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CASE STUDIES AND COMPARATIVE ANALYSES OF ISSUES ASSOCIATED WITH--ETC(U)
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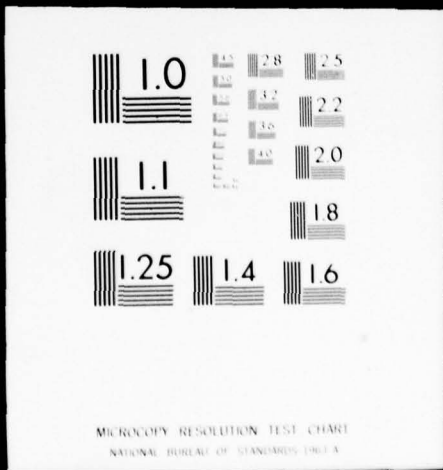
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FOR FURTHER TRAN ²⁰⁵⁴⁸⁹³ (72)
DREDGED MATERIAL
RESEARCH PROGRAM



TECHNICAL REPORT D-77-43

CASE STUDIES AND COMPARATIVE ANALYSES
OF ISSUES ASSOCIATED WITH PRODUCTIVE
LAND USE AT DREDGED MATERIAL
DISPOSAL SITES

Volume I: Main Text
by

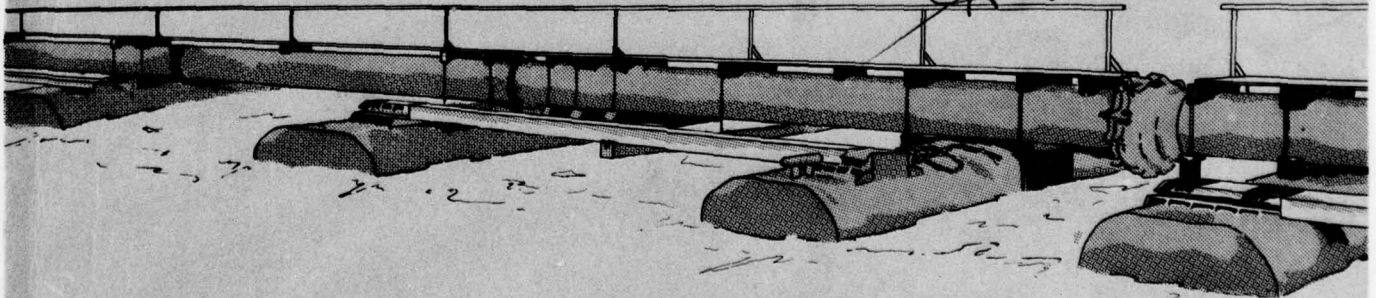
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December 1977
Final Report

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Prepared for Office, Chief of Engineers, U. S. Army
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Monitored by Environmental Effects Laboratory
U. S. Army Engineer Waterways Experiment Station
P. O. Box 631, Vicksburg, Miss. 39180



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IN REPLY REFER TO: WESYV

15 May 1978

SUBJECT: Transmittal of Technical Report D-77-43

TO: All Report Recipients

1. The technical report transmitted herewith represents the results of one of several research efforts (work units) undertaken as part of Task 5D, Disposal Area Land Use Concepts, of the Corps of Engineers' Dredged Material Research Program (DMRP). The objective of Task 5D, as part of the Productive Uses Project (PUP), is to obtain information to facilitate planning and implementation of concepts for the ultimate productive use of dredged material containment areas.
2. Because of possible constraints on open-water disposal of dredged material, the Corps of Engineers has had to resort more and more to land disposal. Land for disposal activities is becoming scarce; the problem becomes more acute with the need for selecting each new disposal area. Attention, therefore, can be profitably and justifiably directed towards identifying disposal concepts that enhance rather than degrade available land.
3. Some DMRP work units under other tasks were designed to develop improved disposal facility operations and management procedures as well as techniques for the reclamation of potentially valuable materials; both objectives would increase area life expectancy as well as enhance aesthetic and environmental characteristics. However, all sites will eventually be filled and the total picture would be incomplete without considering concepts for the productive uses of the created land. To this end, most of the problems associated with the land use of dredged material containment areas relate to a planning rather than an engineering function. This particular research effort was one of five aimed at assessing the economic, technical, environmental, institutional, legal, and social incentives and constraints for the development of a rational basis for site selection, the ultimate land use, and the management of the created land.
4. In this investigation, a case studies approach was used. Twelve sites in which land use was a specific objective were studied in an attempt to discover what issues are raised during projects, why some issues are more important than others, and how the issues were addressed

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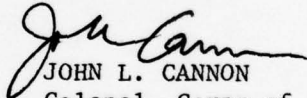
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by the various agencies and individuals involved. Along with the issues, the study sought to identify the planning elements that affect the feasibility of productive land use plans. The final objective was the development of recommendations addressing Corps of Engineers' actions in planning, evaluating, selecting, and implementing productive land use concepts for confined disposal sites.

5. The study produced a list of implementation factors for productive use of dredged material containment areas. These factors are both substantive and procedural, addressing the full range of planning and engineering problems. The factors are broken down into environmental, technical, economic/financial, legal, institutional, and planning implementation categories. In all, there are 37 factors that address the full range of substantive and procedural considerations and that are necessary when contemplating productive use of dredged material containment areas.

6. It is realized that each specific project will have its unique problems; however, the implementation factors provide the framework for both planners and engineers to approach the productive land use of dredged material containment areas.


JOHN L. CANNON

Colonel, Corps of Engineers
Commander and Director

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) An important use of dredged material as a manageable resource occurs when confined disposal sites are developed for productive land use purposes. This study involved the documentation and comparative evaluation of 12 selected cases where dredged material from navigation projects was used to create productive land. The 12 case studies were prepared to examine multiobjective disposal-productive use planning in terms of: (Continued) 2 next page		

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20. ABSTRACT (Continued).

- a. The sequence of events comprising the planning and implementation process.
- b. Participants in project planning/review and their roles, perspectives, and interactions.
- c. Issues addressed during project planning/review, their importance, and how they were resolved.
- d. Physical planning elements affecting the feasibility of disposal facility and productive land use plans, and
- e. Land use planning principles that should be reflected in proposed productive use concepts.

The results of this study are directly applicable as a management aid for Corps disposal planners. The principal output of the study was the development of an overall set of "implementation factors" for disposal-productive use projects. Thirty-seven factors were identified and categorized as environmental, technical, economic/financial, legal, institutional, or planning/implementation. These factors provide a framework for ensuring that project planners address the full range of substantive and procedural considerations that are important to successful project implementation.

The set of implementation factors is actually a distillation of intermediate project findings in three areas. First, a checklist of issues associated with disposal facility planning (from siting to reuse) was generated, encompassing a wide range of concerns having the potential to lead to project delays. Second, the important physical elements affecting both disposal facility and productive use planning were identified. The elements provide a planning tool for using physical characteristics to enhance project feasibility and public acceptance, to maximize site utility, and to coordinate disposal-productive use planning from a technical viewpoint. Third, 10 land use planning principles for disposal-land use projects were identified. The principles serve as indicators of project feasibility and represent good planning practice against which the corresponding features of proposed productive land use plans can be evaluated to point out plan deficiencies.

The 12 case studies provide documented proof that disposal-productive use project success is as much affected by procedural factors as by substantive factors. The procedural aspects of each case study are fully delineated in individual case study synopses contained in Volume II of the study report. The detailed comparative analyses of the 12 cases, which led to the identification of the important implementation factors, are also provided in Volume II. The matrix approach used in this study enabled the site-specific nature of disposal planning to be retained in the analysis while providing a common basis for comparison. As a result, the set of implementation factors is applicable to all disposal planning situations.

SUMMARY

An important use of dredged material as a manageable resource occurs when confined disposal sites are developed for productive land use purposes. In this study, Corps of Engineers involvement in disposal-productive use projects was evaluated through a series of 12 case studies in eight Districts.

The 12 case study projects represent a variety of planning scenarios, particularly in terms of the Corps' involvement, the land use concepts proposed, the relationships between disposal facility and productive land use planning, and the implementation obstacles encountered. The case studies were developed through an extensive on-site data gathering effort during which discussions were held with all key project participants, such as the Corps, local project sponsors, State and Federal resource management agencies, cognizant planning agencies, environmental groups, and affected residents.

The 12 case studies were prepared in synopsis form and comparatively evaluated. The output of the comparative analyses was the identification of the following, which are the findings and conclusions of the study:

- a. Issues associated with disposal-productive use projects.
- b. Physical planning elements affecting disposal facility and productive land use planning.
- c. Land use planning principles that are most important for disposal site productive use planning.
- d. An overall set of implementation factors for disposal-productive use projects.

The planning and development of multiobjective projects, such as disposal-productive use projects, is typically a complex undertaking. Each of the findings and conclusions of this study can be used by Corps planners as a management aid during disposal-productive use project planning and implementation:

- a. Issues - During early planning activities, both the issues likely to be the basis for opposition to a project and the agencies or groups likely to raise the issues should be identified. Then, an overall

implementation strategy can be formulated to deal with the issues before plans are well-advanced. The issues associated with the 12 case studies identify typical bases of objection and are useful as a checklist of concerns having the potential to result in project delays.

- b. Physical Planning Elements - The success of a proposed productive land use plan is quite often dependent on physical planning elements that must be addressed during disposal facility planning. The physical planning elements identified in this study provide a planning tool for using physical characteristics to enhance project feasibility and public acceptance, and to maximize site utility.
- c. Land Use Planning Principles - For a majority of the projects examined in this study, interesting correlations were observed to exist between effective project implementation and the quality of land use planning exhibited by the proposed land use concepts. Ten land use planning principles were identified as being indicators of project feasibility. These 10 planning principles represent good planning practice against which the corresponding features of proposed productive land use plans can be evaluated to point out plan deficiencies.
- d. Implementation Factors - The set of implementation factors developed from the 12 case studies provides a framework for ensuring that project planners address the full range of substantive and procedural considerations that are important to successful project implementation.

Corps of Engineer involvement in disposal-productive use projects is managed within the Corps' well-established dredged material disposal planning system. Since the mid 1960's, planning for dredged material disposal, particularly for confined disposal, has become increasingly difficult, primarily as a result of environmental initiatives. Faced with the basic problem of providing sufficient confined disposal capacity, Corps planners have rarely participated in planning for the productive use of the completed sites. From case study evaluation of 12 disposal-productive use projects, several recommendations for improving the process by which such projects are planned and implemented are made. These are briefly stated below.

Direct Corps participation
in productive land use planning

Within the existing dredged material disposal planning system, the

Corps of Engineers should actively participate in disposal planning involving productive land use concepts for confined disposal sites. Active Corps involvement in productive land use planning is most appropriate during the planning of new disposal facilities for Federal dredging projects, but is also appropriate during planning for the productive development of active disposal sites.

Corps land use planning expertise

At the present time, Corps and project sponsor disposal planners do not systematically address wide-ranging land use planning considerations during disposal-productive use project planning and review. A basic deficiency noted during this study was the lack of involvement of Corps land use and water resource planning expertise in disposal planning activities. It is, therefore, recommended that Corps disposal planning staffs include an experienced land use planning professional.

Coordination of disposal facility and productive land use planning

The feasibility and operational viability of a productive land use concept can be greatly affected by the design features of the disposal facility. To optimize the functional capabilities of the proposed use, disposal facility and productive land use planning should be undertaken as a single, coordinated effort whenever possible.

Public participation

Under existing procedures, the public (either at large or adjacent to a proposed site) is typically not involved in project planning and review until advanced stages of the implementation process. For disposal-productive use projects, the Corps' policy should be one of full disclosure to the public of all relevant facts at the earliest stages of the planning process. Public involvement in Corps of Engineer planning efforts, or in planning efforts significantly dependent on Corps disposal activities, should not be left up to local project sponsors. Instead, it should be handled directly by Corps personnel.

Application of sound
planning principles in
developing productive land use plans

Productive land use plans proposed for confined dredged material disposal sites should explicitly address the 10 land use planning principles identified in this study as most important for sound disposal site productive use planning.

Authority to expend public funds to enhance disposal-
productive use project feasibility

The Corps' authority to expend public funds for disposal activities should be extended to enable the development and selection of facility designs that reflect the productive use objective. Disposal-productive use projects are constrained by the capability and willingness of project sponsors to assume the incremental costs associated with facility designs more suited to proposed productive land use concepts.

Corps policies and procedures
for disposal-productive use projects

Existing Corps of Engineer policies, procedures, rules, and regulations developed in response to the U.S. Water Resources Council's September 1973 Principles and Standards for Planning, Water and Related Land Resources establish the framework within which multiobjective Corps projects must be planned. Corps Engineering Regulations for multi-objective project planning and review should be revised to provide more guidance to Corps planners applying the Principles and Standards to disposal-productive use projects. The implementation factors identified in this study should be utilized during early planning activities to formulate overall project implementation strategies.

Preface

This is a report of a 14-month study to conduct case studies and comparative analyses of issues associated with the implementation of productive land use concepts for confined dredged material disposal sites. The project was conducted as part of Task 5D: Disposal Area Land Use Concepts of the Productive Uses Project of the Dredged Material Research Program. The DMRP, sponsored by the Office of the Chief of Engineers, is assigned to the U.S. Army Engineer Waterways Experiment Station, Environmental Effects Laboratory, Vicksburg, Mississippi.

The study was funded under Contract No. DACW39-76-C-0127 with Energy Resources Co. Inc., Cambridge, Massachusetts. Sasaki Associates Inc., Watertown, Massachusetts was employed by Energy Resources, under subcontract, to assist in the analysis of land use planning considerations. The contract was directed by John Gushue, principal investigator, of Energy Resources. Project staff from Energy Resources included Donald Harrington, Jeff Stollman, Leslie Wilson, Barry Gehron, and Wayne Pitts. Project coordinator for Sasaki Associates was Kenneth Kreutziger, who was assisted by William Firth and Daniel Kenney. Manuscript preparation was supervised by Charline Lake of Energy Resources.

Managers of the Productive Uses Project during the course of the contract were MAJ Robert Meccia, CE, and Mr. Thomas Patin. The contract was managed by MAJ Mark D. Malkasian, CE, under the general supervision of Dr. John Harrison, Chief of the Environmental Effects Laboratory.

Directors of WES during the course of the contract were COL G.H. Hilt, CE, and COL J.L. Cannon, CE. The Technical Director was Mr. F.R. Brown.

CONTENTS

Volume I

	<u>Page</u>
EXECUTIVE SUMMARY	1
PREFACE	5
PART I: PROJECT DESCRIPTION	17
Objectives	17
Approach	20
Definitions	34
PART II: CHARACTERIZATION OF CASE STUDY PROJECTS	36
Data Summaries	36
Planning Scenarios Represented	36
PART III: FINDINGS AND CONCLUSIONS	46
Overview	46
Findings: Issues Associated with Disposal- Productive Use Projects	48
Findings: Physical Planning Elements Affecting Disposal Facility and Productive Land Use Planning	72
Findings: Land Use Planning Principles	82
Conclusions: Implementation Factors for Disposal- Productive Use Projects	90
PART IV: RECOMMENDATIONS	105
Introduction	105
Recommendations	105
BIBLIOGRAPHY.....	111

CONTENTS

Volume II

	<u>Page</u>
APPENDIX A: SYNOPSIS OF CASE STUDY NO. 1 - BLOUNT ISLAND - JACKSONVILLE, FLORIDA	A1
APPENDIX B: SYNOPSIS OF CASE STUDY NO. 2 - CLEVELAND SITE 14 - CLEVELAND, OHIO	B1
APPENDIX C: SYNOPSIS OF CASE STUDY NO. 3 - BAY PORT - GREEN BAY, WISCONSIN	C1
APPENDIX D: SYNOPSIS OF CASE STUDY NO. 4 - CRYSTAL BEACH - CRYSTAL BEACH, FLORIDA	D1
APPENDIX E: SYNOPSIS OF CASE STUDY NO. 5 - HURON SITE 1 - HURON, OHIO	E1
APPENDIX F: SYNOPSIS OF CASE STUDY NO. 6 - FIFTH AVENUE MARINA - SAN DIEGO, CALIFORNIA	F1
APPENDIX G: SYNOPSIS OF CASE STUDY NO. 7 - EASTSIDE SITE 14 - COOS BAY, OREGON	G1
APPENDIX H: SYNOPSIS OF CASE STUDY NO. 8 - ANACORTES - ANACORTES, WASHINGTON	H1
APPENDIX I: SYNOPSIS OF CASE STUDY NO. 9 - HOQUIAM - HOQUIAM, WASHINGTON	I1
APPENDIX J: SYNOPSIS OF CASE STUDY NO. 10 - FORT MIFFLIN - PHILADELPHIA, PENNSYLVANIA	J1
APPENDIX K: SYNOPSIS OF CASE STUDY NO. 11 - RIVERGATE - MEMPHIS, TENNESSEE	K1

CONTENTS

Volume II (Concluded)

	<u>Page</u>
APPENDIX L: SYNOPSIS OF CASE STUDY NO. 12 - OSCEOLA - OSCEOLA, ARKANSAS	L1
APPENDIX M: PRELIMINARY CHARACTERIZATION OF CONFINED DISPOSAL SITES NOMINATED AS CANDIDATES FOR CASE STUDY	M1
APPENDIX N: EXAMPLE OF SITE DESCRIPTION MEMORANDA DEVELOPED FOLLOWING SECONDARY INFORMATION COLLECTION PHASE OF SITE SELECTION SURVEY	N1
APPENDIX O: COMPLETE LISTING OF CASE STUDY CANDIDATES IDENTIFIED IN DISTRICT OFFICE SURVEY	O1
APPENDIX P: CRITERIA USED DURING CASE STUDY SITE SELECTION	P1
APPENDIX Q: DETAILED COMPARATIVE ANALYSES, PRESENTING CASE- SPECIFIC EXAMPLES OF ISSUES, PHYSICAL PLANNING ELEMENTS, AND FEATURES OF PROPOSED LAND USE PLANS	Q1
APPENDIX R: SUBJECTIVE ASSESSMENT MATRIX FOR FACTORS AFFECTING DISPOSAL-PRODUCTIVE USE PROJECT IMPLEMENTATION	R1

LIST OF TABLES

<u>No.</u>	<u>Page</u>
1 Case Study Sites	18
2 Corps Offices Surveyed for Case Study Candidates	22
3 Application of Screening Criteria to Sites Chosen for Case Study	25
4 Case Study Working Document Content Outline	28
5 Issues Associated with the 12 Case Studies	30
6 Physical Planning Elements of Disposal-Productive Use Projects	32
7 Planning Principles for Disposal Site Productive Use Plans ...	33
8 Summary Characterization of Case Study Projects	42
9 Issues Associated with the 12 Case Studies: Impact Assessments	49
10 Physical Planning Elements of the 12 Case Studies: Influence Assessments	73
11 Proposed Land Use Plans of the 12 Case Studies: Influence Assessments Based on Ten Planning Principles	83
12 Implementation Factors Affecting Disposal-Productive Use Projects	91
A1 Case Study No. 1 - Blount Island: Major Issues Addressed During Implementation	A18
A2 Case Study No. 1 - Blount Island: Physical Planning Elements Affecting Project Implementation	A19
A3 Case Study No. 1 - Blount Island: Key Factors Affecting Project Implementation	A20
B1 Case Study No. 2 - Cleveland Site 14: Major Issues Addressed During Implementation	B15
B2 Case Study No. 2 - Cleveland Site 14: Physical Planning Elements Affecting Project Implementation	B16
B3 Case Study No. 2 - Cleveland Site 14: Key Factors Affecting Project Implementation	B18

LIST OF TABLES (CONTINUED)

<u>No.</u>	<u>Page</u>
C1 Case Study No. 3 - Bay Port: Major Issues Addressed During Implementation	C14
C2 Case Study No. 3 - Bay Port: Physical Planning Elements Affecting Project Implementation	C15
C3 Case Study No. 3 - Bay Port: Key Factors Affecting Project Implementation	C16
D1 Case Study No. 4 - Crystal Beach: Major Issues Addressed During Implementation	D17
D2 Case Study No. 4 - Crystal Beach: Physical Planning Elements Affecting Project Implementation	D19
D3 Case Study No. 4 - Crystal Beach: Key Factors Affecting Project Implementation	D20
E1 Case Study No. 5 - Huron Site 1: Major Issues Addressed During Implementation	E16
E2 Case Study No. 5 - Huron Site 1: Physical Planning Elements Affecting Project Implementation	E17
E3 Case Study No. 5 - Huron Site 1: Key Factors Affecting Project Implementation	E18
F1 Case Study No. 6 - Fifth Avenue Marina: Major Issues Addressed During Implementation	F17
F2 Case Study No. 6 - Fifth Avenue Marina: Physical Planning Elements Affecting Project Implementation	F18
F3 Case Study No. 6 - Fifth Avenue Marina: Key Factors Affecting Project Implementation	F19
G1 Case Study No. 7 - Eastside 14: Major Issues Addressed During Implementation	G18
G2 Case Study No. 7 - Eastside 14: Physical Planning Elements Affecting Project Implementation	G19
G3 Case Study No. 7 - Eastside 14: Key Factors Affecting Project Implementation	G20

LIST OF TABLES (CONTINUED)

<u>No.</u>		<u>Page</u>
H1	Case Study No. 8 - Anacortes: Major Issues Addressed During Implementation	H17
H2	Case Study No. 8 - Anacortes: Physical Planning Elements Affecting Project Implementation	H18
H3	Case Study No. 8 - Anacortes: Key Factors Affecting Project Implementation	H19
I1	Case Study No. 9 - Hoquiam: Major Issues Addressed During Implementation	I18
I2	Case Study No. 9 - Hoquiam: Physical Planning Elements Affecting Project Implementation	I19
I3	Case Study No. 9 - Hoquiam: Key Factors Affecting Project Implementation	I20
J1	Case Study No. 10 - Fort Mifflin: Major Issues Addressed During Implementation	J16
J2	Case Study No. 10 - Fort Mifflin: Physical Planning Elements Affecting Project Implementation	J18
J3	Case Study No. 10 - Fort Mifflin: Key Factors Affecting Project Implementation	J19
K1	Case Study No. 11 - Rivergate: Major Issues Addressed During Implementation	K13
K2	Case Study No. 11 - Rivergate: Physical Planning Elements Affecting Project Implementation	K15
K3	Case Study No. 11 - Rivergate: Key Factors Affecting Project Implementation	K16
L1	Case Study No. 12 - Osceola: Major Issues Addressed During Implementation	L13
L2	Case Study No. 12 - Osceola: Physical Planning Elements Affecting Project Implementation	L14
L3	Case Study No. 12 - Osceola: Key Factors Affecting Project Implementation	L15

LIST OF TABLES (CONCLUDED)

<u>No.</u>		<u>Page</u>
Q1	Issues Associated with the 12 Case Studies: Impact Assessments	Q47
Q2	Physical Planning Elements of the 12 Case Studies: Influence Assessments	Q50
Q3	Proposed Land Use Plans of the 12 Case Studies: Influence Assessments Based on Ten Planning Principles	Q52
R1	Factors Affecting Implementation in the 12 Case Studies: Influence Assessments	R2

LIST OF FIGURES

<u>No.</u>		<u>Page</u>
1	Project Task and Sub-Task Outline	21
2	Geographic Distribution of 12 Case Study Projects	37
3	Capsule Summaries of Round 1 Case Study Sites	38
4	Capsule Summaries of Round 2 Case Study Sites	39
5	Capsule Summaries of Round 3 Case Study Sites	40
6	Capsule Summaries of Round 4 Case Study Sites	41
7	Basic Analytical Approach	47
A1	Location Map for Case Study No. 1 - Blount Island	A12
A2	Blount Island Site Map	A13
A3	Blount Island Productive Use Plan (Offshore Power Systems, Inc., April 1972)	A14
A4	Photo of Blount Island before Start of OPS Disposal- Productive Use Project (October 1973)	A15
A5	Photo of Blount Island after Completion of Major Dredging and Filling Operations (March 1975)	A16
A6	Case Study No. 1 - Blount Island - Chronology of Events	A17
B1	Location Map for Case Study No. 2 - Cleveland Site 14	B10
B2	Cleveland 14 Site Map	B11
B3	Photo of City-Owned Landfill To Be Enclosed within Completed Cleveland Site 14 (November 1976)	B12
B4	Cleveland Site 14 Productive Use Plan (Cleveland Planning Board, July 1976)	B13
B5	Case Study No. 2 - Cleveland Site 14 - Chronology of Events ..	B14
C1	Location Map for Case Study No. 3 - Bay Port	C10
C2	Bay Port Site Map	C11
C3	Photo of Bay Port Disposal Area (April 1975)	C12
C4	Case Study No. 3 - Bay Port - Chronology of Events	C13

LIST OF FIGURES (CONTINUED)

<u>No.</u>	<u>Page</u>
D1 Location Map for Case Study No. 4 - Crystal Beach	D13
D2 Crystal Beach Site Map	D14
D3 Photo of Crystal Beach (1973)	D15
D4 Case Study No. 4 - Crystal Beach - Chronology of Events	D16
E1 Location Map for Case Study No. 5 - Huron Site 1	E11
E2 Huron 1 Site Map	E12
E3 Photo of Huron Site 1 during Dike Construction (1974)	E13
E4 Huron Site 1 Conceptual Development Plan (Buffalo District, Corps of Engineers, July 1972)	E14
E5 Case Study No. 5 - Huron Site 1 - Chronology of Events	E15
F1 Location Map for Case Study No. 6 - Fifth Avenue Marina	F12
F2 Fifth Avenue Marina Site Map	F13
F3 Photo of Fifth Avenue Marina at Completion of Disposal Operations (July 1976)	F14
F4 Fifth Avenue Marina Productive Use Plan (San Diego Unified Port District, October 1975)	F15
F5 Case Study No. 6 - Fifth Avenue Marina - Chronology of Events	F16
G1 Location Map for Case Study No. 7 - Eastside Site 14	G14
G2 Eastside 14 Site Map	G15
G3 Photo of Eastside Site 14 (February 1977)	G16
G4 Case Study No. 7 - Eastside Site 14 - Chronology of Events ...	G17
H1 Location Map for Case Study No. 8 - Anacortes	H13
H2 Anacortes Site Map	H14
H3 Photo of Anacortes Disposal Area (1975)	H15
H4 Case Study No. 8 - Anacortes - Chronology of Events	H16

LIST OF FIGURES (CONCLUDED)

<u>No.</u>	<u>Page</u>
I1 Location Map for Case Study No. 9 - Hoquiam	I13
I2 Hoquiam Site Map	I14
I3 Photo of Hoquiam Site at End of Dike Construction (January 1977)	I15
I4 Hoquiam Productive Use Plan (Kaiser Steel Corporation, August 1975)	I16
I5 Case Study No. 9 - Hoquiam - Chronology of Events	I17
J1 Location Map for Case Study No. 10 - Fort Mifflin	J11
J2 Fort Mifflin Site Map	J12
J3 Photo of Fort Mifflin Area, Sections I and II (1976)	J13
J4 Fort Mifflin Conceptual Development Plan (Philadelphia District, Corps of Engineers, December 1975)	J14
J5 Case Study No. 10 - Fort Mifflin - Chronology of Events	J15
K1 Location Map for Case Study No. 11 - Rivergate	K9
K2 Photo of Rivergate Area (1975)	K10
K3 Rivergate Productive Use Plan (Belz Enterprises, 1976)	K11
K4 Case Study No. 11 - Rivergate - Chronology of Events	K12
L1 Location Map for Case Study No. 12 - Osceola	L9
L2 Osceola Site Map	L10
L3 Photo of Warehouse Built on Osceola Disposal Area (June 1977)	L11
L4 Photo of Eastern Section of Osceola Disposal Area (June 1977)	L11
L5 Case Study No. 12 - Osceola Harbor - Chronology of Events	L12

CASE STUDIES AND COMPARATIVE ANALYSES OF ISSUES
ASSOCIATED WITH PRODUCTIVE LAND USE AT
DREDGED MATERIAL DISPOSAL SITES

PART I: PROJECT DESCRIPTION

Objectives

1. Four principal objectives have governed the work described herein. The first was the documentation and evaluation, using a case study approach, of various "issues" associated with the planning and implementation of productive land use concepts for confined dredged material disposal sites.* Twelve case studies, examining representative disposal-productive use projects (Table 1), were prepared, each one presenting an independent review and analysis of the following:

- a. The sequence of events in the process of planning and implementing the project.
- b. Participants in the project and their roles, perspectives, and interactions.
- c. Issues addressed during project planning and review.
- d. Physical planning elements of the disposal facility and its location, viewed from two perspectives - disposal planning and land use planning.
- e. Land use planning features of proposed plans for productive use of the filled disposal area.

2. The second principal objective of this study was the development and application of a methodology for performing comparative analyses of the 12 case studies. The methodology developed employed a series of three matrices summarizing, for each case study, our assessments of: (1) the significance of the issues involved; (2) the influence of physical planning elements on project implementation; and (3) the

* For this study, "issues" refers to specific substantive and procedural concerns expressed by participants during the process of disposal-productive use project planning and review. See list of definitions at paragraph 30.

Table 1
Case Study Sites*

<u>Case Study Number</u>	<u>Site Name</u>	<u>Corps District</u>
1	Blount Island	Jacksonville
2	Cleveland Site 14	Buffalo
3	Bay Port	Chicago
4	Crystal Beach	Jacksonville
5	Huron Site 1	Buffalo
6	Fifth Avenue Marina	Los Angeles
7	Eastside Site 14	Portland
8	Anacortes	Seattle
9	Hoquiam	Seattle
10	Fort Mifflin	Philadelphia
11	Rivergate	Memphis
12	Osceola	Memphis

* Twelve case study synopses are presented in Appendices A through L, which are bound separately with all other appendices in Volume II of this report.

influence of the proposed land use plans on project implementation. The land use plans were evaluated according to 10 planning principles identified in this study as measures of good planning practice for disposal site productive use. The results of the comparative analyses are summarized in the study findings presented in Part III of this report.

3. The comparative analyses of issues, physical planning elements, and land use planning features were utilized to achieve the third study objective, which was to identify an overall set of "factors" affecting disposal-productive use project implementation.* The set of implementation factors represents the full range of considerations observed in the 12 case studies to be important to project acceptance and approval. The overall set of factors reflects the observed fact that project implementation is affected not only by specific issues raised by participants, but also by several considerations not at issue. For example, on one hand, possible odor problems during disposal might be the basis for local resident opposition to a project and resolution of the odor issue could delay the approval process. On the other hand, implementation difficulties might result from non-issue considerations such as participant responsibilities, interagency coordination procedures, and the standard of land use planning practice reflected in proposed productive use plans. As for the comparative analyses, a matrix presenting our staff assessments of the influence of the various factors on implementation in each case was prepared. The implementation factors are presented as the study conclusions in Part III of this report.

4. The identification of important implementation factors was instrumental in achieving the fourth and final objective of the study, which was the development of recommendations addressing Corps of Engineer actions in planning, evaluating, selecting, and implementing

* For this study, "factors" refers to general substantive and procedural aspects of project planning and development that can advance or impede the implementation process. The factors encompass items which form the basis for specific issues, items addressing planning and review procedures, and items reflecting disposal facility and land use planning considerations.

productive land use concepts for confined disposal sites. The recommendations presented in Part IV of this report are based on our findings and conclusions concerning the process of implementing productive use plans within the disposal planning framework. The recommendations concentrate on procedures as well as on the responsibilities of the various Corps and non-Corps participants and are geared toward future project implementation.

Approach

Case study site selection

5. An outline of the tasks and sub-tasks comprising this study is given in Figure 1. Perhaps the most important and difficult task performed was that of selecting confined disposal sites for case study analysis. Since no master listing of disposal sites in the United States having an actual or planned productive use associated with them was available, an initial survey of 25 Districts and one Division (Table 2) was performed to define the "universe" of potential case study sites. Corps personnel were contacted via telephone and letter, informed of the scope of the study, and requested to identify potential case study sites within their jurisdictions. A data sheet (Appendix M) was provided so that preliminary characterizations of those sites nominated by Corps personnel for case study could be developed. The initial survey resulted in the identification of nearly 70 disposal projects thought to be appropriate for this study.

6. Following receipt of the preliminary data, secondary information requests were made in order to verify, clarify, or expand upon the initial submission. Secondary contacts with Corps personnel were supplemented by discussions with other project participants, including local sponsors and planning agencies.* In some cases field visits were

* In two instances this approach led to the identification of an additional candidate site not previously nominated by Corps personnel. These two sites, Hoquiam (Seattle District) and Fort Mifflin (Philadelphia District) were eventually selected for case study analysis.

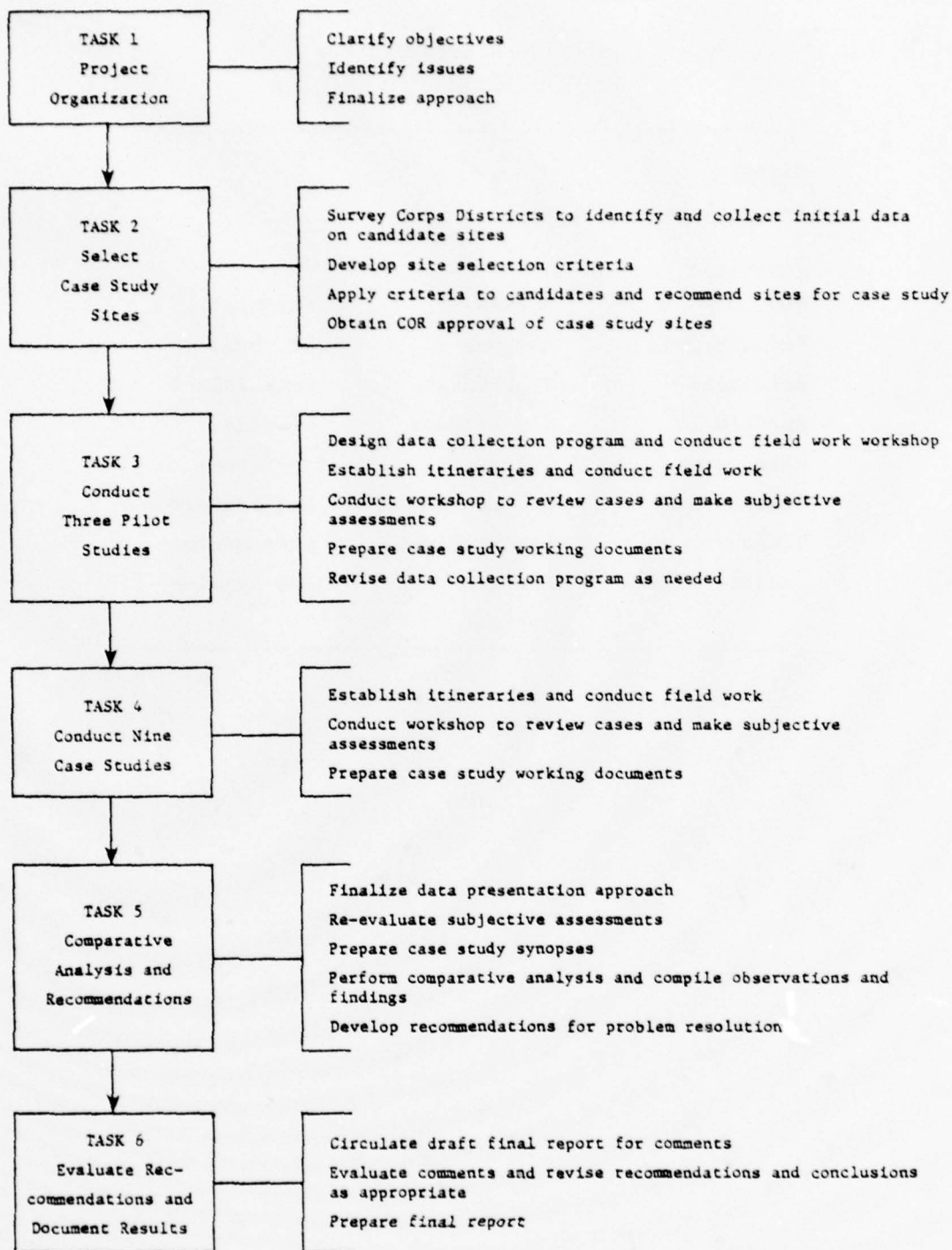


Figure 1. Project Task and Sub-Task Outline

Table 2
Corps Offices Surveyed For
Case Study Candidates

Division

New England (Waltham)

Districts

New York	Mobile	Chicago
Philadelphia	Memphis	St. Paul
Baltimore	Vicksburg	Rock Island
Norfolk	New Orleans	Seattle
Wilmington	Galveston	Portland
Charleston	St. Louis	San Francisco
Savannah	Louisville	Sacramento
Jacksonville	Buffalo	Los Angeles
	Detroit	

made to review candidate sites. The information collected for each candidate project was summarized in site description memoranda (Appendix N). Fifty-two disposal-productive use projects emerged as viable candidates from which the 12 case study projects were chosen (Appendix O). None of these candidates were located in the New England Division.

7. At the outset, it was expected that the site identification and selection process would be applied only once, resulting in the simultaneous selection of all case study sites. As it turned out, there was considerable variability in both the completeness and the timing of the initial District responses, partially as a result of midcourse changes in the decision rules used to identify potential case study sites. Thus, the site identification, data collection, and site selection process was applied four separate times as District responses were received, with three case study sites being selected each time.

8. Most of the difficulty in identifying potential case study sites resulted from the necessity to rule out sites initially appearing to be good candidates, but which, upon closer examination, were found to be incompatible with the study objectives. For example, one dilemma faced was that most sites now in actual post-disposal use were planned and constructed in the early to mid 1960's without going through the environmental impact statement (EIS) review process established under the National Environmental Policy Act of 1969 (NEPA). In such cases productive use planning was rarely done in conjunction with disposal planning and there was little, if any, environmental or other controversy surrounding the project. To circumvent this problem the search for candidate sites had to be weighted toward "NEPA-era" disposal-productive use projects. District personnel were requested to nominate projects in all planning, review, and development stages with preference to be given to those furthest along in the implementation process.

9. After all potential case study sites had been identified and sufficiently characterized, they were then screened using the site selection criteria listed below:

- a. Status of productive land use plans.

- b. Data availability.
- c. Interest rating.
- d. Degree of completion or commitment.
- e. Land use variety.
- f. Success of implementation.
- g. Confined disposal site size.
- h. Urban category.

10. For criteria a. through d., numerical rating scales were established and integer scores from 1 to 4 were subjectively assigned to each candidate site, after reviewing available data, by all members of the project staff. Using this approach the rating scales were consistently applied to all candidate sites, with the more desirable sites receiving the higher ratings. Criteria e. through h. were descriptive in nature and not intended to numerically measure the relative merits of one candidate site versus another. Rather, they were used to guide site selection so that, to the extent possible, the 12 site sample would include sufficient variety along the dimensions represented.*

11. The eight site selection criteria were applied to each of the 52 candidate sites for which preliminary data had been developed. An additional consideration taken into account during site selection was the distribution of the 12 site sample geographically and in terms of the Corps Offices represented. The results of the criteria application are shown in Table 3 for the 12 sites that were eventually chosen for case study analysis. Significantly, the 12 site sample is a highly representative subset of the 52 candidate sites, which encompass the full range of disposal-productive use projects that Corps planners have been involved in since the mid 1960's.

12. Note from Table 3 that 9 of the 12 sites received ratings of three or more in each of the three most important quantified criteria: status of productive land use plans, data availability, and interest rating. For the last quantified criterion, degree of completion, 8 of

* The rating scales for and the rationales behind the eight site selection criteria are discussed in Appendix P of Volume II.

Table 3
Application of Screening Criteria to Sites Chosen for Case Study*

Criteria	East Coast		Gulf Coast		Mississippi River		Great Lakes			West Coast				Summaries				
	Blount Island	Fort Mifflin	Crystal Beach	Osceola	Rivergate	Cleveland	Site 14	Bay Port	Huron Site 1	Fifth Ave. Marina	Eastside Site 14	Anacortes	Hogquiam	4	1	2	3	4
Status of Productive Land Use Plans	1	10	4	11	4	2	3	4	4	4	3	4	4	9	1	1	1	1
Data Availability	4	2	1	4	4	4	4	4	4	4	4	3	4	8	4	0	0	0
Interest Rating	4	3	4	4	3	4	4	4	3	4	4	3	4	6	5	1	0	0
Degree of Completion	4	4	4	3	2	4	3	3	3	4	3	3	4	6	5	1	0	0
Land Use Variety	4	1	1	3	3	1	1	1	1	2	1	3	2	1	3	2	6	6
Success Rating	I	I/PC	RS	I	I	I	RC	I	RC	I	I	I	I	8-I	0-C	4-RC	1-RS	1-RS
Disposal Site Size	I	O	A	P	I	P	P	P	P	P	P	P	P	2-I	8-P	1-O	1-A	1-A
Urban Category	L	L	L	L	M	M	M	L	M	M	L	M	M	0-VL	6-L	6-M	0-S	0-S
	S	HU	S	U	R	HU	HU	U	HU	U	U	U	U	2-HU	7-U	2-S	1-R	1-R

*Key: Status of Productive Land Use Plans
 4 = plan proposed for entire site
 3 = plan proposed for portion of site
 2 = alternative plans proposed for all or part of site
 1 = no plan publicly proposed

Data Availability
 4 = well documented
 3 = adequately documented
 2 = partially documented
 1 = inadequately documented

Interest Rating
 4 = major issues and/or controversies involved
 3 = moderately controversial or of special interest
 2 = minor issues and/or controversies involved
 1 = no issues and/or controversies involved

Degree of Completion
 4 = site partially or entirely developed for productive use
 3 = site under construction for productive use
 2 = productive use planned and funded
 1 = productive use planned but unfunded

Land Use Variety
 I = Industrial
 C = Commercial
 RC = Recreational
 RS = Residential

Success Rating
 I = Implemented
 P = Proceeding
 O = Obstructed
 A = Abandoned

Disposal Site Size
 VL = >1000 acres
 L = 101 to 1000 acres
 M = 20 to 100 acres
 S = <20 acres

Urban Category
 HU = Highly Urban
 U = Urban
 S = Suburban
 R = Rural

the 12 sites received ratings of less than three, a reflection of the site selection dilemma described above in paragraph 8. Only two sites, Crystal Beach and Fort Mifflin, received ratings of less than three in more than one area. The sample diversity in terms of the four descriptive criteria is quite characteristic of the set of 52 candidate sites. Not surprisingly, a large majority of disposal-productive use projects involve water-related industrial and recreational land use concepts. Only a few projects involving commercial and residential land uses were identified among the 52 candidates. Similarly, almost all of the candidate confined sites fell within the 20 to 1000 acre range, and most were situated within or adjacent to areas of intense development. Finally, projects that are still proceeding toward implementation of proposed land use plans dominated the set of candidates.

Case study preparation

13. Case studies of the 12 selected sites were prepared in four rounds of three each. The first three case studies were considered to be "pilot" studies during which the overall data collection, management, evaluation, and presentation approach would be tested and revised, if necessary, for the remaining cases. As it turned out, the data management and presentation approach had to be revised after each round of case studies to incorporate new findings and maintain reporting consistency. For example, in documenting the issues associated with each case study, categories of issues (covering issues in all cases) defined prior to case study field work were used to facilitate uniform data collection and evaluation, and to ensure comparability of the 12 cases. However, as the case studies were prepared, new issues were invariably identified, leading to new issue categories. Based on the specific details of each case study, it was sometimes necessary to reassess previous results in light of the new issue category definitions. All case study results presented in this report are consistent with the data presentation approach finalized after all 12 case studies had been prepared.

14. The data and information used in preparing the case studies were gathered from three sources: (1) participants in the project implementation process; (2) Federal, State, and local agency files; and

(3) published reports on the project, including EIS's if available. Personal interviews were held with all key participants in the projects, which typically included:

- a. Corps of Engineers.
- b. Federal environmental resource management agencies.
- c. State regulatory and resource management agencies.
- d. Local and regional planning bodies.
- e. Local project sponsors, usually a port authority or similar agency.
- f. Environmental groups.
- g. Private citizens, usually local residents.

Interviews with each type of participant were conducted using pre-designed discussion guides. Participants were asked to discuss the basis for their objection to (or support of) the subject project, to state their opinions concerning the manner in which the project was planned and implemented, and to speculate on how to improve the process. While the hard and fast details of each case study were researched in written documentation available for each project, the attitudes reflected in the actions of the various participants were investigated during the personal interviews.

15. Case studies of each disposal-productive use project were initially prepared in the form of "working documents" organized as indicated in Table 4. The rather lengthy working documents were subsequently capsulized into case study synopses (Appendices A through L), which present the data for each case study in a consistent and comparable format. The final design of the data presentation format and the distillation of the 12 working documents into that format provided the foundation from which the comparative analyses of the 12 case studies proceeded.

Comparative analyses

16. In an overall sense, the comparative analyses of the 12 case studies were approached so as to enable sequential accomplishment of three analytical goals. The first goal was to transform the data contained in the 12 working documents into a single, final presentation

Table 4

Case Study Working Document Content Outline

Chapter 1. Case Study Synopsis

Background Summary

Project Implementation

- chronology and participant involvement
- issues
- planning considerations
- key factors

Chapter 2. The Project and Its Implementation

Introduction

Site Description

Site History

Productive Use Project Description

Participants and Their Roles

Issues Associated with the Project

Factors Affecting Project Implementation

Chapter 3. Land Use Planning Considerations

Site Development Potential

Site Analysis

Land Use Planning Background and Process

Chapter 4. Project Implementation Process

Chronology of Events

Assessment

Chapter 5. Issues Summary

Major Issues

Minor Issues

format. This was facilitated by the identification of the following:

- a. Major and minor issues associated with the 12 disposal-productive use projects (Table 5).
- b. Physical planning elements affecting disposal facility and productive land use planning (Table 6).
- c. Land use planning principles that are most important to successful project implementation (Table 7).

17. The desired data presentation format was obtained in two steps. In step one, the various issues, physical planning elements, and features of proposed land use plans associated with the 12 case study project were compiled and redefined for uniformity, and final categories were established for each. These final categories were designed to encompass all issues, etc., represented in the 12 case study sample. In step two, the impacts of the issues, physical planning elements, and features of proposed land use plans on project implementation in each case were subjectively assessed by the project staff. The assessments were then displayed in matrices, using symbols to indicate the significance of particular issues, physical planning elements, and proposed use plans in each case. These matrices and the findings they reflect are presented in Part III of this report.

18. The issues associated with the 12 case study projects have been placed into the following six categories: (1) ENVIRONMENTAL, (2) TECHNICAL, (3) ECONOMIC AND FINANCIAL, (4) LEGAL, (5) INSTITUTIONAL, and (6) PLANNING AND IMPLEMENTATION. Under these categories a total of 39 issues were identified and are listed in Table 5.

19. Physical planning elements defining the planning context of each case study site have been placed into two categories, each reflecting a perspective from which site physical elements must be viewed in project planning: (1) elements related to disposal facility planning; and (2) elements related to productive land use planning. A listing of the 19 physical planning elements found to be important in disposal-productive use project design is given in Table 6.

20. The proposed land use plans of the 12 case studies were reviewed on the basis of 10 "planning principles" identified during the course of the study. The planning principles represent standards

Table 5
Issues Associated with the 12 Case Studies

ENVIRONMENTAL

1. Wetlands filling
2. Wildlife habitat disturbance
3. Aquatic habitat disturbance
4. Regional ecosystem alteration
5. Bay bottomland and/or surface area reduction
6. Dredging-disposal water quality impacts
7. Changes in flow patterns
8. Odor
9. Secondary impacts of the planned use

TECHNICAL

1. Dike stability
2. Site foundation conditions (for planned use)
3. Dredging technique
4. Disposal area capacity
5. Disposal area size and configuration
6. Disposal area operating characteristics
7. Utility relocation/connection

ECONOMIC/FINANCIAL

1. Economic or social benefits (costs) of the disposal-productive use project
2. Economic or social impacts of secondary development
3. Fees or taxes on dredged material
4. Utility relocation costs
5. Additional dredging or disposal costs

(Continued)

Table 5 (Concluded)

LEGAL

1. Conformance with EIS requirements
2. Adequacy of environmental impact assessment or statement
3. Conformance with public hearing requirements
4. Site ownership authorities
5. State vs. Federal permit jurisdiction

INSTITUTIONAL

1. Public participation during project planning
2. Responsiveness to public comments
3. Coordination with review/regulatory agencies

PLANNING/IMPLEMENTATION

1. Dredging project design limits
 2. Dredging project need
 3. Long-range waterway/environmental planning
 4. Evaluation of alternative disposal areas
 5. Adequacy of environmental data base
 6. Appropriateness of proposed use: public vs. private
 7. Appropriateness of proposed use: water dependent
 8. Proposed use compatibility with adjacent uses
 9. Commitment to proposed land use plan
 10. Responsibility for economic impact assessment
-

Table 6

Physical Planning Elements of Disposal-
Productive Use Projects

ELEMENTS RELATED TO DISPOSAL FACILITY PLANNING

1. Pre-disposal site characteristics
 - a. below mean low water
 - b. wetland
 - c. upland
 - d. area of previous fill activity
2. Ecological characteristics
3. Disposal area capacity
4. Sub-surface soil conditions
5. Composition of dredged material
6. Disposal area location
7. Flood or tide conditions
8. Utility relocation/connection
9. Dredging equipment access
10. Sensory factors (visual, odor, dust, smoke, etc.)

ELEMENTS RELATED TO PRODUCTIVE LAND USE PLANNING

1. Foundation conditions
 2. Shipping and boat access
 3. Site size and configuration
 4. Vehicular circulation/traffic generation
 5. Rail access
 6. Utility availability and capacity
 7. Flood or tide conditions
 8. Site plan compatibility with site features and user requirements
 9. Sensory factors (visual, odor, vibration, dust, smoke, etc.)
-

Table 7

Planning Principles for Disposal Site Productive Use Plans

RELATIONSHIP TO PHYSICAL SURROUNDINGS

1. Compatibility with adjacent and surrounding land uses
2. Utilization of existing transportation systems and infrastructure
3. Utilization of waterfront location
4. Compatibility with site size and configuration
5. Site physical characteristics: planned use benefits vs. development costs

RELATIONSHIP TO ESTABLISHED COMMUNITY OBJECTIVES, PLANS, OR POLICIES

1. Contribution to established community land use needs
 2. Maintenance or enhancement of community image
 3. Consistency with master plans
 4. Provision of community benefits
 5. Minimization of induced adverse impacts (traffic, spin-off development, etc.)
-

against which the proposed productive land use plans were evaluated to point out deficiencies. The 10 principles, listed in Table 7, have been grouped according to whether they reflect the plan's relationship to (1) physical surroundings or (2) established community objectives, plans, or policies.

21. The second goal of the comparative analyses was the identification of a general set of "implementation factors" found to be important determinants of disposal-productive use project success. Analysis of the 12 case study projects showed project implementation progress to be influenced not only by specific issues raised by participants, but also by many considerations not necessarily at issue. These non-issue considerations include such items as, for example, the relationship between the sites and the disposal-productive use plans proposed for them, the Corps' procedures for identifying and resolving objections to projects, and the effectiveness of interagency coordination policies. The 37 implementation factors identified were placed into the same general categories as the issues.

22. The third comparative analysis goal was the evaluation of the relative importance of the various implementation factors to disposal-productive use project success. Again, the approach used was to subjectively evaluate and rate the factors in terms of their influence on the implementation processes of the 12 case study projects. These assessments were also displayed in matrix form using symbols keyed to the subjective influence ratings. The implementation factors are presented and discussed as the study conclusions in Part III of this report.

Definitions

23. A number of terms were used in this study as key words around which the work was organized:

- a. Confined Disposal Site - a disposal site completely bounded by man-made and/or natural barriers for the containment of dredged material.

- b. Productive Land Use - a land use resulting in enhanced economic or social benefits, but specifically excluding land uses such as for wildlife refuges, material transfer stations, products development, and fisheries projects.
- c. Issues - specific substantive and procedural concerns expressed by participants during the process of disposal-productive use project planning and review.
- d. Physical Planning Elements - physical features of disposal areas and their proposed sites that affect the feasibility of disposal facility and productive land use plans.
- e. Land Use Planning Principles - general planning considerations that should be addressed in disposal area productive land use plans.
- f. Implementation Factors - general substantive and procedural aspects of disposal-productive use project planning and development that can advance or impede the implementation process. The set of implementation factors encompasses items that form the basis for issues, items reflecting disposal facility and land use planning considerations, and items addressing project planning and review procedures and policies.
- g. Major and Minor Impact - key word indicators of the impact that particular issues were judged to have had on project implementation. Subjective major/minor assessments were made primarily on the basis of the difficulty and delay involved in resolving the issues.
- h. Positive and Negative Influence - key word indicators of the influence that particular planning considerations (and general factors) were judged to have had on project implementation. Positive/negative assessments were made on the basis of whether, in general, the planning considerations (and general factors) served to advance or impede the implementation process.

PART II: CHARACTERIZATION OF CASE STUDY PROJECTS

Data Summaries

24. Figure 2 illustrates the geographic distribution of the 12 case study projects, which included 4 west coast, 3 Great Lakes, 2 east coast, 2 Mississippi River, and 1 gulf coast site(s). Eight Corps Districts were represented in the sample. Figures 3 through 6 present capsule graphic and factual data for the 12 sites, numbered and grouped according to the sequence in which the case studies were prepared. Table 8 presents more detailed summary data for the 12 sites, grouped by geographic region.

Planning Scenarios Represented

25. The 12 site sample includes cases illustrative of the many different types of disposal-productive use projects comprising the set of 52 candidate sites. In fact, much effort was expended during site selection to ensure sample diversity along several dimensions. Primary consideration was given to the dimensions reflected in the site selection criteria, i.e., land use variety, stage of implementation, disposal site size, and urban category. Dimensions of secondary importance included type of dredging, site ownership, productive use planner, and the relationship between disposal facility planning and productive land use planning. As a result, a number of different disposal-productive use "planning scenarios" were included in the sample. The project characteristics defining the various scenarios are summarized in Table 8 and in the following paragraphs.

26. Three types of dredging projects are represented in the 12 case studies: Corps construction, Corps maintenance, and private construction associated with the proposed land use (Case Study Nos. 1 and 11). In terms of project implementation, the type of dredging involved was not found to be of particular significance. Both maintenance and construction dredging projects were subject to doubts as to

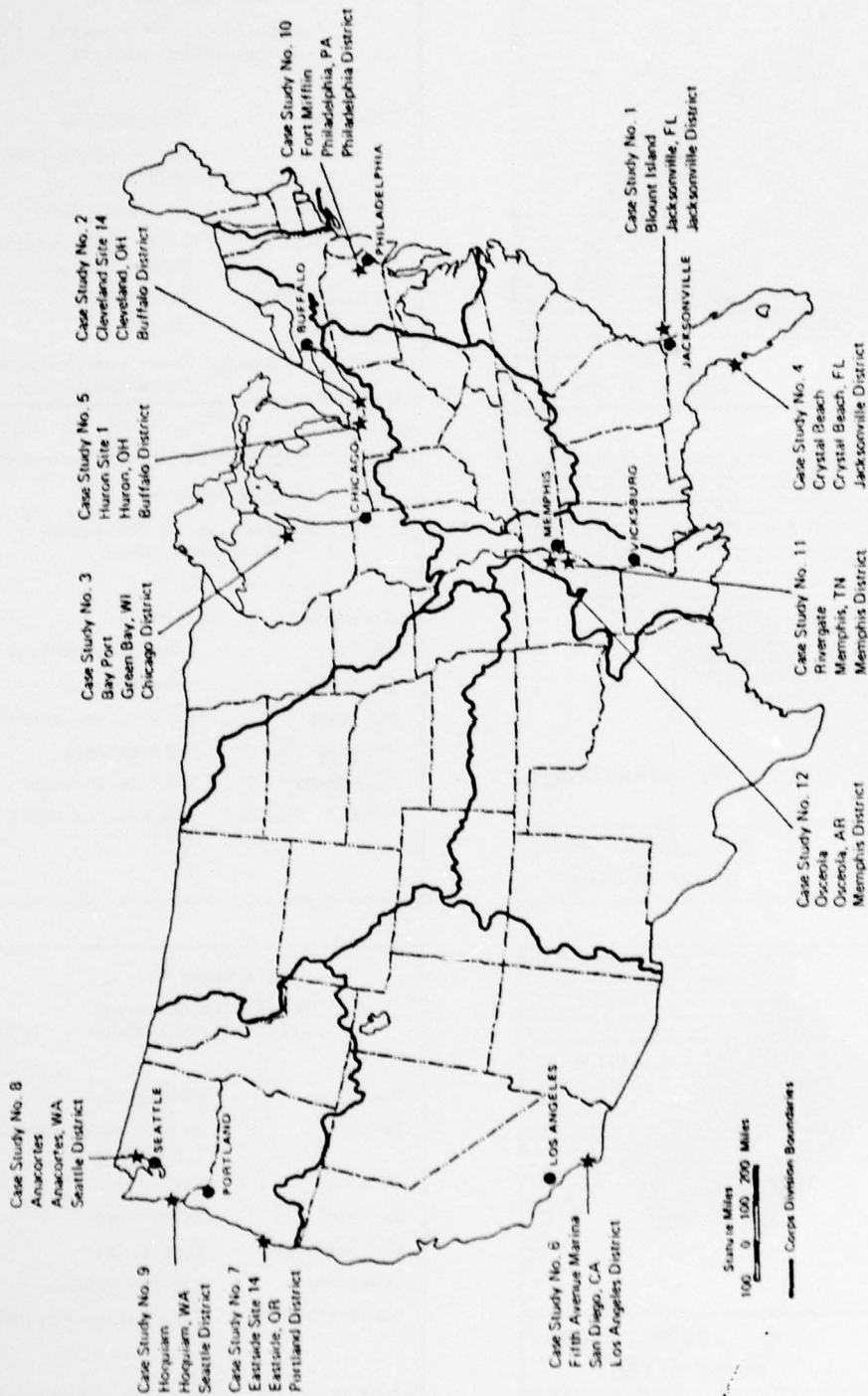
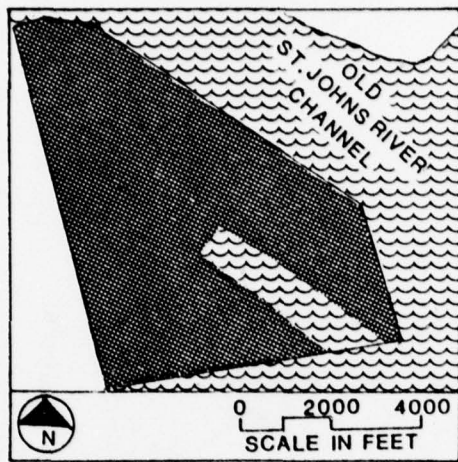
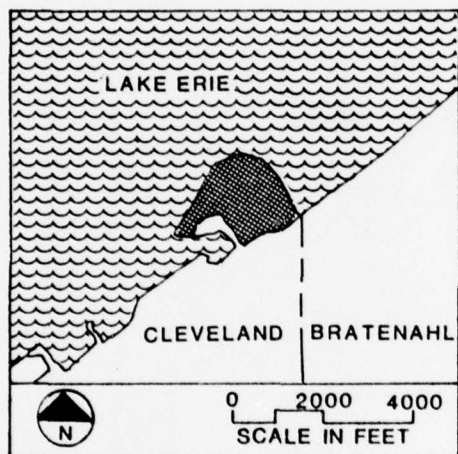


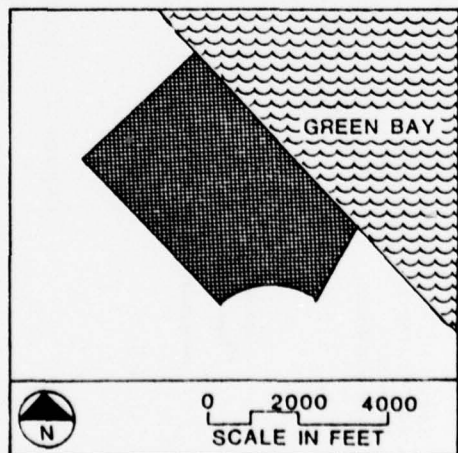
Figure 2. Geographic Distribution of 12 Case Study Projects



Case Study No. 1	
Blount Island (900 acres)	
Jacksonville, Florida	
District	Jacksonville
Sponsor	Jacksonville Port Authority
Waterway	St. Johns River
Material	Silt, clay, organic muck
Proposed Use	Industrial
Timeframe	1970-74
Current Status	Under construction for proposed use

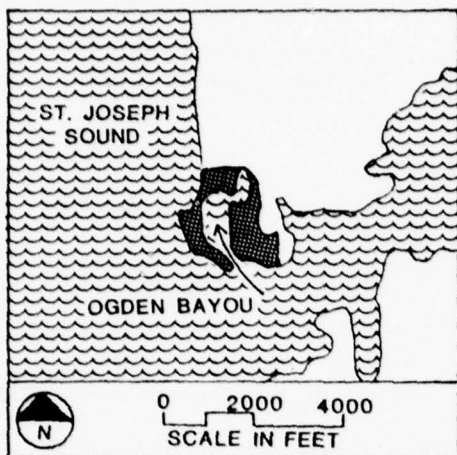


Case Study No. 2	
Cleveland Site 14 (88 acres)	
Cleveland, Ohio	
District	Buffalo
Sponsor	City of Cleveland
Waterway	Lake Erie
Material	Silt, clay, gravel
Proposed Use	Recreational
Timeframe	1963 to present
Current Status	Disposal to begin 1978

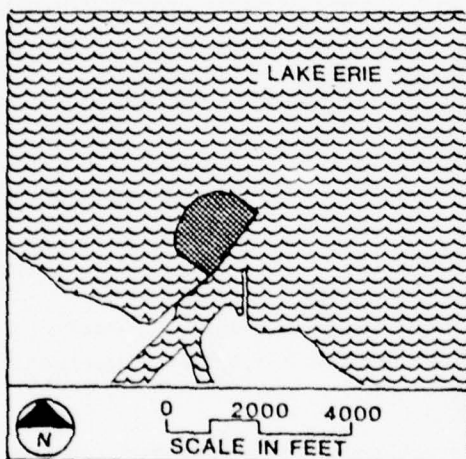


Case Study No. 3	
Bay Port (400 acres)	
Green Bay, Wisconsin	
District	Chicago
Sponsor	Brown County Harbor Commission
Waterway	Green Bay
Material	Silt, sand
Proposed Use	Industrial
Timeframe	1967 to present
Current Status	Disposal to end 1977

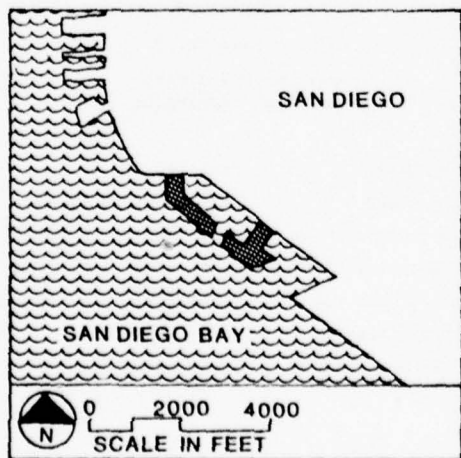
Figure 3. Capsule Summaries of Round 1 Case Study Sites



Case Study No. 4	
Crystal Beach (128 acres) Crystal Beach, Florida	
District	Jacksonville
Sponsor	West Coast Inland Navigation District
Waterway	St. Joseph Sound, Gulf of Mexico
Material	Silt, mud, clay, sand
Proposed Use	Unspecified
Timeframe	1971-75
Current Status	Project halted by court order (1975)

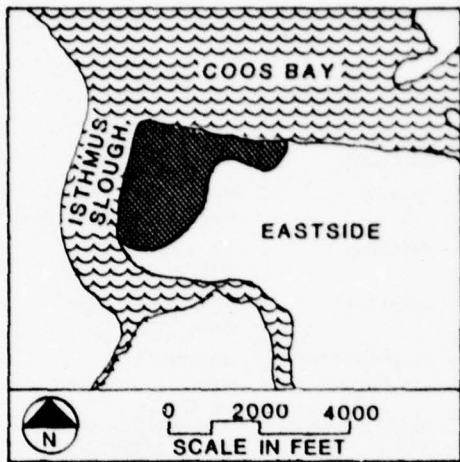


Case Study No. 5	
Huron Site 1 (63 acres) Huron, Ohio	
District	Buffalo
Sponsor	Huron Port Authority
Waterway	Lake Erie
Material	Silt, organic muck
Proposed Use	Recreational
Timeframe	1968 to present
Current Status	Disposal to end 1985

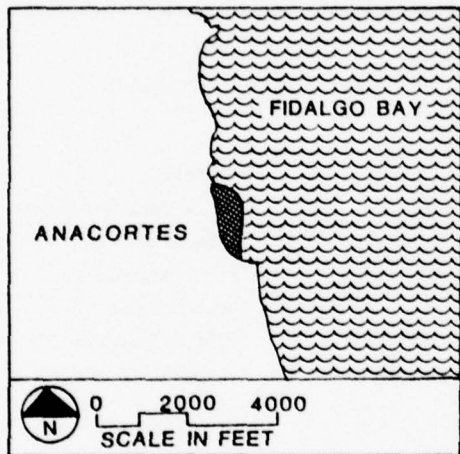


Case Study No. 6	
Fifth Avenue Marina (22 acres) San Diego, California	
District	Los Angeles
Sponsor	San Diego Unified Port District
Waterway	San Diego Bay
Material	Sand (clean)
Proposed Use	Recreational
Timeframe	1967 to present
Current Status	Under construction for proposed use

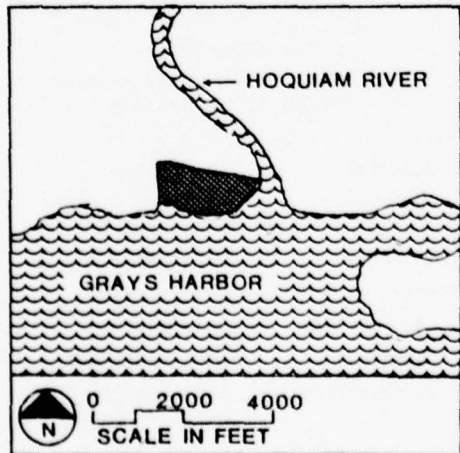
Figure 4. Capsule Summaries of Round 2 Case Study Sites



Case Study No. 7	
Eastside Site 14 (135 acres) Eastside, Oregon	
District	Portland
Sponsor	Port of Coos Bay
Waterway	Coos Bay
Material	Silt, clay, sand, organic muck
Proposed Use	Industrial
Timeframe	1966 to present
Current Status	Disposal to end 1985

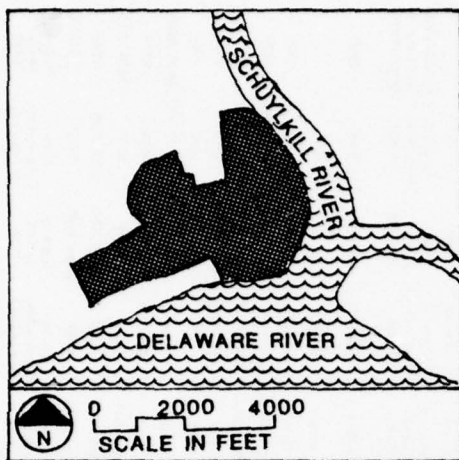


Case Study No. 8	
Anacortes (26 acres) Anacortes, Washington	
District	Seattle
Sponsor	City of Anacortes
Waterway	Fidalgo Bay
Material	Clay, silt
Proposed Use	Industrial
Timeframe	1964 to present
Current Status	Under construction for proposed use

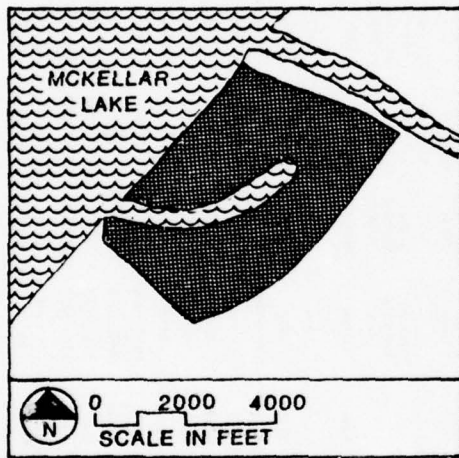


Case Study No. 9	
Hoquiam (45 acres) Hoquiam, Washington	
District	Seattle
Sponsor	Port of Grays Harbor
Waterway	Grays Harbor
Material	Sand, silt
Proposed Use	Industrial
Timeframe	1974 to present
Current Status	Disposal to end 1977

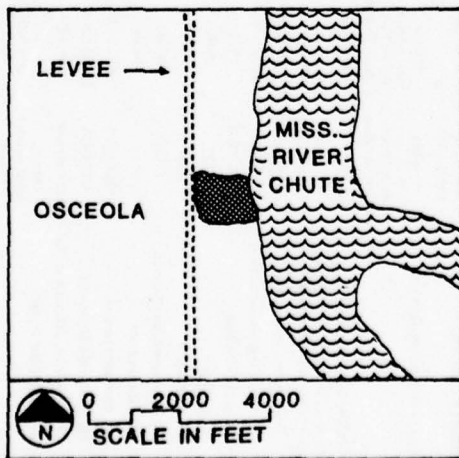
Figure 5. Capsule Summaries of Round 3 Case Study Sites



Case Study No. 10	
Fort Mifflin (298 acres)	
Philadelphia, Pennsylvania	
District	Philadelphia
Sponsor	City of Philadelphia
Waterway	Delaware River
Material	Silt, organic muck
Proposed Use	Industrial (city) Recreational (Corps)
Timeframe	1970 to present
Current Status	Active disposal area (end date unspecified)



Case Study No. 11	
Rivergate (425 acres)	
Memphis, Tennessee	
District	Memphis
Sponsor	Memphis and Shelby County Port Commission
Waterway	McKellar Lake (Mississippi River chute)
Material	Silt, clay, sand
Proposed Use	Industrial
Timeframe	1968 to present
Current Status	Disposal to end 1978



Case Study No. 12	
Osceola (40 acres)	
Osceola, Arkansas	
District	Memphis
Sponsor	Osceola Port Authority
Waterway	Mississippi River
Material	Sand, gravel, silt
Proposed Use	Industrial
Timeframe	1966 to present
Current Status	Under construction for proposed use

Figure 6. Capsule Summaries of Round 4 Case Study Sites

Table 8
Summary Characterization of Case Study Projects

Case Study Number Site Name Waterway Corps District Site (acres) Disposal History 1. unconfined 2. confined Project Sponsor Site Owner Proposed Site User Site Zoning Adjacent Land Uses Proposed Land Use Concept Site/Use Compatibility 1 Project Events Timetable 1. design authorized 2. disposal site selection 3. productive use planning 4. public hearings 5. draft EIS 6. final EIS 7. state permit/certification 8. federal permit 9. dike construction 10. dredging and disposal 11. productive use construction Current Status of Project	EAST COAST			GULF COAST			MISSISSIPPI RIVER			GREAT LAKES			WEST COAST		
	10	4	11	12	2	3	5	6	7	8	9				
Blount Island	Fort Mifflin	Crystal Beach	Rivergate	Ozocola	Cleveland Site 14	Bay Port	Huron Site 1	Fifth Ave. Marina	Eastside Site 14	Anacortes	Hogquam				
St. Johns River	Delaware River	St. Joseph Sound	McKellar Lake	Mississippi River	Lake Erie	Green Bay	Lake Erie	San Diego Bay	Coos Bay	Fidalgo Bay	Grays Harbor				
Jacksonville 900*	Philadelphia 298	Jacksonville 128	Memphis 425	Memphis 40	Buffalo 88	Chicago 400	Buffalo 63	Los Angeles 22	Portland 135	Seattle 26	Seattle 45				
From 1920	From 1836	None	None	None	From 1968**	None	None	None	From 1937	None	1963 1965				
From 1968	From 1966	None	From 1958	None	None	None	None	None	None	None	None				
Jacksonville Port Authority	City of Philadelphia	W. Coast Inland Navig. Dist.	Memphis and Shelby Co. Port Comm.	Ozocola Authority	City of Cleveland	Brown County	Huron Port Authority	San Diego Port District	City of Coos Bay	City of Anacortes	Port of Grays Harbor				
Jacksonville Port Auth.	Corps of Engineers	Island in the Sun, Ltd.	Belz Enterprises	City of Ozocola Industry	City of Cleveland Public at Large	City of Green Bay Port-Related Industry	State of Ohio Public at Large	State of California Public at Large	City of Eastside Related Industry	City of Anacortes Pacific & Being Sea Food Co., Publishers	Port of Grays Harbor Kaiser Steel Corp.				
Offshore Power Systems, Inc.	Industry or Public at Large 1	Island in the Sun, Ltd.	Port-Related Industry	Port-Related Industry	Public at Large	Port-Related Industry	Public at Large	Public at Large	Related Industry	City of Anacortes Pacific & Being Sea Food Co., Publishers	Port of Grays Harbor Kaiser Steel Corp.				
Heavy Industrial	Industrial	Residential	Heavy Industrial	Industrial	Recreational	Industrial	None	None	Industrial Residential	Industrial	Industrial				
Industrial	Industrial	Residential	Industrial	Industrial	Industrial	Industrial	None	None	Residential	Industrial	Industrial				
Residential	Industrial	Open	Open	Open	Residential	Industrial	Open	Recreational Commercial	Open	Industrial	Industrial				
Floating Nuclear Power Plant Manufacturing	Marine Industrial or Public Park & Open Space 1	Unknown 1 1	Water Related Industrial Park	Port Transshipment Area	Multi-use Public Park	Light and Heavy Industry are Desired	Multi-use Public Park	Public Park and Marina	General Marine Industrial	Seafood Processing, Sawmill	Offshore Oil and Gas Rig Manufacturing				
High	High/Low 1	Low	High	Medium	Medium	High	Medium	High	Medium	High	High				
1970	1836	1945	1946	1971	1970	1962	1970	1968	1970	1975	1975				
1968 1972	1968 1974 1 1	1972	1958	1966	1973	1966	1968	1962	1972 1976	1964	1974				
1971 1972	1973 present	1972 1974	1970 present	1966 present	1973 present	1962 present	1972 present	1967 1974	1966 present	1961 1975	1975				
1971, 1973	1975	1974	None	None	1973, 74, 75	1967, 74, 76	1969, 1972	1960, 67, 73	1972, 74, 75	1966, 70, 72	1976				
1972	1975	None	None	1970	1975	1975	1972	1974	1970, 1975	1973	1976				
1973	1975	None	None	1971	1975	1976	1973	1975	1970, 75, 76	1974	1976				
1972	None	None	1974	None	None	None	None	None	None	None	1971, 72, 73				
1973	None	None	1974, 1975	1974	1971 1/2	None	None	None	None	1971	1976				
1968-1972	1966, 1976	None	1958, 1975	1973 1974	1976	1966	1974 1975	1976	1974	1973	1976 1977				
1973 1974	1966 present	None	1958 1978	1974	1978 1985	1967 1977	1975 1985	1976	1971 1985	1975 1976	1977				
1974 present	After 1985 1	None	After 1978	1975 present	After 1985	After 1977	After 1985	1977	After 1985	1977	1977 1/2				
Under Construction for Proposed Use	Active Disposal Area	Project Halting by Coast Order (1975)	Disposal to End Construction for Proposed Use	Under Construction for Proposed Use	Disposal to Begin 1978	Disposal in End 1977	Disposal in End 1985	Under Construction for Proposed Use	Disposal in End 1985	Under Construction for Proposed Use	Disposal in End 1977				

Notes to Table 8

- * Blount Island is a 1660-acre island. The proposed Offshore Power Systems, Inc. development plan involved about 900 acres on the eastern side, 500 of which had been diked and filled by the Jacksonville Port Authority during the period 1968-1972.
- ** The 88-acre Cleveland Site 14 is actually an extension to a city-owned demolition waste landfill created in 1968.
- † Two land use plans have been proposed for the Fort Mifflin site. The city would like to develop the site for marine industrial use in the near term (i.e., by 1985). The Corps would like to raise the dikes and use the site for disposal until the year 2000, after which the site would be developed as a public park and open space resource.
- †† No plans for eventual development of the Crystal Beach site were ever made public. The site owner was a real estate investment and development firm, and local residents feared the site would be developed in a manner inconsistent with the existing low-density residential community.
- ‡ Site/Use Compatibility: subjective assessment of the relationship between the proposed land use plan and the planning features of the site (e.g., available transportation systems, infrastructure, water frontage, size, etc.).
- ‡‡ The Philadelphia District's Long Range Disposal Study (1969) did not mention the existing Fort Mifflin site due to the controversy with the city over its use. In 1974, the Corps made public its plan to use the site for disposal until 2000.
- § In 1971, the city obtained a Federal permit for filling activities at the demolition waste landfill. This permit included the condition that the landfill be contained by a dike. Site 14 offered the city a chance to simultaneously contain the landfill and provide the Corps with a disposal site.
- §§ Kaiser Steel has held a series of 6-month lease options to occupy the Hoquiam site following completion of disposal operations. At this time, however, it is not certain that Kaiser will build on the site, which is smaller than optimal for the proposed use.

whether or not they were necessary. Similarly, projects of any type that were not clearly and consistently specified would invariably be delayed until the dredging details were provided.

27. The disposal areas of the 12 case studies can all be described using one or more of the following: (1) area of prior fill activity; (2) area of prior confined disposal; (3) active disposal facility; (4) new disposal facility; and/or (5) undeveloped waterfront tract. Eight of the 12 case studies (all except Nos. 1, 7, 10, and 11) involved new disposal facilities, two of which were proposed for areas of prior fill activity unrelated to dredging (Nos. 2 and 9). Overall, projects proposed for locations with a history of disposal were more easily implemented. However, the advantage was usually minor, with other project-specific details being greater determinants of acceptability. For new disposal facilities proposed for undeveloped waterfront tracts (Nos. 4, 9, and 12), contiguous development characteristics were very important in relation to project acceptability.

28. Disposal area ownership was not a particularly important consideration in any of the 12 case studies. The Corps of Engineers owned only the Fort Mifflin site of Case Study No. 10. In two instances (Nos. 4 and 11), the sites were owned by the proposed developer. In the remaining nine cases, the sites were owned either by the city, the port authority, or the State. Productive land use plans were proposed by the Corps of Engineers in two cases (Nos. 5 and 10), by the port authority in three cases (Nos. 6, 7, and 12), by a public planning agency in three cases (Nos. 2, 3, and 8), by the developer in one case (No. 11), and jointly by the port authority and the developer in two cases (Nos. 1 and 9). The developer in Case Study No. 4 did not make public a productive use plan.

29. Disposal planning in the 12 case studies was undertaken for one of three primary objectives: (1) solely to provide a disposal area; (2) to facilitate implementation of a productive land use plan; or (3) to extend the active life of an existing disposal facility. Only in Case Study No. 4 was disposal planning done solely to provide the Corps with a disposal facility (i.e., there appeared to be no effort to

coordinate the disposal facility design with an ultimate use concept). In 10 cases, disposal planning was conducted to provide the Corps with disposal capacity as well as to facilitate productive use plans. In one case (No. 10), a plan to extend the active life of an existing disposal facility was proposed.

30. In the 12 case studies, proposed productive land use plans were related to disposal plans in one of three ways: productive use plan (1) developed prior to disposal plan; (2) developed to assist disposal plan approval; (3) developed independently for active disposal area. In 8 of the 12 case studies (all except Nos. 2, 4, 5, and 10), the concepts or plans for productive land use were conceived prior to disposal plan formulation. In three cases (Nos. 2, 5, and 10), the proposed use plans were developed primarily to assist in getting disposal plans approved. In Case Study No. 4, of course, no productive use plan was proposed, at least publicly.

31. One additional planning scenario characteristic is of note. The review phases of the planning and review processes associated with the 12 case study projects were very similar. EIS's were prepared in all except two cases (Nos. 11 and 12). In four cases (Nos. 1, 8, 9, and 11), a State dredge and fill permit and/or water quality certification was obtained. These same four cases also involved a Federal dredge and fill permit. Public hearings were held as a matter of course in nine of the cases, not including Case Study No. 4, in which a public hearing was not held until considerable public and legal pressure was applied.

PART III: FINDINGS AND CONCLUSIONS

Overview

32. A primary output of the comparative analyses of the 12 case studies was the identification and evaluation of the following:

- a. Issues associated with disposal-productive use projects.
- b. Physical planning elements affecting disposal facility and productive land use planning.
- c. Land use planning principles that are most important for disposal site productive use planning.

These issues, physical planning elements, and land use planning principles are the findings of this study. Their implications for disposal-productive use projects are addressed in turn below. After the findings have been discussed, the important factors affecting disposal-productive project implementation are then presented as the conclusions of the study.

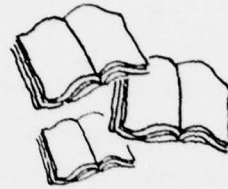
33. The implementation factors represent the full range of substantive and procedural considerations observed in the 12 case sample to be important to successful project implementation. As Figure 7 illustrates, the implementation factors were derived from: (1) comparative analyses of the 12 cases in terms of issues, physical planning elements, and features of proposed land use plans;* and (2) evaluation of the planning and implementation processes of the 12 cases. The results of the comparative analyses of (1) above are the findings of the study and the basis for many of the implementation factors. The results of the planning process evaluations of (2) above are not presented as findings;** rather, they are presented directly as implementation factors addressing the planning process. Several recommendations for improving the planning and implementation process for disposal-productive

* Case-specific examples of issues, physical planning elements, and features of proposed land use plans are presented in Appendix Q.

** Note that several planning process concerns were raised as issues in the 12 case studies and are, therefore, discussed as findings under issues.



On-site
interviews,
files
examination



EIS, hearing
transcript,
technical re-
port review

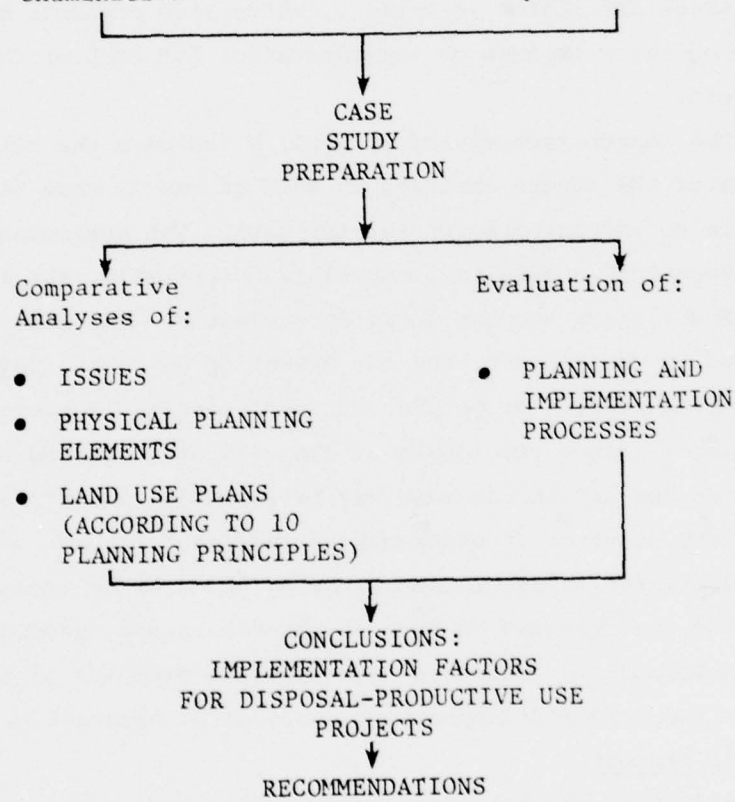


Figure 7. Basic Analytical Approach

use projects are made in Part IV of this report.

Findings: Issues Associated with Disposal-
Productive Use Projects

34. In the process of planning and reviewing disposal-productive use projects, participants raised issues falling within the following six general categories: (1) ENVIRONMENTAL; (2) TECHNICAL; (3) ECONOMIC AND FINANCIAL; (4) LEGAL; (5) INSTITUTIONAL; and (6) PLANNING AND IMPLEMENTATION. Under these categories are a total of 39 sub-categories representing a broad range of issues associated with confined site productive use. The issues are listed in Table 9, which also presents the staff assessments of their impacts on implementation for each of the 12 case study projects.

35. The impact assessments of Table 9 indicate the relative significance of the issues observed in each of the 12 case studies to be of importance to various project participants. The assessments are based on case-specific details concerning, for example, the reasons for an issue being raised, how the Corps or project sponsor was involved in or reacted to the concern, and the extent to which the issue led to delays in implementation or pointed out deficiencies in project planning and development. Since the impact assessments are case-specific, an issue rated as "major" in one case may be rated as "minor" in another case due to the presence of other more significant issues. The case-specific details for issues rated as having had a major impact on implementation are provided in each of the case study synopses given in Appendices A through L. Selected case-specific examples of issues are presented in the detailed comparative analyses of Appendix Q.

Environmental issues*

36. All environmental issues associated with the 12 case study projects are represented in the nine categories listed below:

* Issues relating to interpretation and fulfillment of environmental requirements are discussed under legal issues.

Table 9
Issues Associated with the 12 Case Studies: Impact Assessments

Issue Categories	East Coast		Gulf Coast		Mississippi River		Great Lakes			West Coast				Totals				
	Blount Island	Fort Mifflin	Crystal Beach	Huron Site 1	Cleveland Site 14	Bay Port	Huron Site 1	Osceola	Cleveland Site 14	Bay Port	Huron Site 1	Fitch Ave. Marina	Eastside Site 14	Anacortes	Hoquiam	Major	Minor	No Impact
1. Wetlands filling	■	□	■	—	—	—	—	—	—	—	—	—	—	—	—	5	2	5
2. Wildlife habitat disturbance	—	—	□	—	—	—	—	—	—	—	—	—	—	—	—	1	1	10
3. Aquatic habitat disturbance	□	—	□	—	—	—	—	—	—	—	—	—	—	—	—	2	4	6
4. Regional ecosystem alteration	■	—	—	—	■	—	—	—	—	—	—	—	—	—	—	3	2	7
5. Bay bottomland and/or surface area reduction	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	0	9
6. Dredging-disposal water quality impacts	□	—	■	—	□	—	—	—	—	—	—	—	—	—	—	3	5	4
7. Changes in flow patterns	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	2	7
8. Odor	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	10
9. Secondary impacts of the planned use	□	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	2	10
TECHNICAL																		
1. Dike stability	—	—	—	—	—	—	□	—	—	—	—	—	—	—	—	3	1	8
2. Site foundation conditions (for planned use)	□	■	□	—	—	—	—	—	—	—	—	—	—	—	—	3	3	6
3. Dredging technique	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	0	11
4. Disposal area capacity	□	■	□	—	—	—	—	—	—	—	—	—	—	—	—	4	3	5
5. Disposal area size and configuration	□	—	□	—	—	—	—	—	—	—	—	—	—	—	—	3	3	6
6. Disposal area operating characteristics	—	■	■	—	—	—	—	—	—	—	—	—	—	—	—	4	1	7
7. Utility relocation/connection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1	9

* Key: ■ major; □ minor; — no impact on implementation.

(Continued)

Table 9 (Continued)

Issue Categories	East Coast		Gulf Coast		Mississippi River		Great Lakes				West Coast				Totals	
	Blount Island	Fort Mifflin	Crystal Beach	Osceola	Rivergate	Osceola	Cleveland Site 14	Bay Port	Huron Site 1	Fifth Ave. Marina	Eastside Site 14	Anacortes	Houqum	Major	Minor	No Impact
ECONOMIC/FINANCIAL																
1. Economic or social benefits (costs) of the disposal-productive use project	■	■	□	—	—	—	—	—	—	—	—	—	—	■	□	—
2. Economic or social impacts of secondary development	□	—	—	—	—	—	—	—	—	—	—	—	—	0	2	10
3. Fees or taxes on dredged material	■	—	—	—	—	—	—	—	—	—	—	—	—	1	0	11
4. Utility relocation costs	—	—	—	—	—	■	□	□	□	—	—	—	—	1	3	8
5. Additional dredging or disposal costs	□	■	—	—	—	■	■	■	■	—	□	—	—	4	2	6
LEGAL																
1. Conformance with EIS requirements	—	—	■	—	—	—	—	—	—	—	—	—	■	2	0	10
2. Adequacy of environmental impact assessment or statement	■	■	□	—	—	—	—	—	—	—	—	—	■	3	1	8
3. Conformance with public hearing requirements	■	—	■	—	—	—	—	—	—	—	—	—	—	2	0	10
4. Site ownership authorities	□	—	—	—	—	—	□	□	□	—	—	—	—	1	4	7
5. State vs. Federal permit jurisdiction	—	—	—	—	—	■	—	—	—	—	—	—	—	1	0	11
INSTITUTIONAL																
1. Public participation during project planning	—	—	■	—	—	—	—	—	—	—	—	—	—	1	1	10
2. Responsiveness to public comments	—	—	■	—	—	—	□	—	□	—	—	—	—	1	2	9
3. Coordination with review/regulatory agencies	—	—	—	—	■	—	—	—	—	—	—	—	—	2	1	9

*Key: ■ major; □ minor; — no impact on implementation.

(Continued)

Table 9 (Concluded)

Issue Categories	East Coast		Gulf Mississippi River		Great Lakes			West Coast				Totals			
	Blount Island	Fort Mifflin	Crystal Beach	Rivergate	Osceola	Cleveland Site 14	Bay Port	Huron Site 1	Fifth Ave. Marina	Eastside	Site 14	Anacortes	Hogquam	Major	Minor
1. Dredging project design limits	■	■	■	■	■	■	■	■	■	■	■	■	■	4	1
2. Dredging project need	■	■	■	■	■	■	■	■	■	■	■	■	■	2	2
3. Long-range waterway/environmental planning	■	■	■	■	■	■	■	■	■	■	■	■	■	2	5
4. Evaluation of alternative disposal areas	■	■	■	■	■	■	■	■	■	■	■	■	■	5	2
5. Adequacy of environmental data base	■	■	■	■	■	■	■	■	■	■	■	■	■	1	4
6. Appropriateness of proposed use: public vs. private	■	■	■	■	■	■	■	■	■	■	■	■	■	2	4
7. Appropriateness of proposed use: water dependent	■	■	■	■	■	■	■	■	■	■	■	■	■	1	5
8. Proposed use compatibility with adjacent uses	■	■	■	■	■	■	■	■	■	■	■	■	■	2	2
9. Commitment to proposed land use plan	■	■	■	■	■	■	■	■	■	■	■	■	■	3	2
10. Responsibility for economic impact assessment	■	■	■	■	■	■	■	■	■	■	■	■	■	2	0

*Key: ■ major; □ minor; — no impact on implementation.

PLANNING/IMPLEMENTATION

1. Dredging project design limits
2. Dredging project need
3. Long-range waterway/environmental planning
4. Evaluation of alternative disposal areas
5. Adequacy of environmental data base
6. Appropriateness of proposed use: public vs. private
7. Appropriateness of proposed use: water dependent
8. Proposed use compatibility with adjacent uses
9. Commitment to proposed land use plan
10. Responsibility for economic impact assessment

- a. Wetlands filling.
- b. Wildlife habitat disturbance.
- c. Aquatic habitat disturbance.
- d. Regional ecosystem alteration.
- e. Bay bottomland and/or surface area reduction.
- f. Dredging-disposal water quality impacts.
- g. Changes in flow patterns.
- h. Odor.
- i. Secondary impacts of the planned use.

37. Wetlands filling. Not surprisingly, the most significant environmental concern addressed in the 12 case study projects was the impact of dredged material disposal and site development filling in wetland areas. The issue was raised in seven cases, five times having a major impact on the implementation process. Wetlands were not involved in the other five cases. The importance of the wetlands filling issue to disposal-productive use project planning and development is derived from several considerations. First and foremost is the perceived ecological value of wetland resources, particularly in areas where such resources have been historically diminished through first uncontrolled and then, more recently, controlled filling and construction projects. Wetland destruction to the eventual benefit of private industrial and commercial developers is quite commonly opposed and such opposition is always difficult to assuage.

38. Closely related to the general environmental momentum to preserve wetlands are the more scientific problems associated with questions of the adequacy of environmental impact assessments, of the biological contribution of proposed fill areas to the wider ecosystem, of long-term impacts of piecemeal wetland destruction, etc. It is safe to say that when wetlands are impacted, the design and analysis of disposal-productive use projects (in terms of engineering, environmental, and economic characteristics) must be complete and accurate. Additionally, when wetlands issues are raised, the resolution of them to the satisfaction of all participants can be expected to be difficult and time-consuming.

39. Another prime consideration is the mere fact that there is a multilayered regulatory and resource management system to be dealt with when wetland resources are endangered. This system spans local, State, and Federal jurisdictions responsible for permitting or approving dredging-disposal projects. Within this system there is much capability to evaluate the ecological significance of wetlands filling, with well-established precedents for approving only the most well-conceived and socioeconomically beneficial projects. In addition to the inter-governmental system, there are many highly organized and active environmental groups with considerable expertise available for reviewing ecological impacts and for opposing projects on environmental and economic grounds.

40. Habitat disturbances. Specific environmental concerns due to project-associated disturbances of wildlife (terrestrial) and aquatic habitats were noted in 7 of the 12 case studies, but in only three instances were the concerns significant. For wildlife habitat disturbances resulting from disposal facility construction, three considerations are important: (1) the magnitude of the disturbance (what percentage of the terrestrial ecosystem is impacted and to what degree?); (2) the species involved (are rare or endangered species impacted?); and (3) the impact of the disturbance on the human environment (is the area used for passive recreation? is it aesthetically valuable?). Except in unusual cases, wildlife habitat disturbances are not likely to be the basis of strong opposition to a project.

41. Aquatic habitat disturbances* were addressed as issues in 6 of the 12 case study projects, twice significantly. Project opposition based on aquatic habitat disturbances can be formidable. Aquatic disturbances that are most important to avoid, or at least minimize, during project planning, design, and construction are: (1) food chain disruptions (are critical benthic communities destroyed through either dredging or disposal?); (2) life cycle impacts (are near-shore spawning

* Note that dredging-disposal water quality impacts are covered in a separate environmental issue sub-category below.

areas or migration routes altered?); and (3) community balance shifts (will conditions favorable to less desirable organisms or species be created?). Issues based on aquatic habitat disturbances, both chemical and physical, can be quite difficult to resolve. It is not uncommon for there to be much disparity in professional assessments of the nature, magnitude, and importance of aquatic habitat disturbances resulting from dredging-disposal projects.

42. Regional ecosystem alteration. Issues relating to the impacts of disposal-productive use projects on the wider ecosystems involved were raised in five cases, three times being a major issue. Perhaps the most difficult issue of this type to resolve occurs when impact assessments are made on the basis of comparisons drawn between the relatively limited areas directly affected by the disposal project (e.g., an intertidal tract) and the overall ecosystem (e.g., an estuary). In such cases, regardless of the basis for comparison (e.g., wetland acreage lost vs. total wetland acreage), it is important to account for all development pressures on the overall ecosystem, including those indicated by long-term disposal plans, local or regional land use plans, and any likely to be induced by the proposed productive land use concept itself. A less troublesome type of regional ecosystem issue is derived from possible adverse impacts on migratory species. Typical examples are destruction of nesting areas for migrating waterfowl, or alteration of migration routes for anadromous fish.

43. Bay bottomland and/or surface area reduction. Concerns of this type were expressed in three cases, each time having a significant impact on project implementation. The amount of bay bottomland impacted by a disposal facility is, of course, determined by the size and shape of the facility. In bays and harbors that have been reduced in size over time through dredged material disposal and other shoreline filling activities, each additional increment of bottomland loss is significant and sure to be opposed. The bay bottomland issue can be avoided or resolved by siting disposal facilities in areas of limited benthic and nearshore biological productivity, by opting for smaller disposal facilities (a solution constrained by productive land use plans), and by

planning according to a long-range disposal plan.

44. Surface area reduction issues are similar to bay bottomland concerns in that encroachment of a limited, and often diminishing, resource is involved. Opposition to reductions in surface area is derived from navigation interests concerned about possible safety hazards or loss of typically limited protected harbor water area (i.e., shielded from severe wave action). Disposal facility siting decisions determine whether or not surface area loss will be an issue.

45. Dredging-disposal water quality impacts. The water quality impacts of dredging and disposal operations were at issue in eight case studies, three times as a major concern. Water quality impacts found to form the basis for project opposition were: (1) turbidity during dredging; (2) disturbance of deep substrate anaerobic conditions through dredging; (3) possible polluted discharges resulting from a combination of poor sediment quality and improper disposal facility design; (4) disposal facility overflow interception of a public water supply intake; (5) creation of slack water conditions resulting in degraded water quality; and (6) possible polluted discharges associated with a proposed productive land use. The evaluation of water quality impacts is typically a major part of Corps disposal-related planning activities and, although at times costly and time-consuming, issues based on water quality concerns are usually resolved to everyone's satisfaction.

46. Changes in flow patterns. In five of the case study projects, issues related to changes in existing water flow patterns were expressed, three times strongly enough to warrant Corps action in response. In one interesting case (No.2), the issue arose from the fact that the disposal facility design included extending an existing brook-end culvert through the site to a new terminus at the edge of the dike. Environmental groups felt that the culvert extension would aggravate upstream flooding problems of the brook. The issue was resolved through a Corps hydraulic survey, which identified inadequate upstream storm drainage capacity as the reason for flooding difficulty. A common flow pattern concern is that the presence of a containment structure will increase shoreline erosion. Other common concerns, expressed by

industries located adjacent to disposal facilities, are that wastewater assimilation and mixing characteristics will be altered and that the quality of water used for industrial purposes will be degraded. A more general flow pattern change issue, expressed in two cases, relates to reducing the tidal prism. For the most part, changes in flow patterns are not among the more serious environmental impacts of disposal-productive use projects.

47. Two other environmental issues were noted in the 12 case study sample. Potential odor problems during the active life of the disposal facility were a major issue in one case (No. 2). In general, in terms of disposal site productive use, odor issues are less significant than other types of concerns. However, when the dredged material is highly organic or contaminated with certain industrial wastes (e.g., paper processing wastes), odor can be the basis for strong opposition to a project.

48. In two cases (Nos. 1 and 9), issues of secondary environmental impacts associated with the planned productive land use were raised, both times being a minor issue. However, there is a clear implication that, in cases where productive land use and disposal facility planning are conducted simultaneously, the indirect and long-term environmental impacts could form the basis for strong project opposition. Examples of such indirect impacts are those related to any "spin-off" development generated by the productive land use, or those caused by the productive land use itself (e.g., increased shipping activity in the waters near a new marine terminal facility).

Technical issues

49. Technical issues raised in conjunction with the 12 case study projects were found to relate to the following areas of concern:

- a. Dike stability.
- b. Site foundation conditions (for planned use).
- c. Dredging technique.
- d. Disposal area capacity.
- e. Disposal area size and configuration.
- f. Disposal area operating characteristics.

g. Utility relocation and/or connection.

50. Dike stability. This issue was noted in 4 of the 12 case studies, three times as a major issue. In two instances, prior retaining structure failures were brought up during disposal plan formulation. The Corps assured the objectors in one case (No. 7) that more suitable diking material was being used. In the other case (No. 11), the Corps supervised dike repair operations conducted by the site's owner. Another dike stability issue resulting in project delays arose in Case Study No. 8 when an environmental review agency suggested a particular dike design that was different from the Corps' proposed design. Dike stability is of concern in all confined disposal situations, but proper engineering and construction will eliminate problems. Dike stability issues have no special significance in disposal-productive use projects.

51. Site foundation conditions (for planned use). Disposal site foundation conditions, viewed from a land use planning standpoint, were at issue in 6 of the 12 case study projects, three times in a major way. During early site planning for disposal-productive use projects, it is very important to determine the structural foundation requirements of potential site developers. Foundation costs can be a major component of the cost of developing a dredged material disposal site for productive use, particularly when the use is heavy industry. Foundation conditions can depend as much on pre-disposal sub-surface conditions as on dredged material structural properties. Disposal facility designs that utilize state-of-the-art dewatering techniques, or that involve selective material placement geared to eventual bearing capacity requirements, can help overcome or avoid foundation deficiencies. When the developer is known during disposal planning, the opportunity to coordinate disposal design and operation with the productive land use plan should be taken advantage of.

52. Dredging technique. The dredging technique to be used in conjunction with the disposal-productive use project was an issue in only one case study (No. 8). The issue arose because, using a hydraulic dredge, the disposal site was filled to capacity with one-third of the planned dredging still to be accomplished. The bulking factor of the

dredged material had been miscalculated, and a clamshell dredge was used to complete the project. In general, the type of dredge to be used is important only insofar as disposal operations are coordinated with productive use plans (e.g., selective dredging to obtain sandy material, or selective material placement within the disposal area).

53. Disposal area capacity. The capacity of the disposal facility was observed to be an issue in seven case studies, in four instances as a major point of concern. From the Corps' perspective, the disposal capacity of sites planned for productive development is important in two main ways. First, as the elevation of fill material approaches developable levels, the site's attractiveness for productive use increases. If these developable levels are lower than the planned final fill elevation, and if development pressures are intense enough, the remaining disposal capacity could be lost. This is particularly relevant for projects in which disposal is planned to take place over several years. Second, the proposed productive land use concept itself can determine site capacity, since certain land use concepts are more land-intensive than others. Coordinated disposal facility-productive land use planning can enable both disposal and productive use objectives to be met.

54. From the perspective of potential site users, disposal capacity is also important in two main ways. On one hand, the feasibility of proposed productive land use plans can be dependent upon the ability to fill the site to capacity within a specified time period. On the other hand, a site designed for high capacity (i.e., a high retaining structure) may be difficult to develop productively if foundation requirements become too costly to meet as a result of the depth of fill. Again, coordinated disposal-productive use planning can eliminate capacity as an issue of overwhelming importance.

55. Disposal area size and configuration. Closely related to, but in many cases different from capacity issues, are those issues having to do with the size and configuration of disposal facilities. Issues of this type were addressed in six of the case study projects, three times as major concerns. In one instance (No. 2), the initial site configuration placed a portion of the facility across the boundary

between the city sponsoring the project and an adjacent village. As a result the village became a "local interest" in the project, whose approval was required according to Corps policy. When the village's approval could not be obtained, the site had to be redesigned so as not to encroach the village limits.

56. Of more relevance in terms of disposal site productive use is the relationship between site size and configuration and the proposed use. Ideally, whenever possible, the size and configuration of the disposal facility should be designed for maximum compatibility with the needs of prospective users. Any additional (i.e., above least-cost design) design and construction costs associated with achieving such compatibility, however, must be borne either by the project sponsor or the proposed developer. In one of the case studies (No. 3), facility designs more suited to the intended public recreational use were rejected because the project sponsor was unwilling to pay the added costs. This problem is not likely to arise when a private developer is involved.

57. Disposal area operating characteristics. Issues concerning the operating features of the disposal facility were raised in five of the case study projects, four times with a major impact on project implementation. In one case (No. 4), the poor operating features of the proposed facility were a source of very strong opposition. This occurred because a small, man-made lake, used by local residents for fishing and passive recreation, was proposed as a settling pond. Except as a potential source of delay, issues of this type have little special significance for disposal-productive use projects.

58. Utility relocation/connection. The last technical issue, noted in 3 of the 12 case study projects, was related to the relocation or connection of utilities in conjunction with disposal facility construction. Concerns of this type are not particularly significant overall. However, it should be pointed out that coincident disposal-productive use planning affords an opportunity to install needed utilities during site construction. Installing utilities such as storm drainage, gas, etc., is much more costly once the site has been filled.

Economic and financial issues

59. Five types of issues appropriately grouped in the category of economic and financial concerns were observed in the 12 case studies:

- a. Economic or social benefits (costs) of the disposal-productive use project.
- b. Economic or social impacts of secondary development.
- c. Fees or taxes on dredged material.
- d. Utility relocation costs.
- e. Additional dredging or disposal costs.

60. Economic or social benefits (costs) of the disposal-productive use project. Issues involving the socioeconomic costs and benefits of proposed projects were raised in eight cases, twice with a major impact on project implementation. The ability, on the part of project planners, to deal with issues of this type is extremely important for several reasons. First, community acceptance of a project is more easily obtained when the project can be shown to assist in fulfilling a community need. For example, where unemployment is high, a job-producing land use concept will likely acquire political and business leader support. Similarly, a deficit in public recreational facilities can be closed by a public park concept.

61. Second, economic or social benefits can be very influential in overcoming environmental opposition and in obtaining State and local permits. Third, the economic benefits of industrial land uses can offset high engineering and construction costs, including those resulting from poor site foundation characteristics. Fourth, during initial productive use planning, trade-offs must sometimes be made between private benefits and public costs of proposed non-public land uses (e.g., should a waterfront tract be developed for private use at the expense of a lost opportunity to increase the public recreational resource base?).

62. Detailed economic impact analyses are not necessarily the responsibility of the Corps. This fact was demonstrated in one case (No. 1) in which the project EIS was challenged in court, partly because the proposed developer had prepared the only economic impact analysis of the project. Independent of who prepares the analysis, an accurate

accounting of economic and social benefits is clearly an important part of disposal-productive use project planning and review.

63. Economic or social impacts of secondary development. Concern over secondary socioeconomic impacts was expressed in only two cases, both times with minor impact on project implementation. However, the fact that such issues can arise points out the importance of a thorough socioeconomic impact analysis, including consideration of secondary effects such as: (1) spin-off industrial growth; (2) accelerated urban encroachment on undeveloped areas; (3) increased demand for public goods and services (i.e., fire and public protection, roads, schools, etc.); and (4) land value impacts on nearby properties.

64. Fees or taxes on dredged material. The issue of a proposed site developer or project sponsor paying a fee or tax on dredged material was raised in only one case (No. 1). A State dredge and fill permit was granted with the condition that any State-owned material sold to the proposed developer (a private corporation) would be subject to a lien of \$1 per cubic yard in favor of the State. Such fees or taxes do not appear to present a serious constraint to the productive development of confined disposal sites.

65. Two other financial issues were documented in the 12 case studies, both relating to liability for project-associated costs. In four of the case study projects, the issue of who should pay for utility relocation costs was raised. Such costs are typically the responsibility of the project sponsor, although a proposed developer may assume them as a site development cost. In any case, utility relocation costs are not a critical problem. The question of liability for any additional dredging or disposal costs associated with disposal site productive use was addressed in six of the case study projects. In four cases the issue was rated as major. In two instances (Nos. 2 and 5) the issue was manifested early in disposal planning when preliminary facility designs more suited to the proposed productive use were developed. The project sponsors in each case rejected the designs since any associated costs over and above a least-cost design would have to have been paid by them. A more typical situation is that in which Corps disposal

plans are altered to accommodate a proposed productive use plan, with the sponsor or developer assuming the added costs.

Legal issues

66. The legal issues found to be associated with disposal-productive use projects are covered in the five legal sub-categories listed below:

- a. Conformance with EIS requirements.
- b. Adequacy of environmental impact assessment or statement.
- c. Conformance with public hearing requirements.
- d. Site ownership authorities.
- e. State vs. Federal permit jurisdiction.

67. Conformance with EIS requirements. Disagreement as to whether or not an EIS was required under the provisions of NEPA had a major impact on the implementation of two case study projects. In one case (No. 4), the District Engineer had decided early in project planning that an EIS was not necessary. The District Engineer's decision was based on the opinion that the project (1) was not a major Federal action, and (2) would not have significant adverse impact on the human environment. In subsequent court proceedings challenging that decision, an injunction against the project was granted. The accompanying conclusions of law and findings of fact noted that the proposed project was a major Federal action, involving, as it did, a cost in excess of \$1 million, and that there were significant adverse impacts on the human environment. In another case (No. 9), the District Engineer decided that an EIS was needed, but only after spending 5 months negotiating with environmental review agencies to resolve objections to the project. The project sponsor in this case was opposed to the further delays associated with the EIS preparation and review process. However, since all major environmental issues had already been resolved, a final EIS was prepared in only 6 months.

68. In terms of project implementation schedules, the EIS/no EIS decision is significant in two ways. First, from a legal standpoint, it is much easier to overturn a "no EIS" decision than to prove that

an EIS does not fulfill the requirements of NEPA. Also, given their multiobjective nature, virtually all disposal-productive use projects can be shown to have significant impacts on the human environment. Thus, preparation of an EIS for such projects will not only help avoid subsequent legal proceedings, but will also, more importantly, afford the project the benefits of the EIS review process. ~~Second, the case~~ study experiences show that, while a late decision to prepare an EIS may be opposed by the project sponsor and/or developer, the timing of the decision is less important than the manner in which the environmental issues involved are approached. Serious project delays can be expected while resolving objections that are not known until after a draft EIS has been prepared.

69. Adequacy of environmental impact assessment or statement.

In four case study projects, the adequacy of an environmental assessment (EA) or an EIS was challenged, three times as a major issue. With the exception of small projects located in rural areas, it is likely that a cursory EA of a disposal-productive use project will not be sufficient. In two cases the completeness of an EA was challenged, once (No. 9) resulting in the preparation of a full-scale EIS and once (No. 4) culminating in court action contesting the Corps' decision that an EIS was not necessary.

70. The adequacy of an EIS was challenged in two instances (No. 1 in court proceedings and No. 10 in interagency discussions), both on the grounds that the EIS failed to fulfill NEPA requirements in evaluating economic and environmental impacts and in studying alternative sites. In each instance, the EIS was prepared by the Corps with little input from outside agencies and the public, leading to serious implementation difficulties and strained interagency relationships. In the one case involving court action, the challenged EIS was found to be adequate for the purposes of NEPA.

71. Conformance with public hearing requirements. In two of the case studies, major issues arose as a result of Corps decisions not to hold public hearings. In one case (No. 1), the District Engineer decided that public hearings held by the State (as part of the State

dredge and fill permit process) were sufficient. In court action subsequently initiated by an environmental group, a temporary restraining order against a Federal dredge and fill permit was granted by the court, primarily because no Federal public hearing had been held as required under Section 404 of Public Law (PL) 92-500. The situation in another case (No. 4) was quite similar, although State public hearings were not held since a State permit was not required. In this instance, local residents opposed to the project obtained a temporary restraining order, which was granted in part because their comments had not been solicited in a public forum. The implication of these experiences is clear: public hearings should be held as a matter of course for multi-objective Corps projects such as disposal-productive use projects.

72. Site ownership authorities. Issues of this type, which relate to the authority of a public agency to acquire land or to sell/lease land to private individuals or corporations, were raised in five cases. In one instance (No. 12), the issue had a significant impact on the project because the project sponsor did not own or have rights to the land proposed as a disposal-productive use site. Federal economic development funds needed to finance the project were held up while agreements guaranteeing the availability of the land were secured. In two cases (Nos. 2 and 5), the productive land use concepts proposed for the disposal sites were restricted to public uses under a State law applicable to publicly-owned land. Finally, in two cases (Nos. 1 and 6) in which the disposal sites were owned by port authorities, their authority to sell or lease the land to private developers was unsuccessfully challenged. Clearly, disposal-productive use project planning should begin with a clear understanding of any constraints related to site ownership.

73. State vs. Federal permit jurisdiction. Surprisingly enough, this issue was raised in only one case (No. 6). The issue arose because a State regulatory agency claimed that the project sponsor had to obtain a permit for the project since the proposed productive use would serve a non-Federal function. The Corps and the project sponsor argued that the project was part of a Federal navigation job and, therefore, not subject

to State permit requirements.

Institutional issues*

74. Three institutional issues were raised by participants in the 12 case study projects:

- a. Public participation during project planning.
- b. Responsiveness to public comments.
- c. Coordination with review/regulatory agencies.

These issues reflect specific planning process deficiencies that were actually addressed during the planning and implementation processes of several of the case study projects. A number of additional planning process deficiencies that were not raised as issues are also identified in this report. All process deficiencies are reflected in the implementation factors presented later in Part III as the study conclusions.

75. Public participation during project planning. Criticism of the level of public involvement in project planning was voiced in 2 of the 12 case study projects, once as a major issue. In that case (No. 4), project planning proceeded for over 2 years without any public involvement whatsoever. The proposed disposal site was adjacent to a quiet, low-density community, whose residents had long ago formed a community association. Since public involvement had been left up to the project sponsor in this case, and since the sponsor did not discuss the project with the adjacent residents, the Corps' disposal planning activities did not take into account the existence of an active community association. Only 3 years earlier this association had strongly opposed a dredge and fill project proposed for the same tract by a previous owner. When the residents finally became aware of the advanced nature of the planning process, they began an intensive campaign to obtain the details of the proposed project so that their opinions could be voiced. Eventually they learned that the tract proposed as the disposal site had been systematically purchased by a real estate investment and development

* Institutional issues are those related to participant responsibilities, roles, and interactions in disposal-productive use project planning and development.

firm. Since no productive land use plan had been publicly proposed for the site, the residents became fearful that a land use inconsistent with their low-density community was envisioned. Strongly resentful of what they perceived to be closed-door planning by the Corps, the local residents retained counsel and were eventually successful in halting the project.

76. For disposal-productive use projects, a high level of public involvement (especially adjacent residents) is essential for a number of reasons. First, all individuals and groups having an interest in a proposed project represent potential sources of opposition. To minimize delays, they should be identified early and involved in project planning from the start (during site selection, if possible). Second, failure to inform local residents of the proposed productive land use will likely lead to speculation that an undesirable use will result. Third, a deficient level of early public involvement can lead to an atmosphere of distrust, making the resolution of subsequently identified objections difficult, thereby resulting in unnecessary delays. Finally, efficient allocation of Corps disposal planning staff resources requires that management decisions be made with all potential difficulties known. It should not be assumed that any and all opposition encountered will be overcome.

77. Responsiveness to public comments. Complaints about the Corps' responsiveness to the concerns of the public were made in three cases, once as a major issue (No. 4). In that case, the local residents felt that both the Corps and the project sponsor were arrogant and indifferent to their concerns. In retrospective interviews, Corps personnel indicated that the residents were (and still are) perceived as a group opposed to any and all development in the vicinity of their homes. In contrast, the residents stated, during personal interviews, that they were not (and still are not) categorically opposed to development, provided that an environmentally sound plan involving a land use compatible with the existing community character was proposed. The extreme lack of coordination between the Corps/sponsor and the local residents in this particular case was unusual. In the remaining

11 cases, with the exception of two very minor instances, the Corps' responsiveness was not criticized.

78. Coordination with review/regulatory agencies. In 3 of the 12 case study projects, complaints about the Corps' coordination efforts with review/regulatory agencies were voiced. In one case (No. 7), representatives of two State resource management agencies expressed dismay at not having been involved in early planning phases. However, interagency coordination during subsequent plan review and revision was praised highly overall. In another case (No. 11), the cognizant planning agency, although supportive of the project, was concerned over not having been consulted as initial productive land use planning activities took place. Although no significant project delays were attributable to insufficient coordination with review/regulatory agencies, some interagency relationships were strained. For the most part, though, the Corps' interagency coordination efforts were highly praised. One obvious area of needed improvement was identified: include land use planning agencies in the interagency review process as a matter of course for productive use projects. Current Corps policy is to leave virtually all responsibilities related to land use planning up to the project sponsor or developer. As discussed in the recommendations in Part IV, more direct Corps involvement in productive land use planning for disposal facilities is warranted.

Planning and implementation issues

79. In the 12 case studies, 10 types of issues concerning the overall process of planning and implementing disposal-productive use projects were documented:

- a. Dredging project design limits.
- b. Dredging project need.
- c. Long-range waterway and/or environmental planning.
- d. Evaluation of alternative disposal areas.
- e. Adequacy of environmental data base.
- f. Appropriateness of proposed use: public vs. private.
- g. Appropriateness of proposed use: water-dependent.
- h. Proposed use compatibility with adjacent uses.

- i. Commitment to proposed land use plan.
- j. Responsibility for economic impact assessment.

80. Dredging project design limits. Issues associated with the specification of the dredging operation itself were addressed in five case study projects, four times with a major impact on implementation. Projects were delayed for two reasons related to dredging program design: (1) failure to reach agreement on the desired depth and length of a new channel to be dredged; and (2) opposition to proposed maintenance dredging below authorized depths. Apart from the obvious problems of planning an ill-defined dredging-disposal project, the above situations have two primary implications for productive use projects. First, unless deep draft channel dimensions are specified, it is unlikely that firm commitments to implement proposed water-dependent land use concepts (particularly industrial) can be obtained. Second, and less significant, is the case where, for dredging projects that may not yield sufficient quantities of fill material, a developer requests that dredging below authorized depths be performed to obtain the needed material. Opposition to such advanced dredging is common, particularly when a project is reviewed and approved without consideration of the need for advanced dredging.

81. Dredging project need. The need for the proposed dredging was challenged in four cases, twice as a major objection to the project. For productive land use projects, the need for dredging may be the basis for opposition if the dredging is to be done solely to accommodate a proposed development plan, especially when the developer is a private entity. Corps dredging should be clearly demonstrated as being in the public interest.

82. Long-range waterway and/or environmental planning. Issues addressing the relationship between the proposed project and longer range waterway development/environmental protection planning were documented in seven cases. In two instances (Case Nos. 7 and 9) the issues were major, leading to Corps involvement in estuary-wide development planning. Basically, issues of this nature reflect the need to conduct disposal-productive use planning within the context of broader

development, land use, and environmental initiatives. This is particularly important if the proposed productive land use project will significantly affect such initiatives through, for example, expansion of port-industrial activity, generation of spin-off development, or disruption of ecological resources.

83. Evaluation of alternative disposal areas. Not surprisingly, this issue was brought up in seven of the case study projects, five times with a major impact on implementation. The manner in which the evaluation of alternative disposal areas was raised as an issue was quite different in each case. Three implications for disposal-productive use projects in general were identified. First, opposition to a project can be very serious if, in order to accommodate a productive land use plan, the disposal site is selected over a more environmentally acceptable alternative. Second, for projects involving construction of a new channel, review agencies may desire to simultaneously evaluate both the new work and subsequent maintenance disposal plans. Third, for older, active disposal areas that become attractive for development purposes, project sponsors (or developers) may be willing to assume the incremental costs of disposing at an alternative site in order to productively develop the existing site.

84. Adequacy of environmental data base. Questions concerning the availability of sufficient environmental data to allow project environmental impacts to be properly evaluated were raised in five cases. Only in Case No. 6 was the issue significant, resulting in an implementation delay while the Corps, at the request of the EPA, conducted field work to establish a data base. In view of the time and expense involved in developing reliable environmental data, objections of this type appear to have the potential for seriously disrupting implementation schedules. However, if an environmental monitoring program that transcends a specific project is at issue, project implementation need not be delayed. An agreement to participate in such a large-scale program will likely resolve the issue. On the other hand, if a project-specific environmental impact cannot be evaluated for lack of data, then the project could easily be delayed while the data are

collected. The delay can be minimized in such instances, or even avoided, by early identification of project opposition based on a deficient data base.

85. Appropriateness of proposed use. Two types of issues addressing the appropriateness of the proposed productive land use plan were documented in the 12 case studies. In six cases, the issue of public vs. private land use was raised, twice as a major concern. The most serious instance was in Case Study No. 6, in which the FWS refused to approve the project until a productive land use concept that was for the public benefit was proposed and guaranteed. In two cases (Nos. 2 and 5), the sites were (and are) publicly-owned and, therefore, restricted to public land uses by a State law. In one case (No. 9), the disposal area, although zoned industrial, was the last remaining waterfront tract in the city available for public, water-oriented recreational development, a fact that fueled minor opposition to the proposed industrial development. The issue of public vs. private land use clearly cannot be ignored in disposal-productive use projects involving a publicly-owned tract. Two situations are particularly volatile: (1) environmental agency and/or group opposition to private industrial or commercial land use concepts; and (2) conflicts between the proposed use and community land use plans and/or land use needs.

86. The very similar issue of whether or not the proposed land use should be water-dependent was raised in six cases, once as a major issue. In that case (No. 9), a land use concept that was not water-dependent was initially proposed. However, opposition from environmental agencies was unanimous, their position being that, if the site was to be filled and developed at all, a water-dependent use was essential. In general, especially for disposal-productive use projects in areas of limited waterfront land markets, it makes good planning sense to fully utilize the available water access in the productive land use plan.

87. Proposed use compatibility with adjacent uses. From a land use planning standpoint, land use compatibility is certainly an important consideration. In 4 of the 12 case study projects, the

compatibility of the proposed use with adjacent uses was questioned, twice as a major issue. The experiences documented in the case studies point out the simple fact that, when compatible land uses are proposed, project opposition derived from competing or conflicting land uses (e.g., concern over noise or odor impacts) is decreased. In fact, a productive land use plan that is compatible with existing land uses is likely to meet with the approval of adjacent landowners as well as the cognizant land use planning agencies.

88. Commitment to proposed land use plan. Issues addressing the degree of commitment to disposal site productive land use plans were raised in 5 of the 12 case studies, three times as a major issue. Commitment to the proposed productive land use plan is important for two primary reasons. First, environmental agency review and approval can be hastened if there is no doubt that the completed site will be developed as proposed. Second, disposal facility design and construction can be conducted so as to fully reflect the physical requirements of the proposed use. Of course, in cases where the disposal life of the facility is long-term, a specific productive land use concept may not be proposed and, therefore, the commitment can simply be to a type of land use (e.g., a public park). Basically, the Corps of Engineers should not be placed in the position of participating in a project that is proposed for one type of land use, and then is developed for another.

89. Responsibility for economic impact assessment. In two instances, serious project objections based on this issue were noted. In one case (No. 1), an environmental group protested that the Corps improperly included in the project EIS an economic impact analysis prepared by a consultant to the proposed developer. In subsequent court action, it was ruled that the Corps was not negligent in not conducting its own analysis. Although not necessarily the Corps' responsibility, it is nevertheless true that a detailed accounting of disposal-productive use project socioeconomic benefits can be very persuasive in obtaining public and official approval.

Findings: Physical Planning Elements Affecting Disposal
Facility and Productive Land Use Planning

90. Table 10 identifies, on the basis of the many physical planning elements associated with the 12 case study projects, those elements found to play important roles in determining implementation success. These physical planning elements are important agenda items for early planning meetings for disposal and disposal-productive use projects. In view of the diverse locational and physical characteristics of the 12 sites evaluated in this study, the elements listed in Table 10 most likely represent the full range of important physical planning considerations for disposal site productive land use projects.

91. The assessments of Table 10 indicate the influence (i.e., enhanced or constrained) that each physical element was judged to have had on project implementation in the 12 case studies. The influence assessments were made from two perspectives: (1) disposal facility planning; and (2) productive land use planning. For example, the capacity of a disposal site is a key consideration in planning to satisfy disposal requirements, but it is often of secondary importance in planning for productive land uses. Conversely, vehicular circulation/traffic generation are critical elements during productive land use planning, but are of little concern during disposal facility planning.

92. The elements listed in Table 10, although grouped into two separate categories, should be used simultaneously as a planning tool. More often than not, disposal facility and productive land use planning activities are not initiated and performed simultaneously. With respect to physical concerns, these planning activities should occur concurrently for two reasons. First, the physical requirements for disposal facilities and those for subsequent productive land uses vary significantly. For example, foundation conditions often exert a negative influence on the implementation of land use plans since, in many cases, special foundations are needed, thereby imposing an added economic burden on the developer. Public shipping and boat access to a proposed

Table 10
Physical Planning Elements of the 12 Case Studies: Influence Assessments

Physical Planning Elements	East Coast		Gulf Mississippi River		Great Lakes			West Coast				Totals						
	Blount Island	Fort Mifflin	Crystal Beach	Rivergate	Oceola	Cleveland	Bay Port	Huron	Site 1	Fifth Ave.	Eastside	Site 14	Anacortes	Hogquam	Negative	Positive	No Influence	Not Applicable
ELEMENTS RELATED TO DISPOSAL FACILITY PLANNING																		
1. Pre-disposal site characteristics																		
a. below mean low water	na	na	na	na	na	na	na	na	na	na	na	na	na	na	0	2	1	9
b. wetland	●	na	●	na	na	na	●	na	na	na	na	●	●	●	5	0	1	6
c. upland	—	—	○	na	—	na	○	na	na	na	na	na	na	○	0	3	3	6
d. area of previous fill activity	○	—	na	○	na	○	na	na	na	na	○	na	na	—	0	4	2	6
2. Ecological characteristics	●	—	●	—	○	—	—	●	—	—	○	—	—	●	6	2	4	0
3. Disposal area capacity	—	○	—	○	—	—	—	●	—	—	—	—	—	—	4	3	5	0
4. Sub-surface soil conditions	—	—	—	—	—	●	—	●	—	—	●	—	●	—	4	0	8	0
5. Composition of dredged material	—	—	●	●	—	●	—	—	○	—	—	—	●	—	4	1	7	0
6. Disposal area location	○	●	●	○	○	—	○	○	○	○	○	○	○	○	2	9	1	0
7. Flood or tide conditions	—	—	—	●	●	○	—	—	—	—	—	—	—	—	2	1	9	0
8. Utility relocation/connection	—	—	—	—	—	●	—	—	—	—	—	—	—	—	4	0	8	0
9. Bredging equipment access	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	0	9	0
10. Sensory factors (visual, odor, dust, smoke, etc.)	—	—	●	—	—	—	—	●	—	—	—	—	—	—	4	0	8	0

*Key: ● negative; ○ positive; — no influence on implementation; na not applicable.

(Continued)

Table 10 (Concluded)

Physical Planning Elements	East Coast		Gulf Coast		Mississippi River		Great Lakes			West Coast				Totals			
	Blount Island	Fort Mifflin	Crystal Beach	Rivergate	Osceola	Cleveland Site 14	Bay Port	Huron Site 1	Fifth Ave. Marina	Eastside Site 14	Anacortes	Houliam	Negative	Positive	No Influence	Not Applicable	
1. Foundation conditions	●	●	—	●	—	●	●	●	○	●	●	●	●	1	2	0	0
2. Shipping and boat access	○	○	—	○	○	—	○	—	○	○	○	○	○	8	4	0	0
3. Site size and configuration	○	○	—	○	—	●	○	●	○	—	—	●	4	5	3	0	0
4. Vehicular circulation/traffic generation	●	○	—	○	●	●	●	●	○	○	○	○	6	5	1	0	0
5. Rail access	○	○	—	○	○	—	○	—	○	○	○	○	1	7	4	0	0
6. Utility availability and capacity	●	○	—	○	○	●	○	●	○	○	○	○	4	7	1	0	0
7. Flood or tide conditions	—	—	○	●	—	○	—	—	—	—	—	—	2	2	8	0	0
8. Site plan compatibility with site features and user requirements	○	—	●	○	—	●	—	—	○	—	●	—	4	3	5	0	0
9. Sensory factors (visual, odor, vibration, dust, smoke, etc.)	—	—	●	—	—	○	—	○	○	—	—	—	2	3	7	0	0

*Key: ● negative; ○ positive; — no influence on implementation; na not applicable.

land use is often a beneficial attribute that significantly aids implementation of productive land uses, especially those proposed for heavy industrial use. Second, the success of a planned use is quite often dependent on elements that must be addressed during disposal facility planning. For example, understanding the importance of the availability of required utilities to satisfy the functional requirements of a proposed land use could have an important influence in selecting a site for a disposal facility. Similarly, understanding the land requirements of a productive land use can play a key role in determining the size and configuration of a disposal site. Case-specific examples for each physical planning element discussed below are presented in the detailed comparative analyses of Appendix Q.

Physical elements related
to disposal facility planning

93. Ten physical elements were identified during this study as important disposal facility planning considerations:

- a. Pre-disposal site characteristics.
- b. Ecological characteristics.
- c. Disposal area capacity.
- d. Sub-surface soil conditions.
- e. Composition of dredged material.
- f. Disposal area location.
- g. Flood or tide conditions.
- h. Utility relocation/connection.
- i. Dredging equipment access.
- j. Sensory factors.

94. Pre-disposal site characteristics. The physical conditions and characteristics of proposed disposal area sites are, of course, key considerations during disposal facility planning. In general, a site that has been previously altered by man is preferable to a site in natural condition. In addition, environmental agencies generally prefer disposal sites on upland areas, hoping to minimize environmental damage. Three of the case study projects involved upland sites. Investigation of these projects revealed that the use of upland disposal areas is not

in itself sufficient to avoid environmental damage but that action must also be taken in disposal facility design to protect adjacent sensitive areas. The filling of wetlands was the most controversial issue addressed in the 12 case studies (Table 9) and was a negative influence on disposal planning in 5 cases. Although important biological life was recognized to occur below mean low water, it was considered less critical than nearby wetland areas. In fact, when areas below mean low water were disturbed rather than wetland areas, there was an overall positive influence on implementation. Development of confined disposal sites on areas of previous fill activity was a positive influence on implementation in four cases due to greatly reduced potential for environmental damage.

95. Ecological characteristics. Without question the most important physical element to consider during early disposal facility planning is the potential for disruption of existing ecological characteristics of proposed sites. Beyond an increased concern in our society for preservation of environmental quality, one of the reasons this element was so important in many of the cases was that, at the time of initial EIS review, insufficient environmental data prevented the reliable assessment of project impacts. In several instances, before environmental agency approval was obtained, the Corps had to agree to participate in biological monitoring studies, once involving a before-during-after biological assessment of the area directly affected by the disposal-productive use project. To avoid implementation delays, early disposal planning efforts should include a thorough search of all potential sources of the data needed to evaluate environmental impacts. Data deficiencies can then be remedied in the early planning phase, rather than having to be dealt with after most other project groundwork has been completed. In 6 of the 12 case study projects, the ecological characteristics of and near the sites were ecologically valuable enough to result in negative influence. In two cases, the ecological settings were positive influences because the areas were not ecologically significant and were actually more highly valued for their industrial economic potential.

96. Disposal area capacity. Disposal area capacity was an influential physical planning element in 7 of the 12 case study projects. In four instances the influence was negative. Capacity is typically a most important design constraint in formulating dredged material disposal plans. When productive land use planning is also involved, site capacity may become a secondary design consideration, primarily because: (1) the functional needs of the proposed use must be reflected in the design (e.g., land requirements); (2) the depth of fill may be limited to avoid excessively high foundation costs; and (3) the active disposal life may be shortened to accommodate implementation of a proposed land use.

97. Sub-surface soil conditions. For disposal facility planning, the existing soils of the area primarily affect dike foundation design, although they must be considered along with the foundation requirements of a productive land use plan. This physical element was a negative influence in four of the case study projects, but was not found to be one of the more critical components of overall disposal planning. Of course, if foundation conditions for dikes are inadequate, the weight and mass of the dike construction material will cause displacement, which could eventually result in dike failure, as did happen in one case (No. 7). Generally, through the application of proper engineering techniques, this problem is avoidable.

98. Composition of dredged material. The pollution-causing potential of dredged material is always an important disposal facility planning concern. Facility designs must be capable of resulting in water discharges that conform to applicable water quality standards. In five of the case study projects, the quality of the dredged material was an influential physical planning element, four times in a negative way due to the material's poor quality. Generally, dredged material quality does not have any added significance for disposal-productive use projects.

99. Disposal area location. The close proximity of a disposal area to the channel being dredged results in higher efficiency of the dredge and fill operation, with significant cost advantages. Disposal

area location was, in 9 of the 12 case study projects, a positive influence on project implementation. For disposal-productive use projects, the location of the disposal facility is important not only in terms of disposal economics, but also for enhancing the feasibility of the productive use plan. This is particularly true when shipping and boat access is required in the proposed land use plan.

100. Flood or tide conditions. Wave action generated from high winds demands special engineering considerations during disposal facility planning. Also, flooding conditions caused by heavy rains and runoff must be included as part of the design program for certain sites, especially those along rivers prone to flooding, such as the Mississippi River. In two cases (Nos. 11 and 12), special considerations related to dike elevations were important aspects of the planning process because the Mississippi River has elevation differences of approximately 50 feet. Flood or tide conditions must be addressed during the planning of any disposal project. However, when a productive land use is also involved, the importance of preventing flood damage extends beyond the integrity of the disposal facility to the protection of subsequent investments in site development for productive purposes.

101. Utility relocation/connection. Existing utility mains (e.g., water supply and drainage culverts) located in the disposal site area typically require plans for extension or removal. This planning element can be controversial, especially if it is felt that relocating the utility could create a problem or increase the severity of an existing problem. The need to relocate or provide special accommodations for existing utility lines on disposal site areas had a small negative influence in 4 of the 12 case studies. Generally, these considerations are remedied by relatively simple technical procedures, but at increased costs to project sponsors.

102. Dredging equipment access. Generally, access to the site for dredging equipment was not a severe problem. However, in three of the cases, a special channel was required to provide such access, resulting in additional project costs which were not unusual or large.

103. Sensory factors (visual, odor, dust, smoke, etc.).

Questions asked by the public concerning proposed disposal facilities often include those related to items such as obnoxious odors, dust generated after the dredged material dries, and visual impacts. Although these items were not particularly influential in terms of implementation in the majority of cases, they did impose minor negative influences on four case study projects. For disposal-productive use projects, the favorable sensory characteristics of the productive land use plan can, in certain instances, offset unfavorable sensory impacts during disposal. A good example is the favorable aesthetic appeal of a public park concept for productive land use.

Physical planning elements
related to productive land use planning

104. Nine physical planning elements were documented in the 12 case study projects as having particular influence in terms of productive land use planning:

- a. Foundation conditions.
- b. Shipping and boat access.
- c. Site size and configuration.
- d. Vehicular circulation/traffic generation.
- e. Rail access.
- f. Utility availability and capacity.
- g. Flood or tide conditions.
- h. Site plan compatibility with site features and user requirements.
- i. Sensory factors.

105. Foundation conditions. Foundation costs are an important part of the cost of developing a dredged material disposal site for productive purposes. This is especially true when heavy industrial uses are desired. Foundation costs can render an otherwise feasible project uneconomical, or even necessitate a developer's move to an alternative, less costly location. Due to the structural properties of the dredged material associated with them, productive land uses in 9 of the 12 case study projects were adversely influenced by foundation conditions. In only one case (No. 6) were the foundation conditions a positive

influence (the dredged material was clean sand). Often, foundation conditions were found to be as dependent on the sub-surface conditions of the site prior to disposal as on the quality of the dredged material. In many cases, the foundation conditions required for productive use included special building, utility, or road foundation treatment. Typically, prospective users are aware of special site foundation or site preparation requirements, and are willing to accept additional site development costs because of prime site location characteristics or some other attractive feature of a proposed site.

106. Shipping and boat access. In 8 of the 12 case study projects, shipping and boat access to the site was a major positive physical consideration in land use planning. Disposal sites are usually near or adjacent to existing shipping channels and there is generally a lack of available land with such access. Thus, land created through confined dredged material disposal serves to provide a very scarce resource. The eight case study projects in which shipping and boat access was a positive influence all involved industrial land use concepts dependent on direct access to major shipping channels. However, public recreational land use concepts, particularly those involving marinas, can also benefit from boat access to the site.

107. Site size and configuration. Conflicts between the site size and configuration planning element and the proposed land use plans were serious in 4 of the 12 case study projects. In five cases, site size and configuration was evaluated as having had a positive influence on proposed land use implementation because these characteristics were well-matched to the developer's site selection criteria. When site size or configuration do not meet user needs, they are a serious constraint to productive land use concept implementation.

108. Vehicular circulation/traffic generation. The vehicular circulation and goods movement capabilities of available roadway networks are very important in planning for productive land uses. Particularly when an industrial use is proposed for a site with poor vehicular access, the issue of traffic generation, and resultant adverse impacts on adjacent areas, can be a strong valid obstacle to project

implementation. This is especially true when the adjacent areas are residential. Proposed public recreational uses can also be enhanced by good public access, whereas poor access to a public facility can lead to opposition on the basis of adverse traffic generating characteristics. Traffic generation associated with proposed land uses and the goods movement capabilities of available roadway networks were influential planning elements in 11 out of 12 cases.

109. Rail access. Heavy industrial land uses associated with port facilities often rely on rail transportation to move goods inland from the waterfront area. Rail access is therefore a major attribute of a site being planned for industrial uses. In 7 of the 12 case study projects, rail access had a positive influence on project implementation. In only one case (No. 7) was rail access thought to be a negative influence. The capability of an industrial port site to provide rail access, in addition to highways and nearby air transport facilities, results in the site appealing to a wider industrial market than sites lacking rail service.

110. Utility availability and capacity. The availability and capacity of existing utilities to serve a proposed land use on a disposal facility is also an important site asset. If construction of utility lines such as water, sewer, electricity, gas, or drainage is required over significant distances, development costs will rise and will be reflected in higher land costs to a tenant or buyer. This added cost could conceivably result in a project which is financially infeasible. Where utility service is lacking, implementation of the proposed land use can be negatively affected. In 7 of the 12 case studies the availability of utilities was found to positively influence implementation.

111. Flood or tide conditions. The effects of flood waters due to runoff or flooding as the result of high tide conditions can have a significant impact on land uses being planned for a disposal site. Raising the elevation of site topography to prevent flooding, if the land is not being raised high enough by the disposal activity, is another cost element that can affect the implementation of a disposal facility productive land use project. Costs to provide flood protection

can have the same effect on project financial feasibility as described above for utilities.

112. Site plan compatibility with site features and user requirements. For obvious reasons, detailed site plans for proposed productive uses should reflect optimal compatibility with site features and user requirements. In four of the case studies this was not the case, effecting a negative influence on project implementation. The problems included land uses inconsistent with the character of the area, proposed recreational facilities that were not water-dependent and could have been located at inland sites, and road layout that would become a hindrance to efficient access by proposed site users.

113. Sensory factors. Construction of a productive land use can have both beneficial and detrimental effects on surrounding residential neighborhoods or other types of land uses. Visual aspects become important when disposal facilities can be viewed from residential areas. A positive influence is likely when the productive land use is a park, particularly when the area for the disposal facility has already been visually degraded. If industrial uses are proposed within view of residential areas, opposition, with a negative influence on implementation, is more likely to result than if park uses are involved.

Findings: Land Use Planning Principles

114. For a majority of the disposal-productive land use projects examined in this study, interesting correlations were observed to exist between effective project implementation and sound, state-of-the-art planning exhibited by the characteristics of the proposed land use concepts. In examining the impacts of the various productive land use plans on the overall process of implementation, 10 land use planning principles were identified as being indicators of project feasibility. These 10 planning principles represent good planning practice against which the corresponding features of proposed productive land use plans can be evaluated to point out plan deficiencies. In Table 11 the proposed development plans of the 12 case studies are evaluated, according

Table 11

Proposed Land Use Plans of the 12 Case Studies: Influence Assessments Based on Ten Planning Principles

Land Use Planning Principles	East Coast		Gulf Coast		Mississippi River		Great Lakes				West Coast				Totals			
	Blount Island	Fort Mifflin	Crystal Beach	Osceola	Rivergate	Cleveland	Site 14	Bay Port	Huron	Site 1	Fifth Ave. Marina	Site 14	Anacortes	Hogutiam	Negative	Positive	No Influence	Unknown
RELATIONSHIP TO PHYSICAL SURROUNDINGS																		
1. Compatibility with adjacent and surrounding land uses	●	○	●	—	○	○	○	○	○	○	○	○	○	○	●	○	○	○
2. Utilization of existing transportation systems and infrastructure	●	○	—	●	○	○	○	○	—	○	○	○	○	●	○	○	○	○
3. Utilization of waterfront location	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4. Compatibility with site size and configuration	○	—	—	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
5. Site physical characteristics: planned use benefits vs. development costs	○	●	un	un	○	un	un	un	un	un	un	un	un	○	○	○	○	○
RELATIONSHIP TO ESTABLISHED COMMUNITY OBJECTIVES, PLANS, OR POLICIES																		
1. Contribution to established community land use needs	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
2. Maintenance or enhancement of community image	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
3. Consistency with master plans	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4. Provision of community benefits	○	○	—	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
5. Minimization of induced adverse impacts (traffic, spin-off development, etc.)	●	—	●	—	○	—	○	○	○	○	○	○	○	○	○	○	○	○

*Key: ● negative; ○ positive; — little or no influence on project implementation (in terms of stated planning principles); un unknown.

to these important planning principles, in terms of their effect on project implementation.

115. The 10 planning principles were identified in the 12 case studies as being either positively influential or problematic in gaining public acceptance of proposed land use plans. The process from project implementation to final completion is almost always contingent on public endorsement and support, usually to a high degree. The 10 planning principles reflect those planning components that have recurring importance during productive land use plan preparation. For conceptual and evaluative purposes the 10 principles are grouped into two categories: (1) those which relate the proposed land use plan to the physical surroundings; and (2) those which relate the proposed land use plan to the objectives, plans, or policies established in the community. Satisfying, or at least addressing, both groups of planning principles is important to the success of proposed productive land use plans. Case-specific examples for each of the 10 planning principles discussed below are presented in the detailed comparative analyses of Appendix Q.

Planning principles: relationship to physical surroundings

116. The five planning principles addressing the relationship between the plan and the physical surroundings of the site are:

- a. Compatibility with existing and surrounding land uses.
- b. Utilization of existing transportation systems and infrastructure.
- c. Utilization of waterfront location.
- d. Compatibility with site size and configuration.
- e. Site physical characteristics and their impact on the trade-off between site development costs and the benefits of the planned use.

117. Compatibility with existing and surrounding land uses. It was found during investigation of the 12 case study projects that a direct correlation often exists between the compatibility of a proposed project to its surrounding environment and the magnitude of controversy generated from the project. In general, proposed industrial, commercial, or residential land uses that are similar to or compatible with

existing adjacent land uses are less controversial than those which are dissimilar to their surroundings. Recognition of this reality and incorporation of this fact into disposal-productive land use planning processes can measurably affect the ease of project implementation. When dissimilar land uses are in proximity, functional or aesthetic conflicts such as traffic, noise, odor, or general visual characteristics are more likely to occur. This is especially true in areas of initial development where the dissimilarities are simply the man-made vs. the natural. In nine of the case study projects, either the proposed land uses were consistent with those in the immediate surroundings, or were acceptable to surrounding landowners because they were consistent with existing zoning.

118. Utilization of existing transportation systems and infrastructure. Adequate existing ground or water transportation systems adjacent to (or in proximity to) a disposal site are important ingredients to successful productive land use plan implementation. Also, the existence of infrastructure components such as water supply, sewage disposal, drainage, electrical, and gas service can serve as a major catalyst for project success. In 7 of the 12 sites studied, the proposed land uses successfully utilized existing highways, rail lines, or shipping channels for goods movements and seemingly adequate utility services were available. In five of these seven sites, the ability to utilize existing transportation and utility systems, without expensive modifications, played a paramount role in gaining private and public project support. This is a clear asset in determining overall project feasibility.

119. Utilization of waterfront location. Appropriately, all of the sites investigated had plans for uses which, at least in part, advantageously utilized their true unique locations and, therefore, the use/location relationship was an important positive influence on project implementation. Certain proposed land uses programmed for the 12 case study sites, however, did not fully utilize important site amenities. Optimally, proposed land uses to be located on a disposal site with water frontage, or with access to shipping channels, should capitalize

on these special amenities or site advantages. For example, recreational land uses such as fishing, boating, or other types of water-related activities are more appropriate than baseball fields or amphitheaters, which are not dependent on waterfront locations. In 8 of the 12 case study projects, the industrial land uses proposed for the disposal sites, all of which had deepwater access, were documented as taking full advantage of this locational asset (i.e., the proposed industries involved shipping).

120. Compatibility with site size and configuration. During preparation of the 12 case studies, it became evident that conflicts sometimes exist between the size and/or configuration of the disposal facility and the functional requirements of the proposed land use. Although the final design and constructed form of the disposal facility presumably optimized the prime function of the facility (i.e., containing dredged material), the form or type of construction did not always effectively satisfy the needs of land uses advocated or projected for the site. A continual and highly coordinated planning process involving both the disposal facility and the proposed land use could significantly bypass this problem in future planning efforts.

121. Site physical characteristics: planned use benefits vs. development costs. The physical properties of dredged material often require use of special construction methods for either structural development or infrastructure improvements. These construction methods include foundation pilings or spread footings for buildings, special road foundations or beds designed to spread loads, or unusual utility service designs. High costs associated with unstable or generally inferior sub-surface soil conditions can place a serious financial burden on the productive land use developer, possibly to the extent of rendering the site uneconomical to develop. Whenever practicable, proposed land use plans for disposal sites should be evaluated to enable higher quality fill material, such as coarse sand if available, to be deposited in areas where structures are to be located. This could conceivably result in the use of slab foundations rather than pilings for foundations and thereby aid in minimizing construction costs.

This type of coordination again emphasizes the advantages to be gained from simultaneous planning of both the disposal facility and the productive land use. In many cases, however, the ability of a disposal site to offer unique advantages, such as shipping access tailored to the specific requirements of an industrial use, coupled with the otherwise general lack of a range of alternate suitable sites, can result in the overall development being a viable investment despite high development costs. Because of the preliminary nature of most plans prepared for the 12 case study sites evaluated, the correlation between added development costs due to disposal site characteristics and the willingness of a developer to pay (i.e., economic viability of the project) was not known.

Planning principles: relationship to established community objectives, plans, or policies

122. The five planning principles addressing the relationship between the proposed land use plan and the established community objectives, plans, or policies are:

- a. Contribution to established community land use needs.
- b. Maintenance or enhancement of community image.
- c. Consistency with master plans.
- d. Provision of community benefits.
- e. Minimization of induced adverse impacts (traffic, spin-off development, etc.).

123. Contribution to established community land use needs.

Community needs were discussed during interviews with sponsors of the case study projects and with State, regional, and municipal planners. In all but one case (No. 4), the proposed productive land use was singularly the most desirable use for the specific site in the opinion of those interviewed. This single case is also the only case study where the overall project was disapproved, and the issue of the proposed land use being inconsistent with perceived community needs was significant in the eventual defeat of the plan. There were several instances where an alternative land use was also appropriate and in the public's interest, but in each of these cases, the use that had the strongest support by

both public officials and the general public was the proposed productive land use. General concurrence, within the local community, with the land use plan for a disposal site lends significant additional support for the overall project, even when fairly strong environmental issues exist. The fact that a community need is addressed in a productive land use plan can be the basis for finding a compromise solution to project opposition derived from environmental or other concerns.

124. Maintenance or enhancement of community image. A proposed use that is compatible with an existing community image (i.e., the collage of various land uses that gives a community its identity) is often more acceptable to the public than a land use that might detrimentally alter the established image. For example, the public generally has a great appreciation for natural amenities such as attractive water-oriented views, be they of wetlands, open water, or islands, and, unless a strong position of "public good" or compatibility with the landscape is demonstrated by a proposed use infringing on these amenities, opposition is often generated. Conversely, if a proposed land use clearly enhances its site or immediate surroundings, public sentiment for change is usually more favorable. These public attitudes were recognized either implicitly or explicitly while interviewing project sponsors or public officials during field work in this study and are valuable for disposal-productive land use project planners to understand. In 9 of the 12 case studies, public attitudes toward probable changes in community image as a result of the proposed use were a positive influence on implementation.

125. Consistency with master plans. The case study analyses of land use considerations demonstrate that planned land use consistency with, and reinforcement of, local, regional, and State master plans is a noteworthy, positive impetus in project acceptability. In most cases, the types of land uses proposed were consistent with site use classifications designated on master plans prior to identification of the site as a dredged material disposal area. Master plan site use designations were, in certain cases, made as many as 30 years in advance of site consideration as a disposal facility. In general, proposed uses

that are consistent with long-range local plans are most likely to gain project acceptance from reviewing agencies and adjacent property owners. All but one case (No. 4) had proposed uses consistent with local comprehensive plans and, in that instance, the planning conflict provided much support for arguments against the project by local objectors. In interviews with members of the community adjacent to the proposed disposal site, it was indicated that an environmentally sound disposal project with a productive use plan consistent with local plans and in sympathy with the character of the existing community would have been acceptable.

126. Provision of community benefits. Industrial land uses were proposed in 8 of the 12 cases investigated, and generally, industrial growth in a community or a region has been traditionally recognized as an asset to a municipal tax base. Industrial growth may not only generate new employment in a region, but may also help to offset high costs of community services such as schools, roads, or sewage treatment plants through industrial municipal tax contributions. Park uses provide community benefits in a non-monetary way by creating valuable waterfront recreational land. In the eight industrial use case studies, projected favorable economics and additional employment resulting from the proposed development played an important role in obtaining general community and/or public agency acceptance.

127. Minimization of induced adverse impacts. Quite often, growth in one area of a community will generate additional growth in other areas, especially those in the immediate vicinity. This growth can be categorized under the definition of spin-off development. If the growth triggered by some initial construction activity is deemed to have a negative impact on a community, the new action is often described as having generated "induced adverse impacts." For example, in evaluating a community's ability to accommodate new growth, the impact of increased traffic generation is generally the first impact to be carefully evaluated, not only for traffic carrying capacity of the roadways, but more importantly for the effects that increased traffic will have on adjoining land uses, particularly with regard to residential areas. The impacts on

available utilities or community services are also closely scrutinized by both public agencies and the public at large. In 6 of the 12 sites analyzed, induced adverse impacts projected to be generated by the proposed development were significant in influencing negative attitudes towards the project.

Conclusions: Implementation Factors For
Disposal-Productive Use Projects

128. From the detailed comparative analyses supporting the above findings, and from consideration of the planning processes of the 12 case study projects, an overall set of implementation factors for disposal-productive use projects has been developed (Table 12). The planning and development of multiobjective projects, such as disposal-productive use projects, is typically a complex undertaking. The implementation factors discussed below provide a framework for ensuring that project planners address the full range of substantive and procedural considerations that are important to successful project implementation.

129. Appropriately, as well as for consistency, the implementation factors have been grouped into the same general categories as the issues: (1) ENVIRONMENTAL; (2) TECHNICAL; (3) ECONOMIC AND FINANCIAL; (4) LEGAL; (5) INSTITUTIONAL; and (6) PLANNING AND IMPLEMENTATION. A matrix presenting the staff assessments of the influence (i.e., enhanced or constrained) that each factor was judged to have had on the implementation of the 12 case study projects can be found in Appendix R. Also, the case study synopses of Appendices A through L contain, in tabular format, brief descriptions of the facts relevant to the most important (or "key") factors affecting implementation in each case.

Environmental factors

130. The important environmental considerations (apart from those of a legal nature) to be accounted for during project planning are: (1) the ecological setting of the proposed project; (2) the environmental impacts of the project; and (3) the pollution properties of the

Table 12

Implementation Factors Affecting
Disposal-Productive Use Projects

ENVIRONMENTAL

1. Ecological characteristics of proposed disposal area location
2. Environmental impacts of disposal-productive use project
3. Dredged material pollution properties

TECHNICAL

1. Dredged material structural properties
2. Disposal area sub-surface conditions
3. Disposal facility design and operating characteristics
4. Site size and configuration (as related to productive use)
5. Technical coordination of disposal plan with productive use plan

ECONOMIC/FINANCIAL

1. Economic or social benefits (costs) of the disposal-productive use project
2. Engineering and construction costs
3. Dredged material transport costs
4. Fees or taxes on dredged material
5. Project sponsor capability to assume financial responsibilities

LEGAL

1. Conformance with regulatory requirements
 2. Adequacy of environmental impact assessment or statement
 3. Disposal rights to the site
 4. Site ownership authorities (as related to productive use)
 5. Land use restrictions
-

(Continued)

Table 12 (Concluded)

INSTITUTIONAL

1. Public participation in disposal-productive use planning
2. Coordination with project sponsor
3. Coordination with review/regulatory agencies
4. Coordination with planning agencies
5. Procedures for identifying and resolving objections to the project
6. Corps and other participant attitudes
7. Political, business, and public support

PLANNING/IMPLEMENTATION

1. Long-range Corps disposal planning
 2. Long-range waterway/environmental planning
 3. Dredging project specification
 4. Temporal coordination of disposal plan with productive use plan
 5. Availability of environmental data
 6. Evaluation of alternative disposal areas
 7. Impacts of disposal-productive use project on existing water uses
 8. Proposed use compatibility with adjacent land uses
 9. Proposed use compatibility with master plans
 10. Proposed use compatibility with available transportation systems and infrastructure
 11. Proposed site plan compatibility with site physical features and user requirements
 12. Commitment to proposed land use plan
-

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CASE STUDIES AND COMPARATIVE ANALYSES OF ISSUES ASSOCIATED WITH--ETC(U)
DEC 77 J J GUSHUE, K M KREUTZIGER

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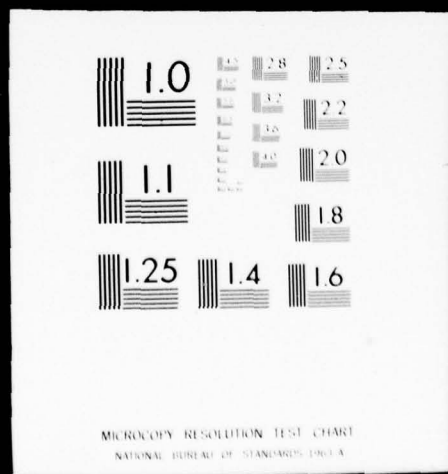
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dredged material. With the exception of the added impacts of the proposed land use concept itself, the environmental implications of a disposal-productive use project are not substantively different from those of just a disposal project. However, implementation delays resulting from environmental opposition to a disposal-productive use project can be more critical, particularly if delays are encountered after substantial investments of time and money have already been made.

131. During early planning activities, both the environmental issues likely to be the basis for opposition to a project and the agencies or groups likely to raise the issues should be identified. Then, an overall implementation strategy can be formulated to deal with the issues before plans are finalized. The environmental issues discussed previously in the study findings identify typical bases of objection (Table 9). Opposition to dredged material disposal and site development filling in wetland areas was the most significant environmental concern addressed in the 12 case studies. With few exceptions, when wetlands are impacted by a project, the resolution of objections can be expected to be both difficult and time-consuming. The severity of project opposition based on other environmental issues (e.g., habitat disturbances, bay bottomland reduction, odor, etc.) depends more on project-specific details.

132. Interestingly enough, in 5 of the 12 case study projects, the environmental impact factor was judged to have been a positive influence on implementation. This does not indicate that there were no adverse environmental impacts resulting from those five projects. Instead, this indicates, for example, that a proposed disposal area location of questionable ecological value (i.e., an area of previous fill activity) and a project design which minimizes overall environmental effects can, in combination, be an advantage in gaining acceptance for the project. This is particularly true when available alternative sites and/or designs involve relatively greater environmental disturbance. The implication is that disposal-productive use project planners, particularly within the Corps of Engineers, can aid implementation by viewing environmental factors from a wide perspective. Innovative

implementation strategies (i.e., strategies that include early confrontation with opposition, or use of the leverage that productive use projects provide when economic/environmental trade-offs are needed, etc.) can result.

Technical factors

133. Five types of technical considerations are important in disposal-productive use projects: (1) dredged material structural properties; (2) disposal area sub-surface conditions; (3) disposal facility design and operating characteristics; (4) site size and configuration (as related to productive use); and (5) technical coordination of disposal plans with productive use plans.

134. Dredged material structural properties and disposal area sub-surface conditions are factors to consider in terms of the foundation requirements of the disposal-productive use project. Foundation conditions at disposal sites are usually poor and must be compensated for through engineering, usually at substantial cost. Heavy industrial uses present the most difficult and costly foundation design problems. The pre-disposal sub-surface conditions of an area affect both containment structure design, and the foundation design of the proposed land use. The structural properties of the dredged sediments can affect disposal facility design by dictating the use of special dewatering techniques, or perhaps by giving rise to a selective material placement scheme based on eventual bearing capacity needs. Naturally, it is preferable to simultaneously address the foundation needs of the disposal facility and the proposed land use in order to achieve any potential savings in foundation costs. Dredged material structural properties were a negative influence in three of four cases, while sub-surface soil conditions were a negative factor in nine of nine cases.

135. Disposal facility design and operating characteristics are important technical factors, because, if not addressed in terms of both disposal and productive use objectives, they can result in design inefficiencies. The design characteristics of the disposal facility are its capacity, size (i.e., acres), and configuration. Providing sufficient disposal capacity for a specific project(s) over a certain time

period is typically the overriding design consideration for disposal facilities. Site size and configuration are then tailored to meet the capacity constraint. When a productive land use is involved, capacity can become a secondary design consideration to accommodate the proposed use, because of land use functional needs, development economics, and development schedules.

136. The operating characteristics of the disposal facility primarily relate to overflow discharge quality. However, special operating features may be appropriate to enhance productive development (e.g., interior dikes to segment the material on the basis of structural properties). The probability of the facility design and operating characteristics serving to assist project implementation can be greatly increased through coordinated disposal and productive use planning. In this study, design and operating characteristics were found to be a negative influence on project implementation in eight cases and a positive influence in three cases.

137. Disposal site size and configuration (as related to productive use) is the most important technical factor for two reasons. First, as discussed above, the functional needs of the proposed use, such as site size and configuration, can have implications on the disposal capacity provided by the project. Second, the relationship between the size and shape of the disposal facility on one hand, and the needs of prospective site users on the other will (1) establish the site's "market value" to potential users, and (2) indicate the quality of land use planning practice applied to the project. Given the impact which disposal-productive use projects can have on adjacent land uses, and on communities as a whole, Corps of Engineer implementation strategies should strive for maximum site/use compatibility. Site size and configuration (as related to productive use) was a positive influence in five case study projects, and a negative factor in five more.

138. Technical coordination of the disposal plan with the productive use plan was judged to have been a positive influence in four case study projects, and a negative influence in three (i.e., technical coordination was not achieved). Technical coordination is important to

establish at the start of project planning. In a design sense, inadequate technical coordination can result in implementation delays while design deficiencies noted late in the planning process are remedied. In a construction sense, technical coordination is essential so that the needs of the site users are fulfilled. Technical coordination extends also to Corps disposal operations, which can be performed according to a developer's needs (e.g., selective material placement), provided that any added costs are assumed by the developer or project sponsor.

Economic and financial factors

139. Five economic and financial factors must be dealt with in disposal-productive use project planning: (1) economic or social benefits and costs; (2) engineering and construction costs; (3) dredged material transport costs; (4) fees or taxes on dredged material; and (5) sponsor capability to assume financial responsibilities.

140. Far and away the most important economic/financial factor to evaluate as part of an overall implementation strategy is the economic or social benefit (cost) of the disposal-productive use project. There are four reasons for the importance of this factor. First, overall community reactions to a proposed project can be determined by the project's relationship to community needs. Job-producing planned uses in areas of depressed employment, or recreational developments where such resources are deficient, are more likely to gain approval than projects that appear to conflict with community needs. Second, economic or social benefits can assist in overcoming environmental opposition and in obtaining approvals from environmental agencies. Third, economic benefits can offset high engineering and construction costs associated with disposal facility and productive land use development. Fourth, trade-offs can be more easily made between the private benefits and the public costs of non-public land use concepts proposed for publicly-owned tracts. In 9 of the 12 case study projects, economic or social benefits were judged to have had a positive influence on implementation. It is clear that a complete demonstration of economic or social benefits is most often a powerful positive influence in disposal-productive use project implementation.

141. Engineering and construction costs for disposal-productive use projects, as for any civil works project, can be a most important factor. Coordinated disposal facility and productive land use planning can affect these costs in two basic ways. First, the foundation requirements of the proposed use may necessitate the use of special compaction equipment and/or building and road foundation designs. High foundation costs are typical and early planning should investigate the sensitivity of the project economics to these costs, and possible measures for reducing them. Second, the provision of utilities to a site, or construction of a retaining structure more suited to the proposed use, will invariably increase project costs. The magnitude of such costs, and the willingness to pay them, should be determined as soon as possible to avoid later implementation difficulties. In 5 of the 12 case study projects, engineering and construction costs were a negative implementation factor.

142. Dredged material transport costs are clearly a major factor in overall disposal project costs. It is not unusual for transport costs to be the telling factor in disposal site selection. For disposal-productive use projects, the possibility of the project sponsor or prospective site developer assuming any added transport costs is very real. Disposal options that might otherwise have been foreclosed may then be made available. An implementation strategy based on coordinated disposal and productive use planning can reduce the extent to which transport costs dictate the viability of disposal site alternatives.

143. Fees or taxes on dredged material are not likely to significantly affect implementation; however, prospective site users should be made aware of this potential cost early in project planning. This factor takes on greater importance as fill quantities increase. A \$1 per cubic yard tax on dredged material was a negative influence in one case study project. Project sponsor financial capabilities can be a significant delay-causing consideration when sponsor cost burdens are disputed or when needed funds are not readily available. Since Federal cost liabilities are limited to minimum disposal cost options, opportunities for facility designs that are more suited to eventual productive

use can be lost if sponsors are unwilling or unable to pay the added expenses. This factor was found to be a negative influence on implementation in four case studies, and a positive influence in six.

Legal factors

144. There are five legal factors to consider as part of an implementation strategy for disposal-productive use projects: (1) conformance with regulatory requirements; (2) adequacy of EA or EIS; (3) disposal rights to the site; (4) site ownership authorities (as related to productive use); and (5) land use restrictions. The first two legal factors are most important to project implementation since they have high potential for resulting in long-term delays.

145. Conformance with regulatory requirements during project planning and review is crucial since many times an interpretation of applicable requirements is involved prior to a particular course of action being taken. Most likely to be contested in litigation are Corps decisions that an EIS, public hearing, or State/local permit is not required. In 5 of the 12 case study projects, this factor was rated as having been a negative influence on implementation, while it received a positive rating in three cases. The adequacy of an EA or EIS is very likely to be questioned during disposal and disposal-productive use project environmental review. However, since it is difficult to establish in litigation that an EIS does not fulfill the requirements of NEPA, EIS adequacy is not usually contested in litigation. In 4 of the 12 case study projects, EA or EIS adequacy was a negative implementation factor, while in two cases it was a positive factor.

146. Disposal rights to the site were found to have been a negative legal factor in 2 of the 12 case study projects. Disposal rights are important primarily when the disposal-productive use project involves a relatively long active disposal period. As the elevation of fill material approaches developable levels, the attractiveness of the site for productive use increases. If development is feasible at an elevation lower than the planned final fill elevation, the remaining disposal capacity can be forfeited in favor of productive use. This is particularly true in cases where no specific productive land use plan

was prepared in conjunction with disposal planning. It is clearly in the best interests of the Corps to have firm and exclusive rights to use a disposal facility to its full capacity as planned.

147. Site ownership authorities (as related to productive use) can be an important implementation factor when the site is publicly-owned. Opposition to the use of publicly-owned material (i.e., the dredged sediments) to enhance a private productive land use development can be quite strong. To avoid implementation difficulties, initial project planning should include an analysis of potential constraints due to site ownership. Land use restrictions set down in local or State laws can present constraints on the types of land use concepts that are feasible for disposal facilities.

Institutional factors

148. The various participants in the planning and review process for disposal-productive use projects each have their own jurisdictions, authorities, responsibilities, policies, and procedures. The framework defined by the intra- and inter-relations among the participants is the institutional setting within which projects are implemented. Important institutional factors of project implementation are: (1) public participation; (2,3,4) coordination with the project sponsors, review/regulatory agencies, and land use planning agencies; (5) Corps procedures for identifying and resolving objections; (6) participant attitudes; and (7) political, business, and public-at-large support.

149. It is essential to the successful implementation of a disposal-productive use project that there be a high level of involvement and understanding by the agencies, governments, communities, and citizens affected by the project. Inadequate transfer of information among participants is likely to result in misconceptions, objections, and delays. Meeting "letter of the law" interagency coordination requirements, for example, may be adequate in one case, but not in another if coordination is ineffective. For high visibility or interest projects, failure to fully disclose project plans, alternatives, evaluations, etc., not only can lead to serious project delays, but also to an erosion of participant relationships. Overall, institutional factors

are the most important factors affecting implementation.

150. Public participation in project planning at its early stages is as essential to plan implementation as frequent and effective coordination with project sponsors, review/regulatory agencies, and planning agencies. Failure to involve all concerned in early project planning can result in the late, and therefore untimely, identification of issues and objections. The public at large, local residents, and cognizant agencies should be active participants and should not be viewed as outsiders who must be convinced of the worth of an already firm plan. Public and interagency coordination in the 12 case study projects assessed in this report was excellent overall; however, when deficient or ineffective (i.e., failing to result in firm approvals of proposed plans) the associated issues and objections were much more difficult and costly to resolve.

151. An integral part of coordination activities are the Corps' procedures for identifying and resolving objections. It is simply not good policy to use the Public Notice or draft EIS as the first step in public participation and/or interagency coordination. As was illustrated in two of the case study projects, failure on the part of the Corps to actively solicit official comments from principal participants (e.g., FWS, EPA) can lead to delays first in specifying points of argument and then in resolving differences. Local residents directly affected by a project should be among the first members of the public-at-large to be invited to participate in project planning and review.

152. Corps and other participant attitudes toward each other are also an important institutional factor and can actually be the underlying cause of interagency coordination problems. The attitudes of Corps of Engineer project planners are especially important since their role is usually pivotal in disposal-productive use projects. Preformed opinions concerning the severity of or underlying reasons for opposition to a project can make resolution of issues very difficult. This is particularly true in the case of adjacent owners and residents, whose vested interests in properties adjacent to a proposed project must always be respected. In 4 of the 12 case study projects, participant

attitudes were a negative implementation factor, and in another four cases they exerted a positive influence.

153. In 10 of the 12 case study projects, political, business, and public support for the project was a positive implementation factor. In only one case was this factor a negative influence. Essentially, the level of community-wide support for a project is determined by the extent to which the project meets community needs. For example, the favorable political aspects of a proposed labor-intensive industrial development can be a major factor in obtaining resolution of environmentally based objections. Project planners should be aware of the effects that community-wide support for (or opposition to) alternative proposed use plans can have on project implementation.

Planning and implementation factors

154. Factors relating to the overall process of planning and implementing disposal-productive use projects include several considerations representing project design, project review and evaluation, and land use planning. These factors are: (1) long-range Corps disposal planning; (2) long-range waterway/environmental planning; (3) project specification; (4) availability of environmental data; (5) evaluation of alternative disposal areas; (6) project impacts on existing water uses; (7,8,9) proposed use compatibility with adjacent land uses, master plans, and available transportation systems and infrastructure; (10) site plan compatibility with site physical features and user requirements; and (11) commitment to the proposed land use plan.

155. Any dredging and disposal project should certainly be conceived in concert with both long-range Corps disposal plans and long-range waterway/environmental plans. For disposal-productive use projects this is especially true, particularly when the proposed use will result in an expansion of port-industrial activity, or will generate spin-off development. In 6 of the 12 case study projects, a failure on the part of the Corps to address the projects in terms of long-range disposal plans resulted in a negative influence on implementation. On the other hand, in seven case study projects, the productive use plans were developed in concert with long-range waterway development plans,

adding a positive influence to the projects.

156. It almost goes without saying that dredging project specification should be achieved early in planning. Prospective developers of industrial, water-dependent land uses cannot be expected to commit to a proposed project if there is uncertainty as to the eventual shipping access characteristics of the site. Also, environmental review procedures, which are usually time-consuming, cannot be initiated until the basic details of the project are finalized. In 3 of the 12 case study projects, implementation delays attributable to inadequate dredging project specification were documented.

157. The availability of environmental data is an important factor to consider in terms of the project review and evaluation process. If project-specific environmental impacts cannot be reliably evaluated due to a lack of data, implementation delays could result while the needed data are developed. Early project planning can include an inventory of available environmental data, and actions to remedy deficiencies can be started soon enough to avoid or minimize implementation delays. In 4 of the 12 case study projects, the availability of environmental data factor was judged to have had a negative influence on implementation, while in two cases a positive effect was observed.

158. The evaluation of alternative disposal areas is obviously an important factor in disposal-productive use project planning. Strong opposition to a project can result if, in order to facilitate a productive land use plan, the disposal site is chosen over a more environmentally acceptable alternative. Conversely, the number of viable alternative disposal areas can be increased if a project sponsor or developer, in order to meet productive use objectives, is willing to assume any added costs incurred if high cost disposal options are selected. When a new channel project is proposed, implementation can be assisted by jointly evaluating both the new work and maintenance disposal plans. Disposal-productive use project impacts on existing water uses, although not one of the more important factors affecting implementation, can be a useful input to the evaluation of alternatives. Existing uses such as recreational boating and fishing, public water

supply, and industrial cooling and process water are of most significance.

159. Four very important implementation factors relating to good land use planning practice should be explicitly addressed in all disposal-productive use projects in which the Corps of Engineers becomes involved. Compatibility with adjacent land uses was found to be a positive influence on implementation in nine cases, and a negative influence in only two. Overall, proposed land use concepts that are similar to or compatible with existing adjacent land uses are much less likely to be opposed than those that represent dissimilar use. Similarly, compatibility with master plans was found to be a significant positive implementation factor in 11 of the 12 case study projects. When proposed use compatibility with adjacent uses and master land use plans cannot be demonstrated, very strong opposition to the project is likely to materialize.

160. From a land use planning perspective, it is also essential that proposed use plans be compatible with available transportation systems and infrastructure. In 5 of the 12 case study projects, the proposed land use concepts included maximum utilization of existing highways, railways, airport access, or shipping channels for goods movement. Also, the existence of infrastructure components such as water supply, sewage disposal, drainage, electricity, and gas service was fully reflected in the designs. Proposed land use concepts that do not take advantage of such site amenities when they are available represent a less than optimal design concept. In locations where waterfront tracts having desirable features, such as rail access, are limited, productive use concepts that take advantage of such site features should be proposed.

161. The fourth implementation factor addressing land use planning is proposed site plan compatibility with site physical features and user requirements. The site plan for the proposed land use is the detailed plan indicating the location of roads, structures, bulkheads, etc., to be constructed on the filled site. A good site plan will utilize the site's physical features to the fullest in

meeting the user's functional needs, while simultaneously minimizing environmental impacts and effects on adjacent land uses. The preparation of site plans is, of course, the responsibility of either the project sponsor, the site owner, or the proposed developer. However, Corps of Engineer planners should be sensitive to the importance of maximum site plan compatibility with site physical features and user requirements.

162. The last implementation factor related to the overall planning and development process is the level of commitment to the proposed land use plan. A firm commitment to the proposed use plan is an important part of project implementation for three reasons. First, in many cases, the approval of environmental review/regulatory agencies can be conditioned upon such a commitment. Second, disposal facility design and construction can be closely coordinated with the proposed use plan if it is certain that the plan will, in fact, be effected. Finally, Corps of Engineer credibility dictates that Corps project planners not become vulnerable to criticism for participating in a project proposed for one land use concept, and then developed for another.

PART IV: RECOMMENDATIONS

Introduction

163. Corps of Engineer involvement in disposal-productive use projects is managed within the Corps' well-established dredged material disposal planning system. Since the mid 1960's, planning for dredged material disposal, particularly for confined disposal, has become increasingly difficult, primarily as a result of environmental initiatives. Faced with the basic problem of providing sufficient confined disposal capacity, Corps planners have rarely participated in planning for the productive use of the completed sites. Active Corps participation in disposal site productive land use planning is one of several recommendations presented below for improving the process by which disposal-productive use projects are planned and implemented.

Recommendations

164. From case study evaluation of 12 disposal-productive use projects, recommendations addressing the following aspects of project implementation are made:

- a. Direct Corps of Engineer participation in productive land use planning.
- b. Corps land use planning expertise.
- c. Coordination of disposal facility and productive land use planning.
- d. Public participation.
- e. Application of sound planning principles in developing productive land use plans.
- f. Authority to expend public funds to enhance disposal-productive use project feasibility.
- g. Corps policies and procedures for disposal-productive use projects.

Direct Corps participation in productive land use planning

165. Within the existing dredged material disposal planning

system, the Corps of Engineers should actively participate in disposal planning involving productive land use concepts for confined disposal sites. As illustrated in the 12 case studies, there are several possible scenarios in which disposal-productive use projects can be planned. Active Corps involvement in productive land use planning is most appropriate during the planning of new disposal facilities for Federal dredging projects, but is also appropriate during planning for the productive development of active disposal sites. For disposal alternatives arising from the preconceived development plans of a project sponsor (or private developer), the appropriate Corps role is more passive, consisting essentially of land use plan review by Corps planners to avoid participation in poorly planned land use projects. Even when the Corps' role is passive, the public usually perceives the Corps' role as more extensive, and thus holds the Corps responsible for deficiencies in the land use plan.

166. There are four primary reasons for direct Corps involvement in productive land use planning. First, the productive development of dredged material disposal sites can have significant impacts on adjacent land uses and, in some cases, on the land use trends of an entire waterfront area. By virtue of its lead role in projects resulting in land creation, the Corps acquires some responsibility for assuring that the interests of adjacent landowners and of the community as a whole are reflected in the ultimate disposition of that land. Admittedly, the Corps' responsibility may be more moral than legal and, in any case, will be determined largely by site ownership considerations.

167. Second, since dredged material disposal pressures are intense and getting more so, it is important for the Corps and local project sponsors to be capable of systematically taking advantage of all planning scenarios that can increase available disposal capacity. Proposed productive land uses that help fulfill the waterfront land use needs of communities will enhance the overall acceptability of proposed disposal plans, thereby assisting implementation and, possibly, providing disposal capacity that might not otherwise have been available.

168. Third, the existing Corps disposal planning system includes policies and procedures for site evaluation and selection, interagency coordination, public involvement, etc. This system provides an excellent framework for achieving a high degree of coordination between disposal facility and productive land use planning. Such coordination will enhance the feasibility and ultimate viability of the selected productive land use concept. Finally, the successful implementation of productive use concepts for confined disposal sites results in the use of dredged material as a manageable resource, thereby avoiding the public relations problems associated with abandoned, unused disposal areas. The increased perception, both inside and outside the Corps, of dredged material as a useful resource is important to the easing of disposal pressures.

Corps land use planning expertise

169. At the present time, Corps and project sponsor disposal planners do not systematically address wide-ranging land use planning considerations during disposal-productive use project planning and review. A basic deficiency noted during this study was the lack of involvement of Corps land use and water resource planning expertise in disposal planning activities. It is, therefore, recommended that Corps disposal planning staffs include an experienced land use planning professional. This will enable land use planning considerations to be addressed as part of a coordinated disposal-productive use planning process. The land use planner, operating according to Corps regulations, would play the role of key liaison among the Corps, project sponsors, site developers, and cognizant planning agencies. The planner would provide important insights regarding alternative disposal areas and site designs, reflecting the types of water-related land uses in demand by the community. For projects of special significance or magnitude, in-house Corps land use planning expertise should be augmented by an outside land use consultant.

Coordination of disposal facility and productive land use planning

170. The feasibility and operational viability of a productive

land use concept can be greatly affected by the design features of the disposal facility. To optimize the functional capabilities of the proposed use, disposal facility and productive land use planning should be undertaken as a single, coordinated effort whenever possible. During disposal facility design, a complete development program as well as a conceptual plan for productive development should be prepared, either by the Corps, the project sponsor, or the proposed developer. This would enable programmed land use needs to be considered early, thereby affording disposal facility designs, including configurations, more suited to the proposed use. Also, disposal operations could then be conducted to account for the needs of the proposed development, enhancing project feasibility and perhaps reducing development costs.

171. The physical planning elements identified in this study (Table 6) are the primary physical features of disposal areas and their proposed locations that affect the feasibility of disposal facility and productive land use plans. They provide a checklist of potential positive physical planning elements that can be capitalized on during project design to enhance project feasibility and public acceptance, and to maximize site utility. Alternatively, they facilitate identification of potential negative physical planning elements that deserve extra attention during project design to eliminate design inefficiencies.

Public participation

172. Under existing procedures, the public (either at large or adjacent to a proposed site) is typically not involved in project planning and review until advanced stages of the implementation process. In instances where public opposition is subsequently encountered, significant project delays can result after most other concerns have been resolved. When public opposition is from adjacent residents who were unaware of a project being planned in their area, a climate of misunderstanding and distrust can develop to the point of overshadowing more rational and important concerns. The appearance of a closed-door Corps planning process should certainly be avoided in any case, but especially to the local public directly impacted by a disposal-productive use project.

173. Existing legislation provides for public participation through a Public Notice and opportunity for public hearings, but project planning has usually proceeded to near final stages by the time official notice is made. For disposal-productive use projects, the Corps' policy should be one of full disclosure to the public of all relevant facts at the earliest stages of the planning process. As with cognizant review agencies, public participants should not be expected to be able to be persuaded of the desirability of a plan. Rather, they should be actively involved in plan development and review from the start. Public involvement in Corps of Engineer planning efforts, or in planning efforts significantly dependent on Corps disposal activities, should not be left up to local project sponsors. Instead, it should be handled directly by Corps personnel.

Application of sound
planning principles in
developing productive land use plans

174. Productive land use plans proposed for confined dredged material disposal sites should explicitly address the 10 land use planning principles identified in this study (Table 7) as most important for sound disposal site productive use planning. Productive land use plans that reflect the 10 planning principles can significantly enhance project acceptability and eventual operational viability. The 10 planning principles can be employed in the form of: (1) minimum planning practice guidelines for project sponsors or potential developers proposing a productive land use concept; (2) an internal Corps checklist for evaluating the features of proposed productive land use plans; and/or (3) a detailed Corps guidance memorandum for direct Corps involvement in productive land use planning.

Authority to expend public funds to enhance disposal-productive use project feasibility

175. A serious constraint on the use of dredged material as a resource through productive land use is the national policy that requires local project sponsors to select, finance, and construct dredged

material disposal areas. Coordination of disposal facility and productive land use planning implies the selection of disposal alternatives that go beyond least-cost options. Thus, disposal-productive use projects are constrained by the capability and willingness of project sponsors to assume the incremental costs associated with facility designs more suited to proposed productive land use concepts. The Corps' authority to expend public funds for disposal activities should be extended to enable the development and selection of facility designs that reflect the productive use objective. Further study is needed to evaluate alternative policies for Federal financial support to enhance productive land use feasibility.

Corps policies and procedures
for disposal-productive use projects

176. Existing Corps of Engineer policies, procedures, rules, and regulations developed in response to the U.S. Water Resources Council's September 1973 Principles and Standards for Planning, Water and Related Land Resources establish the framework within which multi-objective Corps projects must be planned. Corps Engineering Regulations for multiobjective project planning and review should be revised to provide more guidance to Corps planners applying the Principles and Standards to disposal-productive use projects. The implementation factors identified in this study (Table 12) encompass a broad range of considerations important to the successful implementation of disposal-productive use projects. These factors should be utilized during early planning activities (i.e., Stage 1 - Development of Plan of Study) to formulate appropriate project implementation strategies.

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CASE STUDIES AND COMPARATIVE ANALYSES OF ISSUES ASSOCIATED WITH--ETC(U)
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SUPPLEMENTARY

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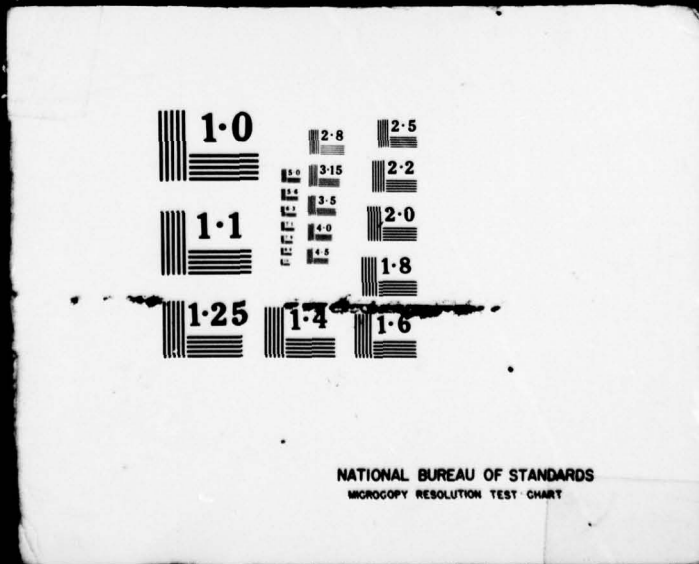


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Errata Sheet

No. 1

CASE STUDIES AND COMPARATIVE ANALYSES OF ISSUES
ASSOCIATED WITH PRODUCTIVE LAND USE AT
DREDGED MATERIAL DISPOSAL SITES

Technical Report D-77-43
Volume I: Main Text
December 1977

1. On cover of report, Susaki Associates Inc. should read:
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