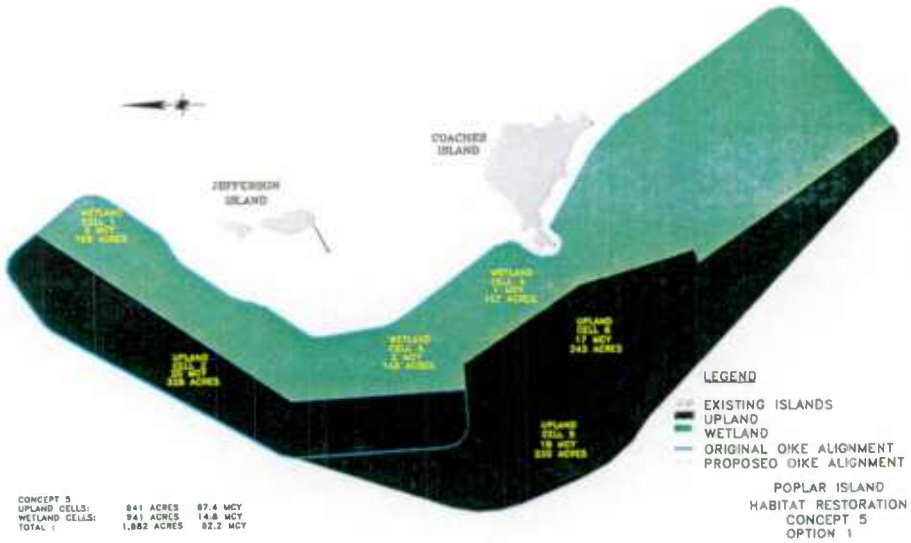
POPLAR ISLAND MODIFICATION
INNOVATIVE USE SITE - COX CREEK
JAMES ISLAND BENEFICIAL USE
PARSONS ISLAND BENEFICIAL USE
LOWER EASTERN NECK ISLAND BENEFICIAL USE
BARREN ISLAND BENEFICIAL USE
HOLLAND ISLAND BENEFICIAL USE

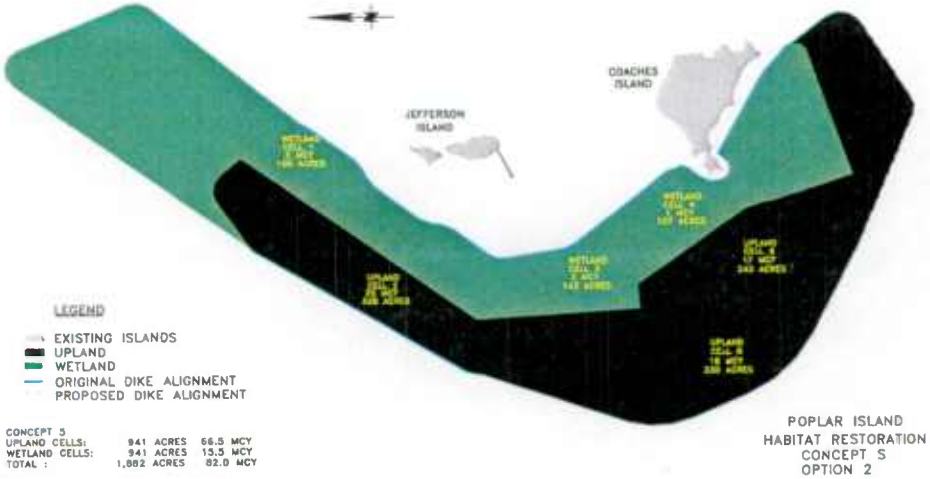
TABLE OF CONTENTS
APPENDIX B

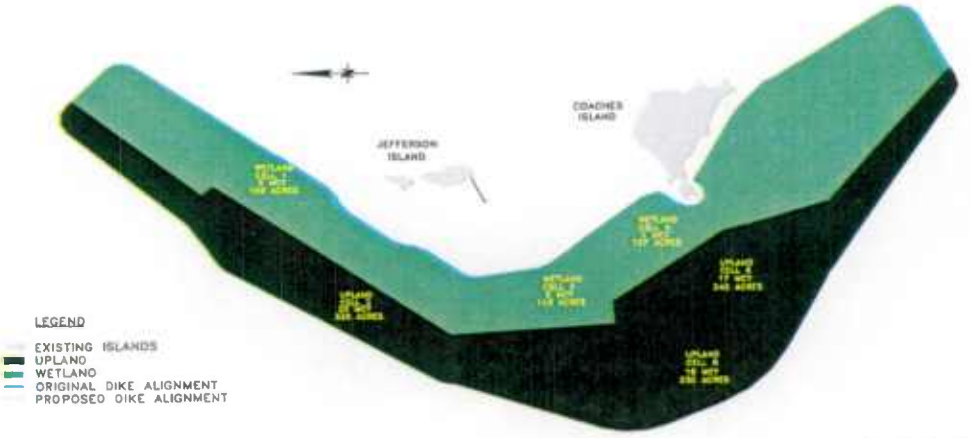
HIGH PRIORITY FOR STUDY

NEAR TERM

Poplar Island Modification

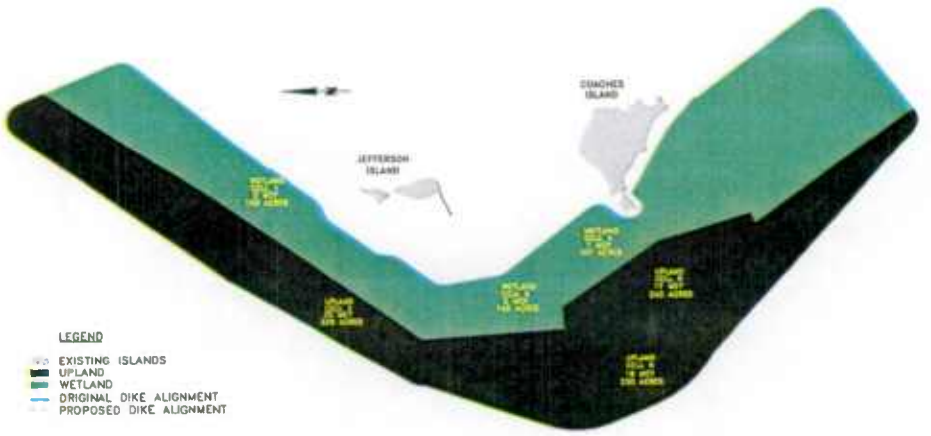

COACHES ISLAND
JEFFERSON ISLAND
LEGEND
EXISTING ISLANDS
UPLAND
WETLAND
ORIGINAL DIKE ALIGNMENT
PROPOSED DIKE ALIGNMENT
CONCEPT 5
UPLAND CELLS: 941 ACRES 67.4 MCY
WETLAND CELLS: 941 ACRES 14.8 MCY
TOTAL : 1,882 ACRES 82.2 MCY
POPLAR ISLAND
HABITAT RESTORATION
CONCEPT 5
OPTION 1


COACHES ISLAND
JEFFERSON ISLAND
LEGEND
EXISTING ISLANDS
UPLAND
WETLAND
ORIGINAL DIKE ALIGNMENT
PROPOSED DIKE ALIGNMENT
CONCEPT 5
UPLAND CELLS: 941 ACRES 66.5 MCY
WETLAND CELLS: 941 ACRES 15.5 MCY
TOTAL : 1,882 ACRES 82.0 MCY
POPLAR ISLAND
HABITAT RESTORATION
CONCEPT 5
OPTION 2



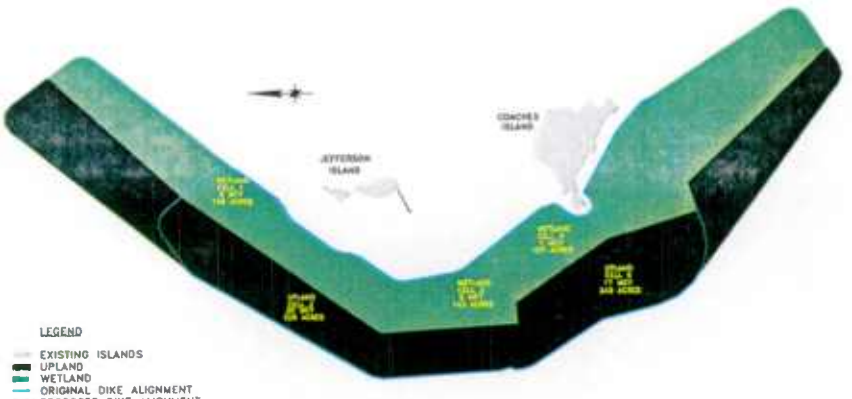
CONCEPT 5
UPLAND CELLS: 941 ACRES 67.6 MCY
WETLAND CELLS: 941 ACRES 13.0 MCY
TOTAL : 1,882 ACRE 80.8 MCY

POPLAR ISLAND
HABITAT RESTORATION
CONCEPT 5
OPTION 3



CONCEPT 5
UPLAND CELLS: 1,129 ACRES 83.4 MCY
WETLAND CELLS: 1,129 ACRES 18.3 MCY
TOTAL : 2,258 ACRES 101.7 MCY

POPLAR ISLAND
HABITAT RESTORATION
CONCEPT 5
OPTION 4



LEGEND

- EXISTING ISLANDS
- UPLAND
- WETLAND
- ORIGINAL DIKE ALIGNMENT
- PROPOSED DIKE ALIGNMENT

CONCEPT 5		
UPLAND CELLS:	941 ACRES	69.5 MCY
WETLAND CELLS:	941 ACRES	12.9 MCY
TOTAL :	1,882 ACRES	82.4 MCY

POPLAR ISLAND
HABITAT RESTORATION
CONCEPT 5
OPTION 5

Poplar Island Modification

Option: Extension of the existing beneficial use island restoration project. Approximately five to six years developmental time frame.

Location: Eastern side of Chesapeake Bay in Talbot County, northwest of Tilghman Island.

Study Ranking: High Priority for Study, Near Term

Study Status: Conceptual phase based on extensive existing database.

Estimated total capacity: 48 - 69 mcy.

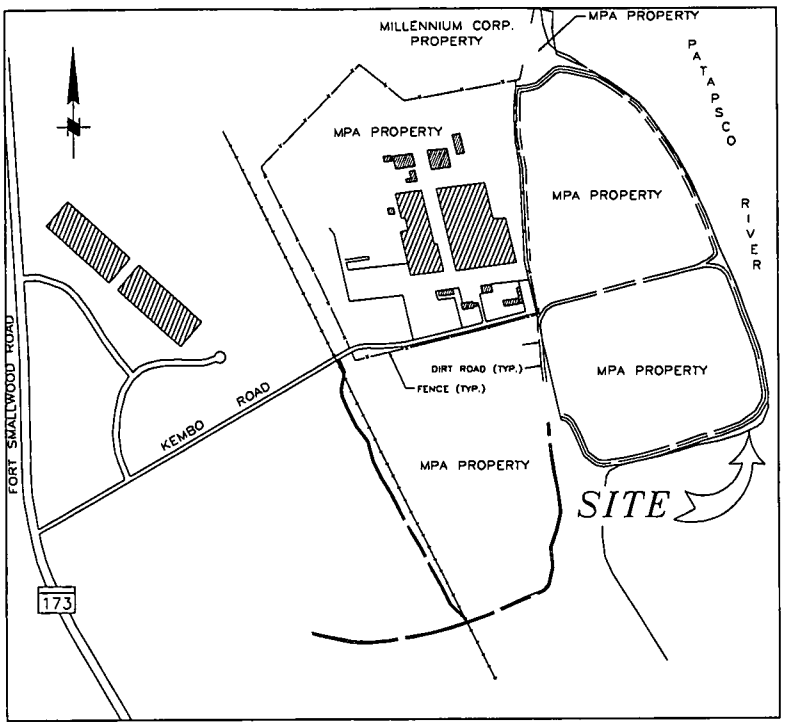
Estimated total cost (in thousands): $554,541 - $907,512
(Federal - $409,088 - $680,634; State - $136,363 - $226,878)

Estimated cost per cy: $11.00 - $14.00
(Federal - $8.00- $11.00; State - $3.00)
(Costs provided are for planning purposes only and may change)

HIGH PRIORITY FOR STUDY

MID TERM

Innovative Use Site - Cox Creek



Cox Creek - Innovative Use

Option: The use of innovative technologies to produce an environmentally suitable and marketable product from contaminated and clean dredged material. The estimated time frame for technology development for 100,000 cubic yard capability is 2 – 5 year. The minimum capability goal is 500,000 cubic yards per year with a target goal of 2 million cubic yards per year.

Location: Cox Creek for processing and variable use locations. Cox Creek is located southwest side of Patapsco River, approximately one mile southeast of the Francis Scott Key Bridge, in Anne Arundel County.

Study Ranking: High Priority for Study, Mid Term

Study Status: Phase I evaluation (Bench Scale) is nearing completion. Several vendors are participating. Vendors could have the option of moving to Phase II (Pilot Phase), or Phase III (Demonstration Phase with MPA approval). MPA is also preparing an RFP for innovative use of clean material.

Estimated total capacity: Indefinite

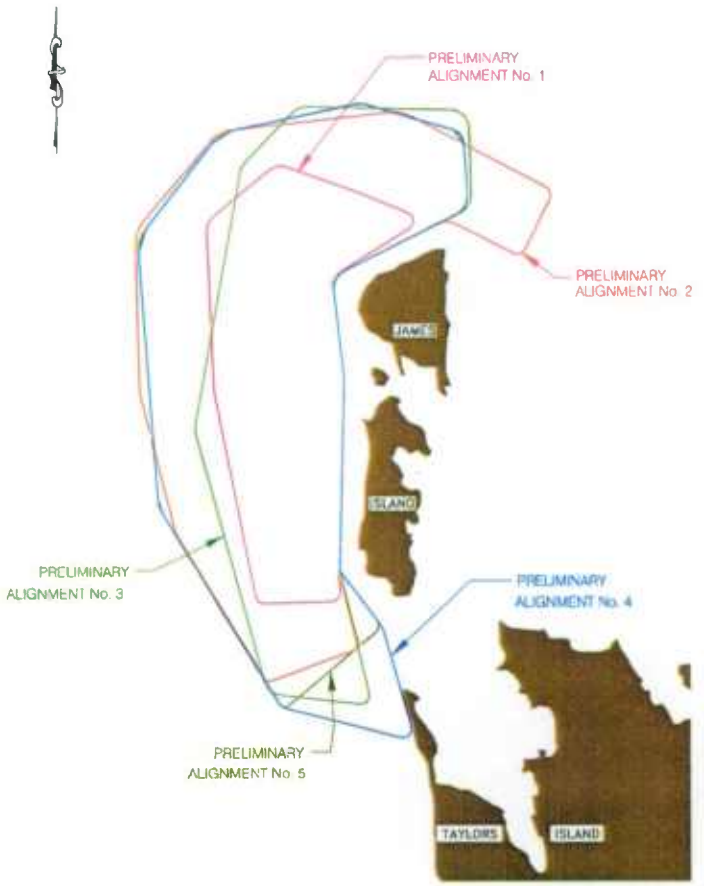
Estimated total cost (in thousands): $12,673 - $30,000
(Federal - $9,505; State - $3,168)

Estimated cost per cy: $25.00 - $35.00
(Costs are dependent on the technology chosen.)
(Costs provided are for planning purposes only and may change)

HIGH PRIORITY FOR STUDY

LONG TERM

James Island Beneficial Use



James Island

Option: Beneficial use/island restoration site. Developmental timeframe of at least 10 years.

Location: Island remnants located approximately one mile northwest of Taylors Island, at the mouth of the Little Choptank River, in Dorchester County.

Study Ranking: High Priority for Study, Long Term

Study Status: Conceptual studies nearing completion. Pre-feasibility studies are underway. Study completion is expected in winter 2002.

Estimated total capacity: 24 to 82 mcy

Estimated total cost (in thousands): $371,550 - $1,221,446
(Federal - $278,663 – 916,100; State - $92,887_305,366)

Estimated cost per cy: $14.78 - $15.91
(Federal - $11.09 – $11.93; State $3.69 – $3.98)
(Costs provided are for planning purposes only and may change)

LOWER PRIORITY FOR STUDY

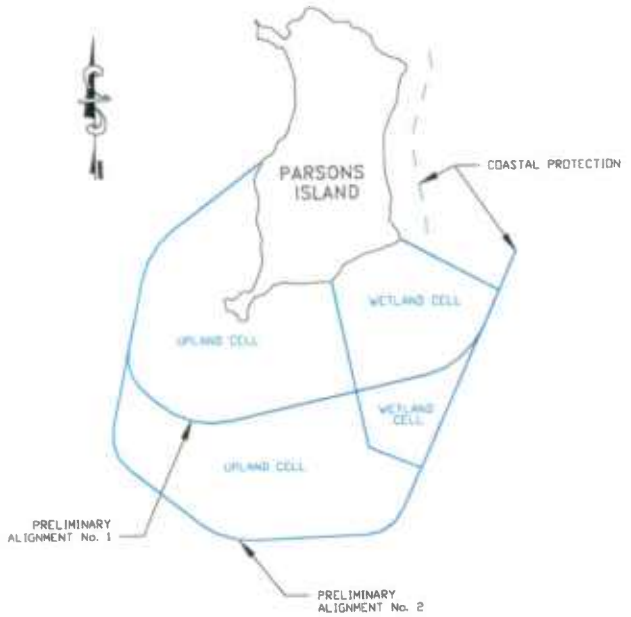
MID TERM

Parsons Island Beneficial Use

Lower Eastern Neck Island Beneficial Use

Furnace Bay

Ocean Placement



Parsons Island

Option: Beneficial use island restoration. An estimated developmental timeframe of at least 3 to 7 years.

Location: Remnant island in Eastern Bay in Queen Anne's County, south of the Kent Narrows.

Study Ranking: Lower Priority for Study, Mid Term

Study Status: Conceptual studies nearing completion. Study completion expected in spring 2002.

Estimated total capacity: 4.4 to 11.5 mcy

Estimated total cost (in thousands): $98,806 - $222,028
(Federal - $74,104 – $166,521; State - $24,702 – $55,507)

Estimated cost per cy: $19.29 - $ 22.25
(Federal - $14.47 – $16.69; State - $4.82 - $5.56)
(Costs provided are for planning purposes only and may change)

Lower Eastern Neck Island Beneficial Use

Option: Beneficial use wetland restoration and shoreline stabilization project. An estimated developmental time frame of at least 3 to 10 years.

Location: In Kent County, on the northeast side of the mouth of the Chester River, northeast of the northern end of Kent Island.

Study Ranking: Lower Priority for Study, Mid Term

Study Status: Concept study nearing completion. Study completion expected in spring 2002.

Estimated total capacity: 3.5 to 5.1 mcy.

Estimated total cost (in thousands): $91,794 - $121,000
(Federal - $68,845 - $90,825; State - $22,949 - $30,275)

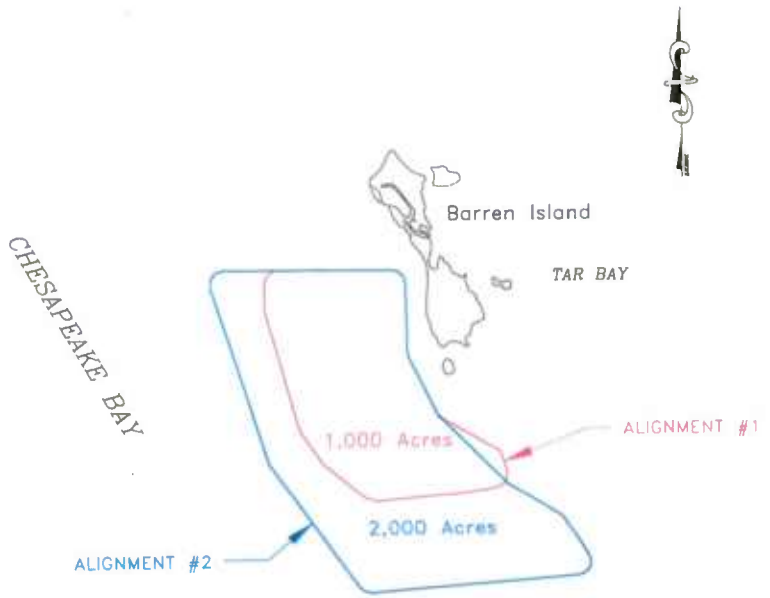
Estimated cost per cy: $23.32 - $26.15
(Federal - $17.49 - $19.61; State - $5.83 - $6.54)
(Costs provided are for planning purposes only and may change)

LOWER PRIORITY FOR STUDY

LONG TERM

Barren Island Beneficial Use

Holland Island Beneficial Use



Barren Island

Option: Beneficial use/island restoration site. An estimated development timeframe of at least 10 years.

Location: Island is located in Dorchester County, immediately west of Upper Hooper Island and east of the mouth of the Patuxent River.

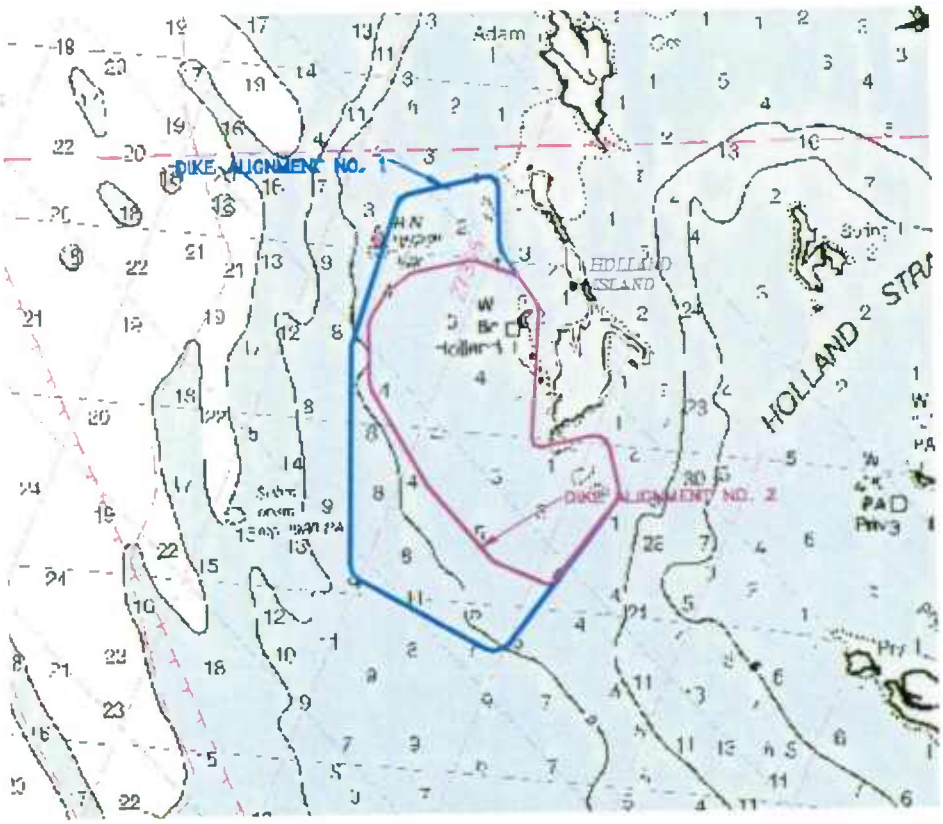
Study Ranking: Lower Priority for Study, Long Term

Study Status: Conceptual study in progress. Study completion anticipated for summer 2002.

Estimated total capacity: 22 to 74 mcy

Estimated total cost (in thousands): $369,999 – $1,217,448
(Federal - $277,499 - $913,086; State - $92,500 - $304,362)

Estimated cost per cy: $16.41 - 17.21
(Federal - $12.31 – $12.91; State - $4.10 - $4.30)
(Costs provided are for planning purposes only and may change)



Holland Island

Option: Beneficial use/island restoration site. An estimated developmental time frame of at least 10 years.

Location: Eastern side of middle Bay, northeast of the mouth of the Potomac River, in Dorchester County.

Study Ranking: Lower Priority for Study, Long Term

Study Status: Conceptual studies underway. Study completion expected in summer 2002.

Estimated total capacity: 22 - 63 mcy

Estimated total cost (in thousands): $413,267 – 1,129,479
(Federal - $309,950-$847,109; State - $103,317-$282,370)

Estimated cost per cy: $17.93 - $18.79
(Federal - $13.45 - $14.09; State - $4.48 - $4.70)
(Costs provided are for planning purposes only and may change)

NOT FEASIBLE AT THIS TIME

LONG TERM

Aberdeen Proving Grounds

Sparrows Point

STATE OF MARYLAND

DREDGED MATERIAL MANAGEMENT PROGRAM (DMMP)
PROPOSED OPTIONS

PRELIMINARY TECHNICAL RESULTS
INTERIM REPORT TO THE

BAY ENHANCEMENT WORKING GROUP

February 15, 2002

PREPARED BY: MARYLAND ENVIRONMENTAL SERVICE

MPA CONTRACT NO. 500912
MPA PIN NO. 600105P

Table of Contents

List of Figures

List of Acronyms

CBP	Chesapeake Bay Program
C&D Canal	Chesapeake and Delaware Canal
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CY	Cubic Yards
DMCF	Dredged Material Containment Facility
DMMP	Dredged Material Management Program
DNR	Department of Natural Resources (Maryland)
DO	Dissolved Oxygen
EFH	Essential Fish Habitat
ENI	Eastern Neck Island
HAPC	Habitat of Particular Concern
LENI	Lower Eastern Neck Island
MCY	Million Cubic Yards
MDE	Maryland Department of the Environment
MES	Maryland Environmental Service
MHT	Maryland Historic Trust
MLLW	Mean Low Lower Water
MLW	Mean Low Water
MPA	Maryland Port Administration
NEPA	National Environmental Policy Act
NOB	Natural Oyster Bars
NOEL	No Observed Effects Level
NPL	National Priorities List
NTU	Nephelometric Turbidity Units
PEL	Probable Effects Level
PIERP	Poplar Island Environmental Restoration Project
PPT	Parts per Thousand
RFP	Request for Proposals
RTE	Rare, Threatened, and Endangered Species
SAV	Submerged Aquatic Vegetation
SHPO	State Historic Preservation Officer
SSPRA	Sensitive Species Project Review Area
UMCES	University of Maryland Center for Environmental Science
USFWS	United States Fish and Wildlife Service
UXO	Unexploded Ordinance
VIMS	Virginia Institute of Marine Science

Salinity	
Oligohaline	0.5-5ppt
Mesohaline	5-18 ppt
Polyhaline	18-35 ppt
Euhaline	>35 ppt

1.0 INTRODUCTION

Purpose: This interim report was compiled to serve as an information resource for use by the Maryland Port Administration's (MPA) Dredged Material Management Program (DMMP). It was prepared at MPA's direction by the Maryland Environmental Service (MES). It is intended to provide participants in the DMMP's Bay Enhancement Working Group (BEWG) with preliminary study information from the proposed placement option studies that are now in progress. The specific purpose of the report is to make technical information available on the 27 options now being studied as potential placement options under the DMMP. The studies are ongoing, but this data is provided as a basis for the screening of options for further study.

Objective: This interim report is designed to serve as a resource in support of the placement option screening process and the matrix evaluating each placement option for a wide variety of environmental factors. It assembles and provides preliminary findings to date for major elements of the studies in progress. The materials presented in this status report are subject to change as studies are completed and additional information and analysis becomes available. As options are screened and evaluated for further study, the information in this report can support the assignment of resource values to each option and enable comparison of the options for a wide range of factors. Ultimately this will result in the selection of those options recommended for further study as part of a State of Maryland Dredged Material Management Plan.

Information Sources: This report incorporates resource information from studies undertaken by MPA, MES and their contractors. Furthermore, literature search and review and collective project team knowledge on site-specific issues was also included.

Report Layout: This report is assembled with similar options grouped together in sections. A map of the options in each section is provided at the beginning of each section. Each option is described for a series of engineering and environmental factors. Varying levels of information are available on each option. In describing each option, there was a strong focus on the consistent application of the data available to enable comparative analysis of each option. The types of options include:

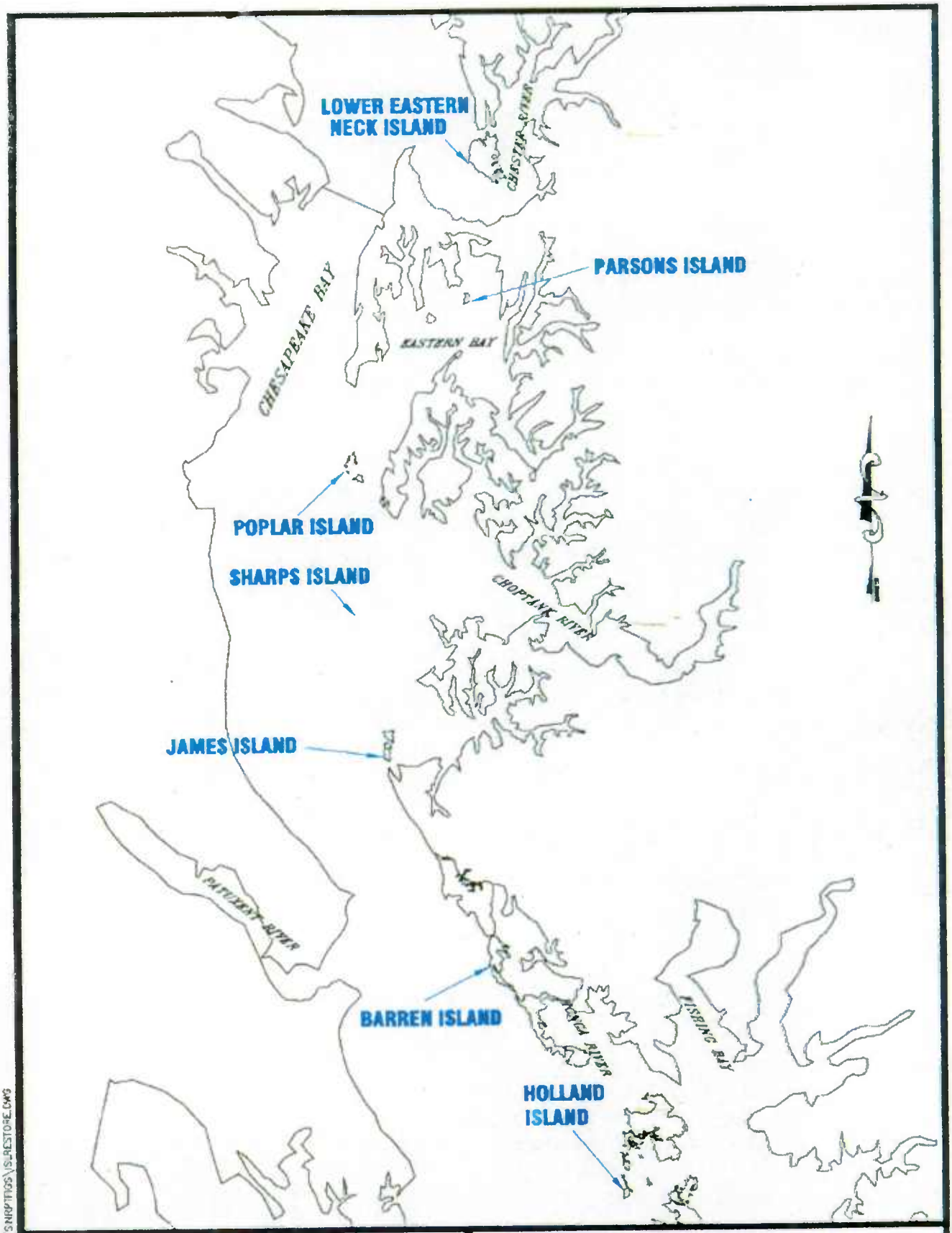
- **Island Restoration Options** – This type of option involves restoring islands in the Chesapeake Bay that are now subject to erosion and land loss. Some islands have been reduced to remnants of just a few acres; others still contain large acreage, but are continuing to experience erosion. All island restoration options include wetland components, most also include upland components. Restoration of eroding islands is generally supported by some resource agencies as a means of preserving secluded habitat areas for waterfowl and waterbirds, which is becoming increasingly rare in the Chesapeake Bay.
- **Upper Bay Island Placement Options** – In response to a request from the Maryland State Legislature, MPA used their working group process to identify and evaluate four sites with seven potential island configurations as part of a significant study effort in 1998. These seven options were each designed as island creation sites. Originally there was no beneficial use component included in the design. MPA has directed that an as-

yet-to-be determined beneficial use component be added to each site design. Since the study of the original four areas, one other area has been added for study.

- **Inner Harbor Placement Options** – The Inner Harbor Placement Options are all located within the Inner Harbor of Baltimore. Placement sites within the Inner Harbor are a high priority for study due to the need for separate placement capacity for dredging performed within the Inner Harbor.
- **New Development Options** – MPA has initiated the study and development of new, or non-traditional options for the management of dredged material. These options include various innovative uses of dredged material: as a feedstock for product manufacture; as reclamation material for mine sites; and to improve marginal agricultural land.
- **Other Options** – Several options do not fit in the above categories. These include Aberdeen Proving Ground, upland placement at C&D Canal upland sites in Maryland, Ocean Placement and a beneficial use project at Sparrows Point in the Inner Harbor.

2.0 ISLAND RESTORATION OPTIONS

Barren Island
Holland Island
James Island
Lower Eastern Neck Island
Parsons Island
Poplar Island Modification



MARYLAND ENVIRONMENTAL SERVICE

ISLAND RESTORATION OPTIONS
VICINITY MAP
FIGURE 1

J:\STRATGICPLAN\SNAPTIGS\ISLRESTORE.CWS

2.1 BARREN ISLAND

SUMMARY: Barren Island is a satellite refuge of the Blackwater National Wildlife Refuge, located in Dorchester County, off the western shore of Hooper Island. The island, owned by USFWS, is currently 175 acres in size, but has lost an estimated 78% of its area since 1848 at a rate of approximately 2.4 to 3.4 acres/yr. In an effort to prevent further erosion, the U.S. Army Corps of Engineers installed bulkheads and geotubes along a portion of Barren's northern and western shores. In 2001, an 11-acre marsh was constructed on the western shore using dredged material from local channels. Barren Island is a remnant island being considered for a beneficial use/ habitat restoration site to be restored with a 50/ 50 ratio of upland to wetland areas.

Geotechnical Engineering:

- Geotechnical Conditions: Coastal Plain Physiographic Province consisting of dark gray to gray brown silt or clay mixed with beds of sand.
- Borrow Source Potential: Studies indicate that adequate sand is available to construct the dikes for a habitat restoration facility.
- Foundation Conditions: Foundation conditions appear to be acceptable to build the island habitat restoration dikes. It is anticipated that some soft areas will need to be undercut and backfilled with sand during construction of the dikes.

Coastal Engineering:

- Coastal Conditions: Mean tide level in the vicinity of Barren Island is approximately 0.8 ft above MLLW, and the mean tidal range is 1.4 ft. Design wind speed calculations for the predominant wind directions range from 32 mph for 5 year storm events to 97 mph for 100 year storm events. Wave heights range from 1 foot, arriving from the east, for 5 year events; to 11.3 feet, arriving from the south, for 100 year events.

Environmental:

Water Quality:

- Dissolved Oxygen: Dissolved oxygen levels at nearby monitoring stations indicate healthy levels to depths of 7 feet.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: Potential for erosion and turbidity is greatest along the northern and western shores.
- Salinity: Mesohaline, 5-18 ppt.
- Ground Water: Clay bottom provides the assumption that groundwater would not be impacted by the placement of dredged material at this beneficial use site.
- Surface Water: No streams, rivers or tributaries in the vicinity are expected to be effected.
- Water quality: The reported water quality is generally good. Over the past 15 years, pH levels averaged 7.6-8.4.

Aquatic Invertebrates:

- Benthic Community: No benthic surveys for the vicinity of Barren Island were performed for the current level of study, however any benthos in the concept area will be lost.
- Shallow Water Habitat: Shallow water surrounds Barren Island, and is generally shallowest on the eastern side of the island. Average water depths around the shoreline are 3 ft on the east side, 4.8 ft to the south, 9 ft to the west, and 7 ft on the northern side.
- SAV: Information is available from 1991-2000; during those years no SAV was mapped on the western side of Barren Island. SAV was mapped on the eastern shore of the island in 1991, 1992, 1993, 1999, and 2000; SAV was also observed along the eastern and southern shores of Barren Island during the October 2001 site visit. The SAV on the southern end of Barren Island may be within the concept area.

Wetlands:

- Tidal Wetlands: Tidal creek, high and low marsh areas extensive on the island, but impacts are not anticipated in these areas.
- Non-tidal Wetlands: During an October 2001 site visit, sparse non-tidal wetlands were encountered, but impacts are not anticipated in these areas.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: No finfish spawning habitat for anadromous species is found in the vicinity of Barren Island.
- Finfish Rearing Habitat: No finfish rearing habitat for anadromous species is found in the vicinity of Barren Island.
- Larval Transport: Larval transport does not appear to be a concern due to island location and shallow water. Hydrodynamic modeling not performed.
- Essential Fish Habitat: The waters in the vicinity of Barren Island are EFH to nine species of fish: windowpane flounder, bluefish, Atlantic butterfish, summer flounder, black sea bass, king mackerel, Spanish mackerel, cobia, and red drum. EFH is only likely of concern to bluefish, summer flounder and windowpane flounder.
- Commercially Harvested Species and Habitat: Commercial crabbing occurs off of the western shore of Barren Island. Two natural oyster bars (NOBs) are located to the north and east in the vicinity of the existing island remnant. DNR personnel have reported that these NOBs are no longer commercially viable; however, oyster cultch is likely to be found at these locations. Licensed pound nets are located within the concept area.
- Thermal Refuge: Due to shallow depths, it is unlikely the waters around Barren Island serve as thermal refuge.

Recreational Fishery: A popular recreational fishing area ("Barren Island Grounds") is located approximately ¼ mile from the western shore of Barren Island.

Special:

- Protected Species (RTE & SSPRA): Barren Island has historically been, and currently is, utilized by the following RTE species: bald eagles, brown pelicans, the least tern, and the black skimmer. SSPRA information was not reviewed.
- Habitat of Particular Concern: SAV beds adjacent to Barren Island may be considered HAPC for summer flounder.

Avian / Terrestrial Habitat:

- Waterfowl Use: Swan, geese, and a variety of ducks utilize the Barren Island vicinity.
- Wading and Shorebird Use: Colonial water bird rookeries are present for herons, egrets, and pelicans. Double crested cormorants also occur.
- Terrestrial Habitat and Wildlife: Terrestrial animals recorded on the island include white-tailed deer, diamondback terrapin, redbelly turtle, and small animals such as raccoon and rodents. Barren Island also provides habitat for migrating butterflies. Terrestrial habitat on Barren Island consists of a mixture of wetlands and upland forest. USFWS estimates indicate that the island is approximately 65-70% forested uplands dominated by coniferous trees (primarily loblolly pine) mixed with deciduous trees. Impacts are not anticipated in these areas.

Physical Parameters:

- Substrate Composition: Sediments consist of a mixture of sand, silt, and clay.
- Hydrodynamics: No hydrodynamic modeling studies were performed to date.
- Contaminants: No sediment sampling for contaminants has been conducted on-site; however, contaminated sediments are not believed to exist in the vicinity of Barren Island.
- CERCLA / UXO Potential: Searches of the EPA's CERCLIS database indicate that there are no CERCLA sites within the vicinity of Barren Island. There is a low potential for UXO to exist in the vicinity.
- Fossil Shell Mining: Fossil shell is not anticipated in the area.

Other:

- Recreational Value: Barren Island is owned by the USFWS and public access is prohibited.
- Aesthetics and Noise: No long-term change to the aesthetics expected for Barren Island; existing noise comes from natural sources, boating, and aircraft. Construction may temporarily change the noise level and aesthetics in the area of the western shore of the remnant island.
- Cultural Resources: The MHT lists no recorded historic or cultural resources on Barren Island; however, the island was inhabited during the pre-colonial and colonial eras. The last inhabitants of Barren Island are believed to have left in the early 1900s. A cemetery dating to the colonial era is located on the west-central part of Barren Island, and is currently eroding into the Bay.
- Navigation: Construction of the proposed project has potential to re-route some local boat traffic, but will not impede traffic in main navigation channels.
- Critical Areas: Barren Island is subject to critical areas regulations; however, restoration activities are considered to be extensions of the existing natural conditions.

Beneficial Attributes:

- Beneficial Use Wetlands: Wetland creation will be a component in the development of this option.
- Beneficial Use Uplands: Upland habitat creation will be a component in the development of this option.

- Beneficial Use Adjacent Habitat enhancement: Adjacent habitat enhancement is expected as a result of development of this option.
- Shoreline Protection: This option can be designed to provide protection to existing shorelines of the remnant island.

Environmental Concerns:

- Trade-off of replacing shallow water habitat and benthos to restore uplands and wetlands, as well as protecting Barren Island and its environmental resources.
- Possibility for short-term effects to water quality during construction, although these will be monitored and regulated as with Poplar Island Environmental Restoration Project (PIERP).
- It is possible that birds and other animals will avoid areas of the island closest to construction, although seasonal construction restrictions should minimize this, as with the Poplar Island restoration project environment.

Dredging Engineering:

- Preliminary concepts range from 1,000 to 2,000 acres.
- Other: The proposed project is reportedly technically feasible. Construction should take 2-4 years. An access channel may be required.

Other Issues:

- Local sponsor needed by Corps, as a rule cannot be another federal agency in the event the project is cost-shared.

References: Information compiled from collective study team knowledge, as well as:

Chesapeake Bay Program (CBP). 1996. High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

US Fish and Wildlife Service (USFWS). 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services.

Roy F. Weston, Inc. 2001. Draft Preliminary Assessment of Environmental Conditions on Barren Island. Prepared for Maryland Port Administration. December 2001.

Engineering, Construction, Consulting and Remediating, Inc. 2001. Draft Geotechnical Feasibility Study For Barren Island. Prepared for Maryland Port Administration. December 2001.

2.2 HOLLAND ISLAND

SUMMARY: Holland Island is located in shallow waters of southern Dorchester County, south of Bloodsworth Island, in the Chesapeake Bay. Holland Island was once one island consisting of 253 acres (1855). Since that time it has lost an estimated 66% of its area and currently consists of three remnant islands of approximately 87 acres today. Holland Island is a remnant island being considered for a beneficial use/ habitat restoration site to be restored with a 50/50 ratio of upland to wetland areas.

Geotechnical Engineering:

- Geotechnical Conditions: Coastal Plain Physiographic Province. Consists of gray to buff sand and gravel, gray to brown lignitic silt and clay, occasional boulders and shell beds. No shell beds were detected in the borings conducted at this study level.
- Borrow Source Potential: Studies indicate that adequate sand is available to construct the dikes for a habitat restoration facility.
- Foundation Conditions: Foundation conditions appear to be acceptable to build the island habitat restoration dikes. It is anticipated that some soft areas will need to be undercut and backfilled with sand during construction of the dikes.

Coastal Engineering:

- Coastal Conditions: Water depths in the area are relatively shallow, ranging between 1 and 11 ft with an average depth of 4 ft in the concept area. Mean tide range of ~1.9 ft. and extreme 100 yr water level of 6.8 ft above MLLW. Average winds of 5-10 miles per hour from north to northwest octant can approach 40 mph during a 5 yr event and 55 mph during a 100 yr event. Wave heights can exceed 5 ft in a 5 yr event and can approach 7 ft in a 100 yr event, arriving from west to northwest.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Dissolved oxygen levels at nearby CBP monitoring stations indicate healthy levels.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: Potential for erosion and turbidity greatest along northern remnant.
- Salinity: High mesohaline, 16.8 - 17.4 ppt.
- Ground Water: Clay bottom provides the assumption that groundwater would not be impacted by the placement of dredged material at this site.
- Surface Water: No surface water sources expected to be effected.
- Other: Water quality is good. Average pH levels are 7.34 – 8.12.

Aquatic Invertebrates:

- Benthic Community: No site-specific data is available; however, the benthos in the concept area will be lost.

- Shallow Water Habitat: Shallow water surrounds Holland Island. Average depths range from 0.5 ft to 5.0 ft.
- SAV: SAV information is available from 1984-1999. SAV coverage for those years around the island range from 0 – 1,379 acres. Most of the observed SAV was located on the eastern shore of the island, although SAV appears on the western shore in some years.

Wetlands:

- Tidal Wetlands: Tidal creek, high and low marsh areas are extensive on the island, however impacts are not anticipated in these areas.
- Non-Tidal Wetlands: Non-tidal wetlands are not present.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: Finfish spawning habitat for anadromous species is not found in the vicinity of Holland Island.
- Finfish Rearing Habitat: Finfish rearing habitat for anadromous species is not found in the vicinity of Holland Island.
- Larval Transport: Larval transport does not appear to be a concern due to island location and shallow water. Hydrodynamic modeling not performed.
- Essential Fish Habitat (EFH): The waters around Holland Island are EFH for nine species: windowpane flounder, bluefish, Atlantic butterfish, summer flounder, black sea bass, king mackerel, Spanish mackerel, cobia, and red drum.
- Commercially Harvested Species and Habitat: Due to shallow waters adjacent to the island, commercial fishing is limited, although there are two pound net locations in the vicinity.. Oyster populations in the area are historically low and the area blue crab populations are considered to be declining, however several commercial crab pots were observed in the shallows around Holland Island. Clamming in the vicinity of Holland Island is also reported to be limited.
- Thermal Refuge: Thermal refuge is unlikely, due to the shallows surrounding the island.
- Recreational Fishery: Due to shallow waters adjacent to the island, recreational fishing is assumed to be limited.

Special:

- Protected Species (RTE & SSPRA): Holland Island has been historically and is currently utilized by the following RTE species: bald eagles and brown pelicans. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): SAV beds around Holland Island may be considered HAPC for summer flounder; further consultation is most likely needed.

Avian/Terrestrial Habitat

- Waterfowl Use: Waterfowl such as swan, geese, and black duck use the concept area.
- Wading and Shorebird Use: Large colonial water bird rookeries are present (herons, egrets, glossy ibises, pelicans).
- Terrestrial Habitat and Wildlife: Osprey nest on the island remnants. Mammal tracks were seen on the island indicating the presence of rabbits and possibly otters. Deer have been sighted on the island. Uplands habitats include scrub shrub and upland tree stands. One

larger stand of trees is present at the southern end of the southern island. Impacts are not anticipated in these areas.

Physical Parameters:

- Substrate Composition: Sediments consist of a mixture of sand, silt, and clay.
- Hydrodynamics: No hydrodynamic studies were performed to date.
- Contaminants: No sediment sampling has been conducted on-site, however it is believed that no toxic contaminants exist.
- CERCLA/UXO Potential: Searches of the CERCLIS database indicate that the closest Superfund site is Bloodsworth Island, two miles to the north of Holland Island; due to this distance there is low potential for CERCLA or UXO issues at Holland Island.
- Fossil Shell Mining: Fossil shell resources is not anticipated in the area.

Other:

- Recreational Value: Recreation on the island is limited to residents; however, it's possible that recreational boaters, fishermen, and nature observers use the area around the island.
- Aesthetics and Noise: Existing noise comes from natural sources, boating, and aircraft. Construction of the proposed project may temporarily change the aesthetics on the western shore of Holland Island.
- Cultural Resources: Three sites on Holland Island (house remnants, cemeteries, and a pier) are registered with the MHT; however, un-recorded sites may exist. A house and cemetery that are not recorded at MHT are also present on the island. The location of the pier and un-recorded graveyard is uncertain and there is a possibility of submerged graves in the area.
- Navigation: Construction of the proposed project has potential to re-route some local boat traffic, but will not impede traffic in main navigation channels.
- Critical Areas: Holland Island is subject to critical areas regulations; however, restoration activities are considered to be extensions of the existing natural conditions.

Beneficial Attributes:

- Beneficial Use Wetlands: Wetland creation will be a component in the development of this option.
- Beneficial Use Uplands: Upland habitat creation will be a component in the development of this option.
- Beneficial Use Adjacent Habitat enhancement: Adjacent habitat enhancement is expected as a result of development of this option.
- Shoreline Protection: This option can be designed to provide protection to the existing island.

Environmental Issues:

- Replacing shallow water habitat and impacting benthos to restore uplands and wetlands and to protect Holland Island and its environmental resources including wetlands, heron rookeries, and upland habitat.
- Currently western shoreline is eroding at an unknown rate. Possibility for short-term effects to water quality, although these will be monitored and regulated as with PIERP.

- It is possible that birds and other animals will avoid areas of the island closest to construction, although seasonal construction restrictions should minimize this, as with PIERP.

Dredging Engineering:

- Concepts range between 930 to 1,639 acres.
- Construction Issues: Technically feasible. Construction 2-4 years. Distance from dredging sites to beneficial use site may be a disadvantage. An access channel would be required.

Other Issues:

- Holland Island is privately owned. A foundation established by the owners is attempting to find partners for saving the existing remnants and habitat. Private property ownership and partnership with public agencies is an issue that would need to be resolved for a project to move forward.

References: Information compiled from draft environmental reports and collective study team knowledge, as well as:

Chesapeake Bay Program (CBP). 1996. High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group.

Environmental Construction Consulting Remediation, Inc. (E2CR). Draft Geotechnical Report for Reconnaissance Study of Holland Island. December 2001.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Gahagan & Bryant Associates, Inc (GBA). Draft Reconnaissance Study for Dredged Material Placement Site Construction at Holland Island. January 2002.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

Michael Baker Jr., Inc. (BAKER) Draft Environmental Conditions Report for Reconnaissance Study at Holland Island. November 2001.

Offshore & Coastal Technologies, Inc. (OCTI). Revised Draft Coastal Engineering Investigation for Reconnaissance Study of Holland Island. December 2001.

US Fish and Wildlife Service (USFWS). 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services.

2.3 JAMES ISLAND

SUMMARY: James Island is located in Dorchester County at the mouth of the Little Choptank River in the Chesapeake Bay. Maps from the 18th century show that James Island was connected to the mainland by Taylors Island. By 1847, the connection with Taylors Island was nearly breached and James Island was estimated to be 976 acres in size and consisting of upland and fringe marsh. James Island currently consists of three remnants and is less than 100 acres in size. It is separated from Taylors Island by ~1 mile of shallow open water. James Island is a remnant island that is being considered for a beneficial use/ habitat restoration site to be restored with a 50/50 upland to wetland ratio.

Geotechnical Engineering:

- Geotechnical Conditions: Preliminary information indicates that the subsurface conditions generally consist of sand at the surface. The thickness of surface sand layers varies from 5 - 40+ ft, but average 5 - 15 ft. Clay is present near the surface in localized areas.
- Borrow Source Potential: Preliminary information indicates sufficient borrow source is available for habitat restoration dike creation.
- Foundation Conditions: Preliminary information indicates that suitable foundation conditions exist to build a habitat restoration site. It is anticipated that some soft areas will need to be undercut and backfilled with sand during construction of the dikes.

Coastal Engineering:

- Coastal Conditions: Mean tide ranges up to 1.7 ft in the area of James Island with extreme 100-year water level of 5.7 ft MLLW. Wind directions are from the north, northeast, south and northwest with ranges approaching 40 mph during 5-year return periods and upwards of 81 mph during a 100-year return period. Largest waves originate from N, NE, S and NW directions. Wave heights can exceed 8 ft in a 5-year event and 12 feet in a 100-year event.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Dissolved oxygen levels do not drop below the minimum oxygen level requirement for SAV and aquatic species.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: Turbidity plumes are caused by erosion of island remnants.
- Salinity: Mesohaline, ranging from 7.34 - 17.22 ppt
- Ground Water: No impacts are anticipated from creation of a beneficial use site.
- Surface Water: No surface waters are expected to be effected.
- Other: Water quality is generally good and does not appear to undergo any unusual seasonal changes. pH levels range from 7.8 - 8.68.

Aquatic Invertebrates:

- Benthic Community: The 1999 B-IBI scores from the shallows northeast of James received a 2.33 score indicating a degraded environment. Any benthos in the concept area will be lost.
- Shallow Water Habitat: Shallow water is extensive around James Island. Water depths range from 2 to 8 ft with an average of 5.8 ft in the concept areas.
- SAV: SAV information was available from 1994-2000. SAV was present only during 1999 and was located along the eastern shore of the island outside the concept area. Historical SAV data was not reviewed for this report.

Wetlands:

- Tidal Wetlands: Tidal creek, high and low marsh areas exist on the island. Impacts are not anticipated in these areas.
- Non-tidal Wetlands: Non-tidal wetlands exist on the northern remnant of the island. Impacts are not anticipated in these areas.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: Finfish spawning habitat for anadromous species is not found in the vicinity of James Island.
- Finfish Rearing Habitat: The mouth of the James River is known to support anadromous fish runs.
- Larval Transport: Larval transport does not appear to be a concern due to island location and shallow water.
- Essential Fish Habitat (EFH): The waters around James Island are EFH for nine species. These species are windowpane flounder, bluefish, Atlantic butterfish, summer flounder, black sea bass, king mackerel, Spanish mackerel, cobia, and red drum.
- Commercially Harvested Species and Habitat: Due to shallow waters adjacent to the island, commercial fishing is limited. However, commercial fishing for oysters, soft-shell clams, blue crabs, and finfish are known to occur in the general vicinity of James Island. There are three NOBs that are fished near James Island. Soft-shell clams are not likely to be fished in the area. Crab pot fields were observed on the northern and southern ends of James Island. No commercial fishing vessels or nets were observed in the immediate vicinity of the island during the site visit.
- Thermal Refuge: Thermal refuge is unlikely, due to the shallows surrounding the island.
- Recreational Fishery: Waters within the concept area may be used for recreational fishing.

Special:

- Protected Species (RTE & SSPRA): Bald eagles and brown pelicans, both RTE species, historically and currently utilize James Island. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): SAV beds around James Island may be considered HAPC for summer flounder; further consultation is needed.

Avian/Terrestrial Habitat:

- Waterfowl Use: Frequented by waterfowl species such as Canada geese, and potentially used for over wintering habitat.

- Wading and Shorebird Use: Potential nesting habitat for colonial birds.
- Terrestrial Habitat and Wildlife: James Island is primarily forested, consisting of coniferous and deciduous trees with a shrub under story. A bermed wet meadow is present on the northern remnant. Species observed during site visits or potentially present according to DNR include: small mammals such as sika deer and muskrats, diamondback terrapins, river otter, hawks, osprey, and migrant songbirds. Impacts are not anticipated in these areas.

Physical Parameters:

- Substrate Composition is primarily sand with some clay pockets underlying the sand.
- Hydrodynamics: Hydrodynamic studies are underway. No results are available as of yet.
- Contaminants: Sediment sample analysis is underway. No results are available, however contaminated sediments are not believed to exist in the vicinity of James Island.
- CERCLA/UXO Potential: Preliminary studies have shown that no hazardous, toxic or radioactive substances exist around James Island. The CERCLIS database indicates that the closest Superfund site is 15 miles northeast of James Island. Due to this distance there is low potential for CERCLA issues at James Island. Due to its distance from the closest military target range, there is low potential for UXO at James Island.
- Fossil Shell Mining: Fossil shell mining information was not reviewed for this report.

Other:

- Recreational Value: James Island is privately owned and used recreationally by the owners for duck hunting and possibly fishing; it is not opened to the public. However the waters in the vicinity of James Island are used for recreational fishing and boating purposes.
- Aesthetics & Noise: Potential to impact the view sheds from the mainland. Current sound sources come from predominantly natural sources. Anthropogenic sounds include passing boats and possibly planes.
- Cultural Resources: There are four recorded archeological sites along the eastern shore of the remnant islands, not in the concept area.
- Navigation: Construction of the proposed project has potential to re-route some local boat traffic, but will not impede traffic in main navigation channels.
- Critical Areas: James Island is subject to critical areas regulations; however, restoration activities are considered to be extensions of the existing natural conditions.

Beneficial Attributes:

- Beneficial Use Wetlands: Wetland creation will be a component in the development of this option.
- Beneficial Use Uplands: Upland habitat creation will be a component in the development of this option.
- Beneficial Use Adjacent Habitat enhancement: Adjacent habitat enhancement is expected as a result of development of this option.
- Shoreline Protection: This option can be designed to provide protection to the existing island.

Environmental Concerns:

- Environmental trade offs are estimated to be similar to Poplar Island.

- This project has the potential for environmental improvements through restoration of habitat that has been decreasing in the Bay.
- It will provide physical protection to shorelines to the east and southeast.

Dredging Engineering:

- Concept area ranges from 978 to 2,072 acres in size.
- Construction Issues: Construction schedule for James Island is 1-3 years depending on borrow method used.

Other Issues:

- James Island is privately owned. Private property ownership and partnership with public agencies is an issue that would need to be resolved for a project to move forward.

References: Information compiled from draft environmental reports and collective study team knowledge, as well as:

Chesapeake Bay Program (CBP). 1996. High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

Maryland Environmental Service (MES), Gahagan & Bryant Associates, Inc. (GBA), Moffatt and Nichol Engineers (MNE), Maryland Geological Survey (MGS). 2001. Draft Conceptual Report, James Island Beneficial Use of Dredged Material. Prepared for Maryland Port Administration. November 2001.

Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

US Fish and Wildlife Service (USFWS). 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services.

2.4 LOWER EASTERN NECK ISLAND

SUMMARY: The southwestern portion of Eastern Neck Island (ENI), a federally managed National Wildlife Refuge, is being considered as an option. This option is called Lower Eastern Neck Island (LENI). LENI is located in Kent County, just north of Kent Island at the mouth of the Chester River. LENI is an island being considered for beneficial use/ habitat restoration through restoration of wetlands. No upland component is under consideration.

Geotechnical Engineering:

- Geotechnical Conditions: Soils contain sand, clay, gravel and peat.
- Borrow Source Potential: Adequate sand appears to be available to build the habitat restoration dikes.
- Foundation Conditions: Foundation conditions appear to be acceptable to build the habitat restoration dikes. It is anticipated that some soft soil areas will need to be undercut for creation of the dikes.

Coastal Engineering:

- Mean tidal range of 0.7 ft - 0.9 ft and extreme 100 yr water level of 7.8 ft above MLLW. Winds from northwest direction can approach 54 mph during 5 yr event Winds can approach 97 mph during a 100 yr event from the southwest. Wave heights can exceed 6.2 ft in a 5 yr event and can approach 8.9ft in a 100 yr event, arriving from the northwest direction. Currents range from 0.6 - 0.8 ft/sec.
- The beach along the northwestern shore of ENI is covered with stone riprap and protected by segmented breakwaters.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Dissolved oxygen levels at nearby monitoring stations indicate healthy levels following normal seasonal patterns.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: Turbidity results from erosion of the shoreline, however the majority of the erosion has been stopped through addition of breakwaters along the northwestern shoreline.
- Salinity: 3.24 – 13.19 ppt.
- Ground Water: Clay bottom indicates that groundwater would not be impacted by the placement of dredged material at this site. Several wells exist on the island.
- Surface Water: No impacts to surface water sources are expected.
- Other: Water quality is good. Average pH levels are 7.5-8.6.

Aquatic Invertebrates:

- Benthic Community: The benthic community in nearby study areas indicated that the benthos are in good health. Any benthos in the concept area will be lost.

- Shallow Water Habitat: Water depths in the area are relatively shallow, ranging between -1 and -6 ft MLLW, with an average depth of -4 ft MLLW in the concept area.
- SAV: SAV information is available from 1992-2000. SAV coverage for those years is predominately along the northern shoreline and extends somewhat along the northwestern and northeastern shorelines. SAV occurs in a southwestern cove (between Cedar Pt and Narrows Pt) adjacent to the preliminary concept area in 5 of the 9 years for which data is available. However, the preliminary concept area would not directly affect the cove.

Wetlands:

- Tidal Wetlands: 1,000 acres of brackish tidal marsh exist around the island, some of which occur along the southwestern shoreline.
- Non-Tidal Wetlands: Non-tidal wetlands are not present.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: Finfish spawning habitat for anadromous species is not likely.
- Finfish Rearing Habitat: The mouth of the Chester River is finfish rearing habitat for anadromous species.
- Larval Transport: Larval transport does not appear to be a concern due to island location and shallow area of shelf under consideration.
- Essential Fish Habitat (EFH): The waters around LENI are EFH for seven species. These species are windowpane flounder, bluefish, summer flounder, king mackerel, Spanish mackerel, cobia, and red drum.
- Commercially Harvested Species and Habitat: The area in the vicinity of LENI in general supports commercial fishing for oysters, soft-shell clams, and finfish. There are 6 NOBs in the vicinity of LENI, which are productive in terms of growth, but not reproduction. No NOBs are present within the concept area. The lower Chester River supports a modest commercial harvest, partially supported by the shelf/shallow near-shore area west of LENI and could lie within the proposed concept area. Blue crabs support a dominant fishery in the entire Chester River. The primary harvest comes from trotlines. It is not known how the area surrounding LENI compares with the rest of the river. Blue crabs over winter in the Chester River at average depths of 40 ft. White perch and striped bass dominate the finfish harvest in the lower Chester River, which is actively fished. The primary harvest came from gill nets, fyke nets, and hook and line. Other finfish species harvested include: catfish, eels, gizzard shad, and menhaden. There are 6 licensed pound nets approximately ¾ to one mile off of the western side of the island.
- Thermal Refuge: Thermal refuge is unlikely, due to the shallows surrounding the island.
- Recreational Fishery: Occurs around the island.

Special:

- Protected Species (RTE & SSPRA): The following RTE are present on the island: least tern, and the bald eagle. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): Potential for summer flounder HAPC associated with the SAV beds.

Avian/Terrestrial Habitat:

- Waterfowl Use: Designated waterfowl concentration and staging area. 243 species of birds known to occur on ENI, waterfowl include Canada geese, tundra swans, canvasbacks, mallards, wigeons, black ducks, lesser scaups, buffleheads, pintails, green- and blue- winged teal, and redheads.
- Wading and Shorebird Use: 243 species of birds known to occur on LENI, wading and shorebirds include great blue and green backed herons and egrets.
- Terrestrial Habitat and Wildlife: This site is a national wildlife refuge. The extent of species present (both permanently and migratory) is extensive. Birds of prey include eagles, hawks, owls, and osprey. Songbirds also exist on the island. Leopard frogs, snapping turtles and diamondback terrapins have been observed, along with fox (red and gray), deer, raccoon, and muskrat. The habitat on the island includes cropland, forest, and grassland.

Physical Parameters:

- Substrate Composition: Sediments consist of a mixture of clay, silt, and sand.
- Hydrodynamics: Hydrodynamic modeling is currently underway to determine effects to water circulation and existing wetlands along the shoreline.
- Contaminants: No sediment sampling for contaminants has been conducted on-site; however, contaminated sediments are not believed to exist in the vicinity of LENI. Clarke and Murdock (1972) studying the Chester River found chlorinate hydrocarbons and PCB's in sediments but at "safe" levels. Agricultural pesticides were found at low levels.
- CERCLA/UXO Potential: Searches of the CERCLIS database indicate that there are no CERCLA sites nearby. There is low potential for UXO.
- Fossil Shell Mining: Fossil shell is not anticipated.

Other:

- Recreational Value: Recreation on the island, which is extensive due to the national wildlife refuge status, includes hunting for deer and waterfowl, wildlife observation, picnicking, and hiking. Recreational boaters, fishermen, and nature observers use the area around the island as well.
- Aesthetics and Noise: Existing noise comes from natural sources, on site equipment, visitor vehicles, boating, and aircraft. Construction of the proposed project may temporarily change the aesthetics and noise levels on the southwestern end of the island to the refuge visitors.
- Cultural Resources: 19 archeological sites have been identified on LENI. Three of these occur along the shoreline near the concept areas. A shipwreck may occur within or adjacent to the proposed concept area.
- Navigation: Impacts to navigation in the area is expected to be minimal due to the shallow nature of the adjacent waters. Barge and tug traffic to the site would need to exercise caution with boat traffic in the Chester River.
- Critical Areas: LENI is subject to critical areas regulations; however, restoration activities are considered to be extensions of the existing natural conditions.

Beneficial Attributes:

- Beneficial Use Wetlands: Wetland creation will be a component in the development of this option.

- Beneficial Use Uplands: Upland habitat creation will not be a component in the development of this option.
- Beneficial Use Adjacent Habitat enhancement: Adjacent habitat enhancement is expected as a result of development of this option.
- Shoreline Protection: Development of this option will provide protection to existing shorelines on the island.

Environmental Concerns:

- Trade-off of replacing shallow water habitat and benthos to restore wetlands, as well as protecting ENI and its environmental resources.
- Possibility for short-term effects to water quality during construction, although these will be monitored and regulated.
- It is possible that wildlife will avoid areas of the island closest to construction, although seasonal construction restrictions should minimize this.
- Potential effects to existing wetlands along shoreline.
- Potential effects to clam and crab fishery.

Dredging Engineering:

- Concepts range between 438-505 acres.

Other Issues:

- Ownership of created wetlands.
- Local sponsor needed by Corps, as a rule cannot be another federal agency.
- Potential shipwreck may occur within or adjacent to proposed site.

References: Information compiled from collective study team knowledge, as well as:

Chesapeake Bay Program (CBP). 1996. High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group.

EA Engineering, Science & Technology, Inc (EA). 2001. Final Conceptual Study of Lower Eastern Neck Island for Beneficial Use and Habitat Restoration: Environmental Conditions. August 2001.

Environmental Construction Consulting Remediation, Inc. (E2CR). 2001. Final Geological Report for Preliminary Feasibility Study, Lower Eastern Neck Island, Chesapeake Bay, Maryland. Prepared for EA Engineering, Science & Technology, Inc (EA). August 2001.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Gahagan & Bryant Associates, Inc (GBA). 2001. Conceptual/ Pre-Feasibility Study for Dredged Material Placement Site Construction at Lower Eastern Neck Island. Final Report. Prepared for EA Engineering, Science & Technology, Inc (EA). December 2001.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

Moffatt and Nichols Engineers. Lower Eastern Neck Island Coastal Engineering Investigation, Preliminary Study, Final Report. October 2001.

USFWS. 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services.

2.5 PARSONS ISLAND

SUMMARY: Parsons Island is located in Eastern Bay, just south of the Kent Narrows, in Queen Anne's County. Parsons Island is eroding at a rate of 2 – 13 feet/year along various points of the island and is projected to be completely eroded by 2058. In the early 1800's Parsons was connected to Kent Island, but by 1844 it was completely separated from the mainland. The eroding island is located in the middle of NOB 7-7. Parsons Island is a remnant island being considered for a beneficial use/ habitat restoration site to be restored with ~ 65/35 upland to wetland ratio.

Geotechnical Engineering:

- Geotechnical Conditions: Silty sand, clayey sand, and silty clay.
- Borrow Source Potential: Preliminary information indicates that sufficient sand borrow source is available to create habitat restoration dikes.
- Foundation Conditions: Preliminary information indicates that suitable foundation conditions exist to build a habitat restoration site. It is anticipated that some soft areas will need to be undercut and backfilled with sand during construction of the dikes.

Coastal Engineering:

- Coastal Conditions: Mean tide range is between 0.7 - 0.9 ft above MLLW however, 100-year return period for a storm surge can be as high as 7.5 ft above MLLW. Wind directions are from all directions and ranges can approach 54 mph during 5-year return periods and upwards of 97 mph during 100-year return period. Wave heights are the highest from the southwest direction and range for 5-year, 35 year and 100-year return period from 3.6 to 12.0 ft. Currents in the area have a maximum velocity of 0.3 ft/sec.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Dissolved oxygen levels at nearby CBP monitoring stations indicate healthy levels following normal seasonal patterns.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: Extensive erosion and turbidity plumes extend outward from Parsons Island.
- Salinity: Seasonally ranges from 9.91 - 15.47 ppt.
- Ground Water: The Aquia Group aquifers lie under Parsons Island however; it is believed that clay substrates would prevent leeching into the system. There is a well on the property and further study would be necessary to determine if the groundwater would be impacted by the project.
- Surface Water: No impacts to surface water sources are expected.
- Other: Water quality is good. The pH levels range from 7.6 - 8.3.

Aquatic Invertebrates:

- Benthic Community: No site specific information is available. The benthic community information available in the vicinity varies greatly. Any benthos in the concept area would be lost.
- Shallow Water Habitat: Shallow water surrounds Parsons Island. Water depths around the island in the project area are 0-5 ft MLLW.
- SAV: SAV mapping information is available for the following years: 1978, 1984-87, 1989 - 2000. Acres and densities of SAV vary throughout the years surveyed.

Wetlands:

- Tidal Wetlands: A few small marsh areas exist on the island, mostly on the northern end.
- Non-Tidal Wetlands: None present.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: Finfish spawning habitat is most likely not a concern for anadromous species.
- Finfish Rearing Habitat: Finfish rearing habitat is most likely not a concern for anadromous species.
- Larval Transport: Larval transport does not appear to be a concern due to island location and shallow water.
- Essential Fish Habitat (EFH): The waters around Parsons Island are EFH for seven species. They are windowpane flounder, bluefish, summer flounder, king mackerel, Spanish mackerel, cobia, and red drum.
- Commercially Harvested Species and Habitat: In the vicinity of Parsons Island commercial fishing occurs for oysters, soft-shell clams, blue crabs, and finfish. The island is located in the middle of a productive oyster bar (NOB 7-7). The bar is most productive at depths of 8 – 12 ft, which is the area most harvested. Concept areas are not located in the productive sections of the bar. DNR also plants shell in the south and southwest sections of the bar to encourage production of seed oysters used to seed other bars in the Oyster Recovery Program. Watermen who harvest the beds have reported a decrease in productivity, possibly due to increased suspended sediments from island erosion. Clamming is not permitted in the waters immediately surrounding the island to aid in the protection of the oyster bar and is unlikely to occur due to the oyster bar substrate. Eastern Bay supports a dominant blue crab fishery, primarily from trotlines. Finfish harvesting may occur in the vicinity of Parsons Island; however, the shallow depths adjacent likely preclude finfish harvesting and boating activity in the area. There are several licensed pound nets in the vicinity of Parsons. No pound nets were observed during site visits.
- Thermal Refuge: Unlikely due to the shallow waters surrounding the island.
- Recreational Fishery: Recreational fishing is limited around Parsons due to the shallow waters.

Special:

- Protected Species (RTE & SSPRA): No known RTE occur on the island. It's a possibility that bald eagles nest on the eastern side of the island, according to USFWS. Bald eagles were seen flying nearby during a site visit, but none were located on the island. SSPRA information for this site was not reviewed for this report.

- Habitat of Particular Concern (HAPC): Potential for summer flounder HAPC.

Avian/Terrestrial Habitat

- Waterfowl Use: Waterfowl concentration area and staging area. Waterfowl observed within and around island includes: canvasback ducks, black scoter, and geese.
- Wading and Shorebird Use: Colonial waterbirds are found on island, including great blue heron (nesting). Kingfisher also observed.
- Terrestrial Habitat and Wildlife: Parsons Island consists of agricultural fields, several small pockets of trees, 2 small ponds, and several buildings. Additional wildlife includes snapping turtles, diamondback terrapins, deer, raccoon, fox, killdeer, great horned owl, and osprey.

Physical Parameters:

- Substrate Composition: Sediment quality includes sand, silt and clay.
- Hydrodynamics: Hydrodynamic modeling indicates that Parsons Island will become extinct by 2058.
- Contaminants: No sediment sampling for contaminants has been conducted on-site; however, contaminated sediments are not believed to exist in the vicinity.
- CERCLA/UXO Potential: UXO highly unlikely. There is no indication of CERCLA liability.
- Fossil Shell Mining: Fossil shell resources are not anticipated in the area.

Other:

- Recreational Value: Parsons Island is privately owned and used recreationally by the owners for duck hunting and possibly fishing. The waters surrounding Parsons Island are used for recreational fishing and boating purposes but are limited due to shallow waters.
- Aesthetics and Noise: Current sounds include natural and anthropogenic sounds such as agricultural equipment, boats and possibly planes. The nearest land in this view shed is over a mile away.
- Cultural Resources: No historical sites exist.
- Navigation: Parsons does not lie within or adjacent to any federal navigation projects. Due to the shallow waters around Parsons, impacts to local traffic will be minimal.
- Critical Areas: Parsons Island is subject to critical areas regulations; however, restoration activities are considered to be extensions of the existing natural conditions.

Beneficial Attributes:

- Beneficial Use Wetlands: Wetland creation will be a component in the development of this option.
- Beneficial Use Uplands: Upland habitat creation will be a component in the development of this option.
- Beneficial Use Adjacent Habitat enhancement: Adjacent habitat enhancement is expected as a result of development of this option.
- Shoreline Protection: This option can be designed to provide protection to the existing shorelines on the remnant island. Without protection, this island will erode within 58 yrs.

Environmental Concerns:

- Trade-off of replacing shallow water habitat and benthos to restore upland and wetlands, as well as protecting island and surrounding resources.
- Protection and cessation of erosion of a historic island and deposition on NOB.
- Potential effects to some SAV, with potential for long-term stabilization of SAV.
- Potential for environmental improvements through restoration of habitat that has been decreasing in the Bay.

Dredging Engineering:

- Concepts range between 165 to 290 acres.
- Construction Issues: None identified.

References: Information compiled collective study team knowledge, as well as:

CBP. 1996. High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group.

EA Engineering, Science & Technology, Inc (EA). 2001. Final Conceptual Study of Parsons Island for Beneficial Use and Habitat Restoration: Environmental Conditions. August 2001.

Environmental Construction Consulting Remediation, Inc. (E2CR). 2001. Final Geological Report for Preliminary Feasibility Study, Parsons Island, Chesapeake Bay, Maryland. Prepared for EA Engineering, Science & Technology, Inc (EA). August 2001.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Gahagan & Bryant Associates, Inc (GBA). 2001. Conceptual/ Pre-Feasibility Study for Dredged Material Placement Site Construction at Parsons Island. Final Report. Prepared for EA Engineering, Science & Technology, Inc (EA). December 2001.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

Moffatt and Nichols Engineers. Parsons Island Coastal Engineering Investigation, Preliminary Study, Final Report. September 2001.

USFWS. 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services.

2.6 POPLAR ISLAND MODIFICATION

SUMMARY: Poplar Island is located in the upper middle Chesapeake Bay, near the confluence of Eastern Bay and Chesapeake Bay, in Talbot County, Maryland. An option is under consideration to expand the newly created Poplar Island Environmental Restoration Program (PIERP). The original PIERP footprint will consist of 550 acres of tidal wetlands and 550 acres of uplands. The Poplar Island Modification option proposes to expand the existing footprint of the PIERP island beneficial use/ habitat restoration site by 375 acres; the new proposed areas of the restored habitat will retain the 50-50 wetland to upland habitat ratio.

Geotechnical Engineering:

- Geotechnical Conditions: Geotechnical studies are ongoing.
- Borrow Source Potential: Geotechnical studies are ongoing.
- Foundation Conditions: Geotechnical studies are ongoing.

Coastal Engieering:

- *Coastal Conditions:* Mean tide level in the vicinity of Poplar Island is approximately 0.9 ft above MLLW, and the mean tidal range is 1.2 ft. Design wind speeds for a 25-year return period storm range from 47 miles per hour (mph) for the east direction to 70 mph for the southwest direction. Wave heights range from 7.0 ft arriving from the south direction to 7.2 ft arriving from the north direction for 25-year events. For a sand bottom, the Poplar island area experiences erosion while deposition occurs at the area between the island and the main deep channel. Erosion is found for the whole island area when the bottom material is clay. Under the action of a southerly wind, erosion occurs around the Coaches Island area. The modification area would be in a shallow water area. The bottom ranges in depth from –0.9 to –3 m (-3 to –10 ft) with an average depth of –1.8 m (-6 ft) MLLW.

Environmental:

Water Quality:

- Dissolved Oxygen: Concentrations vary seasonally, with overall concentrations uniform within the water column. Generally, DO values are greater than 5.0 ppt, the concentration necessary to sustain commercially important shellfish and finfish species.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: Water quality in surrounding waters is high, but wind-driven waves and currents create some turbidity. Turbidity is highest during spring and summer, but generally does not exceed levels detrimental to life stages of shellfish and finfish.
- Salinity: Mesohaline, varies between 10-15 ppt.
- Ground Water: There would be no effects on ground-water resources from use of the site.
- Surface Water: No streams, rivers, or tributaries in the vicinity are expected to be affected.
- Other: Significant water quality effects are not anticipated. The dike system recreating Poplar Harbor is anticipated to recreate conditions favorable to the growth of SAV.

Aquatic Invertebrates:

- Benthic Community: Any benthos in the concept area will be lost.
- Shallow Water Habitat: The site includes areas of shallow water habitat.
- SAV: VIMS surveys since 1994 were reviewed, and the results document no SAV beds in the shallows around Poplar Island. SAV was visually observed in Poplar Harbor (on the eastern side of PIERP) in 1995. Historic SAV was not reviewed.

Wetlands:

- Tidal Wetlands: Impacts are not anticipated in these areas.
- Non-Tidal Wetlands: Impacts are not anticipated in these areas.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: Not found in the concept area, and no impacts expected.
- Finfish Rearing Habitat: Finfish rearing habitat not generally located in the waters around Poplar Island, however, some juvenile anadromous species were found during summer surveys.
- Larval Transport: Impacts to larval transport and fish migration patterns are not expected to occur due to currents and island location.
- Essential Fish Habitat (EFH): The waters around Poplar Island are EFH for nine species. These species are windowpane flounder, bluefish, Atlantic butterfish, summer flounder, black sea bass, king mackerel, Spanish mackerel, cobia, and red drum.
- Commercially Harvested Species and Habitat: Known claming and oyster beds in the area.
- Thermal Refuge: Potential for thermal refuge habitat does not exist at the site.
- Recreational Fishery: Some minor effects on fishing activity might be caused by barge traffic over the extended time period needed to fill the cells.

Special:

- Protected Species (RTE & SSPRA): There is an eagle's nest on Jefferson and Coaches Islands. The Jefferson island nest was not used during 1999. The eagle has nested successfully at Coaches Island through construction of Phase I and Phase II. Restrictions during construction of Phase I and II have minimized impacts to nesting and rearing. Similar results would be expected during construction of any modified project. Least Terns nested on PIERP in Spring 2001, and are expected back in Spring 2002; gull-billed terns have also been observed foraging in the waters around PIERP. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): There are no documented or observed SAV beds in the concept area; therefore, there is low potential for summer flounder HAPC.

Avian and Terrestrial Habitat and Use:

- Waterfowl Use: The site is a waterfowl concentration area for dabbling ducks, sea ducks, geese, swans, loons, and coot; birds would be displaced during construction.
- Wading and Shorebird Use: Depths in the modification area preclude use by wading and shorebirds.
- Terrestrial Habitat and Wildlife: Not expected to effect terrestrial habitat.

Physical Parameters:

- Substrate Composition: Sediments range from sand to silt to hard clay.
- Hydrodynamics: Modeling is underway.
- Contaminants: No sediment sampling for contaminants has been conducted on-site; however, contaminated sediments are not believed to exist in the vicinity.
- CERCLA/UXO: Review of aerial photographs and searches of federal and state records show no historical uses related to environmental liability issues. There is low potential for UXO.
- Fossil Shell Mining: Fossil shell resources not anticipated in the area.

Other:

- Recreational Value: Some interruption of boating activity around the island would be expected because of the barge traffic over the extended time period needed to construct and fill the cells.
- Aesthetics and Noise: There is potential for aesthetic impacts.
- Cultural Resources: No cultural resources are known to occur within the proposed footprint of the expansion.
- Navigation: Use of the site would not adversely affect navigation.
- Critical Areas: The concept area is within a critical area.

Beneficial Attributes:

- Beneficial Use Wetlands: 50:50 beneficial use wetlands to uplands restoration on the order of 375 acres of wetlands and 375 acres of uplands.
- Beneficial Use Uplands: 50:50 beneficial use wetlands to uplands restoration on the order of 375 acres of wetlands and 375 acres of uplands.
- Beneficial Use Adjacent Habitat Enhancement: Adjacent habitat enhancement is expected as a result of implementation of this option.
- Shoreline Protection: Dikes can be designed to provide protection to restored shoreline.

Environmental Concerns:

- There would be environmental trade-offs associated with a footprint expansion that could be offset in the same manner as planned for the currently approved project footprint.
- Construction would be managed to minimize potential effects on an eagle nesting on Jefferson and Coaches Islands.

Dredging Engineering:

- Preliminary concepts include additional wetlands and uplands on the order of 375 acres each.
- Other: The proposed project is reportedly technically feasible. Construction should take 5-6 years.

References: Information compiled from draft environmental reports and collective study team knowledge, as well as:

CBP. 1996. High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

MDNR. 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

MGS. 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

MPA. 2001. Draft Interim Report to the Maryland General Assembly Concerning Implementation of the Dredged Material Management Act of 2001.

USFWS. 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services.

2.7 SHARPS ISLAND

SUMMARY: This option is located at the site of Sharps Island, a drowned island in the east-central portion of the Chesapeake Bay in Talbot County. The former island location is approximately 25 miles south of the Chesapeake Bay Bridge and approximately 43 miles northeast of the Potomac River. In 1848, Sharps Island had an area of approximately 438 acres, but by 1942 the island's area was reduced to approximately 10 acres due to sea level rise and exposure to coastal processes such as winds, waves and currents, resulting in erosion. By 1962, the island was completely drowned. The proposed option is an open water site being considered for a beneficial use/habitat restoration site with a 50:50 ratio of wetland to upland areas.

Geotechnical Engineering:
- Geotechnical Conditions: Geotechnical studies are underway.
- Borrow Source Potential: Geotechnical studies are underway.
- Foundation Conditions: Geotechnical studies are underway.

Coastal Engineering:
- Coastal Conditions: Depths range from 7 to almost 20 feet; further studies are underway.

Environmental Conditions:
Water Quality:
- Dissolved Oxygen: Oxygen levels in the vicinity are assumed to be at healthy levels.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: Wind driven waves and currents in the area anticipated to create locally high turbidity.
- Salinity: Sharps Island is located in the mesohaline portion of the Chesapeake Bay.
- Ground Water: There would be no effects on groundwater resources from use of the site.
- Surface Water: Not applicable.

Aquatic Invertebrates:
- Benthic Community: Any benthos in the concept area would be lost.
- Shallow Water habitat: The concept area will displace some shallow-water.
- SAV: SAV is not found in the area according to VIMS surveys from 1994 through 1999.

Wetlands:
- Tidal Wetlands: Not applicable.
- Non-Tidal Wetlands: Not applicable.

Aquatic Biology – Finfish/Shellfish:
- Finfish Spawning Habitat: Option area not believed to be anadromous finfish spawning habitat.
- Finfish Rearing Habitat: Option area may provide finfish rearing habitat.

- Larval Transport: Not expected to effect larval transport.
- Essential Fish Habitat (EFH): The waters around James Island are EFH for nine species. These species are windowpane flounder, bluefish, Atlantic butterfish, summer flounder, black sea bass, king mackerel, Spanish mackerel, cobia, and red drum.
- Commercially Harvested Species and Habitat: NOB 14-4 is is in the vicinity; the productivity of this NOB is unknown.
- Thermal Refuge: There is no potential for thermal refuge in the area.
- Recreational Fishery: The area is used for recreational fishing.

Special:

- Protected Species (RTE & SSPRA): None expected. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): As there was no documented SAV in the area, there is low potential for HAPC for summer flounder.

Avian and Terrestrial Habitat and Use:

- Waterfowl Use: Canvasback and Redhead ducks use the area historically and potentially in the winter.
- Wading and Shorebird Use: None expected, no shoreline at site.
- Terrestrial Habitat and Wildlife: Not applicable.

Physical Parameters:

- Substrate Composition: Expected to be sand or silty sand.
- Hydrodynamics: Not reviewed.
- Contaminants: No sediment sampling for contaminants has been conducted on-site; however, contaminated sediments are not believed to exist in the vicinity.
- CERCLA/UXO: No CERCLA or UXO issues expected due to concept area's distance from land and military facilities.
- Fossil Shell Mining: Fossil shell resources not anticipated in the area.

Other:

- Recreational Value: The area is used as a recreational fishery.
- Aesthetics and Noise: Current sounds include natural and anthropogenic sounds such as boats and possibly planes. The nearest land is over a mile away.
- Cultural Resources: The Sharps Island lighthouse, located in the vicinity of the proposed alignments, is listed in the National Register of Historic Places, but will not be effected by the proposed project.
- Navigation: Not expected to effect navigation.
- Critical Areas: Concept area is located within a critical area.

Beneficial Attributes:

- Beneficial Use Wetlands: Proposed 50:50 wetland to upland beneficial use restoration.
- Beneficial Use Uplands: Proposed 50:50 wetland to upland beneficial use restoration.
- Beneficial Use Adjacent Habitat Enhancement: Enhancement to surrounding habitat expected.

- Shoreline Protection: The site is currently open water, there is no shoreline protection component.

Dredging Engineering: No information at this time.

References: Information compiled from draft environmental reports and collective study team knowledge, as well as:

CBP. 1996. High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

MDNR. 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

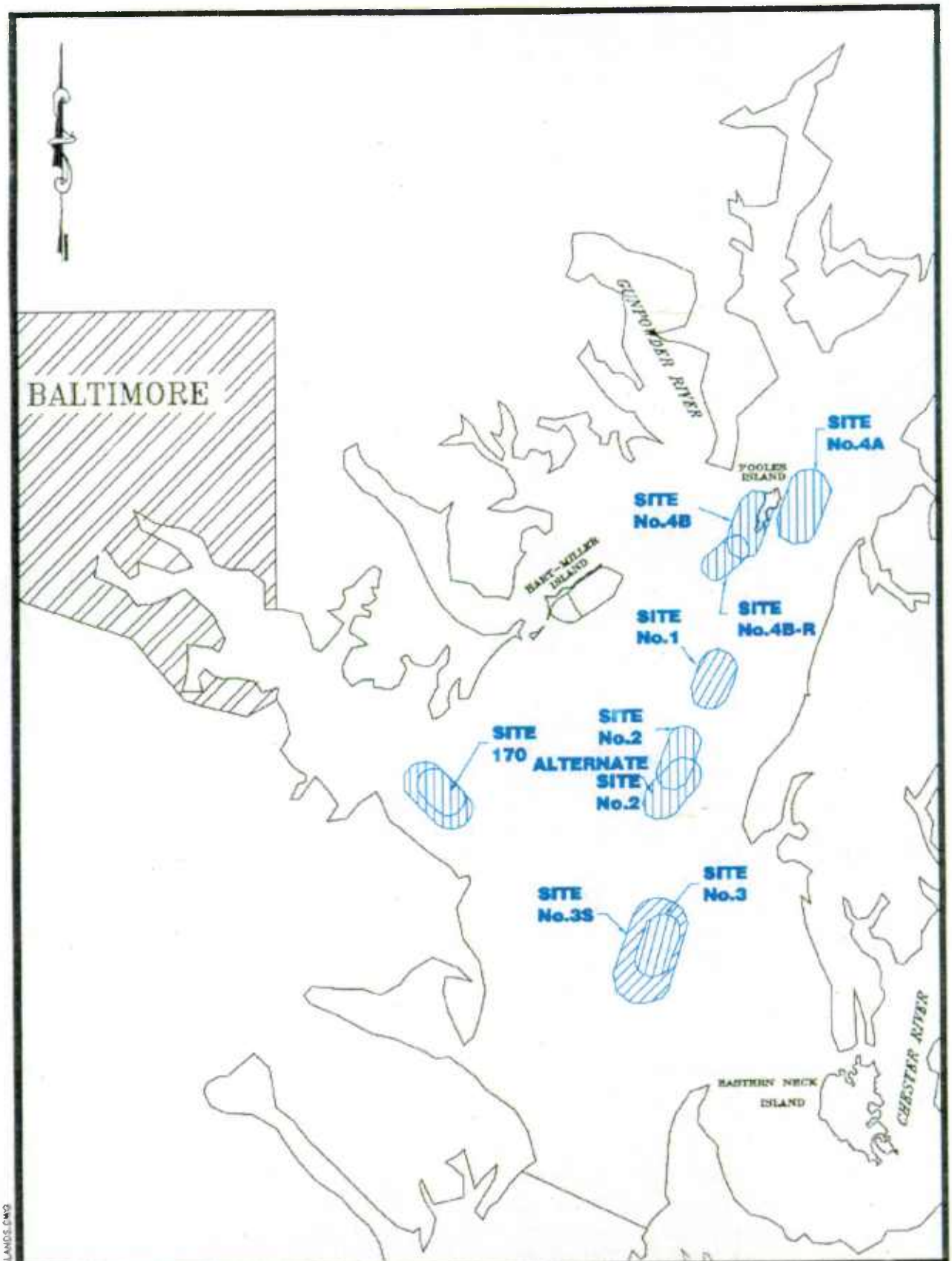
MGS. 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

MPA. 2001. Draft Interim Report to the Maryland General Assembly Concerning Implementation of the Dredged Material Management Act of 2001.

USFWS. 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services.

3.0 UPPER BAY ISLAND PLACEMENT OPTIONS

Site 1 – Tolchester West
Site 2 – Tolchester/ Brewerton Angle
Site 3 – Swan Point West
Site 3S – Swan Point West Submerged
Site 4A – Pooles Island
Site 4B – Pooles Island
Site 4BR – Pooles Island
Site 170 – Mouth of Patapsco River



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MARYLAND ENVIRONMENTAL SERVICE

UPPER BAY ISLAND PLACEMENT OPTIONS
VICINITY MAP
FIGURE 2

3.1 SITE 1 – TOLCHESTER WEST ISLAND

SUMMARY: The open-water site known as Tolchester West is located within the upper Chesapeake Bay to the west of the Tolchester Channel, in the vicinity of Gales Lump Reef. The island configuration described here is also known as Site 1 from the 1998 Upper Bay Island Placement Site Prefeasibility Study. The current open-water site is being looked at as a potential island creation site. The island has an as-yet to be determined design for a minimum 50% wetland component.

Geotechnical Engineering:

- Geotechnical Conditions: The majority of the site is underlain silty sands with layer thickness ranging from 10 to 20 feet. An ancient island may have been located on the site, resulting in over consolidation and substrate conditions that will support a relatively conventional dike structure, without the need for stabilizing berms.
- Borrow Source Potential: The data indicate that there is sufficient sand at the site to build the dike.
- Foundation Conditions: The foundation soils under the dike are predominantly silty sands that follow the –15 ft contour. A 5 to 30 ft silty clay stratum underlies this layer. Slope stability analyses were conducted and determined that the foundation soils will support a conventional dike. The dike design assumed that the foundation would be undercut to about elevation –3 ft MLLW. Conventional dike construction could support a top dike height of +25 ft MLLW.

Coastal Engineering:

- Coastal Conditions: Water depths in the area range from -10 feet to –16 feet MLLW, with an average value of approximately -12 feet. The greatest fetch and the largest waves are from the south-southwest direction and the smallest waves are from the east. Mean tidal range is between 0.9 and 1.2 ft, with a spring tidal range between 1.1 and 1.8 feet. Storm tide elevations for a 25-year return period is 5.7 ft MLLW, 100 yr water level of 9.1 ft above MLLW. Design wind speeds for a 25-year return period storm range from 47 mph for the east direction to 70 mph for the southwest direction. Wave heights can exceed 5.5 ft in a 100 yr event arriving from south-southwest. Peak spectral wave periods are 4.9 seconds for a 100-year event. The 25-year return period significant wave height is 1.6 feet with a spectral wave period of 6.5 seconds.
- Coastal Design Issues: Project concept was aligned to reduce potential impacts on an adjacent fish haven.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Dissolved oxygen levels at nearby monitoring stations indicate some degree of anoxia in the summer months in bottom waters. Seasonal hypoxia at this particular site may be less severe due to its shallower waters.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be

nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.

- Turbidity: Turbidity is generally less than 50 NTU, with higher levels during freshets and storm events.
- Salinity: Low mesohaline, with salinity stratification due to deep water, surface salinity generally 0-13 ppt, bottom salinity 0-17 ppt.
- Ground Water: Not applicable.
- Surface Water: Not applicable.
- Other: Average pH levels are 7 – 8.

Aquatic Invertebrates:

- Benthic Community: The benthic community in adjacent areas studied shows the benthos is in good health, with a B-IBI of 3.4. Substrate over most of the area categorized as low mesohaline containing sand, clayey silt and sandy oyster shell bottom. Community was dominated by mollusks and annelid worms. Amphipods and isopods also prevalent. Benthic community considered typical for area of the Bay. Any benthos in the concept area will be lost.
- Shallow Water Habitat: Shallow water habitat is not present in Tolchester West.
- SAV: SAV does not exist within the Tolchester West concept area.

Wetlands:

- Tidal Wetlands: Not applicable.
- Non-Tidal Wetlands: Not applicable.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: Finfish spawning habitat for anadromous species is not found within the project concept area.
- Finfish Rearing Habitat: Tolchester West is in the nursery area for white perch, American shad and other herring species and may be a major summer concentration area for striped bass.
- Larval Transport: Larval transport is a concern as with some other upper bay island areas. Hydrodynamic modeling was inconclusive in determining potential impacts to larval transport.
- Essential Fish Habitat (EFH): The waters around Tolchester West are not EFH.
- Commercially Harvested Species and Habitat: Tolchester West is in suitable habitat for soft shell clams, oyster and blue crabs. No charted oyster bars occur within the boundaries of Site 1, but some charted oyster bars are located within the general proximity of the site, and an uncharted oyster bar was reported within the site concept area. Clams are occasionally harvested within the area, and is intensively crabbed through the summer. The area is intensively fished for striped bass and white perch in the winter.
- Thermal Refuge: Unlikely to occur in the vicinity.
- Recreational Fishery: The Tolchester West area supports a moderate to good recreational fishery.

Special:

- Protected Species (RTE & SSPRA): RTE are not known to occur in the project concept area. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): HAPC is not present.

Avian/Terrestrial Habitat

- Waterfowl Use: Waterfowl species are expected to use the area only incidentally.
- Wading and Shorebird Use: Not applicable.
- Terrestrial Habitat and Wildlife: Not applicable.

Physical Parameters:

- Substrate Composition: Sediments consist of silty sands and clays.
- Hydrodynamics: Two and Three-dimensional hydrodynamic modeling performed.
- Contaminants: Sediment quality sampling was conducted; zinc concentrations detected in *in-situ* sediments exceeded the PEL value. Other metals concentrations were between the PEL and NOEL or below the NOEL.
- CERCLA/UXO Potential: CERCLA/UXO are not known to be present.
- Fossil Shell Mining: Fossil shell resources have been identified within the site concept area.

Other:

- Recreational Value: Moderate recreational boating is expected.
- Aesthetics and Noise: Existing noise comes from natural sources, boating, and aircraft. The project is more than 0.5 miles from any population center, so noise related impacts are not expected.
- Cultural Resources: None known to be located within the concept area
- Navigation: The Tolchester Channel is located more than 1 mile east of the concept area. Navigation impacts are not expected.
- Critical Areas: Critical areas are not present

Beneficial Attributes:

- Beneficial Use Wetlands: An as yet to be designed wetland component of at least 50% acreage would be added.
- Beneficial Use Uplands: Upland habitat creation will be a component in the development of this option.
- Beneficial Use Adjacent Habitat Enhancement: Adjacent habitat enhancement is expected as a result of development of this option.
- Shoreline Protection: No shoreline protection is expected from this option.

Environmental Issues:

- Ranked as an option with moderate environmental effects.
- Existing benthic communities are healthy, good water quality generally present.
- Commercial and recreational fishing is present.
- Navigation impacts not expected.
- Fossil shell resources underlay concept area.
- Project concept area may have been an ancient island.
- Nearby fish haven and oyster beds.

Dredging Engineering:

- Concepts range between 790-1,060 acres.
- Construction Issues: May be site of an ancient island, resulting in firm foundation conditions and smaller footprint necessary for capacity. Construction 2-4 years. Distance from dredging sites to site may be an advantage.

Other Issues:

- The concept area lies partially within the 5-mile radius of the Hart-Miller Island-Pleasure Island chain, change in State law would be required for construction.

References:

High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group. CBP. 1996.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

Maryland Port Administration (MPA). 1998. Prefeasibility Study for Upper Bay Island Placement Sites—Final Consolidated Report. February.

US Fish and Wildlife Service (USFWS). 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services

3.2 SITE 2 – TOLCHESTER WEST/ BREWERTON ANGLE ISLAND

SUMMARY: The open-water site known as Tolchester /Brewerton Angle is located to the west of the Tolchester Channel, just north of the Brewerton Eastern Extension. The island configuration described here is also known as Site 168 from the 1989 Master Plan and Site 2 from the 1998 Upper Bay Island Placement Site Prefeasibility Study. The current open-water site is being looked at as a potential island creation site. The island has an as-yet to be determined design for a minimum 50% wetland component.

Geotechnical Engineering:

- Geotechnical Conditions: The majority of the site is underlain by soft substrates. Only one stratum was found, it consisted of soft to very soft silty clay to –50 ft MLLW.
- Borrow Source Potential: The data indicate that there is no sand or gravel at the site to build the dike.
- Foundation Conditions: The foundation soils under the dike are anticipated to be soft to very soft silty clay to at least El –50 ft MLLW. Slope stability analyses were conducted for different slope configurations. The soft foundation soils will not support a conventional dike, therefore, the dike design assumed that the very soft clay would be undercut to about elevation –35 ft MLLW and a stabilizing berm would be constructed.

Coastal Engineering:

- Coastal Conditions: Water depths in the area range from -16 feet to –28 feet MLLW, with an average value of approximately -23 feet. The greatest fetch and the largest waves are from the south-southwest direction and the smallest waves are from the east. Mean tidal range is between 0.9 and 1.2 ft, with a spring tidal range between 1.1 and 1.8 feet. Storm tide elevations for a 25-year return period is 5.7 ft MLLW, 100 yr water level of 9.1 ft above MLLW. Design wind speeds for a 25-year return period storm range from 47 mph for the east direction to 70 mph for the southwest direction. Wave heights can exceed 5.5 ft in a 100 yr event arriving from south-southwest. Peak spectral wave periods are 4.9 seconds for a 100-year event. The 25-year return period significant wave height is 1.6 feet with a spectral wave period of 6.5 seconds.
- Coastal Design Issues: Deep water conditions result in the potential that dike structures could be exposed to breaking waves. Toe protection and/or foundation berms serve to provide protection against breaking waves.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Dissolved oxygen levels at nearby monitoring stations indicate anoxia in the summer months. Do of < 1 is typical in bottom waters in warmer months.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: Turbidity is generally less than 50 NTU, with higher levels during freshets and storm events.

- Salinity: Upper to low mesohaline, with significant salinity stratification due to deep water, surface salinity generally 0-14 ppt, bottom salinity 10-18 ppt.
- Ground Water: No impacts expected.
- Surface Water: No streams, rivers or tributaries in vicinity or expected to be effected.
- Other: Average pH levels are 7 – 8.

Aquatic Invertebrates:

- Benthic Community: The benthic community in adjacent areas studied shows the benthos is degraded, with a B-IBI of 2.3. Community is considered stressed, most likely due to seasonally occurring anoxia. Substrate over most of the area categorized as high mesohaline clayey silt. Community consisted of polychaetes, oligochaetes and amphipods.
- Shallow Water Habitat: Shallow water habitat is not present in Tolchester /Brewerton Angle.
- SAV: SAV does not exist within the Tolchester /Brewerton Angle concept area

Wetlands:

- Tidal Wetlands: Tidal wetlands are not present in the project concept area.
- Non-Tidal Wetlands: Non-tidal wetlands are not present.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: Finfish spawning habitat for anadromous species are not found within the project concept area.
- Finfish Rearing Habitat: Finfish rearing habitat for anadromous species are not found in the project concept area.
- Larval Transport: Larval transport is not as significant a concern as with some other upper Bay island areas. Hydrodynamic modeling was inconclusive in determining potential impacts to larval transport.
- Essential Fish Habitat (EFH): The waters around Tolchester /Brewerton Angle are not EFH.
- Commercially Harvested Species and Habitat: Soft shell calms and oysters are not supported at this site due to substrate type and seasonal anoxia. Site 2 supports a relatively productive blue crab harvest through out the summer. The site was identified as an important winter drift netting area.
- Thermal Refuge: Insufficient data available.
- Recreational Fishery: The Tolchester /Brewerton Angle area was not identified as significant by recreational anglers.

Special:

- Protected Species (RTE & SSPRA): RTE are not known to occur in the project concept area. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): HAPC is not present.

Avian/Terrestrial Habitat

- Waterfowl Use: Waterfowl species are expected to use the area only incidentally.
- Wading and Shorebird Use: Not applicable.
- Terrestrial Habitat and Wildlife: Not applicable.

Physical Parameters:

- Substrate Composition: Sediments consist of soft silty clay.
- Hydrodynamics: Two and Three-dimensional hydrodynamic modeling performed.
- Contaminants: Sediment quality sampling was conducted; Cadmium concentrations detected in *in-situ* sediments exceeded the PEL value. Other metals concentrations were between the PEL and NOEL or below the NOEL.
- CERCLA/UXO Potential: CERCLA/UXO are not known to be present.
- Fossil Shell Mining: No fossil shell resources have been identified within the site.

Other:

- Recreational Value: Moderate recreational boating is expected in the area.
- Aesthetics and Noise: Existing noise comes from natural sources, boating, and aircraft. The project is more than 0.5 miles from any population center, so noise related impacts are not expected.
- Cultural Resources: Documented shipwrecks are not known to be located within the concept area
- Navigation: The Tolchester Channel is located east of the concept area, and the Brewerton Channel Eastern Extension is located southwest of this site. Some potential alignments of this site fall within approximately 1,000 feet of the Tolchester channel. The hydrodynamics of an island placed in this location could impact navigation due to effects on currents that is may create.
- Critical Areas: Critical areas are not present

Beneficial Attributes:

- Beneficial Use Wetlands: An as yet to be designed wetland component of at least 50% acreage would be added.
- Beneficial Use Uplands: Upland habitat creation will be a component in the development of this option.
- Beneficial Use Adjacent Habitat Enhancement: Adjacent habitat enhancement is expected as a result of development of this option.
- Shoreline Protection: No shoreline protection is expected from this option.

Environmental Issues:

- Ranked as an option with low environmental effects.
- Existing benthic communities are degraded.
- Some commercial fishing is present.
- Navigation impacts possible, but alignment shifts could reduce navigational effects and could produce sand for construction.

Dredging Engineering:

- Concepts range between 1,075-1,195 acres.

Construction Issues: Technically challenging. Construction 2-4 years. Distance from dredging sites to site may be an advantage.

Other Issues:

- The concept area lies partially within the 5-mile radius of the Hart-Miller Island-Pleasure Island chain, change in State law would be required for construction.

References:

High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group. CBP. 1996.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

Maryland Port Administration (MPA). 1998. Prefeasibility Study for Upper Bay Island Placement Sites—Final Consolidated Report. February.

US Fish and Wildlife Service (USFWS). 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services

3.3 SITE 3 – SWAN POINT WEST ISLAND

SUMMARY: The open-water site known as Swan Point West is located within the upper Chesapeake Bay to the west of the Swan Point Channel, just south of the Brewerton Angle. The island configuration described here is also known as Site 171 from the 1989 Master Plan and Site 3 from the 1998 Upper Bay Island Placement Site Prefeasibility Study. The current open-water site is being looked at as a potential island creation site. The island has an as-yet to be determined design for a minimum 50% wetland component.

Geotechnical Engineering:

- Geotechnical Conditions: The majority of the site is underlain by soft substrates. Only one stratum was found, it consisted of soft to very soft silty clay to about –55 ft MLLW.
- Borrow Source Potential: The data indicate that there is no sand or gravel at the site to build the dike.
- Foundation Conditions: The foundation soils under the dike are anticipated to be soft to very soft silty clay to at least El –50 ft MLLW. Slope stability analyses were conducted for different slope configurations. The soft foundation soils will not support a conventional dike, therefore, the dike design assumed that the very soft clay would be undercut to about elevation –40 ft MLLW and a stabilizing berm would be constructed.

Coastal Engineering:

- Coastal Conditions: Water depths in the area range from -24 feet to –32 feet MLLW, with an average value of approximately -28 feet. The greatest fetch and the largest waves are from the south-southwest direction and the smallest waves are from the east. Mean tidal range is between 0.9 and 1.2 ft, with a spring tidal range between 1.1 and 1.8 feet. Storm tide elevations for a 25-year return period is 5.7 ft MLLW, 100 yr water level of 9.1 ft above MLLW. Design wind speeds for a 25-year return period storm range from 47 mph for the east direction to 70 mph for the southwest direction. Wave heights can exceed 5.5 ft in a 100 yr event arriving from south-southwest. Peak spectral wave periods are 4.9 seconds for a 100-year event. The 25-year return period significant wave height is 1.6 feet with a spectral wave period of 6.5 seconds.
- Coastal Design Issues: Deep water conditions result in the potential that dike structures could be exposed to breaking waves. Toe protection and/or foundation berms serve to provide protection against breaking waves.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Dissolved oxygen levels at nearby monitoring stations indicate anoxia in the summer months. D.O. of < 1 is typical in bottom waters in warmer months.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: Turbidity is generally less than 50 NTU, with higher levels during freshets and storm events.

- Salinity: Upper to low mesohaline, with significant salinity stratification due to deep water, surface salinity generally 0 - 14 ppt, bottom salinity 10-18 ppt.
- Ground Water: Not applicable.
- Surface Water: Not applicable.
- Other: Average pH levels are 7 – 8.

Aquatic Invertebrates:

- Benthic Community: The benthic community in adjacent areas studied shows the benthos is in good health, with a B-IBI of 1.7. Community is considered stressed, most likely due to seasonally occurring anoxia. Substrate over most of the area categorized as high mesohaline clayey silt. Community consisted primarily of annelids, with equal numbers of polychaetes and oligochaetes along with smaller percentages of bivalves.
- Shallow Water Habitat: Shallow water habitat is not present in Swan Point West.
- SAV: Not applicable.

Wetlands:

- Tidal Wetlands: Not applicable.
- Non-Tidal Wetlands: Not applicable.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: Finfish spawning habitat for anadromous species are not found within the project concept area.
- Finfish Rearing Habitat: Finfish rearing habitat for anadromous species are not found in the project concept area.
- Larval Transport: Larval transport is not as significant a concern as with some other upper bay island areas. Hydrodynamic modeling was inconclusive in determining potential impacts to larval transport.
- Essential Fish Habitat (EFH): The waters around Swan Point West are not EFH.
- Commercially Harvested Species and Habitat: Two of the largest oyster beds (NOB 2-9, 4-2) in the Bay are approximately ½ mi outside of the project concept area. Oyster harvests are not supported at this site due to substrate type and seasonal anoxia. Site 3 supports a relatively productive blue crab harvest throughout the summer in years when hypoxia is not as severe. The site was identified as an important winter drift netting area for white perch and striped bass.
- Thermal Refuge: It is anticipated that the deep water island placement alternatives being considered would have a potentially greater impact on thermal water masses than upland or shallow water placement alternatives because of the conversion of deep water to upland or wetland habitat.
- Recreational Fishery: The Swan Point West area was not identified as significant by recreational anglers, although anglers actively fish high relief areas surrounding it.

Special:

- Protected Species (RTE & SSPRA): RTE are not known to occur in the project concept area. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): HAPC is not present.

Avian/Terrestrial Habitat:

- Waterfowl Use: Waterfowl species are expected to use the area only incidentally.
- Wading and Shorebird Use: Not applicable.
- Terrestrial Habitat and Wildlife: Not applicable.

Physical Parameters:

- Substrate Composition: Sediments consist of soft silty clay.
- Hydrodynamics: Two and Three-dimensional hydrodynamic modeling performed.
- Contaminants: Sediment quality sampling was conducted; all *in-situ* sediments had metals concentrations that were between the PEL and NOEL or below the NOEL.
- CERCLA/UXO Potential: CERCLA/UXO are not known to be present.
- Fossil Shell Mining: No fossil shell resources have been identified within the site.

Other:

- Recreational Value: Moderate recreational boating in the vicinity is expected.
- Aesthetics and Noise: Existing noise comes from natural sources, boating, and aircraft. The project is more than 0.5 miles from any population center, so noise related impacts are not expected.
- Cultural Resources: Documented shipwrecks are not known to be located within the concept area
- Navigation: The Swan Point Channel is located to the east of the project concept area. Navigation impacts are not expected.
    - Critical Areas: Critical areas are not present

Beneficial Attributes:

- Beneficial Use Wetlands: An as yet to be designed wetland component of at least 50% acreage would be added.
- Beneficial Use Uplands: Upland habitat creation will be a component in the development of this option.
- Beneficial Use Adjacent Habitat Enhancement: Adjacent habitat enhancement is expected as a result of development of this option.
- Shoreline Protection: No shoreline protection is expected from this option.

Environmental Concerns:

- Ranked as an option with low environmental effects.
- Existing benthic communities are degraded.
- Some commercial fishing is present.
- Large oyster beds nearby.

Dredging Engineering:

- Concepts range between 975-1,065 acres.
- Construction Issues: Technically challenging. Construction 2-4 years. Distance from dredging sites to site is an advantage.

References:

High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group. CBP. 1996.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

Maryland Port Administration (MPA). 1998. Prefeasibility Study for Upper Bay Island Placement Sites—Final Consolidated Report. February.

US Fish and Wildlife Service (USFWS). 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services

3.4 SITE 3S – SWAN POINT WEST SUBMERGED ISLAND

SUMMARY: The open-water site known as Swan Point West Submerged is located within the upper Chesapeake Bay to the west of the Swan Point Channel, just south of the Brewerton Angle. The area described here is also known as Site 171 from the 1989 Master Plan and Site 3-S from the 1998 Upper Bay Island Placement Site Prefeasibility Study. The current open-water site is being looked at as a potential submerged reef location. The beneficial use component of this project concept would be a reef-type capping to enhance oyster and fisheries habitat.

Geotechnical Engineering:

- Geotechnical Conditions: The majority of the site is underlain by soft substrates. Only one stratum was found, it consisted of soft to very soft silty clay to about –55 ft MLLW.
- Borrow Source Potential: The data indicate that there is no sand or gravel at the site to build the underwater containment berm.
- Foundation Conditions: The foundation soils under the dike are anticipated to be soft to very soft silty clay to at least El –50 ft MLLW. The geotechnical design was prepared with a top containment berm elevation of –10 MLLW. Sand for the containment berm would have to be imported, as would the capping material.

Coastal Engineering:

- Coastal Conditions: Water depths in the area range from -16 feet to –40 feet MLLW, with an average value of approximately –29.5 feet. The greatest fetch and the largest waves are from the south-southwest direction and the smallest waves are from the east. Mean tidal range is between 0.9 and 1.2 ft, with a spring tidal range between 1.1 and 1.8 feet. Storm tide elevations for a 25-year return period is 5.7 ft MLLW, 100 yr water level of 9.1 ft above MLLW. Design wind speeds for a 25-year return period storm range from 47 mph for the east direction to 70 mph for the southwest direction. Wave heights can exceed 5.5 ft in a 100 yr event arriving from south-southwest. Peak spectral wave periods are 4.9 seconds for a 100-year event. The 25-year return period significant wave height is 1.6 feet with a spectral wave period of 6.5 seconds.
- Coastal Design Issues: A sand containment berm would contain dredged material within the site. Capping materials would provide a hardened exterior for protection from storm conditions.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Dissolved oxygen levels at nearby monitoring stations indicate anoxia in the summer months. DO of < 1 is typical in bottom waters in warmer months.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: Turbidity is generally less than 50 NTU, with higher levels during freshets and storm events.

- Salinity: Upper to low mesohaline, with significant salinity stratification due to deep water, surface salinity generally 0-14 ppt, bottom salinity 10-18 ppt.
- Ground Water: Not applicable.
- Surface Water: Not applicable.
- Other: Average pH levels are 7 – 8.

Aquatic Invertebrates:

- Benthic Community: The benthic community in adjacent areas studied shows the benthos is degraded, with a B-IBI of 1.7. Community is considered stressed, most likely due to seasonally occurring anoxia. Substrate over most of the area categorized as high mesohaline clayey silt. Community consisted primarily of annelids, with equal numbers of polychaetes and oligochaetes along with smaller percentages of bivalves.
- Shallow Water Habitat: Shallow water habitat is not present in Swan Point West.
- SAV: Not applicable.

Wetlands:

- Tidal Wetlands: Not applicable.
- Non-Tidal Wetlands: Not applicable.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: Finfish spawning habitat for anadromous species are not found within the project concept area.
- Finfish Rearing Habitat: Finfish rearing habitat for anadromous species are not found in the project concept area.
- Larval Transport: Larval transport is not as significant a concern as with some other upper Bay island areas. Hydrodynamic modeling was inconclusive in determining potential impacts to larval transport.
- Essential Fish Habitat (EFH): The waters around Swan Point West are not EFH.
- Commercially Harvested Species and Habitat: Two of the largest oyster beds in the Bay are adjacent to the project concept area. Oyster harvests are not supported at this site due to substrate type and seasonal anoxia. Site 3S supports a relatively productive blue crab harvest throughout the summer in years when hypoxia is not as severe. The site was identified as an important winter drift netting area for white perch and striped bass.
- Thermal Refuge: It is anticipated that the deep water island placement alternatives being considered would have a potentially greater impact on thermal water masses than upland or shallow water placement alternatives because of the conversion of deep water to upland or wetland habitat.
- Recreational Fishery: The Swan Point West area was not identified as significant by recreational anglers, although high relief areas (oyster bars) surrounding it are actively fished by anglers.

Special:

- Protected Species (RTE & SSPRA): RTE are not known to occur in the project concept area. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): HAPC is not present.

Avian/Terrestrial Habitat

- Waterfowl Use: Waterfowl species are expected to use the area only incidentally.
- Wading and Shorebird Use: Not applicable.
- Terrestrial Habitat and Wildlife: Not applicable.

Physical Parameters:

- Substrate Composition: Sediments consist of soft silty clay.
- Hydrodynamics: Two and Three-dimensional hydrodynamic modeling performed.
- Contaminants: Sediment quality sampling was conducted; all *in-situ* sediments had metal concentrations that were between the PEL and NOEL or below the NOEL.
- CERCLA/UXO Potential: CERCLA/UXO are not known to be present.
- Fossil Shell Mining: No fossil shell resources have been identified within the site.

Other:

- Recreational Value: Moderate recreational boating occurs in the vicinity.
- Aesthetics and Noise: Existing noise comes from natural sources, boating, and aircraft. The project is more than 0.5 miles from any population center, so noise related impacts are not expected.
- Cultural Resources: Documented shipwrecks are not known to be located within the concept area
- Navigation: The Swan Point Channel is located to the east of the project concept area. Navigation impacts are not expected.
- Critical Areas: Critical areas are not present

Beneficial Attributes:

- Beneficial Use Wetlands: The project is designed to provide subaqueous wetland habitat in the form of a reef structure to enlarge and enhance the nearby oyster beds and fisheries habitat. Water quality may also be improved by raising the bottom elevation out of the seasonal anoxic zones.
- Beneficial Use Uplands: No upland habitat creation component is planned for this option.
- Beneficial Use Adjacent Habitat enhancement: Adjacent habitat enhancement is expected as a result of development of this option.
- Shoreline Protection: No shoreline protection is expected from this option.

Environmental Concerns:

- Ranked as an option with low environmental effects.
- Existing benthic communities are degraded.
- Some commercial fishing is present.
- Large oyster beds nearby.

Dredging Engineering:

- Concept is 3,000 acres.

- Construction Issues: Construction 2-4 years. Distance from dredging sites to site may be an advantage. Larger site closure costs for cap placement.

References:

High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group. CBP. 1996.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

Maryland Port Administration (MPA). 1998. Prefeasibility Study for Upper Bay Island Placement Sites—Final Consolidated Report. February.

US Fish and Wildlife Service (USFWS). 1979. National Wetland Inve ntory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services

3.5 SITE 4A – POOLES ISLAND 4A

SUMMARY: Pooles Island is located within the upper Chesapeake Bay. The island configuration described here, an open-water site, was designated 4A in the 1998 Upper Bay Island Prefeasibility Study. The island concept is located to the northeast of the island, with a small portion within the APG boundaries. This project concept has an as-yet to be determined design for a minimum 50% wetland component.

Geotechnical Engineering:

- Geotechnical Conditions: The majority of the site is underlain by soft substrates that would require removal prior to dike construction and thus higher site development costs. Only one stratum was found, it consisted of gray silty clay from the mudline (- 20 MLLW) to the bottom of the boring (-45 MLLW).
- Borrow Source Potential: The data indicate that there is no sand or gravel at the site to build the dike. It should be noted that this site is known to have UXO.
- Foundation Conditions: The foundation soils under the dike are anticipated to be soft to very soft silty clay to at least El –45 ft MLLW. The soft clay could, and probably does, extend to a much deeper depth. Slope stability analyses were conducted for different slope configurations. The soft foundation soils will not support a conventional dike, therefore, the dike design assumed that the very soft clay would be undercut to about elevation –30 ft MLLW and a stabilizing berm would be constructed. It should be noted that this site is known to have UXO. Technology for removing foundation material in the presence of UXO may not be readily available. Therefore, because of the presence of UXO, it may not be feasible to construct dikes if unsuitable foundation materials must first be removed.

Coastal Engineering:

- Coastal Conditions: Water depths in the area range from -10 feet to –34 feet MLLW, with an average value of approximately -15 feet. The greatest fetch and the largest waves are from the south-southwest direction. Mean tidal range is between 0.9 and 1.2 ft, with a spring tidal range between 1.1 and 1.8 feet. Storm tide elevations for a 25-year return period is 5.7 ft MLLW, 100 yr water level of 9.1 ft above MLLW. Design wind speeds for a 25-year return period storm range from 47 mph for the east direction to 70 mph for the southwest direction. Wave heights can exceed 5.5 ft in a 100 yr event arriving from south-southwest. Peak spectral wave periods are 4.9 seconds for a 100-year event. The 25-year return period significant wave height is 1.6 feet with a spectral wave period of 6.5 seconds.
- Coastal Design Issues: Deep-water conditions result in the potential that dike structures could be exposed to breaking waves. Toe protection and/or foundation berms serve to provide protection against breaking waves.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Dissolved oxygen levels at nearby monitoring stations indicate healthy levels. Some decline in deeper waters occasionally results in summer levels to fall below 4.0.

- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: This site lies within the turbidity maximum area of the Chesapeake Bay. Flows from the Susquehanna River influence turbidity and total suspended solids concentrations. Turbidity is generally less than 50 NTU, with higher levels during freshets and storm events.
- Salinity: Oligohaline, with some salinity stratification in deeper waters, surface salinity generally less than 6 ppt, bottom salinity less than 10 ppt.
- Ground Water: Not applicable.
- Surface Water: No impacts anticipated.
- Other: Average pH levels are 7 – 8.

Aquatic Invertebrates:

- Benthic Community: The benthic community in adjacent areas studied shows the benthos is in good health, with a B-IBI of 3.4. Substrate over most of the area categorized as low mesohaline clayey silt. Community consisted of polychaetes, bivalves and isopods with other mollusks and arthropods.
- Shallow Water Habitat: Shallow water is present in 4A.
- SAV: SAV does not exist within the concept area .

Wetlands:

- Tidal Wetlands: Not applicable.
- Non-Tidal Wetlands: Not applicable.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: Finfish spawning habitat for anadromous species are found in the vicinity of Pooles Island. Pooles Island is within the designated striped bass spawning area.
- Finfish Rearing Habitat: Finfish rearing habitat for anadromous species are found in vicinity of Pooles Island.
- Larval Transport: Larval transport is a potential concern due to existing currents and island location. Hydrodynamic modeling was inconclusive in determining potential impacts to larval transport.
- Essential Fish Habitat (EFH): The waters around Pooles Island are not EFH.
- Commercially Harvested Species and Habitat: This site is too far north to support soft shell calms and oysters. Site 4A supports a relatively productive blue crab harvest through out the summer. The site was not identified as an important drift netting area. No pound nets are currently set near site 4A.
- Thermal Refuge: It is anticipated that the deep water island placement alternatives being considered would have a potentially greater impact on thermal water masses than upland or shallow water placement alternatives because of the conversion of deep water to upland or wetland habitat.
- Recreational Fishery: The 4A site does contain bottom relief resulting from local shoals, it is fished extensively by recreational anglers in the site 4A concept area.

Special:

- Protected Species (RTE & SSPRA): Pooles Island has been historically and is currently utilized (not for nesting) by bald eagles. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): HAPC is not present.

Avian/Terrestrial Habitat

- Waterfowl Use: Waterfowl species use the area, with a larger variety of species expected in the vicinity of Pooles Island due to the variety of habitat.
- Wading and Shorebird Use: The largest blue heron rookery in the state is present on Pooles Island. Pooles Island has been classified as a significant waterfowl site; with heavy use by waterfowl and other waterbirds in the adjacent waters, including 4A.
- Terrestrial Habitat and Wildlife: Pooles Island has a large blue heron rookery, and bald eagle nests. Restrictions could be imposed on construction activities to limit disturbance.

Physical Parameters:

- Substrate Composition: Sediments consist of a mixture of silt, and clay, with dense sand underlying it for part of the footprint area.
- Hydrodynamics: Two and Three-dimensional hydrodynamic modeling performed.
- Contaminants: Sediment quality sampling was conducted; zinc was detected in *in-situ* sediments exceeded the PEL value. Most concentrations were between the PEL and NOEL or below the NOEL.
- CERCLA/UXO Potential: Site 4A is partially within the boundaries of APG. APG is on the NPL list of hazardous waste sites. As such, any activities on the site must be considered within the framework of CERCLA. These sites also have great potential to contain UXO.
- Fossil Shell Mining: Fossil shell resources have been identified within the site.

Other:

- Recreational Value: Recreational boating around Pooles Island is significant.
- Aesthetics and Noise: Existing noise comes from natural sources, boating, and aircraft. The project is more than 0.5 miles from any population center, so noise related impacts are not expected.
- Cultural Resources: One documented obstruction was noted within the project concept area.
- Navigation: The C&D Approach Channel is located east of and adjacent to the project concept area, but the proposed configuration would not lie in the channel. A portion of the site would like within the West Sailing Course. The hydrodynamics of an island placed at 4A could increase cross-currents in the vicinity of the C&D Canal Approach Channel. Navigation effects are likely due to hydrodynamic effects of the currents that an island placed in this location would produce.
    - Critical Areas: Critical areas are not present

Beneficial Attributes:

- Beneficial Use Wetlands: An as yet to be designed wetland component of at least 50% acreage would be added.
- Beneficial Use Uplands: Upland habitat creation will be a component in the development of this option.
- Beneficial Use Adjacent Habitat Enhancement: Adjacent habitat enhancement is expected as a result of development of this option.
- Shoreline Protection: No shoreline protection is expected from this option.

Environmental Concerns:

- Ranked as an option with high environmental effects.
- Impacts to benthos during upland and wetland creation.
- Possibility for short-term effects to water quality, although these would be monitored and regulated.
- Area is within the striped bass spawning area and is a fish nursery.
- It is possible that birds and other animals will avoid areas of the island closest to construction, although seasonal construction restrictions should minimize this.
- Significant recreational and commercial fishing is present.
- Navigation impacts expected.

Dredging Engineering:

- Concepts range between 1,300-1,475 acres.
- Construction Issues: Technically difficult. UXO may be an insurmountable technical hurdle. Construction 2-4 years. Distance from dredging sites to site may be an advantage.

Other Issues:

- The concept area lies partially within the 5-mile radius of the Hart-Miller Island-Pleasure Island chain, change in State law would be required for construction.
- Pooles Island and the entire subaqueous bottom within APG borders is owned by the U.S. Army and is still considered central to the mission of APG. APG has indicated that the area in the Pooles Island 4A concept area is not anticipated to be available for other purposes for the foreseeable future. Significant historic and archeological resources are present on Pooles Island and within the footprint of this option.

References:

High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group. CBP. 1996.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

Maryland Port Administration (MPA). 1998. Prefeasibility Study for Upper Bay Island Placement Sites—Final Consolidated Report. February.

US Fish and Wildlife Service (USFWS). 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services.

3.6 SITE 4B – POOLES ISLAND 4B

SUMMARY: Pooles Island is located within the upper Chesapeake Bay. The island configuration described here, an open-water site, was designated Pooles Island 4B in the upper Bay Island Prefeasibility Study of 1998. This concept is located southwest of the existing island, with significant portions lying within the APG boundary. This project concept has an as-yet to be determined design for a minimum 50% wetland component.

Geotechnical Engineering:

- Geotechnical Conditions: There were three stratums detected in the geotechnical study of this site, with variability in substrate from the north to the south end of the site. The top strata over the entire site consist of gray or black silty clay. In the southern portion of the 4B area, dense gray silty sand with gravel was encountered below a layer of 8 to 15 feet of the gray silty clay strata. This stratum did not underlay the entire site, and the boring could not be advanced below –20 MLLW, so the full extent of the strata is not known.
- Borrow Source Potential: The data indicate that sand is likely to be available at the 4B site. Recovering the sand will required some stripping. The thickness of the sand is unknown. It is conceivable that depending upon the quantity of sand required, some sand might have to be imported. It should be noted that this site is known to have UXO. Technology for mining sand in the presence of UXO may not be readily available. Therefore, because of the presence of UXO, it may not be feasible to use the local sand for borrow.
- Foundation Conditions: Foundation conditions appear to be acceptable to build the dikes. It is anticipated that some soft sediment areas will need to be undercut for creation of the dikes. It should be noted that this site is known to have UXO. Technology for removing soft foundation material in the presence of UXO may not be readily available. Therefore, because of the presence of UXO, it may not be feasible to construct dikes if unsuitable foundation materials must first be removed.

Coastal Engineering:

- Coastal Conditions: Water depths in the area range from –4 feet to –16 feet MLLW, with an average value of approximately 9 feet. The greatest fetch and the largest waves are from the south-southwest direction. Mean tidal range is between 0.9 and 1.2 ft, with a spring tidal range between 1.1 and 1.8 feet. Storm tide elevations for a 25-year return period is 5.7 ft MLLWW, 100 yr water level of 9.1 ft above MLLW. Design wind speeds for a 25-year return period storm range from 47 mph for the east direction to 70 mph for the southwest direction. Wave heights can exceed 5.5 ft in a 100 yr event arriving from south-southwest. Peak spectral wave periods are 4.9 seconds for a 100-year event. The 25-year return period significant wave height is 1.6 feet with a spectral wave period of 6.5 seconds.
- Coastal Design Issues: Deep water conditions result in the potential that dike structures could be exposed to breaking waves. Toe protection and/or foundation berms serve to provide protection against breaking waves.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Dissolved oxygen levels at nearby monitoring stations indicate healthy levels. Some decline in deeper waters occasionally results in summer levels to fall below 4.0.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: This site lies within the turbidity maximum area of the Chesapeake Bay. Flows from the Susquehanna influence turbidity and total suspended solids concentrations. Turbidity is generally less than 50 NTU, with higher levels during freshets and storm events.
- Salinity: Oligohaline, with some salinity stratification in deeper waters, surface salinity generally less than 6 ppt, bottom salinity less than 10 ppt.
- Ground Water: Not applicable.
- Surface Water: Not applicable.
- Other: Water quality is good. Average pH levels are 7 – 8.

Aquatic Invertebrates:

- Benthic Community: The benthic community in adjacent areas studied shows the benthos is in good health, with a B-IBI of 3.0 at site 4-B. Substrate over most of the area categorized as low mesohaline containing sand, clayey silt, silty sand and sandy clay silt. Community consisted of polychaetes, oligochaetes, bivalves, isopods, amphipods and other mollusks and arthropods. Cobble bottom substrate was observed adjacent to Pooles Island. This substrate is unusual and limited in the Chesapeake Bay. Any benthos in the concept area will be lost.
- Shallow Water Habitat: Shallow water habitat is extensive around Pooles Island.
- SAV: SAV has been determined to exist on the south east side of Pooles Island. The Maryland Tidal Wetland Inventory map of Pooles Island inventories two areas of SAV on the west side of Pooles Island. This map also depicted two areas on SAV interior to the Island. APG monitors SAV and water quality, their surveys in 1996 and 1997 observed wild celery (55 m^2, redhead grass (16 m^2), slender pond weed (2 m^2) and horned pond weed (30 m^2).

Wetlands:

- Tidal Wetlands: Pooles Island and the adjacent near water area support both palustrine and estuarine wetland types. Pooles Island has forested, scrub-shrub, emergent marsh and aquatic bed wetlands. Vernal pools occur in the northern wooded portion of the island. The dominant plans species present with the Pooles Island wetlands include common reed, saltmarsh cordgrass, red maple and Juncus species.
- Non-Tidal Wetlands: Non-tidal wetlands are likely to be impacted.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: Finfish spawning habitat for anadromous species are found in the vicinity of Pooles Island. Pooles Island is within the designated striped bass spawning area.

- Finfish Rearing Habitat: Finfish rearing habitat for anadromous species are found in vicinity of Pooles Island. The cobble bottom in particular is considered valuable finfish rearing habitat.
- Larval Transport: Larval transport is a potential concern due to existing currents and island location. Hydrodynamic modeling was inconclusive in determining potential impacts to larval transport.
- Essential Fish Habitat (EFH): The waters around Pooles Island are not EFH.
- Commercially Harvested Species and Habitat: This site is too far north to support soft shell calms and oysters. Site 4B supports a relatively productive blue crab harvest through out the summer. The site was not identified as an important drift netting area. No pound nets are currently set near site 4B. Portions of Site 4B that lie within the APG controlled area would be off limits to commercial harvesting when the area is closed.
- Thermal Refuge: Is not anticipated in this area.
- Recreational Fishery: Part of the 4B site contains high relief bottom that is fished extensively by recreational anglers.

Special:

- Protected Species (RTE & SSPRA): Pooles Island has been historically and is currently utilized by bald eagles, an RTE species. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): HAPC is not present.

Avian/Terrestrial Habitat

- Waterfowl Use: Waterfowl species use the area, with a larger variety of species expected in the vicinity of Pooles Island due to the variety of habitat.
- Wading and Shorebird Use: The largest blue heron rookery in the state is present on Pooles Island. Pooles Island has been classified as a significant waterfowl site; with heavy use by waterfowl and other waterbirds on the adjacent shallow waters and the ponds on the island.
- Terrestrial Habitat and Wildlife: Pooles Island has a large blue heron rookery, and bald eagle nests. It is a stopover for migratory song birds. Eastern box turtles and eastern mud turtles have been observed. White tailed deer, otter and snakes inhabit the island. It is expected that amphibians such as Fowler's toad, the American toad and the southern leopard frog also inhabit the island.

Physical Parameters:

- Substrate Composition: Sediments consist of a mixture of silt, and clay, with dense sand underlying it. Cobble bottom observe adjacent to Pooles Island.
- Hydrodynamics: Two and Three-dimensional hydrodynamic modeling performed.
- Contaminants: Sediment quality sampling was conducted; zinc levels detected in *in-situ* sediments exceeded the PEL value. Cadmium was below the NOEL, all other values for which a PEL or NOEL existed were between the PEL and NOEL.
- CERCLA/UXO Potential: Site 4B is partially within the boundaries of APG. APG is on the NPL list of hazardous waste sites. As such, any activities on the site must be considered within the framework of CERCLA. These sites also have great potential to contain UXO.
- Fossil Shell Mining: No fossil shell resources have been identified within the site.

Other:

- Recreational Value: Recreational boating around Pooles Island is significant.
- Aesthetics and Noise: Existing noise comes from natural sources, boating, and aircraft. The project is more than 0.5 miles from any population center, so noise related impacts are not expected.
- Cultural Resources: At least four documented shipwrecks are known to be located within the proposed 4B site. The oldest lighthouse in the State is on Pooles Island. SHPO has determined that the lighthouse is eligible for listing in the National Register of Historic Places. Any increase in the size or configuration of the island is subject to the National Historic Preservation Act and must be reviewed for impact by the SHPO. There are an additional 5 range towers that need to be investigated for their eligibility to the National Register. Several archeological sites have been excavated on Pooles Island and prehistoric Native American artifacts were recovered. A solitary gravestone exists on Pooles Island with a date on 1855.
- Navigation: The C&D Approach Channel and the West Sailing Course are located in the vicinity of the site, but the proposed configurations would not lie in the channels. The hydrodynamics of an island placed at 4B could increase cross-currents in the vicinity of the Western Sailing Course. The extent to which these currents could impact navigation would need to be studied further.
- Critical Areas: Pooles Island is not subject to critical areas regulations.

Beneficial Attributes:

- Beneficial Use Wetlands: An as yet to be designed wetland component of at least 50% acreage would be added.
- Beneficial Use Uplands: Upland habitat creation will be a component in the development of this option.
- Beneficial Use Adjacent Habitat Enhancement: Adjacent habitat enhancement is expected as a result of development of this option.
- Shoreline Protection: This option can be designed to provide protection to existing shorelines on the remnant island.

Environmental Concerns:

- Ranked as an option with very high environmental effects.
- Trade-off of replacing shallow water habitat and impacting benthos to create uplands and wetlands.
- The cobble bottom along the Pooles Island western shore is rare and valuable benthic and fish rearing habitat in the upper Bay.
- Possibility for short-term effects to water quality, although these would be monitored and regulated.
- Area is within the striped bass spawning area.
- It is possible that birds and other animals will avoid areas of the island closest to construction, although seasonal construction restrictions should minimize this.
- Significant recreational and commercial fishing is present.

Dredging Engineering:

- Concepts range between 825-1,125 acres.
- Construction Issues: Technically difficult. UXO may be an insurmountable technical hurdle. Construction 2-4 years. Distance from dredging sites to site may be an advantage. An access channel would be required.

Other Issues:

- The concept area lies partially within the 5-mile radius of the Hart-Miller Island-Pleasure Island chain, change in State law would be required for construction.
- Pooles Island and the entire subaqueous bottom within APG borders is owned by the U.S. Army and is still considered central to the mission of APG. APG has indicated that the area in the Pooles Island 4B concept area is not anticipated to be available for other purposes for the foreseeable future. Significant historic and archeological resources are present on Pooles Island and within the footprint of this option.

References:

High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group. CBP. 1996.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

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Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

Maryland Port Administration (MPA). 1998. Prefeasibility Study for Upper Bay Island Placement Sites—Final Consolidated Report. February.

US Fish and Wildlife Service (USFWS). 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services

3.7 SITE 4BR – POOLES ISLAND 4BR

SUMMARY: Pooles Island is located within the upper Chesapeake Bay. The island configuration described here, an open-water site, was designated 4BR in the 1998 upper Bay Island Prefeasibility Study. The concept is located off of the southern end of Pooles Island. This island would be entirely separate from Pooles Island and outside of the APG boundaries. This project concept has an as-yet to be determined design for a minimum 50% wetland component.

Geotechnical Engineering:

- Geotechnical Conditions: The majority of the site is underlain by soft substrates that would require removal prior to dike construction and thus higher site development costs.
- Borrow Source Potential: The data indicate that sand is likely to be available in the northern portion of the 4BR site. Recovering the sand will required some stripping. The thickness of the sand is unknown. It is conceivable that depending upon the quantity of sand required, some sand might have to be imported. For budgeting purposes, it is assumed that about 50% of the sand will need to be imported. This site is located just outside the APG boundary; therefore, there is a high potential for the presence of UXO exists. Because of the potential presence of UXO, it may not be feasible to use the local sand for borrow.
- Foundation Conditions: The foundation soils under the dike are anticipated to vary from the north to the south ends. Near the south perimeter, the soils are anticipated to very soft to soft silty clay to at least –35 ft MLLW. Near the northern perimeter, closer to Pooles Island, the soils are anticipated to be soft clay underlain by dense sand. Consequently, the dike sections at Site 4BR could vary from a dike with no stabilizing berms to a dike with stabilizing berms. The locations where the dike sections may change from dikes with no berms to dikes with berms are not known at this stage. Slope stability analyses were conducted for different slope configurations. The soft foundation soils will not support a conventional dike, therefore, the dike design assumed that the very soft clay would be undercut to about elevation –20 ft MLLW and a stabilizing berm would be constructed.

Coastal Engineering:

- Coastal Conditions: Water depths in the area range from -10 feet to –16 ft MLLW, with an average value of approximately -12 ft. The greatest fetch and the largest waves are from the south-southwest direction. Mean tidal range is between 0.9 and 1.2 ft, with a spring tidal range between 1.1 and 1.8 feet. Storm tide elevations for a 25-year return period is 5.7 ft MLLW, 100 yr water level of 9.1 ft above MLLW. Design wind speeds for a 25-year return period storm range from 47 mph for the east direction to 70 mph for the southwest direction. Wave heights can exceed 5.5 ft in a 100 yr event arriving from south-southwest. Peak spectral wave periods are 4.9 seconds for a 100-year event. The 25-year return period significant wave height is 1.6 feet with a spectral wave period of 6.5 seconds.
- Coastal Design Issues: Deep water conditions result in the potential that dike structures could be exposed to breaking waves. Toe protection and/or foundation berms serve to provide protection against breaking waves.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Dissolved oxygen levels at nearby monitoring stations indicate healthy levels. Some decline in deeper waters occasionally results in summer levels to fall below 4.0.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: This site lies within the turbidity maximum area of the Chesapeake Bay. Flows from the Susquehanna River influence turbidity and total suspended solids concentrations. Turbidity is generally less than 50 NTU, with higher levels during freshets and storm events.
- Salinity: Oligohaline, with some salinity stratification in deeper waters, surface salinity generally less than 6 ppt, bottom salinity less than 10 ppt.
- Ground Water: Not applicable.
- Surface Water: Not applicable.
- Other: Average pH levels are 7 – 8.

Aquatic Invertebrates:

- Benthic Community: The benthic community in adjacent areas studied shows the benthos is in good health, with a B-IBI of 3.0 at site 4-B, adjacent to 4BR. Substrate over most of the area categorized as low mesohaline containing sand, clayey silt, silty sand and sandy clay silt. Community consisted of polychaetes, oligochaetes, bivalves, isopods, amphipods and other mollusks and arthropods. Any benthos in the concept area will be lost.
- Shallow Water Habitat: Shallow water habitat is not present in 4BR.
- SAV: Not applicable.

Wetlands:

- Tidal Wetlands: Not applicable
- Non-Tidal Wetlands: Not applicable.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: Finfish spawning habitat for anadromous species are found in the vicinity of Pooles Island. Pooles Island is within the designated striped bass spawning area.
- Finfish Rearing Habitat: Although this concept generally lies within finfish rearing habitat, the lack of SAV, shoreline and high relief bottom would make it of limited value for this resource.
- Larval Transport: Larval transport is a potential concern due to existing currents and island location. Hydrodynamic modeling was inconclusive in determining potential impacts to larval transport.
- Essential Fish Habitat (EFH): The waters around Pooles Island are not EFH.
- Commercially Harvested Species and Habitat: This site is too far north to support soft shell calms and oysters. Site 4BR supports a relatively productive blue crab harvest through out

the summer. The site was not identified as an important drift netting area. No pound nets are currently set near site 4BR.

- Thermal Refuge: It is anticipated that the deep water island placement alternatives being considered would have a potentially greater impact on thermal water masses than upland or shallow water placement alternatives because of the conversion of deep water to upland or wetland habitat.
- Recreational Fishery: The 4BR site does not contain the same high relief bottom that is fished extensively by recreational anglers in the site 4B concept area, so recreational fisheries are not thought to be as significant in 4BR.

Special:

- Protected Species (RTE & SSPRA): No RTE is known to occur at the site. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): HAPC is not present.

Avian/Terrestrial Habitat

- Waterfowl Use: Waterfowl species are expected to use the area only incidentally.
- Wading and Shorebird Use: Expected to use the area only incidentally.
- Terrestrial Habitat and Wildlife: Not present

Physical Parameters:

- Substrate Composition: Sediments consist of a mixture of silt, and clay, with dense sand underlying it for part of the footprint area.
- Hydrodynamics: Two and Three-dimensional hydrodynamic modeling performed.
- Contaminants: Sediment quality sampling was conducted; zinc levels detected in *in-situ* sediments exceeded the PEL value. Cadmium was below the NOEL, all other values for which a PEL or NOEL existed were between the PEL and NOEL.
- CERCLA/UXO Potential: Site 4BR lies just outside the boundaries of APG. APG is on the NPL list of hazardous waste sites. This site has great potential to contain UXO.
- Fossil Shell Mining: No fossil shell resources have been identified within the site.

Other:

- Recreational Value: Recreational boating around Pooles Island is significant.
- Aesthetics and Noise: Existing noise comes from natural sources, boating, and aircraft. The project is more than 0.5 miles from any population center, so noise related impacts are not expected.
- Cultural Resources: Documented shipwrecks are not known to be located within the proposed 4BR site.
- Navigation: The C&D Approach Channel and the West Sailing Course are located in the vicinity of the site, but the proposed configurations would not lie in the channels. The hydrodynamics of an island placed at 4BR could increase cross-currents in the vicinity of the Western Sailing Course. The extent to which these currents could impact navigation would need to be studied further.
- Critical Areas: Critical areas are not present

Beneficial Attributes:

- Beneficial Use Wetlands: An as yet to be designed wetland component of at least 50% acreage would be added.
- Beneficial Use Uplands: Upland habitat creation will be a component in the development of this option.
- Beneficial Use Adjacent Habitat Enhancement: Adjacent habitat enhancement is expected as a result of development of this option.
- Shoreline Protection: No shoreline protection is expected from this option.

Environmental Issues:

- Ranked as an option with moderate to high environmental effects.
- Impacts to benthos during creation of uplands and wetlands.
- Possibility for short-term effects to water quality, although these would be monitored and regulated.
- Area is within the striped bass spawning area.
- It is possible that birds and other animals will avoid areas of the island closest to construction, although seasonal construction restrictions should minimize this.
- Significant recreational and commercial fishing is present.

Dredging Engineering:

- Concepts range between 680-780 acres.
- Construction Issues: Technically difficult. UXO may be an insurmountable technical hurdle. Construction 2-4 years. Distance from dredging sites to site may be an advantage. An access channel would be required.

Other Issues:

- The concept area lies partially within the 5-mile radius of the Hart-Miller Island-Pleasure Island chain, change in State law would be required for construction.

References:

High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group. CBP. 1996.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

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US Fish and Wildlife Service (USFWS). 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services

3.8 SITE 170 – MOUTH OF THE PATAPSCO ISLAND

SUMMARY: Site 170 is located at the mouth of the Patapsco River just south of the intersection of the Brewerton Channel and the Craighill Channel. The island configuration described here is known as Site 170 from the 1989 Master Plan and Mouth of the Patapsco from historic open-water placement practices. The site is currently an open-water site proposed for island creation with a beneficial use component. The island has an as-yet to be determined design for a minimum 50% wetland component.

Geotechnical Engineering:

- Geotechnical Conditions: Preliminary geotechnical literature reviews suggest that he majority of the site is underlain by soft substrates. The area to the south may have firmer foundation strata below the soft surface layers.
- Borrow Source Potential: Data are not available yet on borrow sources.
- Foundation Conditions: Data are not available yet on foundation conditions. For the conceptual study, the foundation was assumed to consist of soft substrates.

Coastal Engineering:

- Coastal Conditions: Average water depths are approximately -16 feet MLLW. Preliminary coastal work yielded dike design heights of 11 - 15 feet.
- Coastal Design Issues: Deep water conditions result in the potential that dike structures could be exposed to breaking waves. Toe protection and/or foundation berms serve to provide protection against breaking waves.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Dissolved oxygen levels at nearby monitoring stations indicate anoxia in the summer months. Do of < 1 is typical in bottom waters in warmer months.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: Turbidity is generally assumed to be less than 50 NTU, with higher levels during freshets and storm events.
- Salinity: Low mesohaline, with some salinity stratification expected.
- Ground Water: Not applicable.
- Surface Water: Potential impacts to the Patapsco River, which is an impaired water body.
- Other: Average pH levels are 7 – 8. Water quality of the Patapsco River is degraded. Modeling of effects from construction of a placement island would be required.

Aquatic Invertebrates:

- Benthic Community: The benthic community in adjacent areas is assumed to be stressed, due to seasonally occurring anoxia. Substrate over the area is expected to be clayey silt.
- Shallow Water Habitat: Shallow water habitat is not present in Site 170.
- SAV: SAV does not exist within the Site 170 concept area

Wetlands:

- Tidal Wetlands: Not applicable
- Non-Tidal Wetlands: Not appliable.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: There is no potential for finfish spawning habitat of anadromous species within the project concept area.
- Finfish Rearing Habitat: There is a potential for transient finfish rearing habitat of anadromous species within the project concept area.
- Larval Transport: Larval transport is not as significant a concern as with some other upper bay island areas. Hydrodynamic modeling was inconclusive in determining potential impacts to larval transport.
- Essential Fish Habitat (EFH): The waters around Site 170 are not EFH.
- Commercially Harvested Species and Habitat: Site 170 supports clamming, crabbing, and fishing for rockfish and white perch.
- Thermal Refuge: It is not anticipated to be impacted.
- Recreational Fishery: Site 170 may support some recreational fishing. Recreational fishing also occurs at shoal areas immediately east and southeast of Site 170.

Special:

- Protected Species (RTE & SSPRA): RTE are not known to occur in the project concept area. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): HAPC is not present.

Avian/Terrestrial Habitat

- Waterfowl Use: Expected to use the area only incidentally.
- Wading and Shorebird Use: Not applicable.
- Terrestrial Habitat and Wildlife: Not applicable.

Physical Parameters:

- Substrate Composition: Sediments expected to consist of soft silty clay.
- Hydrodynamics: Two and Three-dimensional hydrodynamic modeling performed.
- CERCLA / UXO Potential: No potential.
- Contaminants: Sediment quality sampling not yet conducted.
- Fossil Shell Mining: No fossil shell resources have been identified within the site.

Other:

- Recreational Value: Recreational boating in the area is reported to be significant.
- Aesthetics and Noise: Existing noise comes from natural sources, boating, and aircraft. View shed impacts are expected. Construction of an island would present a significant change to the view shed from the northeastern Anne Arundel County shoreline from Riviera Beach to Bodkin Point and from the Sparrows Point, Old Road Bay, and North Point State Park areas in Baltimore County. The change would be significant because an island did not exist at this location previously, and because the prospective elevation, closeness to the

shoreline, and the vertical viewing angle would make the island appear relatively more pronounced than if the island were located further off shore. The most pronounced effects would be on the view shed as seen from the shoreline along Hog Neck, which could be within 0.8 km (0.5 mi) of the site, and from the Rock Point area in Baltimore County, which could be slightly more than 1.6 km (1 mi) from the site.

- Cultural Resources: None known to occur within the concept area.
- Navigation: The Brewerton and Craighill Channels are located north of the concept area. The hydrodynamics of an island placed in this location could impact navigation due to effects on currents that is may create.
- Critical Areas: Critical areas are not present

Beneficial Attributes:

- Beneficial Use Wetlands: An as yet to be designed wetland component of at least 50% acreage would be added.
- Beneficial Use Uplands: Upland habitat creation will be a component in the development of this option.
- Beneficial Use Adjacent Habitat Enhancement: Adjacent habitat enhancement is expected as a result of development of this option.
- Shoreline Protection: No shoreline protection is expected from this option.

Environmental Concerns:

- Existing benthic communities are expected to be degraded.
- Some commercial fishing is present. Navigation impacts possible.
- Shoreline erosion effects on nearby communities need investigation at future levels of study.
- Water quality of the Patapsco River is impaired for nutrients, several metals and some toxics.
- Discharges from a dredged material placement facility and changes in the hydrodynamic flows and currents from a facility at the mouth of the Patapsco would need to be investigated in future studies.

Dredging Engineering:

- Concepts estimated at 1,600 acres.
- Construction Issues: Unknown presence of borrow source. Construction 2-4 years. Distance from dredging sites to site an advantage.

Other Issues:

- Navigation impacts potential.
- The concept area lies partially within the 5-mile radius of the Hart-Miller Island-Pleasure Island chain, change in State law would be required for construction.
- Nearby communities are concerned about potential impacts from shoreline erosion due to increased current velocity from hydrodynamic changes resulting from island footprints. Further study will be required to determine if these effects would occur or could be minimized.

References:

High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group. CBP. 1996.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Gahagan & Bryant Associates for Maryland Port Administration. 1999. Conceptual Dredging and Site Analysis for Site 170. Gahagan and Bryant Associates, Inc. September 1999.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

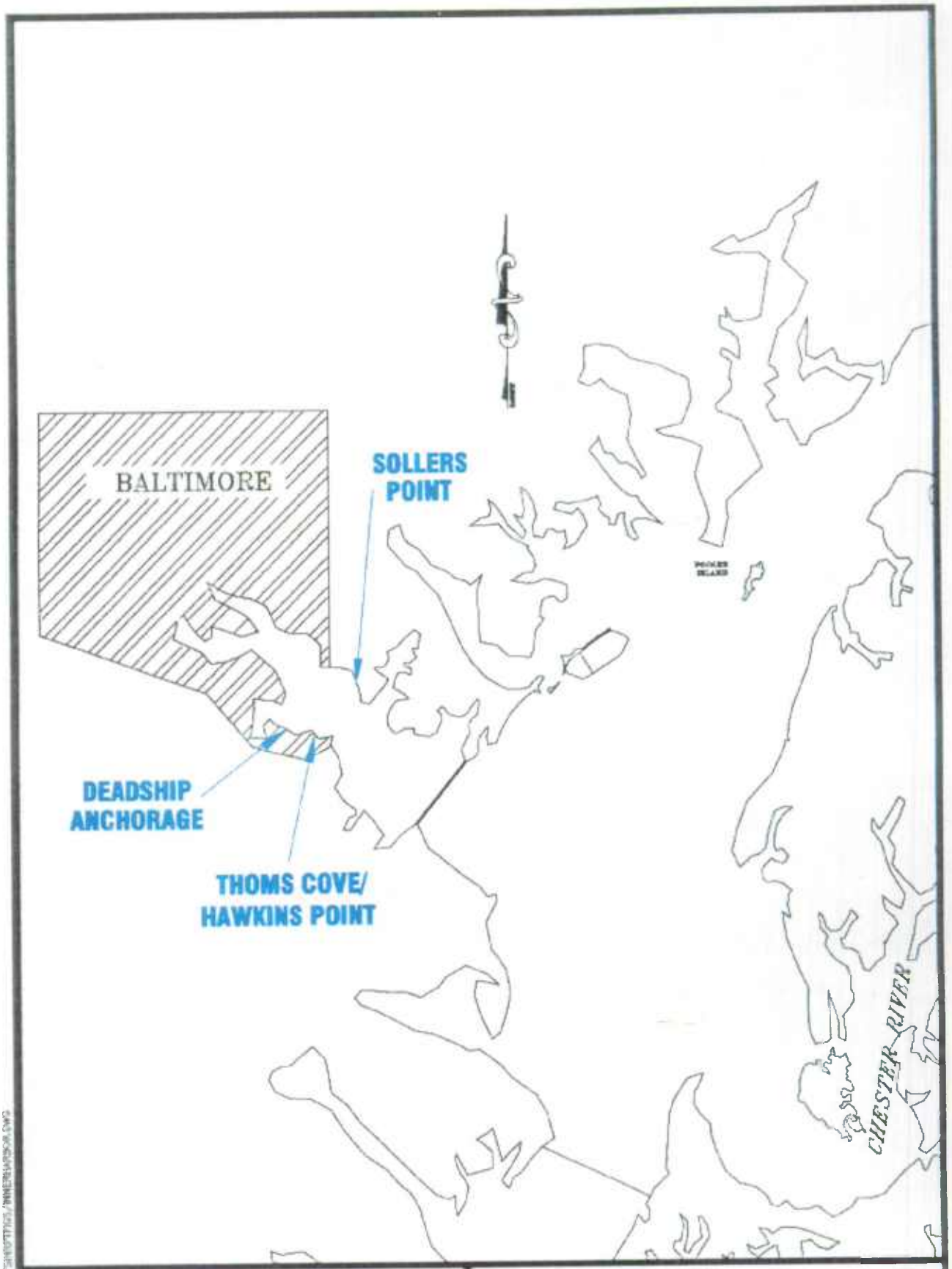
Maryland Port Administration (MPA). 1998. Prefeasibility Study for Upper Bay Island Placement Sites—Final Consolidated Report. February.

US Fish and Wildlife Service (USFWS). 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services

Waterways Experiment Station for Maryland Port Administration. 2000. Assessment of the Impact of the Proposed Site 170 Placement Island in the Upper Chesapeake Bay - A Three Dimensional Numerical Model Study. Billy Johnson, et. al., Waterways Experiment Station, U.S. Army Research and Development Center. Final Report. May 2000.

4.0 INNER HARBOR PLACEMENT OPTIONS

Dead Ship Anchorage
Sollers Point
Hawkins Point/ Thoms Cove



MARYLAND ENVIRONMENTAL SERVICE

INNER HARBOR PLACEMENT OPTIONS
VICINITY MAP
FIGURE 3

4.1 DEAD SHIP ANCHORAGE

SUMMARY: This option is located within the Inner Harbor. It is situated between Sledds Point and Leading Point at the south side of the mouth of Curtis Bay, about one mile west of the Francis Scott Key Bridge in Baltimore. Potential benefits are a good foundation for construction and upland creation. Potential drawbacks include wetland impacts, hydrodynamic impacts to Curtis Bay and recreational boating impacts. Dead Ship Anchorage is a former anchorage that is now being considered as a shoreline/ shallow water fastland creation option.

Geotechnical Engineering:

- Geotechnical Conditions: Geotechnical borings are underway to determine if adequate sand is available for construction of an expanded project footprint, and to determine if the foundation materials are suitable for new dike construction.
- Borrow Source Potential: See above.
- Foundation Conditions: See above.

Coastal Engineering:

- Coastal Conditions: The bottom ranges in depth from -4.57 to - 6.7 m between Sledds Point and Leading Point. Further coastal engineering studies are underway.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Water quality is poor, partly due to low DO conditions in the summer.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: No information at this time.
- Salinity: Ranges from oligohaline to mesohaline.
- Ground Water: Not reviewed.
- Surface Water: Potential impacts to the Patapsco River, which is an impaired water body.

Aquatic Invertebrates:

- Benthic Community: A total of 27 benthic species were found in Baltimore Harbor, which is low in comparison with other areas of the Chesapeake Bay. Most species were attributed to three major phyla, the mollusks, the arthropods, and the annelids. Bottom conditions generally favor burrowing invertebrates such as worms. Any benthos in the concept area would be lost.
- Shallow Water Habitat: The area contains shallow-water habitat.
- SAV: VIMS surveys have documented no SAV at this site since 1994. Historical SAV distributions have not been reviewed.

Wetlands:

- Tidal Wetlands: Tidal wetlands are present.
- Non-Tidal Wetlands: Non-tidal wetlands are present.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: There is no potential for finfish spawning habitat of anadromous species within the project concept area.
- Finfish Rearing Habitat: Not reviewed.
- Larval Transport: This option is not believed to have an effect on larval transport.
- Essential Fish Habitat (EFH): Waters around this option are not considered EFH.
- Commercially Harvested Species and Habitat: No impacts anticipated.
- Thermal Refuge: Not reviewed.
- Recreational Fishery: Not reviewed.

Special:

- Protected Species (RTE & SSPRA): SSPRA information for this site was not reviewed for this report.
- Habitat of particular Concern (HAPC): None in the waters around this option.

Avian/Terrestrial Habitat:

- Waterfowl Use: Not reviewed.
- Wading and Shorebird Use: Not reviewed.
- Terrestrial Habitat and Wildlife: Not reviewed..

Physical Parameters:

- Substrate Composition: No information at this time.
- Hydrodynamics: No information at this time.
- Contaminants: Contaminants concentrations in the Inner Harbor tend to be higher than the MD Acute Water Quality Criteria.
- CERCLA/UXO: The Curtis Bay Coast Guard Station, located at Hawkins Point, is proposed for inclusion on the Superfund National Priority List due to historic ship repair activity. The Dead Ship Anchorage was historically used as an anchorage for these the coastguard station, and may have been affiliated with the repair operations. There may be a potential for UXO.
- Fossil Shell Mining: Fossil shell resources are not anticipated in the area.

Other:

- Recreational Value: Not reviewed.
- Aesthetics and Noise: No additional impacts anticipated.
- Cultural Resources: The Coast Guard Station at Curtis Bay is listed on the National Register of Historic Places; the Dead Ship Anchorage was historically affiliated with the Coast Guard station.
- Navigation: The Curtis Bay shipping channel is adjacent to the proposed site.
- Critical Areas: As this is a shoreline option, it lays within a critical area

Beneficial Attributes:

- Beneficial Use Wetlands: The site would most likely be used, not for beneficial habitat restoration, but as a marine terminal. There is low potential for wetlands habitat creation.
- Beneficial Use Uplands: The site would most likely be used, not for beneficial habitat restoration, but as a marine terminal. There is low potential for uplands habitat creation.
- Beneficial Use Adjacent Habitat Enhancement: The site would most likely be used, not for beneficial habitat restoration, but as a marine terminal. There is low potential for adjacent habitat enhancement.
- Shoreline Protection: Containment dikes can be designed to provide additional shoreline protection.

Environmental Concerns:

- Construction of the upland facility would eliminate shallow-water habitat and would therefore affect fishing activity in the area. Permitting would be required for construction in shallow-water habitat and for development in a critical area, as well as for wetland disturbance. The area is the last natural shoreline in the Harbor.

References: Information compiled from draft environmental reports and collective study team knowledge, as well as:

Chesapeake Bay Program (CBP). 1996. High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

Maryland Port Administration (MPA). 2001. Draft Interim Report to the Maryland General Assembly Concerning Implementation of the Dredged Material Management Act of 2001.

US Fish and Wildlife Service (USFWS). 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services.

4.2 SOLLERS POINT

SUMMARY: The Sollers Point option consists of 90 acres in Baltimore Harbor located just southeast of the Francis Scott Key Bridge. It is a shoreline/ shallow water fastland creation option.

Geotechnical Engineering:

- Geotechnical Conditions: Mostly soft silts and clays. Additional geotechnical studies are underway.
- Borrow Source Potential: Geotechnical studies are underway to evaluate borrow source potential.
- Foundation Conditions: Bottom material may be unfavorable for construction of containment dikes; additional geotechnical studies are underway.

Coastal Engineering:

- Coastal Conditions: Coastal engineering studies are underway.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Surface DO concentrations range from 4.5 to 12.0 mg/L with bottom concentrations ranging from 1 to 10 mg/L. The area is shallow and would be expected to have sufficient DO to sustain aquatic life.
- Nutrient Enrichment: Chlorophyll-*a* concentrations are generally low and variable by season. Particulate phosphorus is generally steady throughout the year with low concentrations at the surface (mean 0.04 mg/L) when compared with a mean concentration of 0.40 mg/L in deeper regions.
- Turbidity: TSS ranges throughout the season from 10 to 30 mg/L. This range is sufficient to support many finfish species; however, 15 mg/L is reportedly the maximum concentration tolerated by SAV.
- Salinity: Salinity is high mesohaline (10-18 ppt) in the summer and fall, and low mesohaline (5-10 ppt) in late winter and spring.
- Ground Water: Ground water is not used as a potable resource in this area, and the site is not a recharge zone. There would be no effects on ground-water resources from use of this site.
- Surface Water: Potential impacts to the Patapsco River, which is an impaired water body.

Aquatic Invertebrates:

- Benthic Community: A total of 27 benthic species were found in Baltimore Harbor, which is low in comparison with other areas of the Chesapeake Bay. Most species were attributed to three major phyla, the mollusks, the arthropods, and the annelids. Bottom conditions generally favor burrowing invertebrates such as worms. Any benthos in the concept area will be lost.
- Shallow Water Habitat: Shallow water exists.

- SAV: The VIMS SAV survey results since 1994 report no SAV at this site. Historical SAV distributions have not been reviewed.

Wetlands:
- Tidal Wetlands: Tidal wetlands could be impacted.
- Non-Tidal Wetlands: Site is adjacent to non-tidal wetlands.

Aquatic Biology – Finfish/Shellfish:
- Finfish Spawning Habitat: No striped bass eggs or early larvae were found due to the lack of water velocities in fresh-water areas normally associated with successful striped bass offspring. The Harbor has lower salinities, and therefore greater numbers of fresh-water species when compared with other proposed sites. A combination of uninhabitable bottom sediments and low oxygen levels combine to exclude many species of bottom fish throughout deeper areas of the Harbor. The proposed area is shallower and fish exclusion does not occur as readily.
- Finfish Rearing Habitat: There is potential for finfish rearing habitat to exist at this site.
- Larval Transport: Impacts to larval transport are not expected to occur.
- Essential Fish Habitat (EFH): Waters in the area are not considered EFH.
- Commercially Harvested Species and Habitat: There is no commercial fishing activity within or near the site.
- Thermal Refuge: Not reviewed.
- Recreational Fishery: Not reviewed.

Special:
- Protected Species (RTE & SSPRA): No RTE species are known to exist at the site. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): The waters in the area are not designated as HAPC.

Avian and Terrestrial Habitat and Use:
- Waterfowl Use: The area is used by waterfowl for resting and feeding, but it is not considered an important waterfowl area.
- Wading and Shorebird Use: Not reviewed.
- Terrestrial Habitat and Wildlife: Not reviewed.

Physical Parameters:
- Substrate Composition: Not reviewed.
- Hydrodynamics: Not reviewed.
- Contaminants: Sediments in the Sollers Point area are suspected of being severely degraded.
- CERCLA/UXO: The option site is not associated with any CERCLA sites. No UXO issues expected.
- Fossil Shell Mining: Fossil shell mining resources not present.

Other:
- Recreational Value: No data available on recreational activity in the area.

- Aesthetics and Noise: Existing anthropogenic sources of noise include boat and automobile traffic, and local businesses.
- Cultural Resources: No cultural resources are known to exist at the site.
- Navigation: No impact expected.
- Critical Areas: This option is within a critical area.

Beneficial Attributes:

- Beneficial Use Wetlands: The site would most likely be used as a marine terminal; no wetland creation is planned.
- Beneficial Use Uplands: The site would most likely be used as a marine terminal; no uplands creation is planned.
- Beneficial Use Adjacent Habitat Enhancement: This option is not considered to have a beneficial use component.
- Shoreline Protection: Containment dikes can be designed to provide additional shoreline protection.

Environmental Concerns:

- The site is considered severely environmentally degraded.
- Construction of the upland facility would eliminate shallow-water habitat and would therefore affect fishing activity in the area. Permitting would be required for construction in shallow-water habitat and for development in a critical area, as well as for wetland disturbance. The area is the last natural shoreline in the Harbor.

Dredging Engineering:

- Bottom sediment may be unfavorable for construction of containment dikes. The site in near deep water and near shipping channels. Ongoing reconnaissance-level geotechnical and dredging engineering investigations will provide more detailed information.

References: Information compiled from draft environmental reports and collective study team knowledge, as well as:

Chesapeake Bay Program (CBP). 1996. High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

Maryland Port Administration (MPA). 2001. Draft Interim Report to the Maryland General Assembly Concerning Implementation of the Dredged Material Management Act of 2001.

US Fish and Wildlife Service (USFWS). 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services.

4.3 HAWKINS POINT/THOMS COVE

SUMMARY: The Hawkins Point/Thoms Cove option is located in Baltimore Harbor on the south shore of the Patapsco River, west of the Francis Scott Key Bridge in Thoms Cove. The adjacent land area at Hawkins Point has previously been used for placement of dredged material from maintenance dredging in the Harbor; the Hawkins Point area has been completely filled. Use of Hawkins Point/Thoms Cove would result in upland placement and creation of uplands in existing shallow water. This site is a shoreline/ shallow water fastland creation option.

Geotechnical Engineering:

- Geotechnical Conditions: Preliminary studies indicate that the substrates consist mostly of soft silts and clays.
- Borrow Source Potential: Geotechnical borings are underway to determine borrow source potential.
- Foundation Conditions: The cove has poor subsurface conditions; a buried watercourse lies within the cove at a depth of approximately 21 m (70 ft). This ancient watercourse is filled with sediments comprised of very soft silt and clay layers interbedded with very loose deposits. In the center of this former watercourse, the low-strength materials may extend to considerable depths. Ongoing reconnaissance-level geotechnical studies will determine the presence of any foundation materials suitable for new dike construction.

Coastal Engineering:

- Coastal Conditions: The cove is relatively shallow, averaging about 4 ft deep in the near-shore area to -9 to –10 ft deep farther offshore. Further coastal engineering studies are underway.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Water quality is poor due to low DO conditions in the summer and the presence of contaminants higher than the MD Acute Water Quality Criteria in the Harbor.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: Not reviewed.
- Salinity: Salinity ranges from the mesohaline to the oligohaline.
- Ground Water: Effects on ground-water resources are not projected from use of the site.
- Surface Water: Potential impacts to the Patapsco River, which is an impaired water body.

Aquatic Invertebrates:

- Benthic Community: A total of 27 benthic species were found in Baltimore Harbor, which is low in comparison with other areas of the Chesapeake Bay. Most species were attributed to three major phyla, the mollusks, the arthropods, and the annelids. Bottom conditions

generally favor burrowing invertebrates such as worms. Any benthos in the concept area will be lost.

- Shallow Water Habitat: The area contains natural shoreline and shallow-water habitat up to 10 ft deep.
- SAV: VIMS survey results since 1994 record no SAV at this site. Historical SAV distributions were not reviewed.

Wetlands:

- Tidal Wetlands: 1 acre of tidal wetlands is along the shoreline.
- Non-Tidal Wetlands: 6 acres of palustrine wetlands are present along the shoreline.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: No impacts expected.
- Finfish Rearing Habitat: Potential for finfish rearing habitat in the area.
- Larval Transport: Impacts to larval transport are not expected to occur.
- Essential Fish habitat (EFH): This area is not considered to be EFH.
- Commercially Harvested Species and Habitat: Blue crab and soft-shell clam habitat are limited.
- Thermal Refuge: Potential for thermal refuge does exist at the site.
- Recreational Fishery: Recreational fishing potentially occurs at this site.

Special:

- Protected Species (RTE & SSPRA): No RTE species are known to exist at this site. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): There is no HAPC at this site.

Avian and Terrestrial Habitat and Use:

- Waterfowl Use: The wood duck, the American black duck inhabits the area. A Historic Waterfowl Concentration Area exists to the southeast of the site.
- Wading and Shorebird Use: Green-back heron is present.
- Terrestrial Habitat and Wildlife: Terrestrial wildlife includes white-tailed deer.

Physical Parameters:

- Substrate Composition: No information at this time.
- Hydrodynamics: Hydrodynamic modeling would need to be conducted to determine if effects could be expected as a result of using this site.
- Contaminants: Contaminants concentrations in the Inner Harbor tend to be higher than the MD Acute Water Quality Criteria.
- CERCLA/UXO: Proximity to Curtis Bay CERCLA site.
- Fossil Shell Mining: Fossil shell resources are not anticipated in the area.

Other:

- Recreational Value: Potential for recreational fishing at this site.
- Aesthetics and Noise: Existing anthropogenic sources of noise include boat and automobile traffic, and local businesses.

- Cultural Resources: No cultural resources are known to exist at the site.
- Navigation: Navigation would not be affected by use of the site.
- Critical Areas: This site is within a critical area.

Beneficial Attributes:

- Beneficial Use Wetlands: The site would most likely be used as a marine terminal; there is no planned wetland creation.
- Beneficial Use Uplands: The site would most likely be used as a marine terminal, there is no planned upland creation.
- Beneficial Use Adjacent Habitat Enhancement: This option is not considered to have a beneficial use component.
- Shoreline Protection: Containment dikes can be designed to provide additional shoreline protection.

Environmental Concerns:

- Construction of the upland facility would eliminate shallow-water habitat and would therefore affect fishing activity in the area. Permitting would be required for construction in shallow-water habitat and for development in a critical area, as well as for wetland disturbance. The area is the last natural shoreline in the Harbor.

Dredging Engineering:

- Preliminary studies revealed that the cove has poor subsurface conditions; a buried watercourse lies within the cove at a depth of approximately 21 m (70 ft). This ancient watercourse is filled with sediments comprised of very soft silt and clay layers interbedded with very loose deposits. In the center of this former watercourse, the low-strength materials may extend to considerable depths. Ongoing reconnaissance-level geotechnical and dredging engineering investigations will provide more detailed information.

References: Information compiled from draft environmental reports and collective study team knowledge, as well as:

Chesapeake Bay Program (CBP). 1996. High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

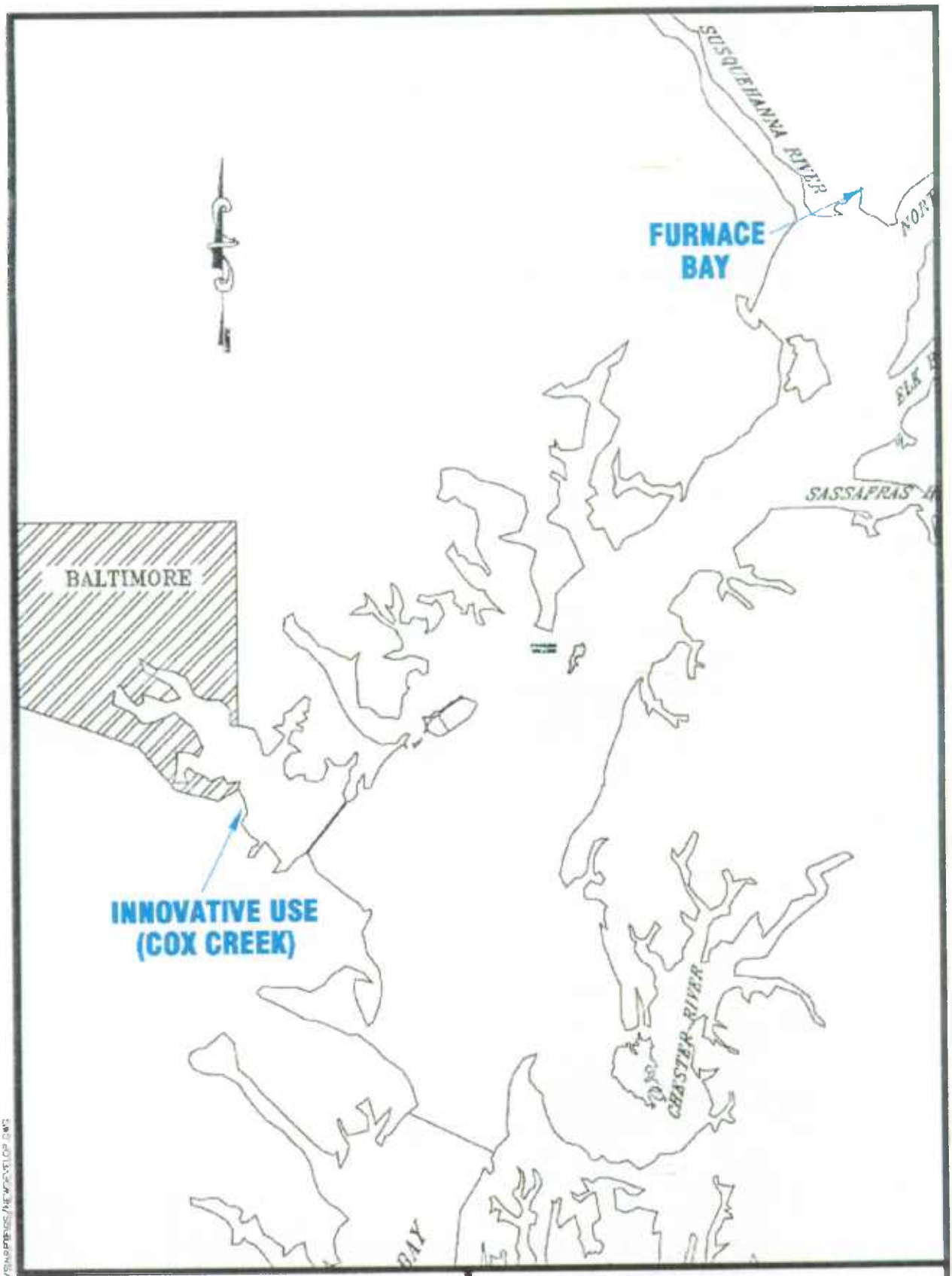
Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

Maryland Port Administration (MPA). 2001. Draft Interim Report to the Maryland General Assembly Concerning Implementation of the Dredged Material Management Act of 2001.

US Fish and Wildlife Service (USFWS). 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services.

5.0 NEW DEVELOPMENT OPTIONS

Agricultural – Innovative Use
Furnace Bay
Innovative Use
Mines and Quarries



MARYLAND ENVIRONMENTAL SERVICE

NEW DEVELOPMENT OPTIONS
VICINITY MAP
FIGURE 4

5.1 AGRICULTURAL - INNOVATIVE USE

SUMMARY: The Maryland Port Administration (MPA) is currently in the process of identifying, evaluating and performing field trials for the innovative use (e.g. beneficial use) of estuarine sediments on agricultural land. This concept would improve marginal, sandy agricultural soils through the addition of fine-grained dredged materials, increasing the ability of agricultural soils to hold water and nutrients and resulting in greater crop production. Laboratory and field studies have been underway for several years, specific implementation sites have not yet been identified.

Geotechnical Engineering:
- Not required.

Coastal Engineering:
- Not required.

Environmental Conditions:

Water Quality:
- Dissolved Oxygen: Not applicable.
- Nutrient Enrichment: Not applicable.
- Turbidity: Not applicable.
- Salinity: Not applicable.
- Ground Water: It has been determined that a certain level of leaching of salts and sulfur is necessary prior crop planting on agricultural sites to maximize the benefit of the addition of dredged material. This impact would be to unconfined surface groundwater, which is not anticipated to affect drinking water. Studies will be performed to evaluate, monitor and minimize groundwater quality impacts.
- Surface Water: Impacts could occur as a result of run-off.
- Other: It is anticipated that environmental study of potential agricultural sites will be performed to evaluate, monitor and minimize water quality impacts to surface waters.

Aquatic Invertebrates:
- Benthic Community: Not applicable.
- Shallow Water Habitat: Not applicable.
- SAV: Not applicable.

Wetlands:
- Tidal Wetlands: Not applicable.
- Non-Tidal Wetlands: Not present in agricultural areas.

Aquatic Biology – Finfish / Shellfish
- Finfish Spawning Habitat: Not applicable.
- Finfish Rearing Habitat: Not applicable.
- Larval Transport: Not applicable.
- Essential Fish Habitat (EFH): Not applicable.

- Commercially Harvested Species and Habitat: Not applicable.
- Thermal Refuge: Not applicable.
- Recreational Fishery: Not applicable.

Special:
- Protected Species (RTE & SSPRA): Site dependent.
- Habitat of Particular Concern (HAPC): Not applicable.

Avian / Terrestrial Habitat:
- Waterfowl Use: No impacts to waterfowl habitat are anticipated as a result of the innovative use of dredged material on agricultural land.
- Wading and Shorebird Use: No impacts to wading or shorebird habitat are anticipated as a result of the innovative use of dredged material on agricultural land.
- Terrestrial Habitat and Wildlife: No impacts to terrestrial habitat are anticipated as a result of the innovative use of dredged material on agricultural land.

Physical Parameters:
- Substrate Composition: Not applicable.
- Hydrodynamics: Not applicable.
- Contaminants: No impacts anticipated as a result of the innovative use of dredged material.
- CERCLA/UXO Potential: CERCLA / UXO sites not assumed to be on agricultural land.
- Fossil Shell Mining: Not applicable.

Other:
- Recreational Value: Not applicable.
- Aesthetics and Noise: Agricultural land is subject to the noise of the farming equipment. No further impacts anticipated.
- Cultural Resources: Already established farming area.
- Navigation: Not applicable.
- Critical Areas: No impacts anticipated as a result of the innovative use of dredged material.

Beneficial Attributes:
- Beneficial Use Wetlands: Wetland component is not part of this option.
- Beneficial Use Uplands: Upland component is not part of this option.
- Beneficial Use Adjacent Habitat enhancement: Adjacent habitat is not part of this option.
- Shoreline Protection: Not a component of this option.
- Other: This option provides an opportunity for innovative use of dredged material toward the improvement of agricultural soils.

Dredging Engineering:
- Factors such as transportation, use of an interim dewatering facility, location of fields, etc., needs to be considered.

5.2 FURNACE BAY

SUMMARY: Furnace Bay is a quarry proposed as an upland placement site located in Perryville, Maryland. The 130-acre property is located in western Cecil County on Principio Creek, a tributary of Furnace Bay. The quarry has an estimated 5 to 7 years of commercial operation remaining, and provisions of the quarry's surface mining permit require reclamation after commercial mining is exhausted. Mechanically placed dewatered dredged material from the Chesapeake Bay is proposed as suitable fill material for the mine reclamation.

Geotechnical Engineering:

- Geotechnical Conditions: Coastal Plain Physiographic Province with Raritan and Patapsco Formations and Lowland Deposits consisting of sandy material, gravels, and clays. Soils exposed at the bottom of the quarry are silty sands and gravels with permeability ratings of 10^{-5} and 10^{-6}, respectively. A clayey silt/ sandy silt layer with a permeability rating of 10^{-6} cm/sec underlays the exposed layer.

Coastal Engineering:

- This upland site does not require coastal engineering studies.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: No data on this is available for Furnace Bay or Principio Creek, however existing periods of low DO are not anticipated.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with the dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: No data is currently available for Furnace Bay or Principio Creek; however, elevated natural turbidity is not anticipated in the area.
- Salinity: Oligohaline.
- Ground Water: The ground water level is approximately 2-4 feet below the existing quarry bottom and future quarry operations, excavation, or placement activities may affect groundwater flow. Groundwater flows to the southwest toward Principio Creek. A groundwater modeling study is underway.
- Surface Water: There is currently no information on the quality of the surface water at the site.

Aquatic Invertebrates:

- Benthic Community: Not applicable.
- Shallow Water Habitat: Not applicable.
- SAV: Not applicable.

Wetlands:

- Tidal Wetlands: Not applicable.
- Non-Tidal Wetlands: Not applicable.

Aquatic Biology-Finfish/ Shellfish:

- Finfish Spawning Habitat: Not applicable. Furnace Bay is an upland site.
- Finfish Rearing Habitat: Not applicable. Furnace Bay is an upland site.
- Larval Transport: Not applicable. Furnace Bay is an upland site.
- Essential Fish Habitat (EFH): Not applicable. Furnace Bay is an upland site.
- Commercially Harvested Species and Habitat: Not applicable. Furnace Bay is an upland site.
- Thermal Refuge: Not applicable. Furnace Bay is an upland site.
- Recreational Fishery: Not applicable. Furnace Bay is an upland site.

Special:

- Protected Species (RTE & SSPRA): There is currently no information on RTE at the proposed beneficial use site. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern (HAPC): Not applicable

Avian/ Terrestrial Habitat:

- Waterfowl species: Not applicable.
- Wading and Shorebird Use: Not applicable.
- Terrestrial Habitat and Wildlife: Not applicable.

Physical Parameters:

- Substrate Composition: Soils exposed at the bottom off the quarry are silty sands and gravels.
- Hydrodynamics: Not applicable to this site.
- Contaminants: No sediment sampling has been conducted on-site; however, it is believed that no toxic contaminants exist.
- CERCLA/UXO Potential: There are no CERCLA sites within two miles of the quarry. Due to the residential nature of the area surrounding this site, there is low potential for UXO issues.
- Fossil Shell Mining: Not applicable.

Other:

- Recreational Value: This site is a commercial enterprise and does not serve as a source of recreation.
- Aesthetics and Noise: Current operations create aesthetic and noise disturbances; dredged material placement activities should not create any additional significant disturbances.
- Cultural Resources: Non anticipated at this quarry site.
- Navigation: Not applicable.
- Critical Areas: The site is located within a critical area; however, the beneficial use project would remediate changes to the critical area caused by the quarry activity.

Beneficial Attributes:

- Beneficial Use Wetlands: Wetland creation is not a component in the development of this option.

- Beneficial Use Uplands: Upland habitat creation is a final stage component in the development of this option as an element of mine reclamation.
- Beneficial Use Adjacent Habitat enhancement: Adjacent habitat enhancement is not anticipated as a result of development of this option.
- Shoreline Protection: Not applicable.
- Other: Mine reclamation and capacity for dredged material.

Environmental Issues:

- Ground water at the site is close to the existing surface and may be subject to leachate from dredged material. A groundwater study is in progress to ascertain potential effects.

Dredging Engineering:

- Innovative use technology may be required for placement intended to achieve topographic relief.
- Other: Dredged material to be placed at this site has to be transported over public roads by trucks from the off-loading site.
- A dredging engineering assessment for hydraulic placement was not favorable for this site.

References:

Maryland Environmental Service. 2000. A Preliminary Assessment of the Feasibility of Using the Stancill's Inc. Property on Furnace Bay in the Cecil County as a Dredged Material Containment Facility. Prepared for Maryland Port Administration. November 2000.

5.3 INNOVATIVE USE

SUMMARY: The Maryland Port Administration (MPA) is currently in the process of identifying, evaluating and selecting test systems for the innovative use (e.g. beneficial use or reuse) of estuarine sediments. In response to a Request for Proposals (RFP) published in December 1999, qualified respondents proposed technologies to produce marketable products and or uses for dredged material from Baltimore Harbor, west of the North Point/ Rock Point line. MPA hopes to create renewable capacity at Cox Creek Dredged Material Containment Facility by using large quantities of dredged material to manufacture environmentally safe commercial products that may be marketed, used, or otherwise disposed of off site by the service provider.

Participants began Bench Scale Tests on their respective technology product lines in January 2001. The Bench Scale Test phase ended in Fall 2001 with each participant submitting final product samples and process reports for evaluation by MPA. Qualified participants will proceed to the next study phase, Pilot Scale Testing, after upgrades have been made to the Cox Creek DMCF.

Geotechnical Engineering:

- Since the Innovative Use project will utilize the existing Cox Creek DMCF, geotechnical studies beyond those previously performed for facility renovations are not required for this option.

Coastal Engineering:

- Since the Innovative Use project will utilize the existing Cox Creek DMCF, coastal engineering studies are not required for this option.

Environmental Conditions:

Cox Creek DMCF is an existing facility. The MPA is renovating the existing dikes for operations at the facility. As there is no planned expansion of the existing facility footprint or additional discharges into the facility from innovative use systems, there are no foreseen adverse environmental effects associated with using the facility as a transfer and interim storage site for dredged material in conjunction with planned facility operations, consistent with applicable regulatory criteria.

Water Quality:

- Not applicable
- Other: All products and their waste streams developed during the Innovative Use project will be subjected to environmental testing to ensure that contaminants from the dredged material will not mobilize into the environment.

Aquatic Invertebrates:

- Not applicable.

Wetlands:

- Not applicable.

Aquatic Biology – Finfish/Shellfish:
- Not applicable.

Special:
- Not applicable.

Avian/Terrestrial Habitat
- Not applicable.

Physical Parameters:
- Not applicable.

Other:
- Not applicable.

Beneficial Attributes:
- Not applicable.

Dredging Engineering:
- An assessment of the placement potential is in progress to provide additional information to assist in planning operation of the facility and innovative use systems.

References: Information compiled collective study team knowledge.

5.4 Mines and Quarries

SUMMARY: The Maryland Port Administration received a not-for-attribution inquiry from representatives of an out-of-state mine regarding the mine's potential suitability as a commercial placement site for dredged material. The MPA authorized a site-specific reconnaissance study using the Maryland Environmental Service (MES) and MES subcontractors. A preliminary visit to the mine by MPA and the study team found that the mine had potential for use as a placement site. Due to the need for access to proprietary information in order to perform the reconnaissance, the study was placed on hold pending the availability of the needed information. The MPA is considering expanding the study to include a general reconnaissance in order to develop planning information on environmental, engineering, transportation and economic issues that would be associated with use of mines and quarries.

Geotechnical Engineering:

- Geotechnical Conditions: Site dependent. Study potential of geotechncial issues under review.
- Borrow Source Potential: Not applicable.
- Foundation Conditions: Site dependent. Study potential of foundation issues under review.

Coastal Engineering:

- Coastal Conditions: Not applicable.

Environmental Conditions:

- Environmental Conditions: Site dependent.
- Environmental Issues: Study potential under review.

Water Quality:

- Site dependent.

Aquatic Invertebrates:

- Not applicable.

Wetlands:

- Tidal Wetlands: Not applicable.
- Non-Tidal Wetlands: Site dependent.

Aquatic Biology – Finfish/Shellfish:

- Not applicable.

Special:

- Protected Species (RTE & SSPRA): Site dependent.
- Habitat of Particular Concern (HAPC): Not applicable.

Avian/Terrestrial Habitat

- Not applicable.

Physical Parameters:

- Substrate Composition: Site dependent.
- Hydrodynamics: Not applicable.
- Contaminants: Site dependent.
- CERCLA/UXO Potential: Site dependent.
- Fossil Shell Mining: Not applicable.

Other:

- Recreational Value: Site dependent.
- Aesthetics and Noise: Site dependent.
- Cultural Resources: Site dependent.
- Navigation: Not applicable.
- Critical Areas: Site dependent.

Beneficial Attributes:

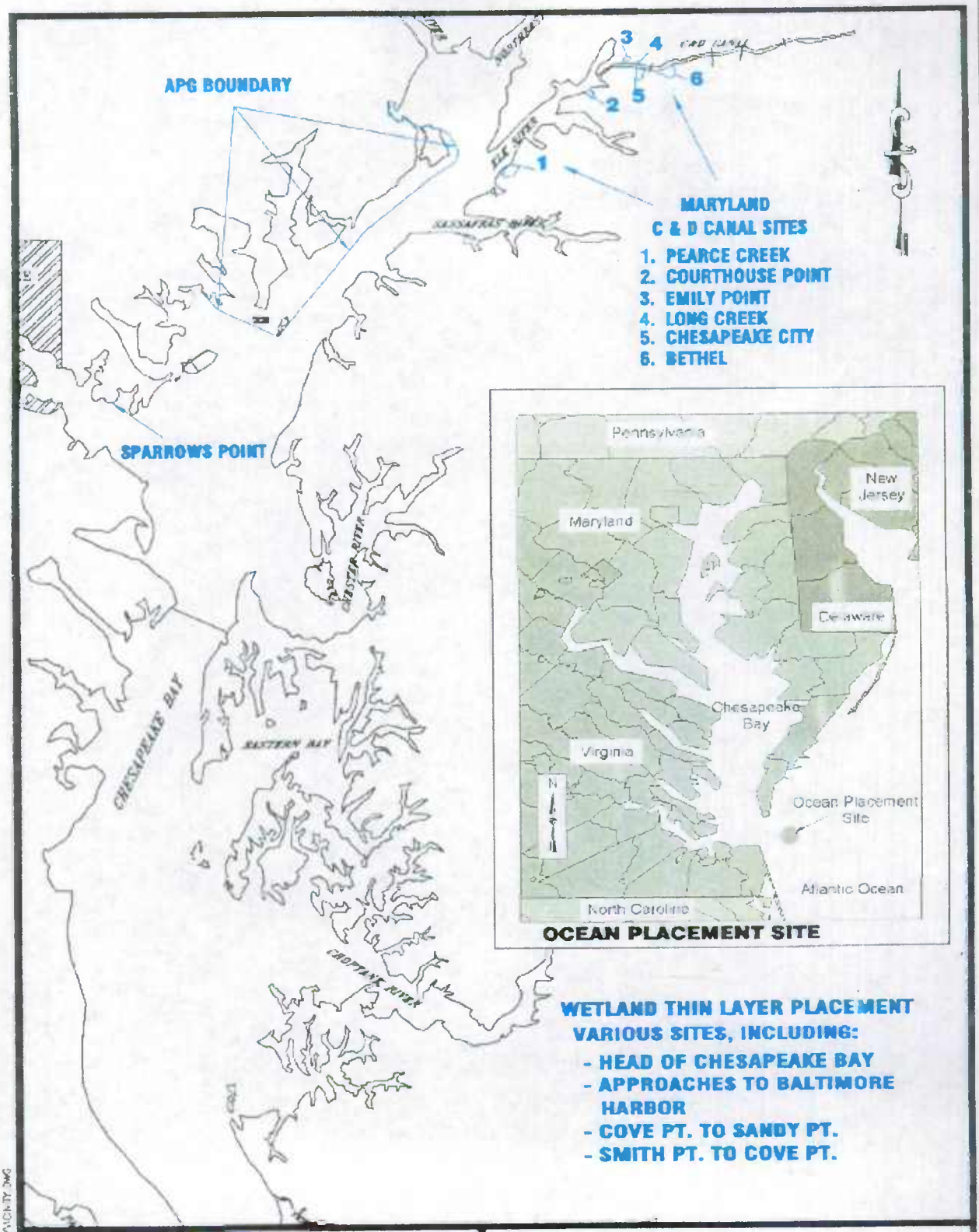
- Beneficial Use Wetlands: No planned wetland component included.
- Beneficial Use Uplands: The Mines and Quarries option would create an opportunity for upland habitat restorationt.
- Beneficial Use Adjacent Habitat enhancement: No planned adjacent habitat enhancement included.
- Shoreline Protection: No planned shoreline protection included.

Dredging Engineering:

- Study potential under review.

6.0 OTHER OPTIONS

Aberdeen Proving Ground
Maryland C&D Canal Sites
Ocean Placement
Sparrows Point
Thin Layer Placement



MARYLAND ENVIRONMENTAL SERVICE

OTHER OPTIONS
VICINITY MAP
FIGURE 5

6.1 ABERDEEN PROVING GROUNDS

SUMMARY: Aberdeen Proving Ground (AGP) is 72,000-acre military installation with multiple national defense missions. APG controlled areas include large amounts of open water, wetlands and uplands. Interest in using APG controlled areas for dredged material placement has received considerable attention from both the Maryland Port Administration (MPA) as well as the public. This option would provide a shoreline fastland creation opportunity.

For the purpose of the Dredged Material Management Program (DMMP), there are no sites under active consideration; none are available for screening. Consideration of specific sites is on long-term hold due to unresolved institutional and liability issues including liability and risk associated with the widespread incidence of hazardous material and unexploded ordnance (UXO), including the presence of UXO in both land and water areas. These conditions constitute a fatal flaw for any APG option until resolved.

Previously (early 1990s), the MPA sponsored a multi-objective study that proposed a number of placement options for APG water areas. All were opposed for a combination of institutional and living resources issues. Subsequent efforts (mid 1990s) identified two sites within APG as potential locations for demonstration projects. Those sites are Graces Quarters which is located along an APG controlled shoreline on the western side of the Gunpowder River, and J-Field, which is located within the APG-controlled area near the mouth of the Gunpowder River at the southeastern end of Gunpowder Neck. The Graces Quarters site was characterized by eroding high bluffs and the presence of unexploded ordnance (UXO) and contaminants in the soils. A small capacity beneficial use project at the base of the bluffs was considered. Construction of a beneficial use project consisting of upland and wetlands was considered for J-Field to protect the shoreline and prevent the breaching of a narrow berm that formed the shoreline for a unique floating marsh. As coordination was in progress, EPA Region III advised that there was no national standard for the remediation of UXO and that in the absence of other guidance, Superfund liability criteria for Potentially Responsible Parties (PRP) would apply. These constraints were determined to be a fatal flaw for any APG site until resolved, and further consideration of specific sites was suspended pending resolution of these issues at the national level. APG has since constructed a shoreline stabilization project at J-Field and had indicated that the garrison is no longer interested in a beneficial use project at that location. The MPA currently has a general reconnaissance study of the APG area in planning to develop current environmental planning information and additional information on UXO issues.

Geotechnical Engineering:

- Geotechnical Conditions: Site dependent.

Coastal Engineering:

- Coastal Conditions: Site dependent.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Site dependent.

- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: Site dependent, however no impacts expected.
- Salinity: Site dependent, however no impacts expected.
- Ground Water: Site dependent.
- Water quality: Site dependent.

Aquatic Invertebrates:

- Benthic Community: Site dependent.
- Shallow Water Habitat: Shallow water areas exist within the APG boundary. Some areas are believed to have high significant environmental value.
- SAV: Site dependent.

Wetlands:

- Tidal Wetlands: Extensive tidal wetlands exist at APG.
- Non-tidal Wetlands: Extensive non-tidal wetlands exist at APG.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: Anadromous fish spawning habitat is located within the vicinity of APG.
- Finfish Rearing Habitat: Anadromous fish rearing habitat is located within the vicinity of APG.
- Larval Transport: It is not anticipated that changes in bathymetry and elevation will affect the existing currents in the area. As a result, impacts to larval transport and fish migration patterns are not expected to occur.
- Essential Fish Habitat: Not likely.
- Commercially Harvested Species and Habitat: Commercial fishing occurs in portions of the area, including the Spry Island Shoal area. Restoration of Spry Island was previously strongly opposed by commercial fishing interests.
- Thermal Refuge: Not anticipated at this site do to shallow water depths.
- Recreational Fishery: The Gunpowder River is a locally important recreational fishing area in the Upper Bay.

Special:

- Protected Species (RTE & SSPRA): 23 active Bald Eagle nests occur throughout APG controlled land. Shortnose sturgeons have been captured within APG territory. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern: Site dependent.

Avian / Terrestrial Habitat:

- Waterfowl Use: Considerable waterfowl activity occurs in the area.
- Wading and Shorebird Use: There is a very large heron rookery on Pooles Island.

- Terrestrial Habitat and Wildlife: Considerable upland habitat exists. The area is used by deer and other wildlife.

Physical Parameters:

- Substrate Composition: Site dependent.
- Hydrodynamics: Not anticipated to be impacted.
- Contaminants: Extensive chemical contamination exists throughout much of the APG upland area and along eroding shorelines.
- CERCLA / UXO Potential: The shoreline and water reaches within the restricted area controlled by APG are contaminated by the presence of between 3 and 30 million rounds of UXO. There is also uncertainty about the degree to which the placement of dredged material would create exposure to future clean-up responsibility or cost if the encapsulated ordnance would need to be excavated or removed.
- Fossil Shell Mining: Not applicable.

Other:

- Recreational Value: Not applicable.
- Aesthetics and Noise: No impacts are expected.
- Cultural Resources: Some National Register listed properties exist on Aberdeen proving grounds, effects to these cultural resources is site dependent.
- Navigation: No effects to commercial navigation.
- Critical Areas: Extensive portions of the APG land mass are within the Chesapeake Bay Critical Area.

Beneficial Attributes:

- Beneficial Use Wetlands: Site dependent, will be included as a component.
- Beneficial Use Uplands: Site dependent, will be included as a component.
- Beneficial Use Adjacent Habitat enhancement: Site dependent, will be included as a component.
- Shoreline Protection: Potential, site dependent, will be included as a component.
- Other: There is potential to encapsulate UXO if aquatic and / or terrestrial encapsulation becomes an accepted long-term remediation technique.

Environmental Issues:

- There is widespread chemical and UXO contamination, including chemical munitions.
- Groundwater contamination is a potential concern for any upland placement option.

References: Information compiled from collective study team knowledge, as well as:

Chesapeake Bay Program (CBP). 1996. High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

US Fish and Wildlife Service (USFWS). 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services.

6.2 MARYLAND C&D CANAL SITES

SUMMARY: There are 6 upland placement sites in Maryland and 13 upland sites in Delaware located along the Chesapeake & Delaware (C&D) Canal. This option focuses on the Maryland sites, as institutional and jurisdictional restrictions prohibit placement of Maryland dredged material in a containment facility outside of Maryland. Of the 6 Maryland sites, 2 are already full (Emily Point and Long Creek) and cannot be considered. Two additional sites (Pearce Creek and Courthouse Point) have had permitting difficulties for several years due to groundwater concerns and their proximity to communities. The remaining 2 sites (Chesapeake City and Bethel) are also located in close proximity to communities, and could potentially face similar obstacles as Pearce Creek. Maryland C&D Canal sites are upland placement options adjacent to water.

These upland options are used to accommodate C&D Canal and northern approach channel material. Increased inflow quantities would result in drastically reduced capacity than what is reported. The Corps has allocated the capacity available in the upland sites for long-term maintenance needs of the Canal. If MPA uses this capacity as part of it's DMMP, it must provide in-kind replacement capacity to the Corps for long-term maintenance of the Canal. For this reason, using up this capacity doesn't help MPA with its long-term capacity need. The capacity would likely be used up within 10 years, due to the large capacity requirements.

The BEWG collectively acknowledged that the C&D sites were not an exceptionally feasible option; however, the Maryland C&D Canal upland placement sites should be ranked with the other 26 proposed options, perhaps as an interim or emergency overflow type of option, not necessarily for long-term, large capacity use.

Geotechnical Engineering:

- Geotechnical Conditions: Site dependent.
- Borrow Source Potential: Site dependent.
- Foundation Conditions: Site dependent.

Coastal Engineering:

- Coastal Conditions: Site dependent.

Environmental:

Water Quality:

- Dissolved Oxygen: Site dependent.
- Nutrient Enrichment: Site dependent.
- Turbidity: Site dependent.
- Salinity: Site dependent.
- Ground Water: Site dependent.
- Surface Water: Site dependent.
- Water quality: Site dependent.

Aquatic Invertebrates:

- Benthic Community: Not applicable.
- Shallow Water Habitat: Not applicable.
- SAV: Not applicable.

Wetlands:

- Tidal Wetlands: Site dependent.
- Non-tidal Wetlands: Site dependent.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: Not applicable.
- Finfish Rearing Habitat: Not applicable.
- Larval Transport: Not applicable.
- Essential Fish Habitat: Not applicable.
- Commercially Harvested Species and Habitat: Not applicable.
- Thermal Refuge: Not applicable.
- Recreational Fishery: Not applicable.

Special:

- Protected Species (RTE & SSPRA): Site dependent.
- Habitat of Particular Concern: Not applicable.

Avian / Terrestrial Habitat:

- Waterfowl Use: Site dependent.
- Wading and Shorebird Use: Site dependent.
- Terrestrial Habitat and Wildlife: Site dependent.

Physical Parameters:

- Substrate Composition: Site dependent.
- Hydrodynamics: Not applicable.
- Contaminants: Site dependent.
- CERCLA / UXO Potential: Site dependent.
- Fossil Shell Mining: Not applicable.

Other:

- Recreational Value: Site dependent
- Aesthetics and Noise: Site dependent
- Cultural Resources: Site dependent
- Navigation: Not applicable.
- Critical Areas: These are shoreline sites that are likely to be within critical areas; however, the exact critical areas status is site dependent.

Beneficial Attributes:

- Beneficial Use Wetlands: The C&D Canal options are upland creation sites, there is no beneficial use/ wetland restoration component.

- Beneficial Use Uplands: This option has a upland creation component.
- Beneficial Use Adjacent Habitat Enhancement: None for this option.
- Shoreline Protection: Site dependent.

Dredging Engineering:

- MD C&D Canal placement sites are less than 300 acres in size.

6.3 OCEAN PLACEMENT

SUMMARY: Two permitted ocean disposal sites exist, one near VA beach for sandy material and the other off the mouth of the Chesapeake Bay (in the Atlantic Ocean 15 miles off the coastline) that is designated for silty material. The proposed concept would be that this second site would be designated for Bay material. NEPA documentation has already been completed for use of the site. The Corps would need to go through their normal public notification process, including distribution of the notification for review and comment. EPA would review the action and comment. The Corps would then issue a Record of Decision on use of the site for the navigation channel material. MPA has identified information needs related to fleet availability, cost and other dredging engineering factors. Scoping is underway to collect this information. This site is an open water placement option.

Geotechnical Engineering:
- Geotechnical Conditions: Open water placement – geotechnical not applicable.
- Borrow Source Potential: Not applicable.
- Foundation Conditions: No applicable

Coastal Engineering:
- Coastal Conditions: Not applicable.
- Coastal Design Issues: Not applicable.

Environmental Conditions:
- Environmental Conditions: Site is already permitted for placement of silty dredged materials from navigation channels. Public notice would be required to designate Baltimore Channels for placement there.
- Environmental Issues: Ocean Placement EPA Region III has completed their regional implementation manual for placement at the Norfolk site. Based on the preliminary results of CENAB sediment quality studies, Region III determined that the Chesapeake Bay navigation material could go to the Norfolk site, with the possible exception of material from a couple of channels for which there were indications of toxicity or bioaccumulation. A risk assessment that could resolve this latter issue and complete the sediment analysis is in progress by CENAB.

Water Quality:
- Dissolved Oxygen: No change expected from existing conditions.
- Nutrient Enrichment: No change expected from existing conditions.
- Turbidity: No change expected from existing conditions.
- Salinity: No change expected from existing conditions.
- Ground Water: No change expected from existing conditions.
- Surface Water: No change expected from existing conditions.

Aquatic Invertebrates:
- Benthic Community: No change expected from existing conditions.

- Shallow Water Habitat: Not applicable.
- SAV: Not applicable.

Wetlands:

- Tidal Wetlands: Not applicable.
- Non-Tidal Wetlands: Not applicable.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: No change expected from existing conditions.
- Finfish Rearing Habitat: No change expected from existing conditions.
- Larval Transport: Not applicable
- Essential Fish Habitat (EFH): Not reviewed.
- Commercially Harvested Species and Habitat: Not reviewed.
- Thermal Refuge: No change expected from existing conditions.
- Recreational Fishery: Not reviewed.

Special:

- Protected Species (RTE & SSPRA): Not applicable.
- Habitat of Particular Concern (HAPC): Not reviewed.

Avian/Terrestrial Habitat

- Waterfowl Use: Not applicable.
- Wading and Shorebird Use: Not applicable.
- Terrestrial Habitat and Wildlife: Not applicable.

Physical Parameters:

- Substrate Composition: No change expected from existing conditions.
- Hydrodynamics: No change expected from existing conditions.
- Contaminants: No change expected from existing conditions.
- CERCLA/UXO Potential: As this site is fifteen miles offshore, there is little potential for CERCLA/UXO issues.
- Fossil Shell Mining: No change expected from existing conditions.

Other:

- Recreational Value: No change expected from existing conditions.
- Aesthetics and Noise: No change expected from existing conditions.
- Cultural Resources: No change expected from existing conditions.
- Navigation: No change expected from existing conditions.
- Critical Areas: Not within critical areas.

Beneficial Attributes:

- Beneficial Use Wetlands: Not a beneficial use option.
- Beneficial Use Uplands: Not a beneficial use option.
- Beneficial Use Adjacent Habitat enhancement: Not a beneficial use option.
- Shoreline Protection: Not applicable.

Dredging Engineering:

- Scoping is underway to collect information needs related to fleet availability, cost and other dredging engineering factors.
- Construction Issues: None.

Other Issues:

- Fleet availability due to the long transit distance from Baltimore navigation channels is a significant issue that is under study now.

References:

Gahagan & Bryant Associates, Inc. (GBA), 2000. Analysis of Placement of Dredged Material at the Cape Henry Ocean Placement Site. Prepared for Maryland Environmental Service (MES). May 2000

6.4 SPARROWS POINT

SUMMARY: Sparrows Point is under consideration as a shoreline/shallow water fastland creation option with a beneficial use component. The site was previously investigated as a 333-acre habitat development site consisting of 300 acres of tidal wetland and 33 acres of upland habitat. The site was to be situated at the southern end of the Sparrows Point Plant of the Bethlehem Steel Corporation along the Patapsco River in Baltimore County. The proposed wetland was to be bounded by Sparrows Point to the North, Pennwood Channel to the east, Sparrows Point Channel to the west, and the Brewerton Channel to the south. The site is being considered with a beneficial use component to improve habitat and provide aesthetic relief to Baltimore Harbor.

Geotechnical Engineering:

- Geotechnical Conditions: Not reviewed.
- Borrow Source Potential: Not reviewed.
- Foundation Conditions: Poor foundation conditions would necessitate highly specialized construction techniques in order to "float" a structure to enclose the site.

Coastal Engineering:

- Coastal Conditions: The site is an open-water area immediately south of and contiguous to the Sparrows point shoreline. Water depths range between -10 to –15 ft MLW and average -15 ft MLW over most of the site.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Bottom water DO conditions were consistently below 5 mg/L.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: No information at this time.
- Salinity: Salinity ranged from 2.7 to 14.2 ppt and followed seasonal trends; lowest during summer and highest during September and October.
- Ground Water: There would be no effects on groundwater resources from use of the site.
- Surface Water: No effects to surface water are anticipated.
- Other: Water quality studies were performed by UMCES during a fisheries cruise from June to October 1994. Water temperatures ranged from 16 to 29.8°C (60.8 to 85.6°F) during the study and followed seasonal trends.

Aquatic Invertebrates:

- Benthic Community: The Sparrows Point site met the MDE benthic quality restoration goal index in an August 1994 study performed by Versar, indicating that it had a healthy, functioning benthic community. Versar indicated that the condition of the benthic community at Sparrows Point was not unique in Baltimore Harbor.
- Shallow Water Habitat: The site ranges in depth from –10 ft to –15 ft.
- SAV: No SAV was observed during a UMCES fisheries cruise in 1994.

Wetlands:

- Tidal Wetlands: Tidal wetlands are not present.
- Non-Tidal Wetlands: Non-tidal wetlands are not present.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: According to NMFS the area is not considered spawning habitat for anadromous fish species.
- Finfish Rearing Habitat: Bay anchovy, spot and white perch are the most abundant species, and juvenile and young-of-year are the most common classes represented in the area. Atlantic menhaden, striped bass are also found in the area, but are not as abundant.
- Larval Transport: Impacts to larval transport and fish migration patterns are not expected to occur at this site.
- Essential Fish Habitat (EFH): Not likely.
- Commercially Harvested Species and Habitat: No commercial fishing is authorized in the area.
- Thermal Refuge: Potential for thermal refuge in the area does not exist because depths are less than 12 m (40 ft).
- Recreational Fishery: Recreational fishing is reported to occur in the area.

Special:

- Protected Species (RTE & SSPRA): No RTE species are known to exist at the site. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern: Not likely.

Avian and Terrestrial Habitat and Use:

- Waterfowl Use: No information at this time.
- Wading and Shorebird Use: The site was designated as potential foraging area for black-crowned night heron in 1998.
- Terrestrial Habitat and Wildlife: Not reviewed.

Physical Parameters:

- Substrate Composition: No information at this time.
- Hydrodynamics: MDE studies of the option indicate that the proposed wetland creation has virtually no effect on Harbor-wide hydrodynamics, as the relative volumetric change of the Harbor caused by the alternative shoreline is negligible. In terms of flushing rates, the impacts of the proposed wetland creation are quite low.
- Contaminants: Contaminant concentrations in the Inner Harbor tend to be higher than the MD Acute Water Quality Criteria.
- CERCLA/UXO: No information at this time.
- Fossil Shell Mining: Fossil shell mining information was not reviewed for this report.

Other:

- Recreational Value: Recreational boating and fishing are reported to occur in the area. The loss of recreational water due to past filling of Bay bottom by Bethlehem Steel was cited by many citizens as reason for their opposition to the conversion of bottom habitat that would result from the proposed beneficial use project.

6.4 SPARROWS POINT

SUMMARY: Sparrows Point is under consideration as a shoreline/shallow water fastland creation option with a beneficial use component. The site was previously investigated as a 333-acre habitat development site consisting of 300 acres of tidal wetland and 33 acres of upland habitat. The site was to be situated at the southern end of the Sparrows Point Plant of the Bethlehem Steel Corporation along the Patapsco River in Baltimore County. The proposed wetland was to be bounded by Sparrows Point to the North, Pennwood Channel to the east, Sparrows Point Channel to the west, and the Brewerton Channel to the south. The site is being considered with a beneficial use component to improve habitat and provide aesthetic relief to Baltimore Harbor.

Geotechnical Engineering:

- Geotechnical Conditions: Not reviewed.
- Borrow Source Potential: Not reviewed.
- Foundation Conditions: Poor foundation conditions would necessitate highly specialized construction techniques in order to "float" a structure to enclose the site.

Coastal Engineering:

- Coastal Conditions: The site is an open-water area immediately south of and contiguous to the Sparrows point shoreline. Water depths range between -10 to –15 ft MLW and average -15 ft MLW over most of the site.

Environmental Conditions:

Water Quality:

- Dissolved Oxygen: Bottom water DO conditions were consistently below 5 mg/L.
- Nutrient Enrichment: Nutrients in the form of ammonia nitrogen are typically associated with dredged material. The Chesapeake Bay and its watershed have been found to be nutrient enriched. Placement of dredged material will result in additional localized loadings of ammonia nitrogen during placement and discharge periods.
- Turbidity: No information at this time.
- Salinity: Salinity ranged from 2.7 to 14.2 ppt and followed seasonal trends; lowest during summer and highest during September and October.
- Ground Water: There would be no effects on groundwater resources from use of the site.
- Surface Water: No effects to surface water are anticipated.
- Other: Water quality studies were performed by UMCES during a fisheries cruise from June to October 1994. Water temperatures ranged from 16 to 29.8°C (60.8 to 85.6°F) during the study and followed seasonal trends.

Aquatic Invertebrates:

- Benthic Community: The Sparrows Point site met the MDE benthic quality restoration goal index in an August 1994 study performed by Versar, indicating that it had a healthy, functioning benthic community. Versar indicated that the condition of the benthic community at Sparrows Point was not unique in Baltimore Harbor.
- Shallow Water Habitat: The site ranges in depth from –10 ft to –15 ft.
- SAV: No SAV was observed during a UMCES fisheries cruise in 1994.

Wetlands:

- Tidal Wetlands: Tidal wetlands are not present.
- Non-Tidal Wetlands: Non-tidal wetlands are not present.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: According to NMFS the area is not considered spawning habitat for anadromous fish species.
- Finfish Rearing Habitat: Bay anchovy, spot and white perch are the most abundant species, and juvenile and young-of-year are the most common classes represented in the area. Atlantic menhaden, striped bass are also found in the area, but are not as abundant.
- Larval Transport: Impacts to larval transport and fish migration patterns are not expected to occur at this site.
- Essential Fish Habitat (EFH): Not likely.
- Commercially Harvested Species and Habitat: No commercial fishing is authorized in the area.
- Thermal Refuge: Potential for thermal refuge in the area does not exist because depths are less than 12 m (40 ft).
- Recreational Fishery: Recreational fishing is reported to occur in the area.

Special:

- Protected Species (RTE & SSPRA): No RTE species are known to exist at the site. SSPRA information for this site was not reviewed for this report.
- Habitat of Particular Concern: Not likely.

Avian and Terrestrial Habitat and Use:

- Waterfowl Use: No information at this time.
- Wading and Shorebird Use: The site was designated as potential foraging area for black-crowned night heron in 1998.
- Terrestrial Habitat and Wildlife: Not reviewed.

Physical Parameters:

- Substrate Composition: No information at this time.
- Hydrodynamics: MDE studies of the option indicate that the proposed wetland creation has virtually no effect on Harbor-wide hydrodynamics, as the relative volumetric change of the Harbor caused by the alternative shoreline is negligible. In terms of flushing rates, the impacts of the proposed wetland creation are quite low.
- Contaminants: Contaminant concentrations in the Inner Harbor tend to be higher than the MD Acute Water Quality Criteria.
- CERCLA/UXO: No information at this time.
- Fossil Shell Mining: Fossil shell mining information was not reviewed for this report.

Other:

- Recreational Value: Recreational boating and fishing are reported to occur in the area. The loss of recreational water due to past filling of Bay bottom by Bethlehem Steel was cited by many citizens as reason for their opposition to the conversion of bottom habitat that would result from the proposed beneficial use project.

- Aesthetics and Noise: There is potential for aesthetic impacts caused by noise and effects on air quality. However, one of the goals of the project is to ultimately improve the aesthetics at the entrance to Baltimore Harbor.
- Cultural Resources: There are no known cultural resources known to occur in the area.
- Navigation: Use of the site would not adversely affect navigation. The concept design calls for the wetland area to be bounded by the channels.
- Critical Areas: This is a shoreline option, it is within critical areas boundaries.

Beneficial Attributes:

- Beneficial Use Wetlands: The project was planned to establish a habitat enhancement project contiguous to industrial shoreline by converting relatively poor bottom to aquatic and intertidal wetlands, high marsh and upland nesting areas in order to benefit living resources. The habitat that was to be created was also envisioned as providing aesthetic relief for the entrance to Baltimore Harbor.
- Beneficial Use Uplands: The project is planned to create high marsh and upland nesting areas.
- Beneficial Use Adjacent Habitat Enhancement: Surrounding habitat enhancement expected as a result of the habitat creation.
- Shoreline Protection: Not reviewed.

- Environmental Issues: Loss of bottom habitat due to filling is a local issue to a citizen concern about the loss of recreational water. However, the potential benefit from the conversion of marginally productive habitat to higher value wetlands buffered by upland habitat would most likely improve the environmental value of the site overall.

Dredging Engineering:

- Construction Issues: Poor foundation conditions would necessitate highly specialized construction techniques in order to "float" a structure to enclose the site.

Other Issues:

- The site is located within an 8-km (5-mi) radius of the Hart-Miller-Pleasure Island Chain in Baltimore County. The current state law prohibiting the construction of a contained area within the 5-mi radius would have to be removed or changed for the Sparrows Point project to be practicable.

References: Information compiled from environmental reports and collective study team knowledge, as well as:

Chesapeake Bay Program (CBP). 1996. High Value Living Resource Map of the Upper Bay. In a memo prepared for the Bay Enhancement Phase II Working Group.

Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley. 1991. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition. Chesapeake Bay Program.

Maryland Department of Natural Resources (MDNR). 1989. Natural Oyster Bar Maps. Prepared by Coast and Geodetic Survey for MDNR.

Maryland Geological Survey (MGS). 1971. Maryland Tidal Wetlands and Critical Area Inventory Maps.

Maryland Port Administration (MPA). 2001. Draft Interim Report to the Maryland General Assembly Concerning Implementation of the Dredged Material Management Act of 2001.

US Fish and Wildlife Service (USFWS). 1979. National Wetland Inventory Maps. Non-Tidal Wetlands Maps. Prepared by Office of Biological Services.

Chao, Shenn-Yu. 1994. Sparrows Point Shoreline ReclamationProject Hydrodynamic Model of Baltimore Harbor. Final Report. Prepared by the University of Maryland System, Center of Environmental and Estuarine Studies (UMCES), Horn Point Environmental Laboratory (HPL). Prepared for Maryland Environmental Service for final submittal to The Maryland Department of the Environment and the Chesapeake Bay and Watershed Management Administration. March 1994.

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6.5 WETLAND THIN LAYER PLACEMENT

SUMMARY: The wetland thin layer concept involves the spraying of a few inches of dredged material over a wetland area. The resulting decreased water depth is expected to result in an improved wetland condition. To date the study has begun to investigate the technical and cost aspects of the thin layer application. It does not evaluate the positive or negative environmental effects that would result from such an application. The conceptual designs and cost estimates are being developed and are based on typical conditions in Chesapeake Bay where this option might be implemented. There are currently four sites under consideration: Head of the Chesapeake Bay, Approaches to Baltimore Harbor, Cove Point to Sandy Point, and Smith Point to Cove Point. These are being focused on since they are within 10,000 ft of 18 ft deep waters, which are necessary for the mechanical equipment to operate.

Geotechnical Engineering:
- Geotechnical Conditions: Not investigated to date and will vary depending on site.
- Borrow Source Potential: Not required
- Foundation Conditions: Not required

Coastal Engineering:
- Coastal Conditions: Not investigated to date and will vary depending on site.
- Costal Design Issues: Not investigated to date and will vary depending on site.

Environmental Conditions:

Water Quality:
- Dissolved Oxygen: Not investigated to date and will vary depending on site.
- Nutrient Enrichment: Not investigated to date and will vary depending on site.
- Turbidity: Not investigated to date and will vary depending on site.
- Salinity: Not investigated to date and will vary depending on site.
- Ground Water: Not investigated to date and will vary depending on site.
- Surface Water: Not investigated to date and will vary depending on site.
- Other: Not investigated to date and will vary depending on site.

Aquatic Invertebrates:
- Benthic Community: Previous studies and applications of this method indicate the benthic community will briefly be covered but then restored as material settles and benthic organisms borrow up.
- Shallow Water Habitat: Not investigated to date and will vary depending on site.
- SAV: Not investigated to date and will vary depending on site.

Wetlands:
- Tidal Wetlands: Previous studies and applications indicate that wetlands respond well to this method.
- Non-Tidal Wetlands: Not investigated to date and will vary depending on site.

Aquatic Biology – Finfish/Shellfish:

- Finfish Spawning Habitat: Not investigated to date and will vary depending on site.
- Finfish Rearing Habitat: Not investigated to date and will vary depending on site.
- Larval Transport: Not investigated to date and will vary depending on site.
- Essential Fish Habitat (EFH): Not investigated to date and will vary depending on site.
- Commercially Harvested Species and Habitat: Not investigated to date and will vary depending on site.
- Thermal Refuge: Not applicable sites will be too shallow.
- Recreational Fishery: Not investigated to date and will vary depending on site.

Special:

- Protected Species (RTE & SSPRA): Not investigated to date and will vary depending on site.
- Habitat of Particular Concern (HAPC): Not investigated to date and will vary depending on site.

Avian/Terrestrial Habitat

- Waterfowl Use: Not investigated to date and will vary depending on site.
- Wading and Shorebird Use: Not investigated to date and will vary depending on site.
- Terrestrial Habitat and Wildlife: Not investigated to date and will vary depending on site.

Physical Parameters:

- Substrate Composition: Not investigated to date and will vary depending on site.
- Hydrodynamics: Not investigated to date and will vary depending on site.
- Contaminants: Not investigated to date and will vary depending on site.
- CERCLA/UXO Potential: Not investigated to date and will vary depending on site.
- Fossil Shell Mining: Not investigated to date and will vary depending on site.

Other:

- Recreational Value: Not investigated to date and will vary depending on site.
- Aesthetics and Noise: Not investigated to date and will vary depending on site.
- Cultural Resources: Not investigated to date and will vary depending on site.
- Navigation: Not investigated to date and will most likely not be a concern at any site due to the shallow nature of application.
- Critical Areas: Not investigated to date and will vary depending on site.

Beneficial Attributes:

- Beneficial Use Wetlands: Applies to project.
- Beneficial Use Uplands: Upland habitat creation does not apply to this project.
- Beneficial Use Adjacent Habitat Enhancement: Applies to project
- Shoreline Protection: Applies to project.

Dredging Engineering:

- Concepts range between: Potential to range up to and possibly beyond 18,000 acres, requiring 2 inches of material to be placed up to and beyond 4.8 million cy.
- Preliminary construction costs range: Not estimated to date.

- Total costs range: Not estimated to date.
- Unit costs range: Not estimated to date.
- Construction Issues: Technically feasible.

References: Information compiled from collective study team knowledge, as well as:

Gahagan & Bryant. 2002. Draft Wetland Thin Layering Concept Report. February 8, 2002.