

TABLE OF CONTENTS

	Page
EXECUTIVE SUMMARY	ES-1
E1.0 Project Overview	ES-2
E2.0 Purpose and Need	ES-2
E3.0 Project Alternatives	ES-4
E4.0 Environmental Consequences	ES-7
PART I - PURPOSE AND NEED	I-1
I.1.0 CIDMMA EXPANSION	I-1
Study Authority	I-1
Study Area	I-2
Need For and Objective of Action.....	I-2
Need for Additional Dredged Material Storage Capacity	I-3
I.2.0 TERMINAL CONSTRUCTION.....	I-6
Purpose of New VPA Container Terminal	I-6
Improvements to Existing VPA Facilities to Meet Short-Term Needs	I-7
Effect of Maersk Property to Help Meet Short Term Needs	I-8
Additional Land Area Required to Meet Long Term Port Needs	I-9
PART II - EVALUATION OF ALTERNATIVES	II-1
II.1.0 ALTERNATIVE PLAN DEVELOPMENT	II-1
II.1.1 ALTERNATIVE PLAN DEVELOPMENT CRITERIA	II-1
II.2.0 ALTERNATIVES ANALYSIS.....	II-3
II.2.1 IDENTIFICATION AND EXAMINATION, AND SCREENING OF INITIAL ALTERNATIVES, INCLUDING NO ACTION ALTERNATIVE (STEPS 1-3)	II-4
II.2.1.1 CIDMMA Expansion Alternatives	II-4
II.2.1.2 Terminal Construction Alternatives.....	II-33
Overview.....	II-33
New Container Terminal Requirements	II-33
Description of Potential Locations.....	II-34
Comparison of Marine Terminal Alternatives	II-36
Selected Port Alternative	II-39
II.3.0 ELIMINATION OF NO ACTION ALTERNATIVE	II-39
II.4.0 EVALUATION OF ALTERNATIVE PLANS (STEP 4)	II-41
Eastward Expansion Alternative	II-41
Eastward Expansion with West Dike Strengthening Alternative	II-41
II.5.0 ECONOMIC EVALUATION OF ALTERNATIVE PLANS (STEP 5).....	II-41
II.6.0 PLAN SELECTION (STEP 6)	II-45
Recommended Plan – Eastward Expansion of the CIDMMA	II-46
II.7.0 DESCRIPTION OF EASTWARD CIDMMA EXPANSION.....	II-47
Access to Eastward Expansion and Proposed Craney Island Marine Terminal	II-49

TABLE OF CONTENTS

(Continued)

	Page
Phased Development of Craney Island Marine Terminal.....	II-49
PART III - AFFECTED ENVIRONMENT.....	III-1
III.1.0 COMBINED CIDMMA EXPANSION AND PROPOSED PORT DEVELOPMENT.....	III-1
III.1.1 WATER QUALITY	III-1
III.1.1.1 General Condition.....	III-1
III.1.1.2 Metals	III-3
III.1.1.3 Hydrocarbons.....	III-4
III.1.1.4 Dissolved Oxygen.....	III-4
III.1.1.5 Chesapeake Bay Program	III-5
III.1.1.6 Elizabeth River Project/Virginia Department of Environmental Quality	III-5
III.1.1.7 Hydrodynamics.....	III-6
III.1.1.8 VIMS Hydrodynamic Study	III-7
III.1.1.9 Groundwater	III-7
III.1.2 AIR QUALITY	III-8
III.1.2.1 Air Quality Regulations and Standards.....	III-8
III.1.2.2 Regional Conditions	III-9
III.1.2.2.1 Projected Regional Emissions Inventory.....	III-10
III.1.3 PROTECTED SPECIES AND CRITICAL HABITAT.....	III-10
III.1.3.1 State and Federal Regulations.....	III-10
III.1.3.2 Species and Habitat.....	III-11
III.1.4 AQUATIC BIOTA.....	III-18
III.1.4.1 Finfish	III-18
III.1.4.2 Essential Fish Habitat	III-20
III.1.4.3 Crabs	III-27
III.1.4.4 Submerged Aquatic Vegetation	III-28
III.1.4.5 Benthos	III-28
III.1.4.6 Clams	III-34
III.1.4.7 Oysters	III-35
III.1.4.8 Non-Native Invasive Species.....	III-38
III.1.4.9 Other Flora and Fauna	III-38
III.1.5 WETLANDS AND UPLANDS	III-38
III.1.5.1 Wetlands	III-38
III.1.5.2 Uplands	III-39
III.1.6 SANCTUARIES AND REFUGES	III-39
III.1.7 TRANSPORTATION	III-40
III.1.7.1 Transportation Impact Study Area.....	III-40
III.1.7.2 Highways	III-40
III.1.7.3 Planned and Programmed Improvements	III-42
III.1.7.4 Railroads	III-42
III.1.7.5 Federal Navigation Channels and Anchorages	III-44
III.1.7.6 Public and Private Terminals.....	III-45

TABLE OF CONTENTS

(Continued)

	Page
III.1.7.7 Traffic	III-45
III.1.8 UTILITIES	III-47
III.1.8.1 Water Supply	III-47
III.1.8.2 Wastewater	III-48
III.1.8.3 Energy	III-48
III.1.8.4 Telecommunications	III-48
III.1.9 WASTE MANAGEMENT	III-48
III.1.9.1 Solid Waste Disposal	III-48
III.1.9.2 Hazardous Waste and Materials	III-49
III.1.9.3 Generation, Storage, and Disposal of Hazardous and Petroleum Wastes	III-50
III.1.9.4 CIDMMA	III-51
III.1.10 LAND USE	III-53
III.1.10.1 Residential Uses	III-53
III.1.10.2 Commercial Uses	III-53
III.1.10.3 Industrial and Institutional Uses	III-53
III.1.10.4 Open Space and Conservation Areas	III-54
III.1.10.5 Zoning	III-54
III.1.10.6 Local Plans	III-54
III.1.11 NOISE	III-55
III.1.11.1 Ambient Noise Monitoring	III-56
III.1.11.2 Noise Regulations	III-59
III.1.11.3 Receptors	III-60
III.1.12 VISUAL AND AESTHETIC RESOURCES	III-61
III.1.12.1 Sensitive Receptors	III-61
III.1.13 RECREATIONAL AND COMMERCIAL USE OF WATERS	III-61
III.1.13.1 Commercial Shipping	III-61
III.1.13.2 Commercial Fishing	III-62
III.1.13.3 Recreational Boating and Fishing	III-63
III.1.14 ECONOMICS	III-64
III.1.14.1 Affected Environment	III-64
III.1.14.2 Economic Impact of Virginia Port Authority	III-65
III.1.15 ENVIRONMENTAL JUSTICE	III-67
III.1.15.1 Affected Environment	III-67
III.1.16 PUBLIC SAFETY	III-70
III.1.16.1 Emergency Planning	III-70
III.1.16.2 Emergency Services	III-71
III.1.16.2.1 Fire Protection	III-71
III.1.16.2.2 Law Enforcement	III-71
III.1.16.2.3 Emergency Medical Services	III-72
III.1.16.2.4 Hurricane Evacuation	III-72
III.1.17 HISTORIC AND ARCHAEOLOGICAL RESOURCES	III-73
III.1.18 SECONDARY GROWTH	III-77

TABLE OF CONTENTS

(Continued)

	Page
III.1.18.1 Population Growth.....	III-77
PART IV - ENVIRONMENTAL CONSEQUENCES	IV-1
IV.1.1 HYDRODYNAMICS AND WATER QUALITY.....	IV-1
IV.1.1.1 Hydrodynamic Modeling	IV-1
IV.1.1.2 Water Quality.....	IV-3
IV.1.1.2.1 Dredging for Access Channel and Cell Construction	IV-3
IV.1.1.2.2 Terminal Development	IV-7
IV.1.1.2.3 Accidental Spills	IV-15
IV.1.1.2.4 Ship Operations/Overboard Waste	IV-17
IV.1.1.2.5 Wave Action/Erosion and Hydrodynamics	IV-17
IV.1.1.2.6 Ballast Water	IV-18
IV.1.1.2.7 Sediment Suspension	IV-19
IV.1.2 AIR QUALITY	IV-19
IV.1.2.1 Estimated Air Emissions from Dredging and Dike Construction at CIDMMA.....	IV-19
IV.1.2.2 General Conformity – CIDMMA Expansion	IV-21
IV.1.2.3 Craney Island Terminal Emissions Inventory.....	IV-21
IV.1.2.4 Emissions Estimation Methodology	IV-24
IV.1.2.5 Craney Island Terminal Emissions Summary.....	IV-28
IV.1.2.6 General Conformity – Terminal	IV-30
IV.1.3 PROTECTED SPECIES AND CRITICAL HABITAT.....	IV-31
IV.1.3.1 CIDMMA Expansion /Terminal Development	IV-31
IV.1.3.1.1 Sea Turtles	IV-31
IV.1.3.1.2 Bald Eagles	IV-33
IV.1.3.1.3 Piping Plover/Least Tern	IV-33
IV.1.3.1.4 Marine Mammals.....	IV-33
IV.1.3.1.5 Conclusions.....	IV-34
IV.1.4 AQUATIC BIOTA.....	IV-34
IV.1.4.1 CIDMMA Expansion.....	IV-34
IV.1.4.1.1 Fish and Essential Fish Habitat.....	IV-34
IV.1.4.1.2 Submerged Aquatic Vegetation	IV-39
IV.1.4.1.3 Benthos	IV-39
IV.1.4.2 Other Flora and Fauna	IV-42
IV.1.4.3 Terminal Development	IV-42
IV.1.4.3.1 Fish and Essential Fish Habitat.....	IV-42
IV.1.4.3.2 Submerged Aquatic Vegetation (SAV)	IV-43
IV.1.4.3.3 Benthos	IV-43
IV.1.4.3.4 Other Flora and Fauna	IV-43
IV.1.5 WETLANDS AND SUBAQUEOUS BOTTOMS	IV-43
IV.1.5.1 Dredging and Cell Construction	IV-45
IV.1.5.2 Terminal Development	IV-45
IV.1.5.2.1 Rail Spur and Road Access Corridors	IV-45

TABLE OF CONTENTS

(Continued)

		Page
IV.1.5.2.2	Mudflats	IV-48
IV.1.5.2.3	Subaqueous Bottom	IV-48
IV.1.6	SANCTUARIES AND REFUGES	IV-50
IV.1.7	TRANSPORTATION	IV-50
IV.1.7.1	Trip Generation	IV-51
IV.1.7.2	Projected Daily Traffic	IV-52
IV.1.7.3	2018 Traffic Forecasts and Levels of Service	IV-54
IV.1.7.4	Trip Distribution	IV-55
IV.1.7.5	Roadways	IV-55
IV.1.7.6	Rail Traffic	IV-57
IV.1.7.7	Navigation and Terminal Facilities	IV-58
IV.1.7.7.1	Vessel Traffic	IV-58
IV.1.7.7.2	Terminal Facilities	IV-58
IV.1.8	UTILITIES	IV-59
IV.1.8.1	Water Supply	IV-59
IV.1.8.2	Wastewater	IV-60
IV.1.8.3	Energy	IV-60
IV.1.8.4	Telecommunications	IV-60
IV.1.8.5	Relocation of Existing Utilities	IV-60
IV.1.9	WASTE MANAGEMENT	IV-61
IV.1.9.1	CIDMMA Expansion	IV-61
IV.1.9.1.1	Solid Waste	IV-61
IV.1.9.1.2	Hazardous Wastes and Materials	IV-61
IV.1.9.2	Terminal Development	IV-61
IV.1.9.2.1	Solid Waste	IV-61
IV.1.9.2.2	Hazardous Materials	IV-62
IV.1.10	LAND USE	IV-63
IV.1.10.1	CIDMMA Expansion	IV-63
IV.1.10.1.1	Land Use	IV-63
IV.1.10.1.2	Zoning	IV-64
IV.1.10.2	Terminal	IV-64
IV.1.10.2.1	Land Use	IV-64
IV.1.11	NOISE	IV-65
IV.1.11.1	CIDMMA Expansion	IV-65
IV.1.11.2	Terminal Development	IV-65
IV.1.11.2.1	Trucks	IV-66
IV.1.11.2.2	Operations	IV-67
IV.1.11.2.3	Trains	IV-67
IV.1.11.2.4	Cumulative Noise Impacts from Terminal Development	IV-68
IV.1.12	VISUAL AND AESTHETIC RESOURCES	IV-68
IV.1.12.1	CIDMMA Expansion	IV-68
IV.1.12.2	Terminal	IV-70
IV.1.12.2.1	Ambient Light Levels	IV-70

TABLE OF CONTENTS

(Continued)

	Page
IV.1.12.2.2 Construction Impacts	IV-70
IV.1.13 RECREATIONAL AND COMMERCIAL USE OF WATERS.....	IV-70
IV.1.13.1 CIDMMA Expansion and Terminal Development.....	IV-70
IV.1.13.1.1 Commercial Shipping	IV-70
IV.1.13.2.2 Commercial Fishing.....	IV-70
IV.1.13.1.3 Recreational Boating and Fishing.....	IV-72
IV.1.14 ECONOMICS	IV-72
IV.1.14.1 CIDMMA Expansion - Direct, Indirect and Induced Impacts.....	IV-72
IV.1.14.2 Terminal Development - Direct, Indirect and Induced Impacts	IV-74
IV.1.14.3 Measurements of Economic Benefit.....	IV-74
IV.1.14.4 Terminal Operation.....	IV-75
IV.1.15 ENVIRONMENTAL JUSTICE.....	IV-76
IV.1.15.1 CIDMMA Expansion and Terminal Development.....	IV-76
IV.1.16 PUBLIC SAFETY.....	IV-77
IV.1.16.1 CIDMMA Expansion and Terminal Development.....	IV-77
IV.1.17 HISTORIC AND ARCHAEOLOGICAL RESOURCES	IV-77
IV.1.17.1 CIDMMA Expansion.....	IV-77
IV.1.17.2 Terminal Development	IV-78
IV.1.18 SECONDARY GROWTH.....	IV-79
IV.1.18.1 Residential Growth	IV-79
IV.1.18.2 Commercial Development	IV-79
IV.1.18.3 Industrial Development.....	IV-80
IV.1.19 COASTAL ZONE RESOURCES AND PERMITS	IV-80
IV.1.20 SAND BORROW FOR DIKE CONSTRUCTION	IV-81
IV.1.21 CUMULATIVE EFFECTS	IV-82
IV.1.21.1 Cumulative Effects Issues Identified During Scoping.....	IV-84
IV.1.21.2 Cumulative Effects Assessment Methodology	IV-85
IV.1.21.3 Identification of Past, Present and Future Actions.....	IV-87
IV.1.21.4 Results of Cumulative Effects Assessment.....	IV-89
IV.1.22 MITIGATION.....	IV-91
IV.1.22.1 Background.....	IV-91
 PART V – LIST OF PREPARERS.....	 LOP-1
 PART VI – REFERENCES	 R-1
 PART VII – INDEX	 INDEX-1