AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES	
J	1	4

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
0001	25-Aug-2015		

6. ISSUED BY CODE N40192	7. ADMINISTERED BY (If other than item 6) CODE
COMMANDING OFFICER - NAVFAC MARIANAS IPT MILCON PSC 455, BOX 195 FPO AP 96540-2937	**See Item 6**

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		
	X	9A. AMENDMENT OF SOLICITATION NO. N40192-15-R-1301
	X	9B. DATED (SEE ITEM 11) 04-Aug-2015
		10A. MOD. OF CONTRACT/ORDER NO.
		10B. DATED (SEE ITEM 13)
CODE	FACILITY CODE	

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [X] is extended, [ ] is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS.
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

[ ] A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

[ ] B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

[ ] C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

[ ] D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [ ] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

N40192-15-R-1301 FY15 MAINTENANCE DREDGING AT VARIOUS LOCATIONS, APRA HARBOR, NAVAL BASE GUAM

See SF30 Block 14 Continuation Page.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) TEL: EMAIL:	
15B. CONTRACTOR/OFFEROR _____ (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____ (Signature of Contracting Officer)	16C. DATE SIGNED 25-Aug-2015

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

The following have been added by full text:
AMENDMENT 01

In accordance with FAR 52.252-3 Alterations in Solicitation (APR 1984), portions of this solicitation are altered as follows:

1. Insert the following text to Section 00210, Part II, paragraph 2.2(d.)(1)(i.) under Factor 1 – Experience: "The Offeror may utilize experience of a subcontractor that will perform major or critical aspects of the requirement to demonstrate experience under this evaluation factor. The Offeror must provide a binding teaming agreement or other contractual agreement and an explanation of the meaningful involvement that the subcontractor will have in performance of this contract."

2. Replace the bid schedule in its entirety with revised Amendment 0001 Bid Schedule provided as Attachment (1) to incorporate the following changes:
    a. CLIN 0001 (Base Bid) quantity for sediment removal/disposal (Upland Disposal) is changed from 17,400 to "13,400" cubic yards.
    b. CLIN 0003 (MEC Anomaly Investigation) quantity is changed from 2 to "5" days.
    c. CLIN 0004 (Option 1) is deleted and replaced with "Perimeter Dike Option".
    d. CLIN 000801 and 000802 (Additional MEC Anomaly Investigation) quantities are revised.
    e. CLIN 000803 for Additional MEC Anomaly Investigation is added.

3. Replace in its entirety RFP Part 2 Specification SECTION 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS dated 04/17/15 with SECTION 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS dated 05/15 provided as Attachment (2).

4. Replace in its entirety RFP Part 3 Project Program dated 31 July 2015 with RFP Part 3 Project Program dated 20 August 2015 provided as Attachment (3). **NOTE: All revisions are highlighted in blue.**

5. Incorporate Attachment 7 - Sediment Management Framework, Apra Harbor Naval Complex, Apra Harbor, Guam Final Report, September 2010 to RFP Part 3 Project Program provided as Attachment (4).

6. Provide Notice 01 in response to requests for information provided as Attachment (5).

7. Extend the due date for receipt of proposals from September 4, 2015 to Wednesday, September 9, 2015 at 4:30PM (Guam time).

8. Offerors shall acknowledge this amendment in Block 19 of the Standard Form 1442 with their proposals.

SECTION 00010 - SOLICITATION CONTRACT FORM

CLIN 0001
The CLIN extended description has changed
From :
Total Price for all work to be completed, except work in CLIN 0002 and CLIN 0003, for maintenance dredging at various wharves at Apra Harbor, Naval Base Guam in accordance with all requirements of RFP N40192-15-R-1301. For bidding purposes, the base bid includes estimated quantities for the following: (1) 17,400 cubic yards of sediment removal/disposal (Upland Disposal); (2) 39,600 cubic yards of sediment removal/disposal (Ocean Disposal); and (3) To screen and remove/dispose 350 tons of dredged debris two inches (2”) and larger (to include new dredged spoils from this contract and old dredged spoils from Alpha/Bravo wharves located in the designated CDF cell 5A). These estimated quantities shall be subject to FAR Clause 52.211-18 Variation in Estimated Quantity (APR 1984) and Sub Line Item Numbers (SLIN) 000101, 000102, and 000103.

To:
Total Price for all work to be completed, except work in CLIN 0002 and CLIN 0003, for maintenance dredging at various wharves at Apra Harbor, Naval Base Guam in accordance with all requirements of RFP N40192-15-R-1301. For bidding purposes, the base bid includes estimated quantities for the following: (1) 13,400 cubic yards of sediment removal/disposal (Upland Disposal); (2) 39,600 cubic yards of sediment removal/disposal (Ocean Disposal); and (3) To screen and remove/dispose 350 tons of dredged debris two inches (2”) and larger (to include new dredged spoils from this contract and old dredged spoils from Alpha/Bravo wharves located in the designated CDF cell 5A). These estimated quantities shall be subject to FAR Clause 52.211-18 Variation in Estimated Quantity (APR 1984) and Sub Line Item Numbers (SLIN) 000101, 000102, and 000103..

CLIN 0003
The CLIN extended description has changed
From:
Provide a total price for any Munitions and Explosives of Concern (MEC) Anomaly Investigation related to all CDF construction and reconstruction. To include all costs, in accordance with the latest version of the Joint Region Marianas Explosives Safety Submission (JRM ESS) requirements and the requirements of the RFP. For bidding purposes assume the quantity for this CLIN is 2 days. The unit price in CLIN 0003 will be adjusted in accordance with FAR Clause 52.243-4 Changes (JUN 2007).

To:
Provide a total price for any Munitions and Explosives of Concern (MEC) Anomaly Investigation related to all CDF construction and reconstruction. To include all costs, in accordance with the latest version of the Joint Region Marianas Explosives Safety Submission (JRM ESS) requirements and the requirements of the RFP. For bidding purposes assume the quantity for this CLIN is 5 days. The unit price in CLIN 0003 will be adjusted in accordance with FAR Clause 52.243-4 Changes (JUN 2007)..

CLIN 0004
The CLIN description has changed from OPTION 1: Sand Filter To OPTION 1: Perimeter Dike.

The CLIN extended description has changed
From:
Provide a lump sum price including all costs to provide a six foot (6’) thick clean sand filter below the spoils to act as the leachate attenuation at the two new subcells within the existing cell 5A of the CDF site, in accordance with the requirements of the RFP. This option is based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007).

To:
Provide a lump sum price including all costs to clear remainder of Cell 5A of the CDF site beyond the limits of the new sub-cells, and utilize the remaining spoils from Alpha/Bravo wharves within Cell 5A to modify and raise the height of the existing Cell 5A perimeter dike. All work shall be in accordance with the requirements of the RFP. This option is based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007)..

SUBCLIN 000801
The CLIN extended description has changed
From:
Provide a price per day for 1-5 days of additional MEC Anomaly Investigation. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007).

To:
Provide a price per day for 6-10 days of additional MEC Anomaly Investigation. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007)..

SUBCLIN 000802
The CLIN extended description has changed
From:
Provide a price per day for 6-10 days of additional MEC Anomaly Investigation. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007).

To:
Provide a price per day for 11-15 days of additional MEC Anomaly Investigation. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007)..

SUBCLIN 000803 is added as follows:

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000803			Days		
	Unit Price for Additional MEC Anomaly FFP Provide a price per day for 16-30 days of additional MEC Anomaly Investigation. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007). FOB: Destination				

NET AMT

(End of Summary of Changes)

Section 00010 - Solicitation Contract Form

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001			Project		

BASE BID
FFP
Total Price for all work to be completed, except work in CLIN 0002 and CLIN 0003, for maintenance dredging at various wharves at Apra Harbor, Naval Base Guam in accordance with all requirements of RFP N40192-15-R-1301. For bidding purposes, the base bid includes estimated quantities for the following: (1) 13,400 cubic yards of sediment removal/disposal (Upland Disposal); (2) 39,600 cubic yards of sediment removal/disposal (Ocean Disposal); and (3) To screen and remove/dispose 350 tons of dredged debris two inches (2”) and larger (to include new dredged spoils from this contract and old dredged spoils from Alpha/Bravo wharves located in the designated CDF cell 5A). These estimated quantities shall be subject to FAR Clause 52.211-18 Variation in Estimated Quantity (APR 1984) and Sub Line Item Numbers (SLIN) 000101, 000102, and 000103.
FOB: Destination

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000101			Cubic Yard		

Base Bid Unit Price for Upland Disposal
FFP
Provide a unit price per cubic yard for all costs, to remove, transfer and offload sediments to the offloading site, and haul and unload sediments to the CDF in accordance with the estimated quantities (Upland Disposal). The unit price in SLIN 000101 will be used to adjust the total contract price for any increase or decrease to the variation above 115 percent or below 85 percent of the estimated quantities stipulated in the Base Bid (CLIN 0001), subject to FAR Clause 52.211-18, Variation in Estimated Quantity (APR 1984).
FOB: Destination

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000102			Cubic Yard		

Base Bid Unit Price for Ocean Disposal
FFP
Provide a unit price per cubic yard for all costs to remove, transfer and offload sediments to the offloading site, and haul and unload sediments to the ocean disposal site in accordance with the estimated quantities (Ocean Disposal). The unit price in SLIN 000102 will be used to adjust the total contract price for any increase or decrease to the variation above 115 percent or below 85 percent of the estimated quantities stipulated in the Base Bid (CLIN 0001), subject to FAR Clause 52.211-18, Variation in Estimated Quantity (APR 1984).
FOB: Destination

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000103			Wet Ton		

Base Bid Unit Price for Debris Removal
FFP
Provide a unit price per ton for all costs, to screen, remove and dispose dredged debris two inches (2”) and larger (Debris Removal). To include new dredged spoils from this contract and old dredged spoils from the Alpha/Bravo wharves located in the designated CDF cell 5A. The unit price in SLIN 000103 will be used to adjust the total contract price for any increase or decrease in the variation above 115 percent or below 85 percent of the estimated quantities stipulated in the Base Bid (CLIN 0001), subject to FAR Clause 52.211-18, Variation in Estimated Quantity (APR 1984).
FOB: Destination

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0002			Lump Sum		

MEC Anomaly Identification
FFP
Provide a total price for all Munitions and Explosives of Concern (MEC) Anomaly Identification related to all CDF construction and reconstruction work. To include all costs, in accordance with the latest version of the Joint Region Marianas Explosives Safety Submission (JRM ESS) requirements and the requirements of the RFP; not including any work in CLIN 0003, MEC Anomaly Investigation.
FOB: Destination

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0003			Lump Sum		

MEC Anomaly Investigation
FFP
Provide a total price for any Munitions and Explosives of Concern (MEC) Anomaly Investigation related to all CDF construction and reconstruction. To include all costs, in accordance with the latest version of the Joint Region Marianas Explosives Safety Submission (JRM ESS) requirements and the requirements of the RFP. For bidding purposes assume the quantity for this CLIN is 5 days. The unit price in CLIN 0003 will be adjusted in accordance with FAR Clause 52.243-4 Changes (JUN 2007).
FOB: Destination

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0004			Lump Sum		
OPTION	OPTION 1: Perimeter Dike FFP Provide a lump sum price including all costs to clear remainder of Cell 5A of the CDF site beyond the limits of the new sub-cells, and utilize the remaining spoils from Alpha/Bravo wharves within Cell 5A to modify and raise the height of the existing Cell 5A perimeter dike. All work shall be in accordance with the requirements of the RFP. This option is based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007). FOB: Destination				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0005			Cubic Yard		
OPTION	OPTION 2: Additional Upland Disposal FFP Total price, including all costs, for additional Upland Disposal in accordance with the RFP. Unit prices are to be provided in stated quantities in SLIN 000501 and 000502. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions, price adjustment in accordance with FAR Clause 52.243-4 Changes (JUN 2007). FOB: Destination				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000501			Cubic Yard		

UNIT PRICE FOR 1,000 TO 5,000 CY
FFP
Provide a unit price for 1,000 to 5,000 cubic yards of additional Upland Disposal. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007).
FOB: Destination

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000502			Cubic Yard		

UNIT PRICE FOR 5,001 TO 10,000 CY
FFP
Provide a unit price for 5,001 to 10,000 cubic yards of additional Upland Disposal. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007).
FOB: Destination

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0006			Cubic Yard		
OPTION	OPTION 3: Additional Ocean Disposal FFP Total price including all costs, for additional Ocean Disposal in accordance with the RFP. Unit prices are to be provided in stated quantities in SLIN 000601 and 000602. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (JUN 2007). FOB: Destination				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000601			Cubic Yard		
	Additional 1,000 to 5,000 CY FFP Provide a unit price for 1,000 to 5,000 additional cubic yards of Ocean Disposal. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007). FOB: Destination				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000602			Cubic Yard		
	Additional 5,001 to 10,000 CY FFP Provide a unit price for 5,001 to 10,000 cubic yards of additional Ocean Disposal. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007). FOB: Destination				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0007 OPTION			Wet Ton		
	OPTION 4: Additional Debris Removal FFP Total price including all costs for additional Debris Removal in accordance with the RFP. Unit prices are to be provided in stated quantities in SLIN 000701. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (JUN 2007). FOB: Destination				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000701			Wet Ton		
	1 to 50 Additional Tons FFP Provide a unit price for 1 to 50 Tons of additional Debris Removal. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007). FOB: Destination				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008 OPTION			Days		
	OPTION 5: Additional MEC Investigation FFP Provide a unit price per day including all costs, for additional MEC Anomaly Investigation in accordance with the latest version of the Joint Region Marianas Explosives Safety Submission (JRM ESS) requirements and the requirements of the RFP. Unit prices are to be provided for stated quantities in SLIN 000801 and 000802. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007). FOB: Destination				
				NET AMT	

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000801			Days		

Unit Price for Additional MEC Anomaly
FFP
Provide a price per day for 6-10 days of additional MEC Anomaly Investigation. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007).
FOB: Destination

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000802			Days		

Unit Price for Additional MEC Anomaly
FFP
Provide a price per day for 11-15 days of additional MEC Anomaly Investigation. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007).
FOB: Destination

NET AMT

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
000803			Days		
	Unit Price for Additional MEC Anomaly FFP Provide a price per day for 16-30 days of additional MEC Anomaly Investigation. Additional quantities are to be determined based on available funds at time of contract award subject to actual site conditions and price adjustment in accordance with FAR Clause 52.243-4 Changes (June 2007). FOB: Destination				

NET AMT

CLIN STRUCTURE

1. **Notes for Contract Line Item Numbers (CLINS):**

   i. The Offeror shall use the price proposal schedule provided in the solicitation to indicate a price for ALL contract line items.

   ii. Depending on availability of funds, Option 1, Option 2, Option 3, Option 4 and Option 5 (CLINs 0004, 0005, 0006, 0007, 0008) may be exercised at time of award for additional quantities subject to the Changes clause.

   iii. CHANGES CLAUSE: The additional quantities in CLINs 0004, 0005, 0006, 0007 and 0008 are made in accordance with FAR Clause 52.243-4 Changes and subject to actual site conditions. Pending determination of actual site conditions and dredging work, the total price for the task order award is subject to a price adjustment at the unit price for the CLIN.

   iv. In the event there is a difference between a unit price and the extended total amount, the unit price will be held to be the intended offer and the total of the CLINs will be recomputed accordingly.

   v. **FAR 52.217-4, EVALUATION OF OPTIONS EXERCISED AT TIME OF CONTRACT AWARD (JUN 1988)** – Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate the total price for the basic requirement together with any option(s) exercised at the time of award.

SECTION 01 57 19.01 20

SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS
Joint Region Marianas Explosives Safety Submission (JRM ESS)
05/15

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. If state or local references are not provided here, refer to Section 01 57 19.00 20 TEMPORARY ENVIRONMENTAL CONTROLS for appropriate references.

JOINT REGION MARIANAS (JRM)

JRM ESS (Amendment Series)	Explosives Safety Submission, Munitions Response Sites, GUAM CONSTRUCTION SUPPORT

DEPARTMENT OF DEFENSE (DOD)

EM-385-1-1	Safety and Health Requirements Manual, US Army Corp of Engineers (USACE)
NOSSAINST 8020.15D	Naval Ordinance Safety and Security Activity, Explosives Safety Review, Oversight, and Verification of Munitions Responses (U)
NAVSEA OP 5 (Volume 1)	Naval Sea Systems Command, Ammunition and Explosives Safety Ashore
DDESB TP-18	Department of Defense Explosive Safety Board, Technical Paper 18, Qualifications for UXO Technicians
NOSSAINST 8023.11B	Standard Operating Procedures, Development, Implementation, and Maintenance for Ammunition and Explosives

- For all above references the most current version applies

1.2 SUBMITTALS

Government acceptance is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

ESS Work Plans (Anomaly Avoidance, Anomaly Investigation, DGM, DGM followed by Anomaly Investigation, DGM followed by Advanced Technology / Munitions Classifier followed by Anomaly Investigation); G
Installation Commanding Officer (ICO) Notification; G

SD-11 Field Reports, After Action Report, and Closeout

QC/QA Report; G

MEC/MPPEH Spot Report; G

Weekly Situational/Status Report (SITREP); G

After Action Report (AAR) (Anomaly Avoidance, Anomaly Investigation, DGM, Advanced Technology / Munitions Classifier); G

1.2.1 Submittal Schedule

Submittal schedule requirements for various ESS Deliverables are detailed below. The period of review for each resubmittal is the same as for initial submittal.

Scenario 1: Anomaly Avoidance

SUBMITTALS REQUIRED PRIOR TO ANOMALY AVOIDANCE		
Submittals	**Copies**	**Timeframe**
Anomaly Avoidance Work Plan	Electronic, 6 hard copies, each with CD, bookmarked .pdf and .doc (or .xls) file	14 calendar days after award
Government Review/Accept Anomaly Avoidance Work Plan	Electronic, .pdf and .doc (or .xls) file	14 calendar days

*Avoidance field work may commence after Government acceptance of the Anomaly Avoidance Work Plan.

SUBMITTALS REQUIRED DURING ANOMALY AVOIDANCE		
Weekly SITREP	Electronic	Weekly
MEC/MPPEH Spot Report	Electronic	As required, within 1 business day of confirming identification of MECMPPEH
QC/QA Report	Electronic	As required; government review and acceptance 14 calendar days

SUBMITTALS REQUIRED POST-ANOMALY AVOIDANCE		
Anomaly Avoidance After Action Report	Electronic, 6 hard copies, each with CD, bookmarked .pdf and .doc	7 calendar days after completion of all Anomaly Avoidance work
Government Review/Accept Anomaly Avoidance AAR	Electronic, .pdf and .doc (or .xls) file	14 calendar days

Scenario 2: Anomaly Investigation

SUBMITTALS REQUIRED PRIOR TO ANOMALY INVESTIGATION		
Submittals	**Copies**	**Timeframe**
Anomaly Investigation Work Plan	Electronic, 6 hard copies, each with CD, bookmarked .pdf and .doc (or .xls) file	14 calendar days after award
Government Review/ Accept Anomaly Investigation Work Plan	Electronic, DC with .pdf and .doc (or .xls) file	14 calendar days
Installation Commanding Officer (ICO) Notification	Electronic, slide presentation	45 calendar days prior to anomaly investigation

*Anomaly Investigation field work may commence after Government acceptance of Anomaly Investigation Work Plan.

SUBMITTALS REQUIRED DURING ANOMALY INVESTIGATION		
Weekly SITREP	Electronic	Weekly
MEC/MPPEH Spot Report	Electronic	As required, within 1 business day of confirming identification of MECMPPEH
QC/QA Report	Electronic	As required; government review and acceptance 14 calendar days

SUBMITTALS REQUIRED POST-ANOMALY INVESTIGATION		
Anomaly Investigation After Action Report	Electronic, 6 hard copies, each with CD, bookmarked .pdf and .doc	7 calendar days after completion of all Anomaly Investigation work
Government Review/Accept Anomaly Investigation AAR	Electronic, .pdf and .doc (or .xls) file	14 calendar days

Scenario 3: DGM Followed by Anomaly Investigation

SUBMITTALS REQUIRED PRIOR TO DGM		
Submittals	**Copies**	**Timeframe**
DGM Work Plan	Electronic, 6 hard copies, each with CD, bookmarked .pdf and .doc	14 calendar days after award
Government Review/Accept DGM Work Plan	Electronic, .pdf and .doc (or .xls) file	14 calendar days

*DGM field work may commence after Gov't acceptance of DGM Work Plan.

SUBMITTALS REQUIRED DURING DGM		
DGM QC/QA Report	Electronic	As required, government review and acceptance 7 calendar days

SUBMITTALS REQUIRED POST-DGM		
DGM After Action Report	Electronic, 6 hard copies, each with CD, bookmarked .pdf and .doc	30 calendar days after completion of all DGM field work
Government Review/Accept DGM AAR	Electronic, .pdf and .doc (or .xls) file	14 calendar days

*Anomaly Investigation Work Plan shall not be submitted until DGM AAR is accepted by the Government.

SUBMITTALS REQUIRED PRIOR TO ANOMALY INVESTIGATION		
Anomaly Investigation Work Plan	Electronic, 6 hard copies, each with CD, bookmarked .pdf and .doc	14 calendar days after award
Government Review/ Accept Anomaly Investigation Work Plan	Electronic, DC with .pdf and .doc (or .xls) file	14 calendar days
Installation Commanding Officer (ICO) Notification	Electronic, slide presentation	45 calendar days prior to anomaly investigation

*Anomaly Investigation field work may commence after Gov't acceptance of Anomaly Investigation Work Plan.

SUBMITTALS REQUIRED DURING ANOMALY INVESTIGATION		
Weekly SITREP	Electronic	Weekly
MEC/MPPEH Spot Report	Electronic	As required, within 1 business day of confirming identification of MECMPPEH
QC/QA Report	Electronic	As required; government review and acceptance 14 calendar days

SUBMITTALS REQUIRED POST-ANOMALY INVESTIGATION		
Anomaly Investigation After Action Report	Electronic, 6 hard copies, each with CD, bookmarked .pdf and .doc	7 calendar days after completion of all Anomaly Investigation work

Government Review/Accept Anomaly Investigation AAR	Electronic, .pdf and .doc (or .xls) file	14 calendar days

The following requirements apply to the CD ROM.

1. A native file in .doc format will be provided for all reports.
2. A .pdf file(s) of the final documents shall be provided in the following formats: The entire document shall be provided as one pdf file. The pdf file shall have bookmarks for each item identified in the document's table of contents, including tables, figures, captioned photos, and appendices. The bookmark shall use the same description as provided in the table of contents. If the bookmark is lengthy, abbreviate as needed. Bookmark to the second level (i.e. 1.1, 1.2, 1.3, etc.). Do not bookmark signature page of the list of acronyms. Each appendix, regardless of size, shall be provided as an individual pdf file. All maps, figures, and pictures shall be provided at a useable resolution. All color maps, figures, and pictures shall be provided in color.

1.3 Personnel Qualifications and Duties

Personnel shall meet the minimum qualification standards set forth in DDESB TP 18 and the JRM ESS, including training and experience requirements. Duties are defined in DDESB TP 18 and the JRM ESS.

For projects requiring on site construction support, a UXO Technician II or above shall be present on site.

For projects requiring munitions response (i.e. anomaly avoidance or anomaly investigation), the contractor shall provide the following personnel:

1.3.1 UXO Safety Officer (UXOSO)

The UXOSO shall be responsible for implementing the Site Health and Safety Plan (SHSP) and the Accident Prevention Plan (APP). UXOSO must be on site during anomaly investigation. UXOSO may also perform duties of the UXOQCS.

1.3.2 UXO Quality Control Specialist (UXOQCS)

The UXOQCS shall be responsible for implementing the Quality Control Plan. The UXOQCS may also perform duties of the UXOSO. During DGM, either the UXOQCS or Geophysicist must be on site. The UXOQCS shall not report to the SUXOS. The UXOQCS is responsible to ensure that the three phases of quality control (preparatory, initial, and follow-up) are properly implemented and shall inspect each definable feature of work by phase. If anomaly investigation is included, the UXOQCS is responsible for insuring proper implementation of the Geophysical System Verification process, installing an Instrument Verification Strip, and emplacing blind seeds.

1.3.3 The UXO Quality Assurance Manager (UXOQAM)

A qualified government representative shall be assigned to perform the duties of UXOQAM.

1.3.4 Senior UXO Supervisor (SUXOS)

The SUXOS is responsible to oversee all munitions response work. The SUXOS

shall be on site at all times during anomaly investigation. SUXOS shall not perform the role of UXOSO or UXOQCS.

1.3.5 Geophysicist

A geophysicist shall be required for DGM only. The Geophysicist shall have a degree in geophysics, geology, geological engineering, or other closely-related field. The geophysicist shall have a minimum of five years of experience directly related to the geophysical mapping, detection, and classification of buried military munitions. This individual is the project geophysicist-of-record and has overall responsibility for design, implementation, and management of geophysical investigations required for the work effort related to military munitions. The geophysicist is not required to be on-site full time; however during DGM, either the UXOQCS or geophysicist must be on site.

1.3.6 UXO Technicians

UXO Technicians shall be provided by the contractor as needed based on site and project conditions. Training and experience shall be in accordance with DDESB TP 18 and JRM ESS and be commensurate with their assigned duties.

1.4 General Requirements for all Work Plans (WP)

Specific requirements for WP elements are described below. The WP shall be written, job-specific, and address any unusual or unique aspects of the project or activity for which it is written. The WP shall interface with the Contractor’s overall safety, health, and quality control programs. The Government considers the Prime Contractor to be the “controlling authority” for all work site safety, healthy, and quality control implementation of the subcontractors. Contractors are responsible for informing their subcontractors of the safety and quality provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention and quality control responsibilities are being carried out. The contractor shall implement the three phases of quality control. The WP shall be signed by the project superintendent, the project QC Manager, the project SSHO, the UXOSO, UXOQCS, SUXOS, and geophysicist (DGM WP only).

Once accepted by the Contracting Officer, the WP and attachments will be enforced as part of the contract. Only when the WP is accepted shall the contractor be permitted to begin intrusive activity. Disregarding the provisions of this contract or the accepted WP will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.

Once work begins, changes to the accepted WP shall be made with the knowledge and concurrence of the Contracting Officer, project superintendent, QC Manager, SSHO, UXOSO, UXOQCS, SUXOS, and geophysicist (DGM WP only). Should any severe hazard exposure, i.e. imminent danger, become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate/remove the hazard. In the interim, take all necessary action to restore and maintain safe working

conditions in order to safeguard onsite personnel, visitors, the public, and the environment.

Copies of the accepted WP will be maintained at the Contracting Officer's office and at the job site.

1.4.1 Anomaly Avoidance Work Plan (WP)

The Anomaly Avoidance WP shall include, but not be limited to the following:

1. Project Plan. Describe the overall approach to manage and execute anomaly avoidance for surface and subsurface clearance. Identify the objectives and provide details on the equipment, methods, and standard operating procedures to be used. Identify procedures to be followed in the event that actual or suspected MEC/MPPEH is discovered. The WP shall comply with NAVSEA OP5 Section 14-10.3.1.5 that requires soil to be removed in layers when the depth of intrusive activities exceeds the detection limits of the geophysical instruments used.

2. Organization and Qualifications. Identify the MEC personnel organization, including organizational chart and the names and qualifications of MEC personnel in resume' format. Include copies of all certifications and qualifications per DDESB TP 18 and the JRM ESS.

3. Traffic Control. Detail traffic control and mitigation measures to be employed during anomaly avoidance. Consideration shall be given to temporary road closures, alternate work schedules, and other methods to minimize impact to vehicular and pedestrian traffic. The Contractor shall be responsible for signage, devices, flag men, and any other control measures required to safely employ traffic control. The Traffic Control Plan shall be separate from the Traffic Control Plan required by Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

4. Communications Plan. Identify points of contact within the Prime Contractor and appropriate subcontractor organizations related to MEC/UXO clearance and other on-site activities. The list shall include but may not be limited to appropriate government personnel such as the Construction Management Engineer, EOD representative, and appropriate first responders. All contractor and government points of contact shall have names, titles, and primary and secondary phone numbers listed as appropriate. Include direction on who will be called for what specific reasons and the priority in which they will be contacted.

5. Schedule. Include specific line items for development, review, and acceptance for all submissions. It is the responsibility of the Prime Contractor to present an overall construction schedule that includes anomaly avoidance operations within the overall construction time line.

6. Accident Prevention Plan (APP) / Site Health and Safety Plan (SHSP). Describe site-specific hazards and the procedures to protect the health and safety of workers and the public during MEC activities. Include worker protective clothing and equipment, staging areas, and other requirements as appropriate. The MEC APP shall be a separate submittal from the Construction Accident Prevention Plan required by Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS.

7. Quality Control Plan (QCP). Describe the project-specific quality control and procedures that will be implemented. The three phases of control shall be used. The QCP shall be a separate submittal from the Construction Quality Control Plan required by Section 01 45 00.00 20 QUALITY CONTROL.

1.4.2 Digital Geophysical Mapping (DGM) Work Plan (WP)

The DGM WP shall include but not be limited to the following:

1. Project Plan. Describe the overall approach to manage and execute DGM. Identify the objectives and provide details on the equipment, methods, and standard operating procedures to be used. Detail the munitions history of the site to include previous munitions surveys and responses. Detail the technical approach used to execute DGM operations and the procedures required to prepare the site for DGM. Detail surface clearance procedures. Detail DGM processes and procedures to include the geophysical system verification (GSV) process, data collection, and data processing. Include site maps that identify acreage, HFD, and positional data. The WP shall comply with NAVSEA OP5 Section 14-10.3.1.5 that requires soil to be removed in layers when the depth of intrusive activities exceeds the detection limits of the geophysical instruments used.

2. Organization and Qualifications. Identify the MEC personnel organization, including organizational chart and the names and qualifications of MEC personnel in resume’ format. Include copies of all certifications and qualifications per DDESB TP 18 and the JRM ESS.

3. Traffic Control. Detail traffic control and mitigation measures to be employed during DGM. Consideration shall be given to temporary road closures, alternate work schedules, and other methods to minimize impact to vehicular and pedestrian traffic. The Contractor shall be responsible for signage, devices, flag men, and any other control measures required to safely employ traffic control. The Traffic Control Plan shall be included in the Traffic Control Plan required by Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

4. Communications Plan. Identify points of contact within the Prime Contractor and appropriate subcontractor organizations related to MEC/UXO clearance and other on-site activities. The list shall include but may not be limited to appropriate government personnel such as the Construction Management Engineer, Public Affairs Officer, EOD representative, and appropriate first responders. All contractor and government points of contact shall have names, titles, and primary and secondary phone numbers listed as appropriate. Include direction on who will be called for what specific reasons and the priority in which they will be contacted.

5. Schedule. Include specific line items for development, review, and acceptance for all submissions. It is the responsibility of the Prime Contractor to present an overall construction schedule that includes the appropriate JRM ESS clearance operations within the overall construction time line.

6. Accident Prevention Plan (APP) / Site Health and Safety Plan (SHSP). Describe site-specific hazards and the procedures to protect the health and safety of workers and the public during DGM activities. Include worker protective clothing and equipment, staging areas, and waste disposal requirements. The DGM APP shall be a separate submittal from the

Construction Accident Prevention Plan required by Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS.

7. Quality Control Plan (QCP). Describe the project-specific quality control and procedures that will be implemented during all aspects of the DGM process. The three phases of control shall be used. Include specific details on the instrument validation strip (IVS) and blind seeding procedures. The QCP shall be a separate submittal from the Construction Quality Control Plan required by Section 01 45 00.00 20 QUALITY CONTROL.

1.4.3 Anomaly Investigation Work Plan (WP)

For projects that include DGM, the Anomaly Investigation WP shall be submitted after the acceptance of the DGM After Action Report (AAR). For projects that include extensive footprint or will be executed in zones/phases that result in multiple DGM AARs, a single Anomaly Investigation WP may be submitted and may be supplemented as additional zone DGM AARs are completed and accepted based on the phased schedule.

Only when the Anomaly Investigation WP is accepted by the Government can ground disturbing work begin. Should the accepted Anomaly Investigation WP only include particular zones due to a phased schedule, ground disturbing work may being only in those zones within the accepted Anomaly Investigation WP.

The Anomaly Investigation WP shall include, but not be limited to the following:

1. Project Plan. Describe the overall approach to manage and execute anomaly investigation for surface and subsurface clearance. Identify the objectives and provide details on the equipment, methods, and standard operating procedures to be used. Detail the primary and contingency munitions with the greatest fragmentation distances (MGFD) and the EZs that apply. Detail any reductions in EZs realized through armoring and engineering controls. Address site specific logistical requirements such as water / electrical / other utilities and demolition requirements, site restoration work, etc. Address on-going activities adjacent to the project site that may be impacted by the EZ (e.g. traffic along adjacent roads, housing, offices, etc.). Provide figures that identify exclusion zones for MGFDs and impacted property owners within the EZ. The WP shall comply with NAVSEA OP5 Section 14-10.3.1.5 that requires soil to be removed in layers when the depth of intrusive activities exceeds the detection limits of the geophysical instruments used.

2. Organization and Qualifications. Identify the MEC personnel organization, including organizational chart and the names and qualifications of MEC personnel in resume’ format. Include copies of all certifications and qualifications per DDESB TP 18 and the JRM ESS.

3. Site Specific Logistical Requirements. Identify staging and storage areas, lay down areas, designated soil storage and sifting operations, management and disposal of waste generated from field operations, and coordination with ongoing construction activities.

4. Traffic Control. Detail traffic control and mitigation measures to be employed during anomaly investigation. Consideration shall be given to

temporary road closures, alternate work schedules, and other methods to minimize impact to vehicular and pedestrian traffic. The Contractor shall be responsible for signage, devices, flag men, and any other control measures required to safely employ traffic control. The Traffic Control Plan shall be included in the Traffic Control Plan required by Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS.

5. Community Outreach. Describe the communications measures the Contractor will employ to notify the local community of ESS-related work and its anticipated impact. The contractor shall consider the use of DDESB-approved engineered barricades or bunker in place, alternate work schedules (nights or weekends), base activities and school hours (holidays, summer vacation, etc.), reduced work hours, school bus schedules, rush hour traffic, and other items in order to mitigate impact to the local community. Further requirements for Community Outreach are detailed in Section 3.4.

6. Exclusion Zones. Identify the boundary of the EZ for each separate work period. Work periods may vary depending upon site-specific conditions (DGM AAR results, community impacts, etc.). Indicate all points of vehicle access along the EZ perimeter. Contractor shall be responsible to provide reasonable efforts to clear the EZ daily, prior to the start of anomaly investigation.

7. Communications Plan. Identify points of contact within the Prime Contractor and appropriate subcontractor organizations related to MEC/UXO clearance and other on-site activities. The list shall include but may not be limited to appropriate government personnel such as the Construction Management Engineer, Public Affairs Officer, EOD representative, and appropriate first responders. All contractor and government points of contact shall have names, titles, and primary and secondary phone numbers listed as appropriate. Include direction on who will be called for what specific reasons and the priority in which they will be contacted.

8. Schedule. Include specific line items for development, review, and acceptance for all submissions. It is the responsibility of the Prime Contractor to present an overall construction schedule that includes the appropriate JRM ESS clearance operations within the overall construction time line.

9. Accident Prevention Plan (APP) / Site Health and Safety Plan (SHSP). Describe site-specific hazards and the procedures to protect the health and safety of workers and the public during MEC activities. Include worker protective clothing and equipment, staging areas, and waste disposal requirements. The MEC APP shall be a separate submittal from the Construction Accident Prevention Plan required by Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS.

10. Quality Control Plan (QCP). Describe the project-specific quality control and procedures that will be implemented during all aspects of the field work including, but not limited to Data Interpretation, Target Acquisition, Intrusive Operations, Soil Excavation, Anomaly Avoidance, Soil Sifting and Screening, and MEC Identification / Storage / Transportation / Disposal. Include specific details on the instrument validation strip (IVS) and blind seeding procedures. The three phases of control shall be used. The QCP shall be a separate submittal from the Construction Quality Control Plan required by Section 01 45 00.00 20 QUALITY CONTROL.

1.5 Installation Commanding Officer (ICO) Notification

Intent of this submission is for the ICO to get a quick visual understanding of the anomaly investigation impact and use the submission to advertise the format the EZ, Traffic Control Plan, and impacted buildings. Include an aerial picture. Identify the dates, times, and duration of anomaly investigation. Identify the lead government and contractor point of contact for the on-site work. Submission will likely be 1 to 4 slides for each work period depending on the complexity and size of scope.

1.6 QC/QA Report

1.6.1 Anomaly Avoidance QC/QA Report and Anomaly Investigation QC/QA Report

The Anomaly Avoidance QC/QA Report and the Anomaly Investigation QC/QA Report shall include the coordinate system used, description of grids / area included in the report, depth of clearance, number of anomalies investigated, lbs of debris recovered, number of MEC found, number of MPPEH found, number of blind seeds placed, and number of blind seeds recovered. The report must indicate if the QC inspection passed/failed, and must be signed by the UXOQCS, the Prime Contractor QC Officer (if different), and UXOQAM. In map format, identify the area included in the QC/QA Report Report relative to the entire project footprint, grids, anomalies Left in Place, MEC/MPPEH, and blind seeds. If MEC/MPPEH are found, include a tabular list of the grid, quantity, depth below surface, weight, type (MEC/MPPEH), disposition, mark/model, northing and easting, and any other applicable information. For blind seeds recovered, include a tabular list of the grid, northing and easting, quantity, depth, weight, description, and any other relevant information. For items Left in Place, include a tabular list of the grid, northing and easting, and description. Each complete QC/QA Report shall be submitted to the Government for review and acceptance.

Upon government acceptance of the QC/QA Report, the footprint included within that QC/QA Report may be managed as low likelihood per NAVSEA OP5 and the JRM ESS and construction may proceed in that area. It is anticipated that multiple QC/QA Reports will be required and the number will vary based on project and site conditions. The contractor is responsible for maintaining oversight of intrusive activities to ensure that construction activities that disturb the earth stay within designated areas of low likelihood. Should MEC/MPPEH be uncovered in a site that is managed as low likelihood, the contractor shall immediately stop work and contact the government Construction Management Engineer.

1.6.2 DGM QC/QA Report

Periodic reports documenting Quality Control and Quality Assurance shall be submitted to the Government. The DGM QC/QA Report shall include operational checks of instruments and equipment, compliance with the accepted DGM WP, identify any non-compliant work and resulting re-work, and document the three phases of control.

The report must indicate if the QC inspection passed/failed, and must be signed by the UXOQCS and the Prime Contractor QC Officer (if different).

1.7 MEC/MPPEH Spot Report

Spot report shall include a brief description of positively identified MEC/MPPEH and its disposition.

1.8 Weekly Situational/Status Report (SITREP)

Indicate percentage of anomaly investigation complete to date and any notable MEC-related issues from the previous week.

1.9 General Requirements for all After Action Reports (AAR)

The After Action Reports shall be signed by the project superintendent, the project QC Manager, the project SSHO, the UXOSO, UXOQCS, SUXOS, and geophysicist (DGM AAR only).

1.9.1 Anomaly Avoidance After Action Report (AAR)

The Anomaly Avoidance AAR shall include, but not be limited to the following:

1. Brief description of the site.

2. Summary of MEC and/or MPPEH found, removed, and left in place.

3. Description of the relative effectiveness and any limitations of the technologies used and the effects on residual risk relative to that originally projected.

4. A summary of the QC/QA Reports.

5. Maps showing:

    a. Areas from which MEC and/or MPPEH were left in place.
    b. Areas from which MEC and/or MPPEH were removed.
    c. Areas within the site where response actions were not performed and the rationale for not addressing those areas.
    d. The known or reasonably anticipated end use of each area.

6. A summary of the land use controls that were implemented, if any, and the areas to which they apply.

7. A summary of provisions for long-term management.

8. Additional supporting documents as appropriate to include but not limited to field logs, weekly SITREPs, MEC/MPPEH Spot Reports, daily activity reports, QC/QA Reports, NOSSA audits, photographs, QA documentation, Work Plans, etc.

1.9.2 Digital Geophysical Mapping (DGM) After Action Report (AAR)

The Anomaly Avoidance AAR shall include, but not be limited to the following:

1. Brief description of the DGM operations.

2. Summary of control points and GSV.

3. Detailed description of the GSV placement, survey, and results.

4. Dig list summary, basis for selecting anomalies, resulting polygons, and blinds seed results.

5. Describe data mapping and anomaly selection, and include anomaly maps and dig lists as they relate to established grids. Describe areas not mapped.

6. Maps showing:

a. DGM survey as it relates to the established grids and project site.
b. Detailed grid maps as they relate to the dig list.

7. Additional supporting documents as appropriate to include but not limited to field logs, QC/QA Reports, QC data, raw data, etc.

1.9.3 Anomaly Investigation After Action Report (AAR)

The Anomaly Investigation AAR shall include all items identified in Section 1.9.1 Anomaly Avoidance AAR. Additional requirements include maps and summary data of any DGM efforts, maps and summary data of Geophysical System Verification to include Instrument Verification Strip and blind seed data, and a summary of digital data information. Additional supporting documents shall be included as appropriate for the project.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 Notice to Proceed (NTP) Criteria

Submittals shall not cause delay, limit, or halt the start or any portion of progression of the design work and shall be developed in parallel to the design work. The contractor also shall not use the basis of plans or reports that have not commenced development or uncompleted work to cause delay, limit or halt the start of the design work.

The issuance of each Notice to Proceed shall be authorized only by the Contracting Officer. Each Notice to Proceed shall indicate contractor name/s, start dates, location, and specific work tasks.

3.2. Work Schedule for Subsurface Clearance Activities

The contractor shall schedule work appropriately to mitigate, to the greatest extent practicable, the impacts to base operations and the general public both on and off base. Scheduling shall include phasing as well as night and weekend work as necessary.

3.3 Engineered Barriers / Bunker-in-Place

The contractor shall consider use approved engineered barriers or other approved techniques to mitigate the impact of exclusion zones on quality of life, base operations, and non-DoD property.

3.4 Community Outreach

The contractor shall develop a thorough strategy for community outreach and engagement to ensure all entities impacted by EZs are effectively identified, notified, and informed of anticipated ESS activities and their impacts in a timely manner. Include methods for information dissemination such as timing of the work and required evacuation periods; the plan shall propose clear, effective and timely communication strategies and tactics.

At a minimum, include specific products that will be developed by the contractor to help inform the community. These products may include, but are not limited to, flyers, brochures, scripts to use while making phone calls, presentations that may be used for stakeholder briefs, draft public service announcements and draft media releases.

Community outreach and engagement efforts will include but are not necessarily limited to coordination with on base activities.

The Government may provide support during outreach and engagement activities. The Government shall determine the appropriate support, if any, to be provided based on the Community Relations Plan and other factors.

The Contractor shall initiate the outreach and engagement process as early as possible following contract award. The initial outreach and engagement activities shall begin no less than 40-20 days prior to commencing intrusive investigation.

All proposed Contractor written and oral communications must be approved by a designated Government representative prior to any and all communications with members of the public, stakeholders, etc.

1. Contractor shall provide traffic control at all vehicle access points to the exclusion zone during intrusive investigations. Electronic notification boards shall be posted 7 days prior to anomaly investigations to notify drivers of road closures and suggested alternate routes. Coordinate traffic control plan with Phil Slagel, Department of Public Works at 649-3155.
2. Contractor shall provide notice of imminent evacuation to all property owners / tenants 24 hours prior to establishment of the EZ. The notice shall be in flyer format, approved by the government, and hand delivered to each property. Should the property owner / tenant not be available, the contractor shall leave the flyer in a visible location.
3. Contractor shall provide reasonable verification that the exclusion zone is clear prior to starting intrusive investigations (see paragraph 3.2.6 for definition of reasonable verification).

COMMUNITY OUTREACH		
Community Outreach Initial notification	Face–to–face meeting with land and business owners, residents and tenants. Data base check list.	40-20 days prior to start of anomaly investigations that impact those particular properties. Template must be approved by the government.
Traffic Control	Electronic notification boards to notify drivers of upcoming work and to suggest alternate routes.	7 days prior to start of anomaly investigations and remain in place until investigation is complete

Second notice to residents and businesses	Registered letters to business and residents in effected EZ. Data base check list.	14-10 calendar days prior to start of anomaly investigations that impact those particular properties. Template must be approved by the government.
Notice of imminent evacuation	Contractor shall hand-deliver notice to each business and residence and post on door/mailbox/other appropriate location if no one is available. Notice identifies the start of anomaly investigation and traffic control points. Data base check list.	24 hours prior to start of anomaly investigations that impact those particular properties. Template must be approved by the government.
Establish the EZ	At posted time for start of intrusive digging, contractor shall perform visual survey of EZ to ensure the EZ is clear. Contractor’s SOP (checklist).	Daily, at the start of anomaly investigations

3.5 Enforcement of Exclusion Zones

The contractor shall be responsible for providing reasonable levels of verification and enforcement of identified exclusion zones during ESS activities.

Reasonable verification is defined as observations of exclusion zone no more than 6 hours prior to commencing intrusive investigations; should personnel be observed in the exclusion zone, the contractor shall verbally inform them of the scheduled work and request that they leave the EZ. Verbal contact is intended to remind the impacted residents and businesses of the evacuation requirements and the time and duration when intrusive activities will commence.

Reasonable enforcement is defined as verbal notification and request to evacuate to any individual observed inside the EZ limits during anomaly investigation. The contractor shall not be required to stop work, but shall be required to verbally inform anyone observed in the EZ of the work and the request to vacate. The contractor is required to verbally inform people within the EZ once. The contractor has no authority to detain or escort people out of the EZ.

Upon completion of the anomaly investigation activities in the established EZ the contractor shall notify the evacuees as soon as possible that they may return. Notification may be made by phone, text, social media, or other appropriate notification.

3.6 Soil Excavation and Removal

Shall be in accordance with JRM ESS and NAVSEA OP 5 (Volume 1). When the depth of intrusive activities exceeds the detection limits of the

geophysical instruments used, soil will be removed in layers to allow the detection and removal of MEC and/or MPPEH in the construction footprint.

Anomalies shall be investigated to the depth of construction or when bedrock is reached. Bedrock shall be defined by a licensed professional engineer, geologist or geophysicist. Should the licensed professional engineer, geologist, or geophysicist determine either through site investigation or through the course of anomaly investigation or excavation that the area of excavation is native/virgin soil AND the depth of construction / bedrock is greater than the maximum penetration depth of the munition with the greatest fragmentation distance (MGFD) as described in the JRM ESS, anomalies shall be investigated to the maximum penetration depth of the MGFD only. Should the licensed professional engineer, geologist, or geophysicist determine that anomaly investigation is appropriate to maximum MGFD penetration depth vice depth of construction or bedrock, the contractor shall submit an RFI to the government to accept the reduced scope.

Upon completion and acceptance by the Government of anomaly investigation, earthwork and other ground disturbance activities may commence.

3.7 Imported Soils

The Contractor shall ensure that all imported soils are free of MEC/UXO/MPPEH item or materials. All imported soils shall be obtained from Government approved borrow pits or must be screened using a 0.75” screen prior to entering the project site or Government property.

3.8 Requirements When MEC/MPPEH is Encountered

Stop all work immediately if any material or object believed to be MEC/MPPEH is encountered and execute first response protocols immediately. Notify the UXO Technician III, UXOSO or SUXOS. Notify the CME as soon as possible. Follow procedures of the Work Plan.

MEC and MPPEH storage, transportation, and disposal will be accomplished by military EOD IAW JRM ESS.

The Contractor shall not blow-in-place or counter-charge any MEC/MPPEH encountered.

If MEC/MPPEH encountered is determined by the SUXOS to be unsafe to move, poses a threat to human health and the environment or represents an imminent and substantial endangerment to human health and the environment, execute first response protocols immediately. The Contractor shall also coordinate as soon as possible with Explosive Ordnance Disposal Mobile Unit Five (EODMU-5) or the appropriate EOD response team for further disposition.

If MEC/MPPEH encountered is determined by the SUXOS to be safe to move and does not pose a threat to human health or the environment, it may be moved and stored for the appropriate EOD response team for further disposition.

-- End of Section --

WON 1370757
FY15 MAINTENANCE DREDGING
VARIOUS WHARVES
NAVAL BASE GUAM APRA HARBOR
GUAM

Final RFP SUBMITTAL
20 August 2015

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PART 3
PROJECT PROGRAM

RFP Part 3
Statement of Work / Project Program

20 AUGUST 2015

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1. PROJECT DESCRIPTION

This is a "Design-Build" Multiple Award Construction Contract (DB-MACC) project intended to perform maintenance dredging at Various Wharves, Naval Base Guam.

The proposed performance period of this project is **780 calendar days**, commencing on the date of contract award. The performance period includes all required engineering design, reviews, approval of dredging and disposal operation plan, mobilization/de-mobilization, permitting, dredging and disposal, monitoring, corrections if required, acceptance and other requirements necessary to fully satisfy and deliver the requirements and intended purpose of the project.

2. PROJECT OBJECTIVES / REQUIREMENTS / SCOPE

The Navy proposes to conduct maintenance dredging at various locations within Apra Harbor including the entrance to Inner Apra Harbor, Alpha-Bravo Wharves and turning basin, and Lima, Mike and November Wharves. Maintenance dredging is required in this area to meet military operational requirement by ensuring adequate navigation depth for the draft requirements of current and future vessels. Maintenance dredging is planned to (-) 40 feet MLLW for the entrance to Inner Apra Harbor, Alpha-Bravo Wharves, and Alpha-Bravo turning basin. Maintenance dredging is planned to (-) 35 feet MLLW for Lima, Mike and November Wharves. The project scope of work generally includes, but is not limited to the following. See also Engineering Systems Requirements (ESR), Section 6 of this Part.

A) Dredging:

- Remove shoals/sediments from a point no closer than ten feet (10') from the face of the wharves/pier utilizing a barge mounted closed bucket excavator in accordance with (IAW) conditions and requirements to be defined in the approved Army Corps of Engineering (ACOE) permit, to restore navigational depths. Refer to Attachments in Part 6 for site and location map, project limits, and 2014 hydrographic survey.
- Before dredging operations can proceed, the Contractor shall submit ten copies of the dredging and disposal operation plan for review and approval by USACOE and NAVFAC via the Contracting Officer. The Plan shall include a copy of the dredging contract, contractor's site phone numbers, description of the proposed removal and disposal procedures, a best management practice plan, proposed methods to track and verify the transport and disposal of the dredged material, and an outline of the notification plan.
- Overdredge is allowed, but shall not exceed two feet (2') beyond the maintenance depth as defined in the above project objectives.
- If items of potential historical or archaeological significance are discovered during dredging and disposal activities, the Contractor shall stop work and immediately notify the Contracting Officer.
- The Contractor shall allow the USACOE District Engineer or his authorized representatives to inspect the dredging activity at any time to ensure that the dredging activity is being performed in accordance with the terms and conditions of the permit.
- Extreme care shall be taken to ensure that no debris, petroleum products or other deleterious materials or wastes be allowed to fall, flow, leach or otherwise enter the water.
- Install silt curtains to contain all sediment within and prevent suspended sediment from leaving the work area as well as control levels of turbidity.
- Areas outside the silt curtain shall be continuously monitored by the dredging contractor and/or its representatives for a visual plume of turbidity, and particular attention shall be directed to the areas closest to the mouth of the entrance channel.
- If a visual plume is detected, dredging shall cease until the source of the turbidity can be identified and corrective measures enacted.

- The Contractor shall provide for biological monitoring and water quality monitoring focused on turbidity and sedimentation levels in Outer/Inner Apra Harbor outside the dredge footprint. Rate and type of monitoring shall be in accordance with the approved ACOE permit and Attachments.
- The Contractor shall prevent scouring of benthic resources in areas outside the dredging footprint, particularly at the mouth of the Inner Harbor entrance channel. Any tow vessels, such as barges, scows and the like, shall be either lashed directly to the tow vessel, with no cable in the water, or connected to the tow vessel by floating line. All other operations shall be conducted in a manner that eliminates the possibility of dragging the cable or other equipment along the bottom and damaging aquatic resources.
- The Contractor shall immediately notify the Contracting Officer of any impacts that may occur. The Contractor shall initiate within 24 hours of any incident, the recovery and restoration of the damage to living coral outside of the dredge footprint in the event of unforeseen accidents, such as anchor damage or anchor cable scouring.
- The Contractor shall not allow any water of dredged material placed in a hopper dredge or disposal barge or scow to flow over the sides or leak from such vessels during the transportation to the Confined Disposal Facilities (CDF). The level that a disposal barge or scow can be filled shall not exceed the load line to prevent any dredged material from spilling over the sides at the dredge site. No disposal barge or scow shall be filled above this predetermined level.
- Provide suitable facilities and a workable method using mechanical offloading (barge transport to offloading site, offloading into sealed-end dump truck, truck hauling to CDF) for re-handling dredged materials, which shall be placed in a suitable upland location made to contain within and prevent dredge materials from leaving the disposal area (Note: Proposed offloading sites are Quebec Wharf and Finger Pier (See D. Special Requirements below) and the disposal site shall be at the CDF #5. Refer to Part 6 Attachments for CDF #5 location and as-built plans). There shall be zero release from offloading and transport.

B) Environmental Considerations Mitigations:

- Impact to marine water quality during transport of scows to the offloading site shall be minimized by BMPs such as restricting load volumes to avoid over-flow during transport.
- Dredging operations shall cease during the coral spawning period. See Part 6, Attachment 7 Environmental Conditions.

C) Disposal Sites:

- Approximately 13,400 CY of dredge material from east side of entrance channel (November, Mike and Lima Wharves) are to be disposed of at upland Confined Disposal Facility (CDF) Cell 5A located between Marine Drive and Sumay Drive and at the approved Guam Deep Ocean Disposal Site (G-ODMDS) as indicated in the attached drawings.
- Approximately 39,600 CY of dredged material from west side of entrance channel (Submarine Turning Basin, Alpha Wharf, and Bravo Wharf) is permitted to be disposed at the approved Ocean Disposal Site. Refer to PTS H40 for additional requirements.
- Ocean disposal operations shall be conducted in accordance with the requirements specified in the Site Management and Monitoring Plans.
- The contractor will design and construct two subcells within the existing cell 5A. One cell shall contain the spoils from Lima/Mike Wharves (Approximately 8,400 CY) and the other cell shall contain the spoils from November Wharf (Approximately 5,000 CY). The new cells will be engineered to contain all rainfall with zero discharge outside the dikes which will be a minimum of 2 feet of freeboard. The new subcells shall retain a minimum of 5 feet of existing dredge spoils to act as a leachate filter for the new dredge spoils to be place on top.
- Clear and mulch vegetation overgrowth as necessary to construct new dikes to provide storage for the dredged materials with a minimum 2 feet freeboard. The new dikes shall be

constructed utilizing available dredge spoils within the developed section of Cell 5A with the exception of the spoils from the Uniform Wharf spoils subcell and/or a maximum excavation of 18" below the existing grade of the undeveloped portion of Cell 5A. The maximum height of the new dikes shall be restricted by the Sediment Management Framework Report 2010 (See Part 6 of the RFP).

- Any excess material shall be stored in an engineered pile within Cell 5A for re-use in future dredging projects.
- All disturbed areas and all existing spoil material requiring excavation or handling in any way must be screened for MEC in accordance with JRM Explosives Safety Submission (ESS).
- The contractor may encounter asbestos associated with discarded piping. The contractor shall remove and dispose all asbestos material encountered off-island. The contractor shall submit asbestos handling and removal plan to the Government for review prior to execution.
- Comply with all conditions of the CDF plan.
- Manage and maintain the CDF such as to allow proper dewatering of dredge materials and prevent these materials and runoff from leaving the disposal area. Provide 30 mil polyethylene sheet liner on the side slopes of the dike and/or side slopes of old remaining spoils where new maintenance dredge spoils will interface.
- Maintain a separation between old dredge spoils and the new dredge spoils from this contract. Upon project completion, submit as-built survey of the CDF showing the delineation of the old and new dredged materials in the CDF.
- All dredge material to be placed in the CDF shall be screened to remove 2 inches and larger debris in any dimension before placement into the confined disposal facility.
- Environmental Consideration:
  - Noise (earth moving equipments)
  - Air Quality (air emissions and fugitive dust generation by heavy equipment and trucks, approval to operate stationary emission sources)
  - Odor
- Environmental Consideration Mitigation:
  - BMPs, such as water spray, could be used to minimize fugitive dust impacts.
  - Should the site present an attractive nuisance for migratory birds (e.g., standing water, scavenging of food from placed materials), reflective flagging and/or other management practices may be used to discourage bird use.
- Social Consideration:
  - Due to long duration, a traffic plan may be required to minimize impacts associated with this activity.

D) Additive Bid Option:

- The Contractor shall clear and grub the remainder of Cell 5A beyond the limits of the new sub-cells and utilize the remaining Alpha/Bravo spoils within Cell 5A to modify and raise the height of the existing Cell 5A perimeter dike. The maximum height of the reconstructed perimeter dike shall be limited by the available Alpha/Bravo spoil material or the 2010 Sediment Management Frame Work (see Part 6 Attachments) recommended dike elevations.

E) Special Requirements:

- The Contaminants of Concern (COC)s for this project were selected based on US Army Corps of Engineers and US Environmental Protection Agency guidance on dredge spoil sampling for characterization. Heavy metals, pesticides, PAHs, PCBs, petroleum hydrocarbons, presented in Table 6 of the Sampling and Analysis Report, Attachment 3 in Part 6, were selected as COCs at the site based on historical use of the sites. The sampling and analysis procedures described in this Report were performed in accordance with

applicable industry standards and methods accepted by the U.S. EPA. Based on the results of the sampling and analysis described within this report, levels of contamination have been determined for sediment sample locations along the various dredging locations, which will be useful in determining potential concerns for chemical contamination during dredging operations and disposal options for dredge spoils.

- Work of this project shall be coordinated for design and construction with other ongoing projects concerned with waterfront operation sustainment, maintenance and repairs (SRM). Other projects along Lima, Mike, November, Oscar, Papa, Quebec, Romeo, Sierra, Tango, Uniform, Victor, Alpha and Bravo Wharves include:

  Romeo Wharf Repair
  Lima Wharf Repair

- Important Contract Milestones Notice to Proceed (NTP):

  1st NTP: (Upon Notice of Award): Design, work plan, ESS anomaly identification, and submittals necessary to obtain the USACOE permit and approval to begin dredging.

  2nd NTP: CDF site preparation and ESS anomaly investigation (Following approval of design submittals and completion of ESS anomaly identification). Contractor shall assume CDF Work cannot begin until 90 days after 1st NTP.

  3rd NTP: Mobilize for and begin in-water work. Contractor shall assume Dredging Work cannot begin until 180 days after 1st NTP.

  Project shall be completed within 600 days after 2nd NTP.

2.1 DREDGING, DESIGN AND CONSTRUCTION REQUIREMENTS:

The Contractor shall perform all tasks and requirements in this statement of work in addition to the requirements in the base contract. The dredging, design and construction shall be in accordance with the latest revision/edition of applicable U.S. Federal and Local codes, standards and regulations, applicable USACE Engineering Manuals (EM), International Building Code, WBDG Unified Facility Guide Specifications (UFGS) and Unified Facilities Criteria (UFC), Marianas Region Architectural and Construction Standard (MRACS) and requirements of this statement of work. The term "Latest Revision/Edition" is defined as the version as of the project award date. In case of conflict between codes, standards, regulations, and specifications, the most stringent requirements shall apply.

The KTR shall provide all labor, materials, equipment, permits, clearances, engineering services, transportation, supervision, and other incidental work required for the project. Other incidental work required includes any and all items and considerations necessary to insure a complete and usable final product, including, but not limited to, the necessary design and construction considerations not specifically stated elsewhere in this statement of work. Complete and usable final product means that the completed final product can be used to fully satisfy the requirements and the intended purpose of the project. The activities will be performed in a manner as to NOT negatively impact the operational capabilities of the Wharves. KTR shall attempt to minimize interruption of ongoing operations. KTR shall coordinate for interruption of wharves services. All other actions not involving interruption of services can be conducted during regular working hours.

All design or construction drawings, specifications and calculations shall be done by/or under the direct supervision of a Professional Engineer. All required survey shall be done by/or under the direct supervision of a Professional Surveyor. Professional Engineer and Surveyor shall have current National Council of Examiners for Engineering and Surveying (NCEES) registration issued from a

state within the United States of America (USA) or one of its territories who shall stamp all design or construction drawings, specifications, calculations, and survey drawings, respectively.

The KTR shall be responsible to verify all existing site conditions, dimensions, survey elevations and other requirements necessary to complete the project. Any adjustments to suit field conditions shall be made without the additional cost to the Government including the restoration of damages borne by the contractor in the performance of this contract. KTR shall be responsible for proper handling and disposal of all materials/waste removed and/or demolished from dredging and construction sites.

KTR is responsible for obtaining all required permits (with the exception of USACOE permit, GEPA 401 WQC and CZMA Negative Determination) and shall ensure that all required permits are obtained before dredging and construction begins. The contractor is responsible for developing and submitting methodologies and plans required within the USACOE and GEPA 401 WQC permit applications. The plans include but are not limited to a water quality monitoring plan, updated biological monitoring plan, waste disposal plan, environmental protection plan, concise methodologies plan, and a turtle observation plan. KTR must abide by Occupational Safety and Health Act (OSHA) regarding issues such as abatement of Asbestos-Containing Materials (ACM), noise, confined space, or others as applicable. Verify other requirements with the assigned Construction Management Engineer (CME) or Engineering Technician (ET) concerning any or all environmental requirements.

See Part 2, General Requirements Section 01 35 26 for Government Safety Requirements.

2.1.1 SUBMITTALS

In addition to the submittals required under the basic contract, submit the following:

a. Submittal Requirements (after award and before start of construction):

1. Health and Safety Plan.

2. Detailed dredging plans with phasing, schedules and equipment specifications, to include methods for ceasing dredging operations or demobilizing for emergency port operations, pre-dredge hydrographic survey of harbor bottom, pre-dredge topographic survey of CDF cell 5A and immediate ground areas, and CDF construction, reconstruction and filling plan.

3. Documentation as required by the ACOE permit conditions, which will be issued after contract award.

4. Design, Construction and Dredging Plan Drawings and Specifications: Design or construction and dredging plan drawings shall be prepared using AutoCAD R2009 formatted for 24”x36” size sheets and shall have the standard NAVFAC title block on each sheet and standard NAVFAC Plot setting , including the respective contractor obtained NAVFAC drawing numbers for each sheet. Contractor shall submit three (3) hard copies of the Final design, construction and dredging plan drawings and specifications and original CADD and Specification files (“.dwg”, “.doc”) and copy files (“.pdf”) on two (2) CD-ROM discs. (Contractor will not be allowed to start construction and dredging without the Government approved plans and specifications).

5. Pre-construction Documents: Activity Hazard Analysis (AHA), Accident Prevention Plan (APP), Contractor’s Quality Control Plan (CQC), Erosion and Sediment Control Plan (ESC).

6. Approved Work/Construction Schedule.

7. Explosive Safety Submission (ESS) – Munitions and Explosives of Concern (MEC) Clearance Work Plan (MEC field work will not be allowed to start without the Government approved MEC Plan)

The Prime or MEC Contractor shall submit the deliverables to the Construction Manager Engineer (CME) and the MEC/UXO Naval Technical Representative per Section 01 57 19.01 20 of the Specifications in Part 2.

Design Drawings: shall be prepared using AutoCAD 2009 formatted for ANSI D (22" x 34") sheets and shall include the standard NAVFAC Marianas title block on each sheet, including the respective contractor obtained NAVFAC drawing numbers for each sheet. The Ready for Construction submission shall be stamped and signed by the Designer of Record.
Basis of Design: Each submission shall include a basis of design with all proposed materials including calculations to substantiate the design meets the RFP and all applicable codes.
Specifications: Shall be submitted in Construction Specification Institute (CSI) 2004 format.

Contractor shall submit the number of copies as requested as defined under each required submission identified below. The basis of design, design drawings and specifications shall be included on a CD-ROM in addition to the required hard copy for each submission. Each submission shall be submitted to the NAVFAC Marianas Construction Manager Engineer (CME) for Government review and RFP concurrence.

The Contractor shall submit a copy of the Government review comments from each prior submission with each subsequent submission. This document shall indicate the corrective action taken for each comment and or other proposed solution. Incomplete submissions will be returned to the Contractor with no additional time added to the performance period.

Electronically seal and sign all Acrobat PDF drawings and other documents. The electronic signature software utilized should meet the requirements of the National Council of Examiners for Engineering and Surveying (NCEES). The electronic signatures shall be printable and viewable in Adobe Acrobat Reader with no additional software.

8. 60% Design Submittal: 45 calendar days following the date of delivery order. Submit five (5) hard copies of 11" x 17" half-scale drawing sets, outline specifications, preliminary construction schedule and basis of design, and electronic pdf copies on five (5) CD-ROMs. Allow 14 calendar days for Government review.

9. 100% design submittal: 21 calendar days following receipt of Government review comments on the 60% design submittal. Submit five (5) hard copies 11" x 17" drawing sets, specifications, preliminary construction schedule, basis of design, submittal register; and electronic pdf copies on five (5) CD-ROMs. Allow 7 calendar days for Government review.

10. "Ready for Construction" (RFC) documents: 7 calendar days following receipt of Government review comments on the 100% design and notice to proceed with Ready for Construction documents. The RFC documents include all documents required for the 100% submission finalized. Submit five (5) hard copies 11" x 17" drawing sets, specifications, preliminary construction schedule, basis of design, and submittal register; and electronic pdf copies on five (5) CD-ROMs.

c. Final Close Out Submittal Requirements:

14 Calendar days after completion/acceptance of the project and prior to final payment.

1. Submit complete pre- and post-fill as-built/topographic survey drawings of CDF cell 5A indicating ground elevations, locations of old and new dredged materials, amount of existing (old) dredged materials used in the construction and/or reconstruction of dikes, amount of remaining existing (old) dredged materials, and amount of new dredged materials from this dredging contract. Submit post-dredge Hydrographic Study report indicating the final profile of the harbor with as-built drawings. Submit as-built drawings to CME in ANSI D (22" x 34") size Mylar sheets and two (2) sets of CD-ROM containing CADD and PDF files of drawings and specifications, submittal register, and any other documents (photos, support files, etc.) as applicable. Perform the closeout surveys utilizing the same stations from the RFP documents. All as-built survey work shall be done by/or under the direct supervision of a Professional Surveyor with current National Council of Examiners for Engineering and Surveying (NCEES) registration issued from a state within the United States of America (USA) or one of its territories who shall stamp all survey drawings. All surveys shall be signed by the Contractor to certify their accuracy.

2.1.2 SITE SAFETY AND HEALTH OFFICER (SSHO) QUALIFICATIONS

The Site Safety and Health Officer for this Task Order shall meet the requirements of Level 4.

2.1.3 QUALITY CONTROL REQUIREMENTS

The QC Manager for this Task Order shall meet the requirements as outlined in the basic contract.

See Basic Contract Part 2, General Requirements Section 01 45 00.05 20 for Design and Construction Quality Control Requirements.

2.2 ENVIRONMENTAL REQUIREMENTS

Contractor shall comply with the requirements of the US Army Corps of Engineers (ACOE) and US Environmental Protection Agency (EPA) in addition to the requirements of the basic contract. A U.S. ACOE permit is required for this project. Government will obtain permit. Minimum requirements for biological and water quality monitoring and expected permit conditions/requirements are attached in Part 6, Attachments 5, 6 and 7.

All of Cell 5 spans on a Low (Green) to Medium (Yellow) likelihood of encountering MEC or MPPEH. Provide munitions clearance as per JRM Explosives Safety Submission (ESS) Munitions Response Sites Guam Construction Support Implementation, Current Amendment Series and all applicable references identified therein. Provide details of ESS implementation and removal of anomalies upon construction contract award and how this work is incorporated in the project schedule.

2.3 WORKFLOW PROCESS

Scheduling of work shall be coordinated with the Port Ops to minimize disruption of services. Port Ops shall be granted access during emergency.

2.4 HOURS OF OPERATION

Wharves operations typically take place under daylight conditions. During periods of high activity, operations are conducted around the clock. The level of activities will be dictated by events occurring worldwide. This unpredictable nature of world events can cause scheduling problems, delays and difficulties in the work of this project. The Contractor shall provide flexibility in their schedule for the duration of the work.

2.5 SPECIAL WORK CHALLENGES

The Contractor must consider the following factors in planning the work. The primary purpose of this project is for maintenance dredging of various wharves, pier and inner Apra Harbor. The challenges for this work include:

1. Dredging shall provide a schedule that will have the least disruption to operational capability of the wharves.

2. The existing structural system of wharves shall remain undamaged during dredging and offloading.

3. Functional existing utilities shall remain undamaged during dredging and offloading.

4. Wharves operations include limited ordnance handling. Wharves will be off-limits to Contractors for the duration of these ordnance handling operations. The contractor shall incorporate work stoppage in their schedule for ordnance handling requirements. Mandatory explosives safety briefing for contractors is required. Assume six (6) ordnance handling events per year at three (3) days each.

5. The work of this project will likely take place during or overlap with construction and dredging projects of other wharves. Therefore, the work of this project must be closely coordinated with all adjacent projects.

3. SITE ANALYSIS

3.1 EXISTING SITE CONDITIONS

The 2014 hydrographic survey determined that shoaling have occurred at the entrance to the inner Apra Harbor, Alpha-Bravo Wharves and turning basin, and Lima, Mike and November Wharves, thereby reducing the water depth to less than the design navigational depths in some places. The shallow depth causes damage to ship hulls and propellers and prohibits navigation and berthing operations. There are sustainment/repair/maintenance projects ongoing for Romeo, Sierra, Tango, Uniform and Victor Wharves.

According to as-built plan available, Confined Disposal Facility (CDF) #5, located between Marine Drive and Sumay Drive, comprises of two cells (A & B). Entire Cell 5B area was utilized while only a portion (reduced footprint) of Cell 5A was utilized. The cells were built in 2006 with dikes from onsite materials and served as the upland placement of dredge materials from the P-431 Alpha/Bravo dredging project. The amount of dredged materials placed in these cells was approximately 180,000 CY. Cell 5B is believed to have not been used since the Alpha/Bravo dredging. Currently, Cell 5B is overgrown with dense vegetation. A portion of Cell 5A was restructured and utilized for the Uniform Wharf Dredging project in 2014 and a portion remains undeveloped. See Cell 5A current as-built in Part 6 Attachments.

3.2 SITE DEVELOPMENT

Sediments will be removed from the various proposed dredging locations from a point no closer than 10 feet from the bulkhead. The dredging work will utilize a barge mounted close bucket excavator and comply with the requirements of the US Army Corps of Engineers (USACE). Sediments to be dispose of upland will be offloaded at Quebec Wharf and Finger Pier, hauled to and confined at CDF cell 5A.

The project will require clearing and grubbing of vegetation as necessary to construct new sub cells in the Cell 5A area and cells to receive new dredge materials. Vegetation shall be mulched and

spread out on the dike walls to act as top soil. . Side slopes of Dikes (and internal dike if constructed) where new dredged spoils will interface shall be lined with 30 mil of polyethylene sheets. Polyethylene sheets shall be UV stable, chemical resistant, puncture/tear resistant, and shall withstand Guam high outdoor temperature. The Contractor shall retain a minimum of 5 feet of existing dredge spoils to act as a leachate filter for the new dredge spoils to be place on top. Contractor shall analyze total volume of old dredge materials confined in Cell 5A suitable for construction of dike by considering information provided in Attachment 2 in Part 6.

4. BUILDING REQUIREMENTS

Not Used.

5. ROOM REQUIREMENTS

Not used.

6. ENGINEERING SYSTEMS REQUIREMENTS (ESR)

Perform the project according to the construction criteria, standards and publications, and applicable Uniform Facilities Criteria (UFC) and Unified Facility Guide Specifications (UFGS).

G10 SITE PREPARATION

Physically verify the location of the CDF cell 5A and other pertinent information needed for construction and reconstruction of confining dikes. Verify location of the dredge materials offloading site and coordinate with other ongoing sustainment/repair/maintenance (SRM) projects in the area. Perform pre-fill topographic survey of the CDF cell 5A,and immediate surrounding area, other structures and utilities, etc.) and pre-dredge hydrographic survey of the harbor bottom to verify baseline. Include these surveys in the CDF design and construction and dredging plans. Contractor shall provide CADD files (.dwg format) and PDF files to Government upon completion of required pre-construction surveys.

G1010 SITE CLEARING

Minimize removal and disposal of all trees required for project construction. Take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government. Repair or replace damaged items as approved by the Contracting Officer.

Grubbing shall consist of the removal and disposal of stumps, roots and matted roots.

Burning will not be allowed.

All grubbing and clearing residue, rubbish, debris and waste, generated by this project shall become the property of the KTR and shall be transported and disposed of off the Government property or recycled in accordance with the basic contract requirements and applicable federal regulations. All trees/plants within the existing reduced footprint of cell 5A shall be cleared and grubbed, cut, chipped and pile within the cell. This pile shall be tested for contaminants of concern prior to disposal off-site.

G1020 SITE DEMOLITION & RELOCATIONS

Asbestos containing pipe materials indicated on As-built Drawings.

G1030 SITE EARTHWORK

Provide minimum 2% slope grading if necessary so the site will drain away from the confined disposal Facility (CDF).

All unsuitable and surplus materials shall become the property of the KTR and shall be disposed of off Government property.

G20 SITE IMPROVEMENTS

G2040 SITE DEVELOPMENT

Design and construct new dikes and reconstruct existing perimeter dikes in the CDF Cell 5A to accommodate the two new subcells. Design of dikes shall consider stability, factor of safety against potential failure, and angle of repose. Height of dikes shall consider storage of new dredge materials plus two feet (2') freeboard. For the onsite soil borrow, the top 1.5 ft of soil in the undeveloped Cell 5A area, in addition to the suitable old dredged materials, may be used for the new dike construction. Contractor shall assume old dredge materials (except Uniform Wharf dredge spoils) are suitable for the construction of dikes and shall maximize the use of these old dredge materials and the onsite soil borrow materials for construction, reconstruction and determination of the new height/elevation of dikes. See also 3.2 Site Development.

G2050 LANDSCAPING

Provide soil preparation and hydroseeding in all disturbed outer/surrounding areas of the CDF. Prepare subgrade soil for bonding with topsoil. Spread topsoil evenly grade to the elevations and slopes required.

Restore affected areas to its original or better condition following MRACS.

H40 NAVIGATION DREDGING

SYSTEM DESCRIPTION
The Navigation Dredging consists of maintenance dredging of the entrance to the inner Apra Harbor, Alpha-Bravo Wharves and turning basin, and Lima, Mike and November Wharves at Apra Harbor, Naval Base Guam necessary and required to navigate the design vessel to the berths.

GENERAL SYSTEM REQUIREMENTS
Provide a Navigation Dredging complete in place, tested and approved, as specified throughout this RFP. All dredging shall be performed per this Part, the criteria of ESR, and PTS Section H40.

Contractor shall not commence in-water dredging work until the required permits are obtained. Work to be done below Mean Higher High Water (MHHW)] is considered in-water work.

The dredging requirements and design that govern the areas to be dredged and dredge depth have been determined by the Government and are specified in this ESR H40 and elsewhere in this part and shown on the RFP drawings provided in Part 6.

Dredging will be done to increase water depth in the vicinity of the existing waterfront structure. Contractor shall consider impact of dredging on structural integrity of the existing waterfront structure.

H4010 DREDGING

The design dredge depth shall be -40 ft MLLW for the entrance to inner Apra Harbor, Alpha-Bravo Wharves and turning basin, -35 ft MLLW for Lima, Mike and November Wharves, with 2 ft over dredge tolerance.

Existing navigation in the Harbor must be allowed to continue which would require the dredge equipment to be moved out at Contractor's expense when a conflict occurs. See Paragraphs 2.3, 2.4 and 2.5 in this Part.

Preliminary hydrographic study has been performed by the Government and copy of the report or mapping is provided in Part 6 for information only. Approximate dredge limits shown on the drawings provided in Part 6 are for information only and shall be finalized by the Contractor. It is the Contractor's responsibility to perform a detailed hydrographic survey and to confirm/determine the final dredge limits and volume. The required dredged depth shall be verified by post-dredge hydrographic survey.

Blasting will not be allowed during dredging operation.

H4020 DREDGING DISPOSAL

Dredge material characterization and management plan have been prepared and the results and recommendation are included as Attachment in Part 6. Dredge material shall be disposed of at the existing Confined Disposal Facility (CDF) #5A and approved Guam Ocean Disposal Site. Location of the disposal sites are shown on the RFP drawings provided in Part 6. CDF as-builts and other details provided in Part 6 are for information only. Contractor shall verify information and is responsible for full coordination and to design and construct a facility, which shall meet the needs of the using activity and comply with the RFP project requirements. The CDF shall be designed and constructed by the Contractor. Design of the CDF, disposal handling, and ocean disposal shall meet the requirements of this Part 3, Part 4 PTS H40 and Part 6 Attachments.

-- End of Section --

PART 6
ATTACHMENTS

ATTACHMENT 7

Sediment Management Framework, September 2010
(See Separate Attachment)

Architect-Engineering Services for Environmental Planning Support
Strategic Forward Basing Initiatives and Related Technical Services and Activities
At Various Navy and Marine Corps Locations, Pacific Basin and Indian Ocean Areas
Contract No. N62742-06-D-1870
Amendment No. 0024

Sediment Management Framework
Apra Harbor Naval Complex
Apra Harbor, Guam

Final Report

Prepared For:

Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
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September 2010

WESTON SOLUTIONS

TEC Inc. Joint Venture
A Joint Venture of TEC Inc., Earth Tech, Inc., and EDAW, Inc.

Sediment Management Framework
Apra Harbor Naval Complex
Apra Harbor, Guam

Final Report

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September 2010

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ACRONYMS AND ABBREVIATIONS

ADDAMS	Automated Dredging and Disposal Alternative Modeling System
AFB	Air Force Base
COMJRM	Commander, Joint Region Marianas
CVN	Carrier Vessel Nuclear
DMMP	Dredged Material Management Plan
DMUPS	Dredged Material Upland Placement Study
EIS	Environmental Impact Statement
EET	Effluent Elutriate Test
FDA	Food and Drug Administration
G-DODS	Guam Deep Ocean Disposal Site
GovGuam	Government of Guam
HHFP	Helber, Hastert & Fee
LC_{50}	Lethal Median Concentration
LPC	Limiting Permissible Concentration
LTCST	Long Tube Column Settling Test
MDP	Maintenance Dredge Project
MLLW	Mean Lower Low Water
MPS	Maritime Prepositioning Ship
MSC	Military Sealift Command
NMS	Naval Munitions Site
NSOD	Not Suitable for Ocean Disposal
ODMDS	Ocean Dredged Material Disposal Site
OSHA	Occupational Safety and Health Administration
OTM	Ocean Testing Manual
PAG	Port Authority of Guam
PCLT	Pancake Column Leach Test
PWC	Public Works Center
RSLS	Rainfall Simulator/Lysimeter System
RUNQUAL	Runoff Quality Program
SBLP	Sequential Batch Leachate Procedure
SOD	Suitable for Ocean Disposal
SRF	Ship Repair Facility
SLAMRAAM	Surface-Launched Advanced Medium Range Air-to-Air Missile
SLRP	Simplified Laboratory Runoff Procedure
TBP	Theoretical Bioaccumulation Potential
TCLP	Toxicity Characteristic Leaching Procedure
THAAD	Theater High Altitude Area Defense
TOC	Total Organic Carbon
TS	Total Suspended Solids
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USMC	United States Marine Corps
UTM	Upland Testing Manual
WQS	Water Quality Standards
ZSF	Zone of Siting Feasibility

UNITS OF MEASURE AND CONVERSION FACTORS

ac	acre	1 ac	x	0.4047	≈	hectares	ha
cy	cubic yards	1 cy	x	0.7645	≈	cubic meters	m^3
ft	foot/feet	1 ft	x	0.3048	=	meters	m
in	inch	1 in	x	2.54	=	centimeters	cm
nm	nautical mile	1 nm	x	1.852	=	kilometers	km
sf	square feet	1 sf	x	0.0929	≈	square meters	m^2
yds	yards	1 yd	x	0.9144	=	meters	m
%	percent						

EXECUTIVE SUMMARY

This Sediment Management Framework (Framework) evaluates the U.S. Navy's dredging needs from 2010 through 2030 and presents a scenario for dredged material management with an emphasis on beneficial use of dredged material. The Framework reviews previous dredged material management studies conducted within Apra Harbor, designates proposed upland dewatering sites to accept specific classification of dredged material. The Framework illustrates that — although dredged material may be beneficially used or placed in an upland environment — ocean disposal, when necessary, is a practical and viable management alternative for suitable, (i.e., clean) dredged materials.

Framework Assumptions

This alternative analysis is based on three key elements:

- Dredging is required to maintain safe navigation within Apra Harbor and those dredged materials require management that is consistent with maintaining public safety, a sustainable environment and U.S. Navy operations.
- Dredged material is a viable resource that may be beneficially used.
- If beneficial projects are not immediately available, upland placement of dredged materials for future beneficial use projects must be carefully managed to maintain capacity of upland dewatering sites for specific dredged material types. Dredged material may be placed at the Guam Deep Ocean Disposal Site (G-DODS) if and only if beneficial use projects or upland capacity is not sufficient and it is determined to be suitable (i.e., clean) for ocean disposal (SOD) in accordance with specific regulatory criteria for ocean disposal.

Framework Process

The framework for evaluating management alternatives for dredged materials involves a three step process:

1. Identify dredging projects.
2. Calculate dredge volumes.
3. Identify beneficial use options.

Only dredged material found suitable for ocean disposal may be placed at the ocean disposal site. If a beneficial use project is not available and the material is not suitable for ocean disposal (NSOD), the dredged material must be placed in an upland dewatering site specific to the classification of the dredged material.

Source of Dredged Materials

A total of six dredging projects — three maintenance dredging and three construction dredging — have been identified by the Navy. The maintenance dredging projects include:

- Delta/Echo Wharves: Maintenance dredging at Delta and Echo Wharves would occur on the south side of Cabras Island Channel in Outer Apra Harbor with a dredge footprint that

extends approximately 200 feet (ft) from the wharf face and to a depth of -45 ft mean low lower water (MLLW). An estimated 5,000 cubic yards (cy) of dredged material would be excavated in 2011.

- Victor Wharf: Maintenance dredging at Victor Wharf would have a dredge footprint that extends approximately 200 ft from the wharf face and to a depth of -32 ft MLLW. An estimated 5,500 cy of dredged material would be excavated in 2011.
- X-Ray Wharf: Maintenance dredging at X-Ray Wharf would have a dredge footprint that extends approximately 200 ft from the wharf face and to a depth of -32 ft MLLW. An estimated 1,500 cy of dredged material would be generated in 2011.

In addition, nine maintenance dredging projects, occurring periodically every 10 years, were assumed in order to calculate a conservative dredging volume for the next 20 years. The total volume from these assumed projects over the next 20 years was 1,336,000 cy.

The construction dredging projects include:

- Sierra Wharf: Construction dredging at Sierra Wharf would occur adjacent to Sierra and Tango Wharves, extending approximately 2,300 ft into central Inner Apra Harbor to a depth of -38 ft MLLW. An estimated 327,000 cy of dredged material would be generated in 2016.
- X-Ray Wharf: Construction dredging at X-Ray Wharf is assumed to have a dredge footprint that extends approximately 200 ft from the wharf face and includes an access fairway towards the entrance to Inner Apra Harbor to a depth of -35 ft MLLW. An estimated 50,000 cy of dredged material would be generated in 2015.
- CVN Capable Berth: Construction dredging at the proposed new CVN Capable Berth, (assumed as Alternative 1 - Polaris Point) would occur adjace to the area fronting the wharf, a turning basin northwest of the site, and an access fairway extending from the turning basin northwest toward the Outer Apra Harbor entrance to a depth of -49.5 feet MLLW. An estimated 608,000 cy of dredged material would be generated in 2015.

Management Alternatives

Management alternatives considered in this Framework included:

- *Beneficial Use Alternatives*: including existing alternatives (such as daily landfill cover) and future alternatives (including landfill cover, magazine cover and backstops at firing ranges).
- *Confined Upland Dewatering Sites*: placement of dredged material in an upland dewatering sites such as the Ship Repair Facility (SRF), Orote Airfield, Field 3, Field 5 Cell A or B, and Polaris Point Cell A or B.
- *Ocean Disposal*: placement of dredged material at the G-DODS and conducted in compliance with the U.S. Environmental Protection Agency (USEPA)/U.S. Army Corps of Engineers (USACE) Ocean Testing Manual (OTM).

Sediment Management Framework Findings

Candidate dewatering sites described in the Dredged Material Upland Placement Study (Weston Solutions and TEC JV 2008) were reevaluated and seven viable sites were identified. These sites included:

1. Ship Repair Facility: Currently at capacity. If capacity is regained by utilizing dewatered dredged material stockpiled at SRF, the site could be used to place future generated clean dredged material.
2. Orote Airfield: Currently at capacity. If capacity is regained by utilizing the dewatered dredged material stockpiled at Orote Airfield for a beneficial use, the site could be used to place future generated clean dredged material.
3. Field 3: Designated to receive dredged materials classified as NSOD but suitable for beneficial use.
4. Field 5 Cell A: Designated to receive dredged materials classified as NSOD or beneficial use.
5. Field 5 Cell B: Designated to receive dredged materials classified as NSOD or beneficial use.
6. Polaris Point Cell A: Not designated for specific dredged material type. Site reserved for emergency dredging project needs or other dredged material with specific geotechnical or chemical properties.
7. Polaris Point Cell B: Designated as a viable alternative for placement of clean dredged material for future beneficial use projects.

Management Calculation

The management calculation (i.e., allocation of dredged material to upland dewatering sites, dewatered material to beneficial use alternatives, and ocean disposal of suitable dredged material when upland dewatering sites are at capacity) was based on a number of key assumptions. A proposed schedule for these dredging activities, together with estimated volumes was developed within the management calculation. A total dredging volume for the period of 2010 through 2030 was estimated to be 2,567,000 cy.

It was assumed that 25% of those sediments (approximately 642,000 cy) were potentially NSOD) and would therefore require management in upland dewatering sites. The remaining sediments would most likely be suitable for beneficial uses such as use in construction of upland dewatering dikes, landfill daily cover, magazine construction, or backstops at firing ranges.

Over the course of the twenty year period evaluated (2010 – 2030), approximately 710,050 cy of dredged material may be beneficially used. During that same period approximately 1,050,200 cy of dredged material may be disposed at the ocean disposal site. Upland dewatering sites Polaris Point Cell B, SRF and Orote Airfield would be at capacity. Field 5 Cell A would be near capacity, with room for approximately 8,900 cy of dredged material NSOD and not suitable for beneficial use. Field 5 Cell B would have the capacity for the placement of 123,313 cy of dredged material NSOD and not suitable for beneficial use. Field 3 would have the capacity for the placement of 160,738 cy of dredged material NSOD but suitable for beneficial use. Polaris

Point Cell A would not have been built, and would be reserved the placement of an emergency dredging project, or for a specific type of material (i.e., having distinct geotechnical or chemical properties requiring segregation).

1.0 PURPOSE AND NEED FOR FRAMEWORK

1.1 Introduction

The Navy presence on Guam supports operating forces of the 7th Fleet and 3rd Fleet forces that are homeported or transiting through the area to the Persian Gulf or other points west of Guam. The Marine Corps is planning a greater presence on Guam including amphibious missions requiring ship support. The Naval Base at Apra Harbor operates and maintains wharves in Inner and Outer Apra Harbor. There are planned projects to improve existing wharves and construct new wharves. Maintenance and construction dredging will continue to be required to meet military operational requirements. Dredged material management planning is critical to identify and evaluate potential beneficial reuse and land disposal options.

1.2 Background

Management of dredged material from maintenance and construction dredging projects requires the identification of feasible dewatering placement sites on the Naval Complex, and the potential beneficial use of the dewatered dredged material in planned construction projects. The evaluation of management alternatives (placement and beneficial use) included technical, logistical and economic feasibility, and consideration of the potential for environmental and social impacts.

A Phase I Dredged Material Management Plan (DMMP), COMNAVMARIANAS, Guam (MEC–Weston, 2005), was developed to assist the Navy to complete proposed construction dredging projects in an efficient, environmentally sound, logistical feasible and cost effective manner. A DMMP for three construction dredging projects was necessary to establish the feasibility of potential placement and beneficial use options for an estimated total of 765,000 cubic yards of material. Six dewatering sites and four beneficial uses were determined to be feasible when evaluating whether they satisfied the needs and purpose of the DMMP; were technologically, logistically, and economically feasible; and did not result in any unacceptable environmental or social impacts. Each of the six potential dewatering sites (Polaris Point Field, Commercial Port Field 1, PWC Compound, and Fields 3, 4, and 5) was determined to be capable of accommodating the volume of at least one of the three proposed dredging projects, to have reasonable dewatering times, and to have minimal or no lasting environmental or social impacts. The least expensive option calculated was to place all of the material from the three dredging projects across a 51.2 acre (ac) site at Polaris Point. Each of the four beneficial uses (use of dredged material for berms surrounding ordnance magazines, construction fill in development of Charlie Wharf and Commercial Port, and as daily landfill cover) was also determined to be feasible. Based on this preliminary investigation all feasible beneficial use alternatives were recommended, assuming dewatered dredged material was chemically and geotechnically suitable.

In the three years following the development of the Phase I DMMP, changes to the Navy's waterfront functional plans and new mission preparedness objectives required a review and update of the Phase I DMMP. The purpose of the updated Dredged Material Upland Placement Study (DMUPS) (Weston Solutions and TEC, 2008) was to reevaluate potential locations for dewatering facilities and beneficial use alternatives as presented in the Phase I DMMP, determine if any additional locations for dewatering facilities or beneficial use alternatives had

become available in the three years since the Phase I DMMP study was completed, and provide sound management recommendations. In keeping with the Navy's sustainable planning policies, a key component of that study was to identify management alternatives that dewater the maximum amount of dewatered dredged material and minimize the acreage of Navy lands required, with little or no significant environmental impact. In the DMUPS, six dewatering sites and three beneficial use alternatives were considered logistically, technically, and economically feasible. Of the six potential dewatering sites (Polaris Point Field, Commercial Port Field 1, PWC Compound, and Fields 3, 4, and 5), all except Field 3 were determined to have the capacity to store material from at least one of the planned construction dredging projects. All three of the potential beneficial uses (magazine construction, landfill daily cover, and construction fill for Commercial Port expansion) were determined to be feasible. Based on the updated evaluation, all feasible beneficial use alternatives were recommended, assuming dewatered dredged material was chemically and geotechnically suitable.

In order to provide the U.S. Navy with an alternative management option of dredged material, the U.S. Environmental Protection Agency (USEPA) initiated a process to designate an ocean dredged material disposal site (ODMDS) offshore of the Territory of Guam. This process began with a Zone of Siting Feasibility (ZSF) (Weston Solutions and Belt Collins 2006) which constrained available study areas for the siting of an ODMDS based on existing information (e.g., jurisdictional boundaries, navigational hazards, sensitive resources, etc.). The ZSF identified two areas that met the siting criteria; these two areas were subject to intensive field studies to further understand the environmental resources which may be impacted during offshore disposal activities. The environmental impact statement identified a preferred alternative located approximately 11 nautical miles (nm) northwest from the entrance to Apra Harbor in water depths greater than 8,000 feet (ft). The Guam Deep Ocean Disposal Site (G-DODS) was officially designated on August 31, 2010.

1.3 Purpose and Need

In order to successfully carry out its mission, the U.S. Navy will require dredging within Apra Harbor to maintain safe navigation for current and future operational needs. Those dredged materials will require management that is consistent with maintaining public safety, a sustainable environment and U.S. Navy operations. This Sediment Management Framework (Framework) evaluates the U.S. Navy's dredging needs from 2010 through 2030 and presents a scenario for dredged material management with an emphasis on beneficial use of dredged material. This Framework reviews previous dredged material management studies conducted within Apra Harbor, designates proposed upland dewatering sites to accept specific classification of dredged material. Further, it illustrates that although dredged material may be beneficially used or placed in an upland environment, ocean disposal, when necessary, is a practical and viable management alternative for dredged materials determined to be suitable (i.e., clean) for ocean disposal (SOD) in accordance with existing regulations (Section 3.3). Effectively managing the placement of dredged materials SOD at the G-DODS maintains capacity at upland dewatering sites for dredged materials determined to be not suitable for ocean disposal (NSOD).

2.0 DREDGING REQUIREMENTS

2.1 Existing Requirements

A comprehensive dredged material management plan (Phase I DMMP) was conducted and completed for the COMNAVMARIANAS (currently known as COMJRM). The final report completed in 2005 evaluated the dredging operations, which included various alternatives for dredged material management. Subsequently, an update to the Phase I DMMP, the Dredged Material Upland Placement Study, Apra Harbor, Guam (Weston Solutions and TEC, 2008) was conducted and completed in 2008. As such, a summary of the dredging projects is provided herein. For further details of the projects, refer to both Phase I DMMP and the 2008 DMUPS.

Projects that were identified in the Phase I DMMP included MCON P-431 Alpha and Bravo Wharves, MCON P-518 X-Ray Wharf and MCON P-436 Romeo/Sierra/Tango Wharves. Project MCON P-431 was completed. Approximately, 180,000 cubic yards (cy) of dredged material was placed at the Field 5 dewatering facility. Projects MCON P-518 and MCON P-436 were cancelled. These two projects were to generate approximately 325,500 cy.

Projects identified in the 2008 DMUPS report included P-433 construction dredging at Sierra/Tango Wharves, the unscheduled CVN Capable Berth and MCON P-502 construction dredging at Kilo Wharf. Although MCON P-433 was scheduled for 2010, the project has been delayed. This project was estimated to generate approximately 508,877 cy. The unscheduled CVN project was estimated to generate approximately 478,900 cy to 758,000 cy. Dredged material from MCON P-502 was not included in the 2008 DMMP because it was determined in an evaluation done by Moffat and Nichol (2007) that it could be placed at the Orote Airfield dewatering facility. Project MCON P-502 has been completed. Approximately, 12,000 cy of dredged material was placed at the Orote Airfield dewatering facility; the remaining material consisting of fossilized reef platform was crushed to a gravel consistency and beneficially used as fill in the Kilo Wharf expansion project.

Subsequent to the 2008 DMUPS, there were significant changes to land use plans and future dredging projections by the Navy and Port Authority of Guam (PAG). This Framework, Apra Harbor Naval Complex, reevaluates the options for dredged material management.

2.2 Future Requirements

Currently, a total of six dredging projects, three maintenance dredging and three construction dredging, have been identified by the Navy in order to accommodate future operational needs (Table 1). The maintenance dredging projects include Delta/Echo Wharves, Victor Wharf and X-Ray Wharf. The construction dredging projects include Sierra Wharf, X-Ray Wharf and the proposed new CVN Capable Berth (Figure 1). A preferred alternative for the CVN capable berth has not been determined at the time of this study. This study assumes CVN Alternative 1 (at Polaris Point) is the preferred alternative since it will generate a greater volume of dredged material, therefore is a conservative estimate for use in this study's sediment management calculations.

Future maintenance dredging needs for Inner and Outer Apra Harbor over the next 20 years can be estimated based on the following assumptions:

- A sedimentation rate of approximately 1.0 inch (in.) per year occurs evenly throughout Inner Apra Harbor between 2010 and 2030[1]. Note: shoaling will likely be higher in depositional areas (e.g., adjacent to the wharf faces) and lower in high traffic areas (e.g., channel entrance).
- Maintenance dredging activities will likely occur nearest the wharves on the western side and along X-Ray Wharf on the southeast side of Inner Apra Harbor. Shallow areas along the northeastern, eastern and southernmost shores of Inner Apra Harbor, which are subject to sediment deposition from the Atantano and Aplacho Rivers, respectively, will likely not be dredged.

[1] A sedimentation rate of 1.0 in. is consistent with assumptions made in the Zone of Siting Feasibility Study (Weston Solutions and Belt Collins, 2006), conducted prior to the designation of an ocean dredged material disposal site. Although the ZSF study calculated a sedimentation rate of 2.7 in. per year based on a hydrographic survey conducted in 2000 which showed a decrease in water depths of approximately 5 ft since 1978 (Schroeder et al., 2001), this decrease in water depths of approximately 5 ft was noted as "a loss…in berthing depth", and was likely exasperated by ship traffic transiting to and from the wharves. Consequently, since the sedimentation rates in other parts of the harbor are likely much lower, a sedimentation rate of 1.0 in. was assumed to be more typical of conditions throughout the harbor.

Table 1. Dredging Requirements

	Dredging Footprint (SF)		FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	Total
			(Dredge Volumes in CY)																					
Maintenance Projects																								
X-Ray Wharf	190,000		0	1,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,500
Delta/Echo Wharves	304,000		0	5,000	0	0	0	0	0	0	0	0	0	0	6,000	0	0	0	0	0	0	0	0	11,000
Victor Wharf	570,000		0	5,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5,500
MDP-01	1,181,000		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40,000	0	0	0	0	0	40,000
MDP-02	1,152,000		0	0	0	0	0	0	80,000	0	0	0	0	0	0	0	0	0	80,000	0	0	0	0	160,000
MDP-03	2,637,000		0	0	0	40,000	0	0	0	0	0	0	0	0	0	40,000	0	0	0	0	0	0	0	80,000
MDP-04	2,494,000		0	0	0	0	0	0	90,000	0	0	0	0	0	0	0	0	0	90,000	0	0	0	0	180,000
MDP-05	3,014,000		0	0	0	0	0	0	0	0	0	0	0	0	0	80,000	0	0	0	0	0	0	0	80,000
MDP-06	4,196,000		0	0	0	0	0	0	0	0	130,000	0	0	0	0	0	0	0	0	0	130,000	0	0	260,000
MDP-07	4,534,000		0	0	0	0	0	0	0	0	0	0	140,000	0	0	0	0	0	0	0	0	0	140,000	280,000
MDP-08	3,918,000		0	0	0	0	0	0	0	0	0	0	120,000	0	0	0	0	0	0	0	0	0	120,000	240,000
MDP-09	130,000		0	0	0	0	0	0	0	0	5,000	0	0	0	0	0	0	0	0	0	5,000	0	0	10,000
																								0
TOTAL			**0**	**12,000**	**0**	**40,000**	**0**	**0**	**170,000**	**0**	**135,000**	**0**	**260,000**	**0**	**6,000**	**120,000**	**0**	**40,000**	**170,000**	**0**	**135,000**	**0**	**260,000**	**1,348,000**
Contingency		**10%**	**0**	**1,200**	**0**	**4,000**	**0**	**0**	**17,000**	**0**	**13,500**	**0**	**26,000**	**0**	**600**	**12,000**	**0**	**4,000**	**17,000**	**0**	**13,500**	**0**	**26,000**	**134,800**
TOTAL MAINTENANCE			**0**	**13,200**	**0**	**44,000**	**0**	**0**	**187,000**	**0**	**148,500**	**0**	**286,000**	**0**	**6,600**	**132,000**	**0**	**44,000**	**187,000**	**0**	**148,500**	**0**	**286,000**	**1,482,800**
Construction Projects																								
X-Ray Wharf	190,000		0	0	0	0	0	50,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50,000
Sierra Wharf (P-433)	2,021,000		0	0	0	0	0	0	327,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	327,000
CVN Alternative 1 (Polaris Point)	2,310,000		0	0	0	0	0	608,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	608,000
CVN Alternative 2 (Former SRF)*	1,929,000																							429,000
TOTAL			**0**	**0**	**0**	**0**	**0**	**658,000**	**327,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**985,000**
Contingency		**10%**	**0**	**0**	**0**	**0**	**0**	**65,800**	**32,700**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**98,500**
TOTAL CONSTRUCTION			**0**	**0**	**0**	**0**	**0**	**723,800**	**359,700**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,083,500**
TOTAL MAINTENANCE			**0**	**13,200**	**0**	**44,000**	**0**	**0**	**187,000**	**0**	**148,500**	**0**	**286,000**	**0**	**6,600**	**132,000**	**0**	**44,000**	**187,000**	**0**	**148,500**	**0**	**286,000**	**1,482,800**
TOTAL CONSTRUCTION			**0**	**0**	**0**	**0**	**0**	**723,800**	**359,700**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,083,500**
TOTAL			**0**	**13,200**	**0**	**44,000**	**0**	**723,800**	**546,700**	**0**	**148,500**	**0**	**286,000**	**0**	**6,600**	**132,000**	**0**	**44,000**	**187,000**	**0**	**148,500**	**0**	**286,000**	**2,566,300**
TOTAL PROJECTED QUANTITY (CY)																								
(FY2010-FY2030)	**clean**	75%	0	9,900	0	33,000	0	542,850	410,025	0	111,375	0	214,500	0	4,950	99,000	0	33,000	140,250	0	111,375	0	214,500	1,924,725
2,566,300	**contaminated**	25%	0	3,300	0	11,000	0	180,950	136,675	0	37,125	0	71,500	0	1,650	33,000	0	11,000	46,750	0	37,125	0	71,500	641,575

* A preferred alternative for the CVN capable berth has not been determined at the time of this study. This study assumes CVN Alternative 1 (Polaris Point) is the preferred alternative since it will generate a greater volume of dredged material; therefore, it is a conservative estimate for use in this study's sediment management calculations.

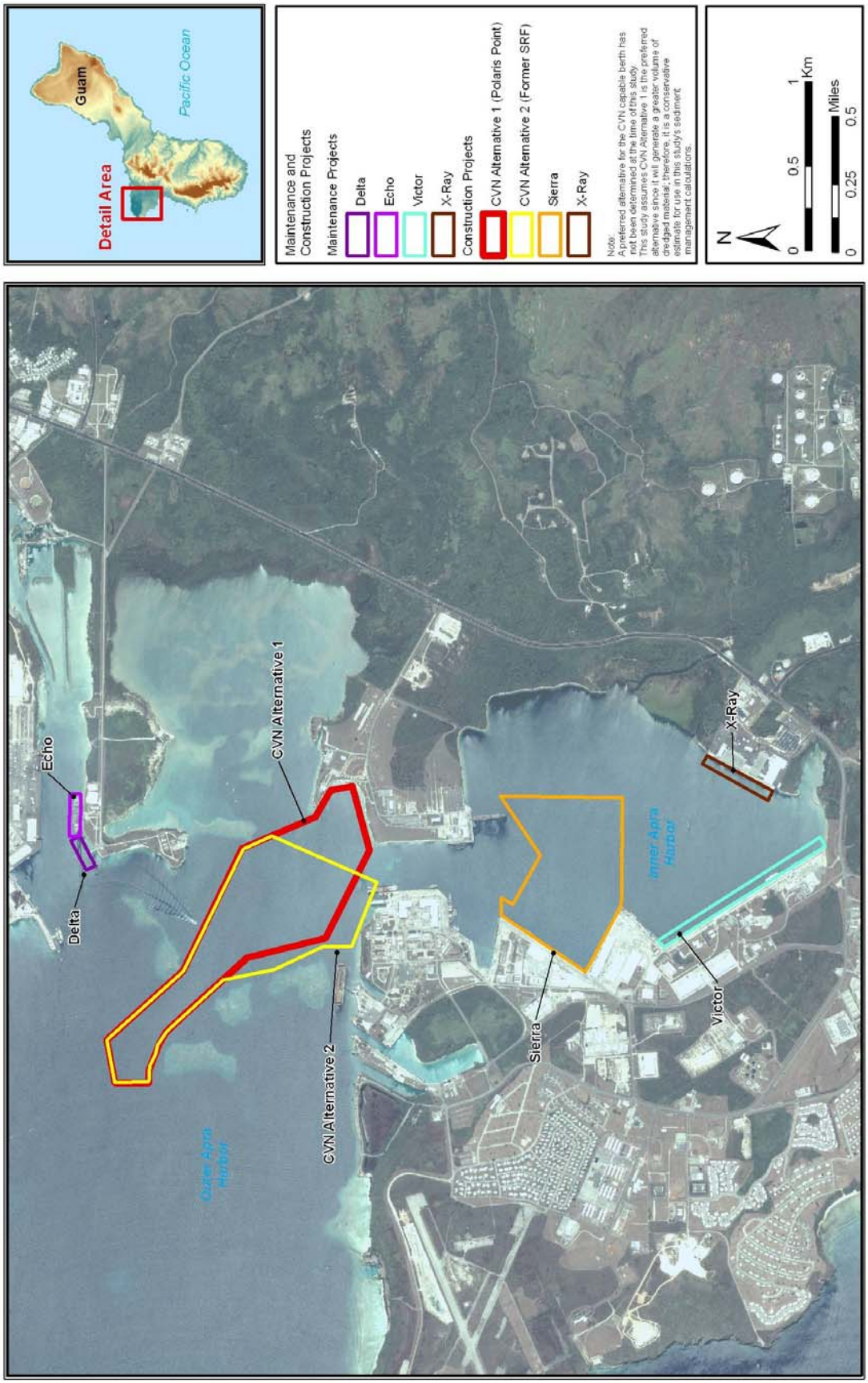

Figure 1. Planned Construction and Maintenance Dredging Projects at Apra Harbor, Guam, 2010-2030

2.2.1 Maintenance Dredging

2.2.1.1 Delta/Echo

The U.S. Navy has proposed to conduct maintenance dredging at Delta and Echo Wharves on the south side of Cabras Island Channel in Outer Apra Harbor. The dredge footprint would encompass the area from along the wharf from 10 ft out to 200 ft from the wharf face and to a depth of -45 ft mean lower low water (MLLW). Approximately 5,000 cy of dredged material is anticipated to be generated in 2011. This study further assumed a similar maintenance dredging project would be required in 2022.

2.2.1.2 Victor

The U.S. Navy has proposed to conduct maintenance dredging at Victor Wharf in the southwest portion of Inner Apra Harbor. The dredge footprint would encompass the area from along the wharf from 10 ft out to 200 ft from the wharf face and to a depth of -32 ft MLLW. Approximately 5,500 cy of dredged material is anticipated to be generated in 2011.

2.2.1.3 X-Ray

The U.S. Navy has proposed to conduct maintenance dredging at X-Ray Wharf in the southeast portion of Inner Apra Harbor. The dredge footprint would encompass the area from along the wharf from 10 ft out to 200 ft from the wharf face and to a depth of -32 ft MLLW. Approximately 1,500 cy of dredged material is anticipated to be generated in 2011.

2.2.1.4 Maintenance Dredging Projects

For the purpose of calculating a reasonable maintenance dredging volume for the next 20-years, this study established theoretical dredging projects for planning purposes. Nine separate maintenance dredge project (MDPs) areas were generated to encompass all of Inner Apra Harbor, areas adjacent to the CVN Berth Alternative 1 (at Polaris Point) and Kilo Wharf (Figure 2). A majority of Inner Apra Harbor has recently been dredged or is scheduled to be dredged in the immediate future. These MDPs are scheduled at approximately 10 year intervals from the most recent dredging project (Table 1). As mentioned previously, dredge volumes from maintenance dredging projects is based on an average sedimentation rate of 1.0 in./year.

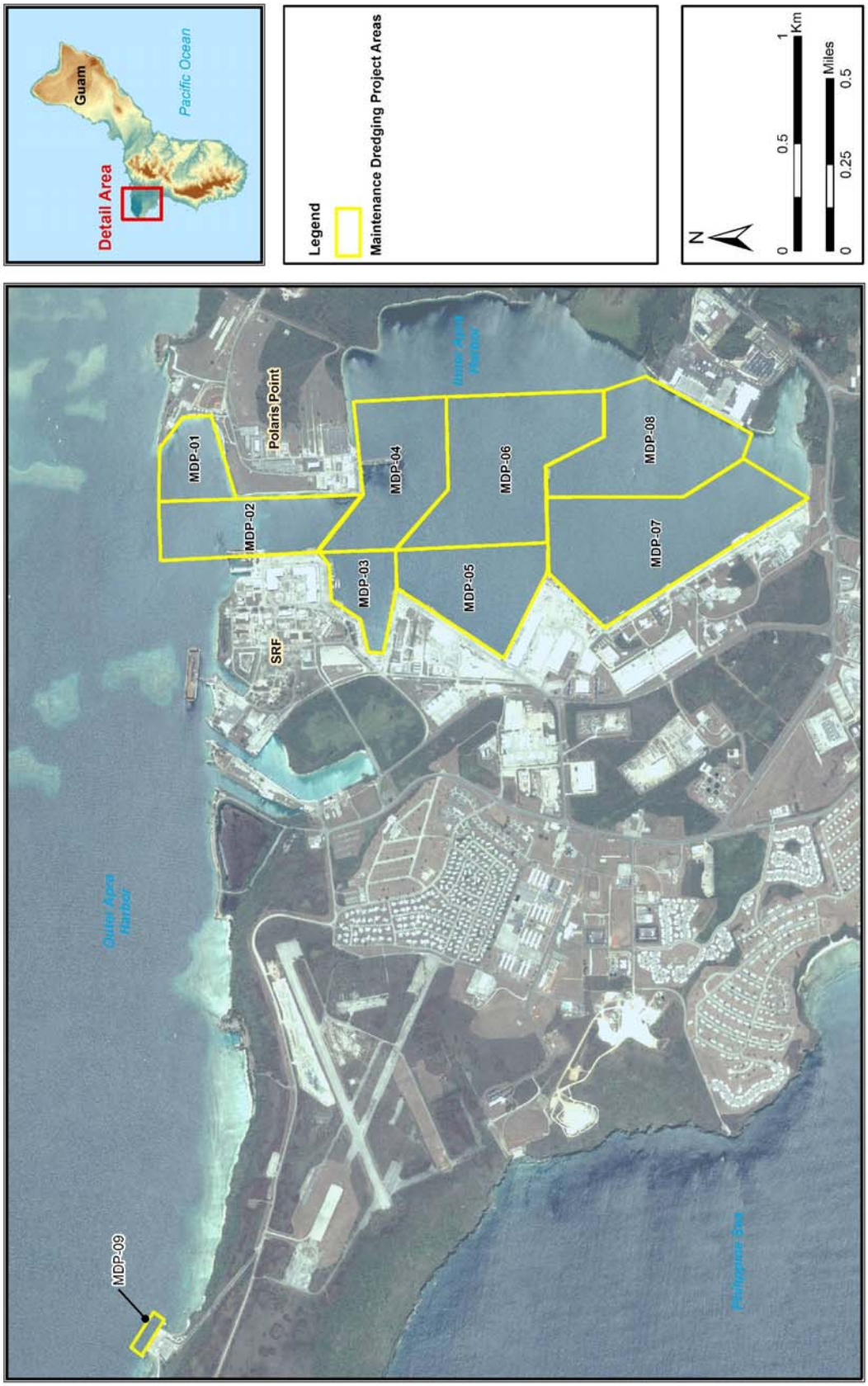

Figure 2. Maintenance Dredging Project Areas, Apra Harbor, Guam

MDP-01
Approximately 40,000 cy of dredged material to be generated within the area fronting the CVN Berth Alternative 1 (at Polaris Point) and immediate approaches per maintenance dredging episode. The construction dredging for the CVN capable berth at Polaris Point is planned for 2015; therefore, maintenance dredging of MDP-01 would not be required until 2025. During the 20 year planning cycle assumed in this study, maintenance dredging at MDP-01 would only occur once. Dredged material was assumed to consist of predominantly coarse-grained (i.e., predominantly sand and gravel) sediments.

MDP-02
Approximately 80,000 cy of dredged material to be generated within the entrance channel to Inner Apra Harbor per maintenance dredging episode. The construction dredging of the entrance channel was completed in 2007; therefore, maintenance dredging of MDP-02 was planned for 2016 and 2026. Dredged material was assumed to consist of predominantly coarse-grained sediments.

MDP-03
Approximately 40,000 cy of dredge material to be generated within the area fronting Mike through Romeo Wharves and immediate approaches per maintenance dredging episode. Maintenance dredging in this area was conducted in 2003; therefore, maintenance dredging of MDP-03 was planned for 2013 and 2023. Dredged material was assumed to consist of predominantly fine-grained (i.e., predominantly clay and silt) sediments.

MDP-04
Approximately 90,000 cy of dredge material to be generated within the area fronting Alpha Wharf and immediate approaches per maintenance dredging episode. Construction dredging in this area was conducted as part of the P-431 project completed in 2007; therefore, maintenance dredging was planned for 2016 and 2026. Dredged material was assumed to consist of predominantly fine-grained sediments.

MDP-05
Approximately 80,000 cy of dredged material to be generated within the area fronting Sierra and Tango Wharves and immediate approaches per maintenance dredging episode. Construction dredging is currently planned for Sierra Wharf and was assumed to occur in 2013 (see Section 2.2.2.1); therefore, only one maintenance dredging episode was planned for this area occurring in 2023. Dredged material was assumed to consist of predominantly fine-grained sediments.

MDP-06
Approximately 130,000 cy of dredged material to be generated within the central portion of Inner Apra Harbor per maintenance dredging episode. Maintenance dredging was planned for 2018 and 2028. Dredged material was assumed to consist of predominantly fine-grained sediments.

MDP-07
Approximately 140,000 cy of dredged material to be generated within the area fronting Uniform and Victor Wharves and immediate approaches per maintenance dredging episode. A smaller

dredge footprint adjacent to Victor Wharf is scheduled for maintenance dredging in 2010; therefore, maintenance dredging of the MDP-07 area was planned for 2020 and 2030. Dredged material was assumed to consist of predominantly fine-grained sediments.

MDP-08
Approximately 120,000 cy of dredged material to be generated within the area fronting X-Ray Wharf and immediate approaches per maintenance dredging episode. A smaller dredge footprint adjacent to X-Ray Wharf is scheduled for 2011 and construction dredging in the immediate vicinity of X-Ray Wharf is scheduled for 2015; therefore, maintenance dredging of the MDP-08 area was planned for 2020 and 2030. Dredged material was assumed to consist of predominantly fine-grained sediments.

MDP-09
Approximately 5,000 cy of dredged material to be generated within the area immediately adjacent to Kilo Wharf per maintenance dredging episode. Construction dredging at Kilo Wharf occurred in 2008; therefore, maintenance dredging of MDP-09 was planned for 2018 and 2028. Dredged material was assumed to consist of predominantly coarse-grained sediments.

2.2.1.5 Other

The Navy may require the eastern and southernmost portions of Inner Apra Harbor to be dredged for continued safe operations (Figure 3). It appears these areas have not been historically maintained. Maintenance and/or construction dredging of these areas to similar water depths in other parts of Inner Apra Harbor may increase the volume of dredged material to be managed in Inner Apra Harbor by over 1,383,000 cy over the next 20 years. This assumes the existing water depth in these two areas is approximately -30 ft MLLW and would be dredged to -35 ft MLLW with a 2-ft overdredge. This additional dredged material was not considered in the management calculation (See Section 4.3).

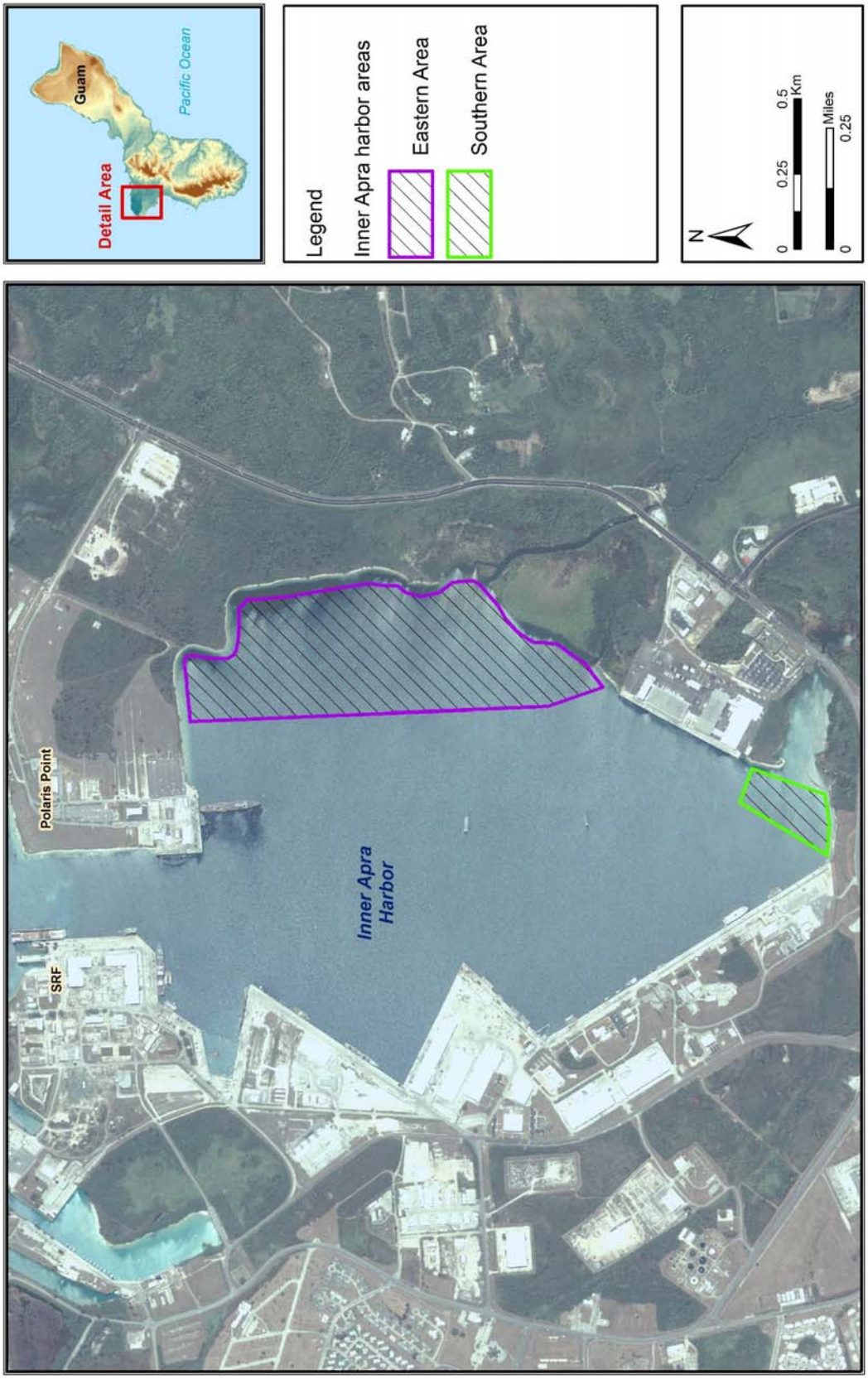

Figure 3. Other Inner Apra Harbor Areas Potentially Requiring Dredging

2.2.2 Construction Dredging

2.2.2.1 Sierra Wharf

Construction dredging adjacent to Sierra Wharf is expected to result in the removal of approximately 327,000 cy of sediment, including a 2-ft overdredge. As part of the project design, dredging will occur adjacent to Sierra and Tango Wharves, extending approximately 2,300 ft into central Inner Apra Harbor to a depth of -38 ft MLLW. The project, originally scheduled for 2010, is tentatively scheduled to occur during 2016.

2.2.2.2 X-Ray

Construction dredging at X-Ray Wharf is assumed to have a dredge footprint that extends approximately 200 ft from the wharf face and includes an access fairway towards the entrance to Inner Apra Harbor to a depth of -35 ft MLLW. An estimated 50,000 cy of dredged material would be generated in 2015.

2.2.2.3 CVN Capable Berth

The potential CVN capable berth site at Polaris Point is located in Outer Apra Harbor at the northern end of Polaris Point in a cove situated east of the Inner Harbor entrance channel. The dredge footprint for this potential site includes the area fronting the wharf, a turning basin northwest of the site, and an access fairway extending from the turning basin northwest toward the Outer Apra Harbor entrance. If this site is selected, dredging will occur to -49.5 feet MLLW, with approximately 449,000 cy of material removed and managed from the area fronting the wharf, the Turning Basin, and the access fairway. With a 2-ft overdredge included, the total volume is approximately 608,000 cy of dredge material. Although an alternative CVN capable berth site is currently being considered along the northern portion of the Ship Repair Facility which would generate a total of 429,000 cy of dredged material, the Polaris Point site is considered the preferred alternative and would generate a greater volume of dredged material, making the assumptions herein conservative.

3.0 MANAGEMENT ALTERNATIVES

3.1 Beneficial Use Alternatives

Dredged material provides a manageable and valuable resource. As such, beneficial use is a desired management option. Dredged material may be beneficially used as a resource in a variety of projects such as construction fill material, magazine construction, daily landfill cover, and shoreline restoration. Factors that should be considered in the evaluation of beneficial use alternatives include the identification of local needs and opportunities for beneficial use, geotechnical and sediment chemistry requirements, distance from the dredging site or dewatering site to the location of beneficial use, site accessibility, handling requirements, and capacity of beneficial use in relation to the volume of dredged material available. For all of the beneficial use alternatives discussed in this report, the material is assumed to first be placed in an upland dewatering facility. After the material is sufficiently dry, the material would be available for beneficial use alternatives in planned construction or other use activities.

3.1.1 Existing Alternatives

Currently, only daily landfill cover, magazine construction and firing range backstop construction were determined to be projects suitable for accepting dredged material and therefore evaluated as potential beneficial use alternatives. The availability of material on-site or geotechnical requirements eliminated the potential for the beneficial use of dredged material at other proposed construction projects.

3.1.1.1 Daily Landfill Cover

Daily landfill cover requires workability, moderate cohesion and low permeability characteristics. Dredged material often consists of fine-grained, cohesive sediments with low permeability. Based on preliminary geotechnical tests of the proposed construction dredged material, a majority of the dredged material is likely to be suitable for daily landfill cover. Dewatered material will need to pass a paint filter test and be evaluated for hazardous waste (e.g., toxicity characteristic leaching procedure [TCLP]) prior to use in the landfill.

Landfill cover was identified as a beneficial use of dredged material at the PWC Landfill. Landfill cover was identified as a feasible alternative in the 2005 Phase I DMMPS and the 2008 DMUPS. It was estimated that the average capacity of this alternative would be approximately 20,000 cy/yr and that the PWC Compound could continue to receive dredged material for daily cover through 2011 for a total volume of landfill cover of 40,000 cy.

3.1.2 Future Alternatives

3.1.2.1 Daily Landfill Cover

With the PWC Landfill at capacity, landfill cover is still a feasible beneficial use alternative. The Government of Guam's (GovGuam) Layon Landfill is scheduled to be opened in 2011. As the Department of Defense has provided the GovGuam with a letter of intent to use the Layon Landfill for the disposal of municipal solid waste, this study assumed that use of dredged

material generated from Apra Harbor within the jurisdiction of the Apra Harbor Naval Complex would also be available for use at the Layon Landfill. This study further assumed that the average capacity of landfill cover per year would be equivalent to the PWC Landfill, with an average capacity of 20,000 cy/yr. If 20,000 cy/yr were applied to the Layon Landfill every year from the time it came online in 2012 through 2030, the total volume of landfill cover would be 380,000 cy.

3.1.2.2 Magazine Cover

The construction design of magazines (i.e., munitions storage areas) includes earthen berms, or barricades, and cover. Barricades and earth cover are effective strategies for reducing risks associated with the storage of hazardous ordnance materials. Dredged material could be used for these projects in the construction of barricades or as covers. The alternative would include the beneficial use of dredged material dewatered at one or more dewatering sites. After dewatering and consolidation, the dredged material would be removed from the dewatering site and transported to the project site.

Orote Peninsula

Construction of magazines at the Orote Peninsula was identified as a feasible beneficial use of dredged material alternative in the 2005 Phase I DMMP and the 2008 DMUPS. Two ammunition storage site projects, including open ammunition storage and non-propagation wall/earth covered magazines, were identified in the Ordnance Function Plan for Orote Peninsula (HHFP 2003a). Although identified for 2008, this project (MCON P-425) has been categorized as a 2015 or beyond project; this study assumed construction of magazines and the beneficial use of dredged material during construction of magazines at Orote Peninsula would occur in FY15. The total volume of material for the two Orote Peninsula magazine construction projects would be 102,000 cy, which assumes 20,000 cy would be used for barricades in the construction of six 9,350 square feet (sf) open ammunition storage pads and 82,000 cy would be used for earth cover in the construction of 17 4,800 sf box magazines.

Naval Munitions Site

The potential beneficial use of dewatered dredged material for magazine construction at the Naval Munitions Site (NMS) (formerly known as the Ordnance Annex) was identified and evaluated as a feasible alternative in the 2005 Phase I and the 2008 DMUPS. The Ordnance Function Plan (HHFP, 2003b) proposed several construction projects, including container holding yards, open ammunition storage and high explosive magazines, to increase the ordnance handling capacities and to provide for operational improvements at the NMS. Initially it was thought that these projects would be initiated in 2008; however, construction of new magazines at NMS is now categorized as a 2016 or beyond project; this study assumed construction of magazines and the beneficial use of dredged material during construction of magazines at the NMS would occur in 2019. It was estimated to have a total capacity of 47,000 cy, which includes the construction of earthen barricades bordering three container holding yards (requiring 5,000 cy of dredged material), earthen barricades between nine open ammunition storage pads (requiring 30,000 cy of dredged material), and earth cover for the construction of two high explosive magazines (requiring 12,000 cy of dredged material). Designs were based on specifications obtained in the Navy publication “NAVSEA OP 5” (DON, 2001b).

The Military Relocation Environmental Impact Statement (EIS) identified the need for additional munitions storage magazine at the NMS (NAVFACPAC, 2010). This alternative includes the construction of 11 munitions storage magazines. Construction of these magazines is categorized as a 2016 or beyond project; this study assumed construction of magazines and the beneficial use of dredged material during construction of magazines at NMS would occur in 2019. Using a similar conceptual design as magazine construction at Orote Peninsula, approximately 53,000 cy of dewatered dredged material could be used in construction of these additional magazines at NMS.

Andersen Air Force Base

The beneficial use of dewatered dredged material for magazine construction for two separate projects at Andersen Air Force Base (AFB) was identified as potential beneficial use alternatives for this study. The first project includes the construction of 12 munitions storage magazines and support facilities. Construction of these magazines is categorized as a 2016 or beyond project; this study assumed construction of magazines and the beneficial use of dredged material during construction of magazines at Andersen AFB would occur in 2019. Using a similar concept design as magazine construction at Orote Peninsula, approximately 58,000 cy of dewatered dredged material could be used in construction of magazines at Andersen AFB. The second project includes the construction of one Theater High Altitude Area Defense (THAAD) Launcher Storage, three Patriot/Avenger/Surface-Launched Medium Range Air-to-Air Missile (SLAMRAAM) launcher storage and four guided missile magazines. Construction of these storage units and magazines is categorized as a 2016 or beyond project; this study assumed construction of magazines and the beneficial use of dredged material during construction of magazines at Andersen AFB would occur in 2020. Construction of these units could beneficially use approximately 17,000 cy of dewatered dredged material.

3.1.2.3 Firing Ranges

The beneficial use of dewatered dredged material for construction of firing range backstops at the Route 15 Training Complex was identified as a potential beneficial us alternative for this study. The berms to be constructed as backstops would range in length from 35 to 255 ft, in width from 7 to 56 ft, and in height from 3 to 7 ft. Construction of these firing range backstops could beneficially use approximately 160,000 cy of dewatered dredged material and is assumed to occur in 2014.

3.1.2.4 USMC Main Cantonment Site

Development at the U.S. Marine Corps (USMC) Main Cantonment Site in the Finegayan area may include infrastructure and support facilities. Currently, planning documents suggest that on-site material will be sufficient for construction fill; however, once final designs are completed, additional material for construction fill may be required. Dewatered dredged material from Apra Harbor may be suitable for beneficial use at this site. However, this study assumes dewatered dredged material is not suitable and/or not required for construction activities at the USMC Main Cantonment Site, based on the existing information.

3.2 Confined Upland Dewatering Sites

A confined upland dewatering site is an engineered structure for containment of dredged material. Upland dewatering sites are bound by confinement structures, or dikes, to enclose the disposal area, thereby isolating the dredged material from its surrounding environment. The design of the upland dewatering site considers factors such as site location, type of material to be placed, volume of material to be placed, and placement method. The height of the confinement structure, or dike height, is evaluated to determine the maximum capacity of the site. The height to which the dredged material is placed within the dikes is the lift height and is typically 2 ft less than dike height to prevent loss of material.

3.2.1 Dredging Methods

Placement of dredged material at upland locations can be accomplished either hydraulically or mechanically. Hydraulic placement is generally limited by distance, physical barriers and environmental controls placed on return flows of water after settling and decanting. Mechanical placement of dredging is limited by size or availability of dewatering facilities, and expense of effort required to rehandle, de-water and transport dried dredged material to its final location.

Hydraulic placement involves the dredging of material using a cutterhead (suction) dredge. Material is then conveyed via pipeline to its ultimate destination. Contractors may need to employ booster pumps and add water to maintain flow of slurried dredged material. The pipeline and ancillary equipment (pumps, joints, etc) will require continuous monitoring and maintenance to preclude problems due to leaking or catastrophic failure. The contractor will need to rotate the pipeline to provide even internal wear, especially when abrasive material is dredged and conveyed. The end of the pipeline will require frequent repositioning to avoid mounding of material at the discharge point. Contractors will employ manifolds and other methods to assist in the filling of individual cells at placement sites. Contractors also employ training walls, and submerged berms constructed of dredged material and/or native material to extend residence time and assist in the settling of dredged material. Weirs and other water control structures facilitate the return of decanted water to the receiving water body. Potential issues include contaminants in solution, turbidity, and total suspended solids.

Mechanical dredging and rehandling begins with dredging of material using clamshell, or bucket, dredges. It is placed into a scow barge and conveyed to the re-handling site. If a dump barge is used, the unloading doors must be maintained in a closed position by positive means to prevent leakage en-route or during offloading operations. The rehandling area must be located immediately adjacent to the offloading (material transfer) site. The area should be sealed to prevent leakage of placed material. Precast modular concrete segments (k-rail), sealed with high density polyethylene fabric, or some other impermeable material have been successfully employed during recent re-handling operations to contain dredged material. The transfer of dredged material from the barge into the re-handling site is generally accomplished via shore mounted crane or derrick barge equipped with clamshell lifting devices. Care must taken to preclude the inadvertent loss of material during transfer from scow barge to the containment facility. This is usually accomplished via a bridging device to contain spilled material. Material is generally dewatered within the containment facility by exposing it to the sun and wind via frequent manipulation with a front-end loader or other equipment. Dried material can be

stockpiled on site awaiting transport to its ultimate destination. Care must be taken not to over-dry the material to the point where it is lost (wind-blown dust). Experience has shown that approximately 80% solids is optimum for re-handling / transportation operations. Material is wet enough not to be blown off transporting equipment, yet dry enough not to flow onto roadways. Potential issues include contaminants in dredged sediment and air emissions associate with re-handling and transportation equipment.

Both the Phase I DMMP and 2008 DMUPS recommended mechanical dredging for future dredging projects. This recommendation was based on two key points: 1) historical dredging activities conducted by the Navy have used mechanical dredging methods; and 2) the nature of mechanically dredged material is better suited for management alternatives identified in the Phase I DMMP, 2008 DMUPS and in this study. In the Phase II DMMP evaluations (Weston Solutions and Hawaii Pacific Engineers, 2005a and b; Weston Solutions and Belt Collins, 2005), it was determined the sediment characteristics and water content of mechanically dredged material did not result in a discharge of effluent from the upland placement site. Hydraulic dredging would likely generate much greater volumes of water which reduces capacity at the upland placement sites and requires additional management of effluent. Recent projects used mechanical dredging methods: the dredged material was offloaded at a nearby wharf and trucked to nearby upland placement sites.

3.2.2 Evaluation for Upland Placement

Several Phase II DMMP evaluations have recently been conducted to evaluate potential contaminant impacts from the placement of dredged material into an upland setting on Guam. These include the *Dredged Material Management Plan: Phase II Evaluation for Environmental Effects for Dewatering and Management of Materials from MCON P-431* (Weston Solutions and HPE, 2005a), *Dredged Material Long-Term Management Strategy: Phase II, Guam, Evaluation of Environmental Effects for Dewatering and Management of Materials from MCON P-518 and P-436* (Weston Solutions and HPE, 2005b), and *Dredged Material Management Plan: Sampling and Analysis of Sediments for Construction Dredging at Kilo Wharf* (Weston Solutions and Belt Collins, 2005).

After dredged material is placed in the dewatering site, contaminants and nutrients may migrate out of the facility by several different pathways. These pathways include runoff associated with rain, leachate associated with foundation soils, effluent discharge from pore water and excess carrier water, volatilization, and/or plant and animal uptake. The method for evaluating each potential pathway for contaminant migration is described in the Upland Testing Manual (UTM) (USACE, 2003). In addition to evaluating impacts through the standard contaminant pathways, the potential for offensive odors emanating from exposed dredged material during the dewatering process can be assessed.

The UTM outlines a four-tiered approach to evaluating contaminated-related impacts to the multiple pathways following the placement of dredged material in an upland environment.

- Tier I uses existing information to determine the need for evaluation of pathways, which pathways need evaluation and what receptor of concern and contaminants of concern need evaluation.

- Tier II is required if Tier I data is insufficient for making management decisions. Tier II uses basic information about the physical, chemical and biological properties of the dredged material as well as information about the upland disposal site. Tier II uses screening level assessments to evaluate potential contaminant migration pathways.
- Tier III is required if Tier I and Tier II data is insufficient for making management decisions. Tier III is designed to gather more detailed information and includes effects-based testing for each of the specific pathways of concern. Sections 3.2.2.1 through 3.2.2.5 provide a brief summary of the various pathways and associated tests available to evaluate contamination migration through these pathways.
- Tier IV is seldomly employed and consists of site-specific studies or formal risk assessment evaluations.

3.2.2.1 Runoff

Runoff is the water resulting from a rain event that flows off an upland placement. An evaluation of the ponded water can be conducted to estimate temporary discharge of rainwater during exceptional situations. The Simplified Laboratory Runoff Procedure (SLRP) or Rainfall Simulator/Lysimeter System (RSLS) can be conducted on composite sediment samples from the proposed dredge footprint and evaluated against chemistry (WQS) or toxicological endpoints. Comparisons to water quality standards can then be made using the Runoff Quality (RUNQUAL) program (Schroeder et al. 1995) module within the Automated Dredging and Disposal Alternative Modeling System (ADDAMS) program (Schroeder et al. 2004). If an analyte is predicted to exceed water quality standards (WQS), mixing zones can be determined to determine when WQS are met. The mixing zones are modeled using CORMIX.

3.2.2.2 Leachate

Easily dissolved contaminants within dredged material can be mobilized by water. Dissolved contaminants in carrier water, pore water, and rainwater (leachate) may percolate down through dredged material then underlying soil (i.e., foundation of the dewatering facility) and eventually mix with groundwater. Therefore, an evaluation of leachate quality is necessary and can be conducted using the Sequential Batch Leachate Procedure (SBLP) or Pancake Column Leach Test (PCLT). Leachate quality should be compared to the most stringent WQS.

3.2.2.3 Effluent

Effluent is considered any water discharged from a confined upland placement site as a result of filling or disposal of dredged material. Several tests are required to evaluate the discharge of effluent, including the Long Tube Column Settling Test (LTCST), measurements of turbidity and total suspended solids (TSS), and Effluent Elutriate Tests (EET) evaluated against chemistry (WQS) or toxicological endpoints.

3.2.2.4 Volatilization

Dissolved contaminants on the surface of wet dredged material or in ponded water overlying dredged material can volatize into the atmosphere and may impact air quality. An evaluation of dredged material volatile emissions can be conducted using a Volatile Emissions Laboratory Test Procedure. Results from the volatilization model are compared to Occupational Safety and Health Administration (OSHA) air quality standards.

3.2.2.5 Odor

Dredged material is generally composed of fine-grained material that often releases odorous volatile organics when exposed to the sun. An odor's degree of potential offensiveness is subjective; therefore, an odor test involving human subjects can be used to evaluate the offensiveness of odors from dredged material.

3.2.3 Existing Sites

Existing confined upland dewatering sites have been identified, evaluated and reevaluated in the 2005 Phase I DMMP and the 2008 DMUPS, respectively. These sites included the Ship Repair Facility (SRF), the Orote Airfield Site and Field 5 and were considered as feasible alternatives (Figure 4). Details for the existing sites are included in both reports. As such, a summary of each site in terms of size and capacity is provided (Table 2). Refer to the Phase I DMMP and the 2008 DMUPS for more details of the existing sites.

3.2.3.1 Ship Repair Facility

A confined dewatering site already exists at the SRF. This dewatering site was constructed for the management of the dredged material from Phase I maintenance dredging project at Victor and X-Ray Wharves, Inner Apra Harbor, Guam. It is approximately 2 ac and has a dike height of 10.0 ft (Cruz, pers. comm., 2010). The estimated capacity of the site is 16,000 cy. Currently, the SRF site is at capacity.

In the Phase I DMMP, this alternative did not meet the requirement of the purpose and need of the DMMP because of insufficient capacity. As such, it was eliminated from further evaluation.

This Framework, contrary to the determination in the Phase I DMMP and 2008 DMUPS, considers the SRF upland placement site as a viable alternative. Dewatered dredged material currently stored at this facility could be beneficially used; thereby, restoring the site's capacity to accept dredged material from future projects. This alternative would use the existing dewatering facility for placement of clean dredged material for future beneficial use.

3.2.3.2 Orote Airfield

A confined upland dewatering site already exists at the Orote Airfield. It is located adjacent to the airstrip, which is still active and is designated as a historic site. Because of the historic site designation, the dewatering site was built with the required 16.5 ft setbacks from the runway. This limited the available area. The dewatering site is approximately 16.8 ac and has a dike height of 20.0 ft (Cruz, pers. comm., 2010). The capacity of the existing dewatering site is approximately 71,900 cy. Dredged material from previous maintenance dredging projects was placed at this site. Currently, the filled site is overgrown with a mixture of urban and alien grassland.

In the Phase I DMMP, this alternative did not meet the requirement of the purpose and need of the DMMP because of insufficient capacity and scheduling limitations (i.e., dredged material was not expected to be dewatered for placement in a beneficial use project prior to the need to place additional dredged material). As such, it was eliminated from further evaluation.

This Framework, contrary to the determination in the Phase I DMMP and 2008 DMUPS, considers the Orote Airfield upland placement site as a viable alternative. Dewatered dredged material currently stored at this facility could be beneficially used; thereby, restoring the site's capacity to accept dredged material from future projects. This alternative would use the existing dewatering facility for placement of clean dredged material for future beneficial use.

3.2.3.3 Field 5

Another existing confined upland dewatering site is called Field 5, which is located between Sumay Drive and Marine Drive (Figure 5). Originally, the dewatering site was designed with a footprint of 53.2 ac and would have a maximum capacity of approximately 2,060,000 cy (Table 2). This assumed a dike height of 26 ft and required 607,000 cy of dike material.

A portion of Field 5 (Cell A) has been built to hold dredged material from the previous MCON P-431 Alpha/Bravo Wharf project. Approximately, 75 percent of the site was cleared for the placement of dredged material from MCON P-431.

For this Framework, a reduced footprint of the original alternative would be considered for placement of dredged material NSOD or for beneficial use. The reduced footprint and two cell design retains the existing drainage canal through the site (Sato, pers. comm., 2010a). It also eliminates the need to reroute overhead electrical utilities. The reduced footprint includes two distinct cells (Cell A and Cell B). Field 5 Cell A would have a footprint of 15.3 ac and a total capacity of 364,000 cy (Table 2). A dike height of 17.0 ft and a lift height of 15.0 ft was assumed for Field 5 Cell A. Field 5 Cell B would have a footprint of 16.0 ac and a total capacity of 309,000 cy. A dike height of 14.0 ft and a lift height of 12.0 ft was assumed for Field 5 Cell B.

Table 2. Dewatering Sites

Potential Dewatering Site		Footprint Size (ac)	Capacity (cy)	Dike Height (ft)	Distance from Offloading Site[1] (mi)	Status
Ship Repair Facility		2.0	16,000	10.0	1.3	At Capacity. Feasible for placement of dredged material assuming existing dried dredged material is removed for beneficial use.
Orote Airfield		16.8	71,900	20.0	2.0	At Capacity. Feasible for placement of dredged material assuming existing dried dredged material is removed for beneficial use.
Field 5	DMMP/DMUPS	53.2	2,059,904	26.0	1.2	Feasible for placement of dredged material.
	Cell A	15.3	364,000	17.0		
	Cell B	16.0	309,000	14.0		
Field 3		16.0	426,000	18.5	1.75	Feasible for placement of dredged material.
Polaris Point	DMMP/DMUPS	44.3	2,072,649	31.0	0.25	Feasible for placement of dredged material.
	Cell A	6.4	151,000	17.0		
	Cell B	12.2	290,000	17.0		
Field 4		26.6	600,805	16.0	1.2	Removed from consideration due to designation for Solar Farm Project.
PWC Compound		27.8	762,461	19.0	0.25	Removed from consideration due to designation for Navy operational needs and proximity to historical resources.
Commercial Port Field I	East	22.7	476, 095	15.0	2.5	Removed from consideration due to elimination by the Port Authority of Guam's Port Modernization Program.
	West	14.2	97, 365	6.25		

Note: Shaded cells present data from Phase I DMMP (MEC-Weston, 2005) and DMUPS (Weston Solutions and TEC, 2008). Unshaded cells present current data.

(1) Distances calculated from an offloading site on Uniform Wharf

Figure 4. Existing and Proposed Upland Dewatering Sites, Apra Harbor Naval Complex, Guam

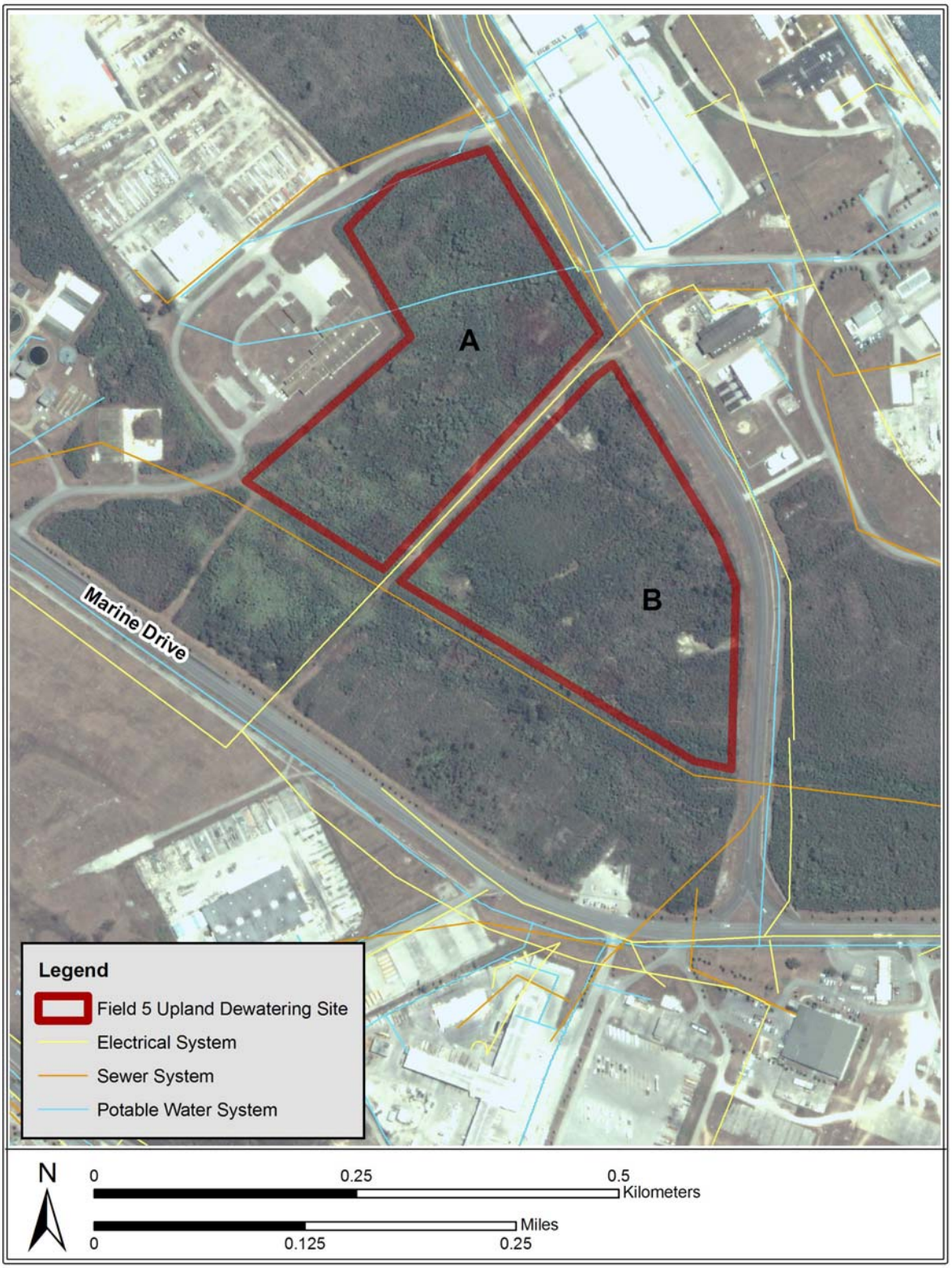

Figure 5. Field 5 Upland Dewatering Site

3.2.4 Proposed Sites

Field 3 and Polaris Point confined upland dewatering sites were evaluated during the Phase I DMMP and/or the 2008 DMUPS. These sites were determined to be feasible alternative dewatering sites. As such, descriptions of the sites in terms of size and capacity are summarized. For further details of each site, refer to the Phase I DMMP and/or 2008 DMUPS reports.

3.2.4.1 Field 3

The proposed confined upland dewatering site, referred to as Field 3 will be located on undeveloped lands south of the Commissary (Figure 6). Field 3 is approximately 16.0 ac. The maximum capacity for Field 3 would be approximately 426,000 cy, assuming a dike height of 18.5 ft and a lift height of 16.5 ft.

For this Framework, Field 3 would be considered for the placement of dredged material NSOD but potentially suitable for beneficial use.

3.2.4.2 Polaris Point

The Polaris Point upland dewatering site is on undeveloped lands at Polaris Point (Figure 7). This alternative was determined as a feasible alternative in both the 2005 Phase I DMMPS and the 2008 DMUPS. The originally proposed site has a footprint size of 44.3 ac with a maximum capacity of approximately 2,073,000 cy, assuming a dike height of 31.0 ft and a lift height of 29.0 ft (Table 2).

Due to recent changes in the Navy's operational needs, a reduced footprint of the original alternative would be required at Polaris Point for placement of clean dredged material suitable for beneficial use. The reduced footprint includes two distinct cells (Cell A and Cell B). Polaris Point Cell A would have a footprint of 6.4 ac and a total capacity of 151,000 cy (Table 2). Polaris Point Cell B would have a footprint of 12.2 ac and a total capacity of 290,000 cy. A dike height of 17.0 ft and lift height of 15.0 ft is assumed for both cells. The reduced footprint and two cell design accommodates the placement of a helipad, support facilities, and additional sewage lines. It also eliminates the need to reroute existing sewage and potable water lines.

Figure 6. Field 3 Upland Dewatering Site

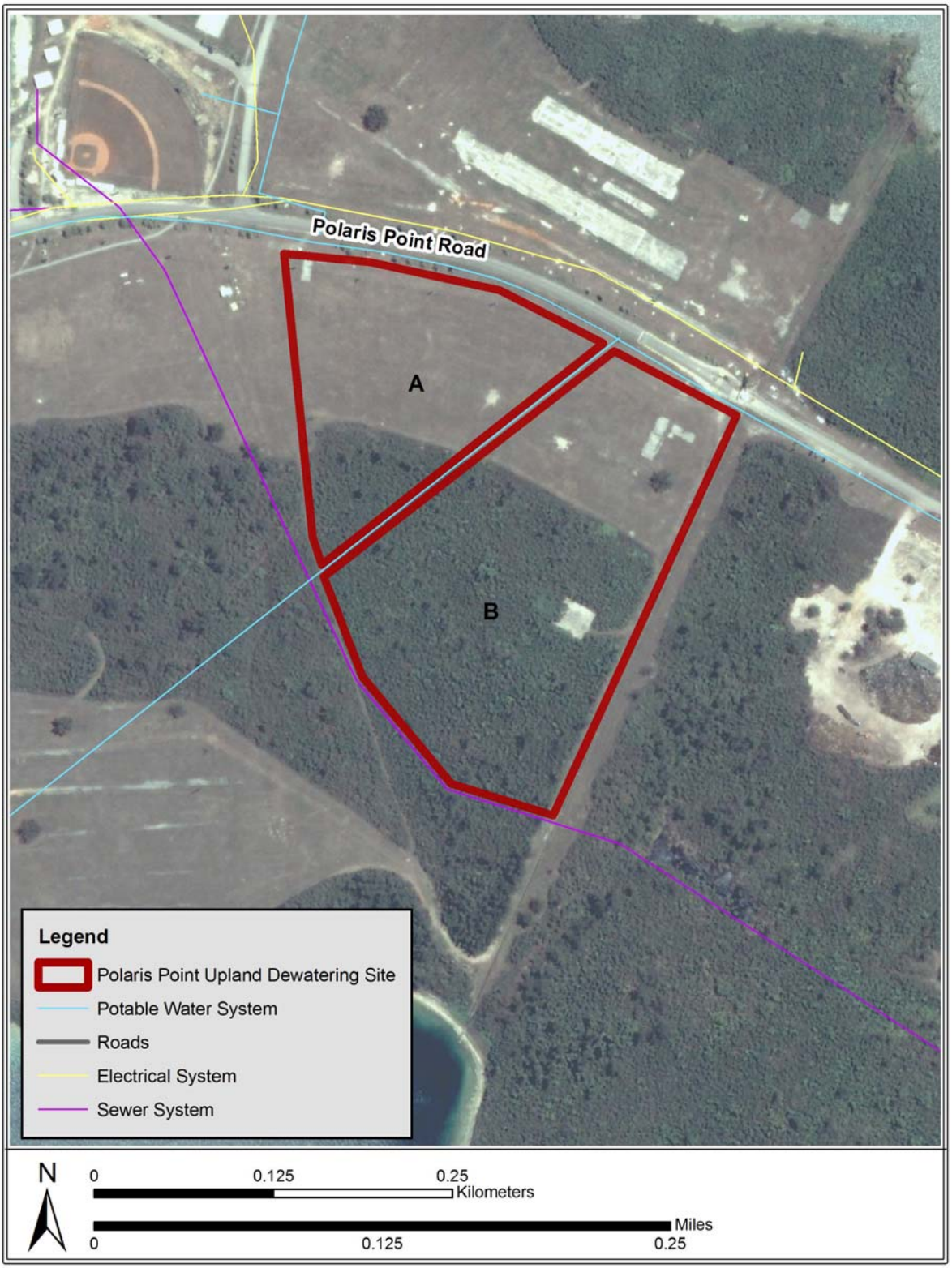

Figure 7. Polaris Point Upland Dewatering Site

3.2.5 Sites Removed From Further Consideration

3.2.5.1 Field 4

Field 4 was another confined upland dewatering site that was determined as a feasible dewatering alternative site in the 2005 Phase I DMMP and the 2008 DMUPS. It was located between Shoreline Drive to the west and Marine Drive to the east. The proposed footprint of this site was approximately 26.6 ac and had the potential to handle approximately 600,805 cy of dredged material, assuming a dike height of 16.0 ft and lift height of 14.0 ft.

Due to recent changes in the Navy's operational needs, this site has been removed from further consideration. A Solar Farm Project has been designated for placement on a portion of this site (Sato, pers. comm., 2010b). A reduced footprint was not considered given the availability of sufficient land identified at other dewatering sites. In addition, the site is near to existing support facilities and family housing and is best reserved for other compatible land uses.

3.2.5.2 PWC Compound

The PWC Compound Upland dewatering site was identified as a feasible alternative in the 2005 Phase I DMMP and the 2008 DMUPS. It was located between Harbor Drive, Sumay Drive and Nob Hill Bowl Theater. The proposed footprint of the PWC Compound site was approximately 27.8 ac with a maximum capacity of 762,461 cy, assuming a dike height of 19.0 ft and lift height of 17.0 ft.

Due to recent changes in the Navy's operational needs, this site was removed from further consideration. A new Navy Exchange gas station, mini-mart and medical/dental clinic is planned to be located on the western portion of this site (Sato, pers. comm., 2010b). Additional considerations were made to its proximity to Nob Hill Bowl Theater and other potential historical resources located in the eastern portion of the site; thereby, eliminating the placement of a reduced footprint dewatering site at the PWC Compound.

3.2.5.3 Commercial Port Field 1

The Commercial Port Field 1 dewatering site was identified as a feasible alternative in the 2005 Phase I DMMP and the 2008 DMUPS. It was located on Cabras Island on Commercial Port property and divided into an eastern cell and a western cell. The proposed total footprint of this site was 36.9 ac with a maximum capacity of approximately 573,000 cy assuming dike heights of 15.0 and 6.25 ft and lift heights of 14.0 and 4.25 ft for the eastern cell and western cell, respectively.

Due to recent changes in the Port Authority of Guam's (PAG) operational needs, this site was removed from further consideration. The PAG's Port Modernization Program land use requirements eliminated the space previously designated for a dewatering site (Sato, pers. comm., 2010a).

3.3 Ocean Disposal

3.3.1 Requirements

In order to be determined suitable for ocean disposal (SOD), dredged material must meet the criteria defined in the USEPA/USACE document Evaluation of Dredged Material Proposed for Ocean Disposal (The Ocean Testing Manual [OTM]) (USEPA and USACE, 1991). This document proposes a four tier approach for evaluating compliance with the limiting permissible concentration (LPC) as defined by the ocean-dumping regulations.

The LPC for the suspended particulate phase concentration of dredged material in the water column is the concentration that, after allowance for initial mixing, does not exceed applicable marine WQS or a toxicity threshold of 0.01 of the acutely toxic concentration. The LPC of the solid phase is the concentration that will not cause unreasonable toxicity or bioaccumulation

Tier I information is gathered and compared to three exclusionary criteria (§227.13):

- The dredged material is composed predominantly of sand, gravel, rock or any other naturally occurring bottom material with particle sizes larger than silt, and the material is found in areas of high current or wave energy such as streams with large bed loads or coastal areas with shifting bars and channels; or

- Dredged material is used for beach nourishment or restoration and is composed predominantly of sand, gravel or shell with particle sizes compatible with material on the receiving beaches; or

- When the material proposed for disposal is substantially the same as the substrate at the proposed disposal site; and the site from which the material proposed to be dredged is far removed from known existing and historical sources of pollution so as to provide reasonable assurance that such material has not been contaminated by such pollution.

If one or more of the exclusionary criteria can be satisfied, the LPC is met and no further evaluation is required. If no exclusionary criteria can be met the LPC is evaluated based on the collected data. The data must include data analysis of toxicity and bioaccumulation potential of the dredged material and the reference sediments. The information must also be sufficient to determine if the WQS or 1% of the lethal median concentration (LC_{50}) will be exceeded in the water column following the initial-mixing period. If this information is not available or if it is not adequate the evaluation process moves to Tier II.

Tier II: if existing information is insufficient to evaluate LPC compliance of §227.13(c); the regulations require testing to determine the potential for water-column impact and whether the corresponding LPC is met. Tier II consists of the evaluation of WQS compliance and an evaluation of the potential for benthic impact using calculations of theoretical bioaccumulation potential. The dredged-material impact in the water column must be within the marine WQS for all contaminants of concern outside the boundary of the site at all times and within the site following the 4-hr initial mixing period. Currently there are no procedures to assess LPC compliance for water-column toxicity in Tier II, for dredged-material contaminants without

WQS or from effects of synergistic reactions. If WQS has not been established for all contaminants of concern or if synergistic effects are expected, further testing in Tier III is required. The WQS evaluation in Tier II can be bypassed only if there are no exceedances of WQS for any of the contaminants in the dredged material. The WQS evaluation is performed in a two-step process:

Step one of the water-column evaluation comprises a screen that assumes that all of the contaminants in the dredged material are released into the water column during the disposal operation. If the numerical model in Appendix B of the OTM predicts that the concentration of all of the contaminants of concern released into the water are less than the applicable WQS and no synergistic effects are suspected, the dredged material meets the LPC for the water column. If the numerical model indicates that the LPC is exceeded, Step 2 must be employed. If WQS have not been established for all contaminants of concern or if synergistic effects are suspected, further testing in Tier III is required to determine compliance with the LPC.

Step two of the water-column evaluation involves conducting a numerical mixing model found in Appendix B of the OTMwith data obtained from an elutriate test conducted on the dredged material. If the numerical model predicts that the concentration of all contaminants of concern in the water column are less than the applicable WQS and no synergistic effects are suspected the dredged material will meet the LPC for the water column.

Currently, only the benthic bioaccumulation impact of nonpolar organic compounds in dredge material can be evaluated in Tier II. The approved procedure calculates the theoretical bioaccumulation potential (TBP) for the test organism by factoring the concentrations of the nonpolar organic chemical and total organic carbon (TOC) in the sediment and the percent lipid concentration (%L) in the organism. A comparison is made between the TBP calculated for the nonpolar organic contaminants of concern in the dredged material and for the same constituents in the reference sediment. The TBP calculation is used to evaluate nonpolar organic compounds in Tier II, a particular dredged material may contain contaminants of concern for which it may be inappropriate to make this calculation. For these contaminants, bioaccumulation has to be evaluated in Tiers III and/or IV.

Tier III testing assesses the impact of contaminants in the dredged material on appropriate sensitive organisms to determine if there is potential for the dredged material to have an unacceptable impact. Tier III does this through three separate tests, water-column bioassays, whole-sediment bioassays and bioaccumulation by benthos testing.

If additional water-column testing is necessary, the Tier III water-column evaluation considers the effects after the allowance for initial mixing of dissolved contaminants plus those associated with suspended particulates on water-column organisms. According to the regulations water-column bioassays must be used when there are not applicable marine WQC for all of the contaminants of concern or when there is reason to suspect the synergistic effects of certain contaminants.

Bioassays with sediment are designed to determine whether the dredged material is likely to produce unacceptable adverse effects on appropriate sensitive marine organisms. Test animals are exposed to the test sediment for 10 days for acute tests and the number of survivors is

recorded. For bioaccumulation tests the test animals are exposed to the dredged material for 10-28 days depending on the contaminant of concern. The concentrations of the contaminants are analyzed in the animal test tissues.

Benthic-bioaccumulation tests provide for the determination of bioavailability. A 10-day exposure test is used if all contaminants of concern are metals, and a 28-day exposure test is used if any of the contaminants of concern are organic or organometallic compounds. Following the 10 or 28-day exposure to the dredged material, concentrations of contaminants of concern in tissues of benthic organisms are compared initially against applicable Food and Drug Administration (FDA) Action Levels for Poisonous or Deleterious Substances in Fish and Shellfish for Human Food.

If a decision regarding toxicity or bioaccumulation has not been reached at the lower numbered tiers, then a Tier IV evaluation is necessary. Tier IV test consist of bioassays and bioaccumulation tests to determine the long-term effects of exposure to dredged material. Tier IV test should be carefully selected to address the specific issues relevant to the case in question. The case-specific evaluative criteria for these tests have to be determined beforehand and agreed upon by the U.S. Environmental Protection Agency (USEPA) and the U.S. Army Corps of Engineers (USACE) and have to be adequate to determine compliance with the requirements of paragraph §227.13(c).

Tier IV bioassays should measure sensitive indicators of long-term effects of clear ecological importance, such as survival, and reproduction. Tier IV testing might be appropriate when the evidence is sufficient to require testing for carcinogens, mutagens, or teratogens.

If a decision cannot be reached based on the 10 or 28-day bioavailability data, it is appropriate to determine steady-state bioaccumulation of the contaminants of concern. Tissue samples used for this evaluation may be collected in the field or be generated by laboratory exposure of test organisms to the dredged material.

3.3.2 Annual Capacity

Dredging is essential for maintaining safe navigation at port and naval facilities. Not all dredged materials are suitable for beneficial reuse and not all suitable material can be re-used or stockpiled for future use. Therefore, there was a need to designate a permanent ocean disposal site for Apra Harbor and other locations around Guam as an alternative management option for dredged material SOD. The USEPA designated the G-DODS on August 31, 2010. The site is limited to a maximum disposal capacity of 1,000,000 cy per calendar year.

4.0 SEDIMENT MANAGEMENT FRAMEWORK

4.1 Alternative Analysis Framework

This alternative analysis is based on three key elements:

- Dredging is required to maintain safe navigation within Apra Harbor and those dredged materials require management that is consistent with maintaining public safety, a sustainable environment and U.S. Navy operations.
- Dredged material is a viable resource that may be beneficially used.
- If beneficial projects are not immediately available, upland placement of dredged materials for future beneficial use projects must be carefully managed to maintain capacity of upland dewatering sites for specific dredged material types. Dredged material may be placed at the G-DODS if and only if beneficial use projects or upland capacity is not sufficient and it meets specific regulatory criteria for ocean disposal.

Figure 8 illustrates a framework for evaluating management alternatives of dredged material. First, a need for dredging is determined (e.g., is maintenance dredging required to maintain safe navigation; or, is construction dredging necessary to increase water depths for the safe berthing of larger class vessels?). Second, once the need for dredging has been established, volumes of dredged material are calculated. Third, beneficial use alternatives are evaluated as potential management options (e.g., does the schedule of dredging project align with the local needs and opportunities for beneficial use, geotechnical and sediment chemistry requirements, distance from the dredging site or dewatering site to the location of beneficial use, site accessibility, handling requirements, and capacity of beneficial use in relation to the volume of dredged material available). If beneficial use is a viable management option, the dredged material may be further evaluated and placed into designated upland dewatering sites. If beneficial use is not a viable option and there is limited upland dewatering site capacity, the material may be evaluated for ocean disposal. Only dredged material found SOD may be placed at the ocean disposal site. If a beneficial use project is not available and the material is NSOD, the dredged material must be placed in an upland dewatering site specific to the classification of the dredged material.

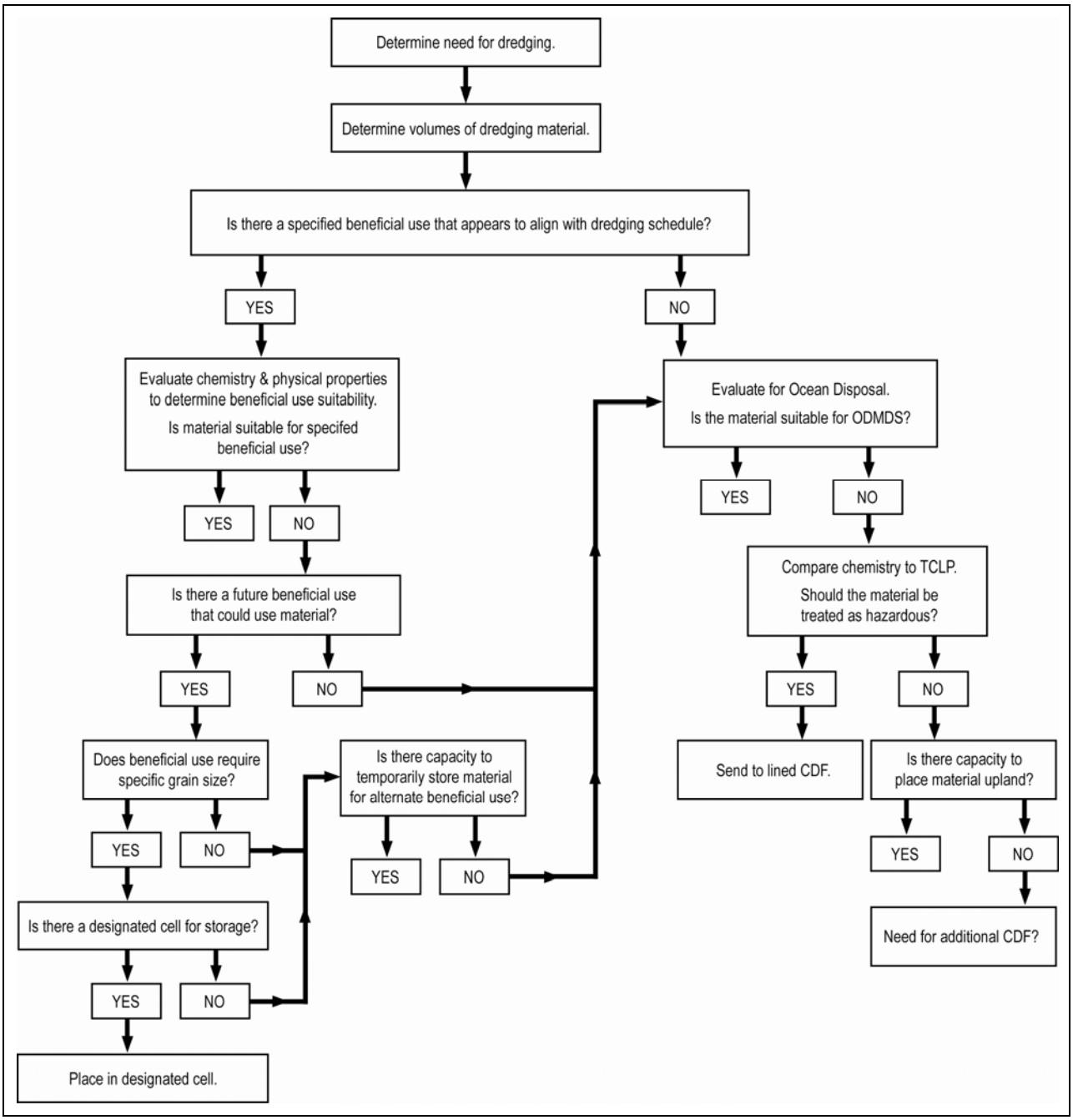

Figure 8. Alternative Analysis Framework

4.2 Dewatering Site Designation

The DMUPS identified six sites, not including the preexisting sites at SRF and Orote Airfield, as potential dewatering site alternatives for proposed future dredging projects. These sites included:

1. Polaris Point - 44.3 ac site located on Polaris Point;
2. Field 5 - 53.2 ac site located northwest of the Commissary, between and Marine Drive and Sumay Drive;
3. Commercial Port Field 1 - 36.9 ac site located within Commercial Port property on Cabras Island;
4. Field 3 - 16.0 ac site located south of the Navy Exchange Center and Commissary;
5. Field 4 - 26.6 ac site located northwest of the Commissary, between Shoreline Drive and Marine Drive; and
6. PWC Compound - 27.8 ac site located between Marine Drive and Sumay Drive at the former PWC Compound.

Since the DMUPS was completed, proposed changes to land use at several of these sites has either reduced or eliminated the available area for placement of a dewatering site. In addition, this study made the conservative assumption that existing infrastructure (electrical, water, sewer, etc.) would not be relocated for placement of dredged material. This assumption resulted in the splitting of Field 5 into two distinct placement sites and the reduction of Polaris Point and results in a conservative estimate of available upland capacity for dredged material. Commercial Port Field 1, Field 4 and PWC Compound were eliminated from further consideration due to changes in the Navy and Port Authority of Guam's operational needs.

Of the remaining available sites, each site was designated to receive a specific classification of dredged material. The classifications of dredged material included: 1) not suitable for ocean disposal (NSOD), but suitable for beneficial use; 2) not suitable for ocean disposal (NSOD) or beneficial use; and 3) suitable for ocean disposal (SOD) and beneficial use. The last classification assumes material found SOD will be preferentially placed upland if there is sufficient upland capacity. This assumption is consistent with the U.S. Navy's desire to beneficially use dredged material whenever feasible and to minimize the disposal of dredged material at the ocean disposal site. Field 3 was designated to receive dredged materials classified as NSOD, but suitable for beneficial use. Field 5 Cell A and Field 5 Cell B were designated to receive dredged materials classified as NSOD or beneficial use. Polaris Point Cell B, Orote Airfield and SRF were designated as SOD and suitable for beneficial use.

Dewatering sites designated suitable for beneficial use may be further classified to receive only fine or coarse-grained material. Separation of dredged material by grain size would further aid in the designating specific dredged materials for beneficial use projects that require specific geotechnical properties. The initial calculation assumes this separation is not conducted, but a scenario could be developed where Orote Airfield is designated to receive coarse-grained material. This scenario is not preferred since it requires additional rehandling of material already placed in Orote Airfield (e.g., material from Orote Airfield is transferred to another upland dewatering site in order to gain capacity specifically for coarse-grained material). Rehandling

would increase project costs and which would need to be evaluated against the benefit of having coarse-grained specific material for future beneficial use.

During the process of the management calculation, the calculations showed there were limited upland placement options for clean (i.e., SOD) dredged material. After construction of dikes at Field 3, Field 5 Cell A and B and Polaris Point Cell B, only Polaris Point Cell B, SRF and Orote Airfield were designated to receive clean dredged material. The combined capacity of these three sites was approximately 350,000 cy (including material needed for dike construction at Polaris Point Cell B), which is much less than the 1,925,000 cy of clean material anticipated to generated and managed.

4.3 Management Calculation

The following assumptions were used in determining likely dredging volumes, placement of material, construction of dewatering site dikes, and beneficial use of dewatered material:

- As stated in the Phase I DMMP, a bulking factor of 10 percent (%) should be applied to dredged volume during mechanical dredging. Dredged volumes used in the Guam Upland Placement Study did not include a bulking factor to be consistent with other concurrent studies (TEC Inc. JV, 2008).
- Although this study did not apply a 10% bulking factor, per se, a 10% contingency was applied to all dredging projects.
- In preparing the upland dewatering sites, the top 1.5 ft of soil at each upland dewatering site would be used for dike construction (with the exception of Field 5 Cell A where excavation has already occurred and dredged material placed).
- Dikes are built according to design for the maximum site capacity prior to the placement of dredged material, with the exception of Field 3 and Field 5 Cell B. The dike height at Field 3 was limited to 18.5 ft. The dike height at Field 5 Cell B was limited based on available material for dike construction in 2011. Dikes are built from a combination of soil excavated from the site during site preparation and clean dredged material.
- All clean dredged material is considered suitable for dike construction.
- All dredged material SOD and dredged material NSOD but suitable for beneficial use placed upland is suitable for whichever beneficial use alternative as required.
- 25% of all dredged material is NSOD. Of this amount, 50% (i.e., 12.5% of total dredge volume) is considered not suitable for beneficial use and 50% is considered suitable for beneficial use.
- Based on historical sediment chemistry results, no material was considered hazardous (i.e., failed to meet TCLP criteria). Dredged material that fails to meet TCLP criteria would need to be disposed of in an upland confined disposal facility permitted to accept hazardous material.
- Due to limited capacity of Polaris Point Cell A, this site was reserved for placement of material related to emergency dredging needs or material identified as hazardous, assuming the site can be designed, permitted and approved to accept hazardous material.

Table 3 presents the management calculation (i.e., allocation of dredged material to upland dewatering sites, dewatered material to beneficial use alternatives, and ocean disposal of suitable dredged material when upland dewatering sites are at capacity) for the U.S. Navy's dredging

needs in Inner and Outer Apra Harbor from 2010 to 2030. It is recognized that this is only one of multiple scenarios for the management of dredged material from Apra Harbor. This scenario illustrates the requirement to set aside locations for the placement of dewatering sites specific to the three classifications of sediment: 1) NSOD, but suitable for beneficial use; 2) NSOD or beneficial use; and 3) SOD and beneficial use. For the most part, minor changes to the proposed schedule (projects occurring plus or minus a year or two), shouldn't change the overall placement decisions. However, a large construction dredging project or beneficial use project not accounted for in this study may significantly alter the volume of material requiring ocean disposal.

The first milestones occur in 2011. First, dike construction at Field 5 Cell A and B, as well as at Field 3 will be initiated prior to scheduled maintenance projects. At Field 5 Cell A, where 180,000 cy of dredged material was previously placed and dewatered, 134,000 cy of that material would be used in the construction of the dikes. The remaining 46,000 cy of material would be used in the construction of dikes at Field 5 Cell B, in conjunction with approximately 40,000 cy of soil made available at the site during site preparation. At Field 3, approximately 40,000 cy of soil made available at the site during site preparation would be used to initiate dike construction there. Second, maintenance dredging operations at Delta and Echo Wharves, Victor Wharf and X-Ray Wharf will generate approximately 13,200 cy of dredged material (accounting for a 10% contingency). Approximately 3,300 cy of this material is assumed to be NSOD, comprised of 1,650 cy suitable for beneficial use and 1,650 cy not suitable for beneficial use. Field 5 Cell A would receive 1,650 cy of dredged material NSOD and not suitable for beneficial use, Field 3 would receive 1,650 cy of dredged material NSOD but suitable for beneficial use and the remaining 9,900 cy of dredged material would be used to for additional dike construction at Field 5 Cell B.

No dredging or beneficial use of dredged material would occur in 2012.

In 2013, maintenance dredging of MDP-03 would generate a total of 44,000 cy of dredged material (accounting for a 10% contingency). Approximately 5,900 cy would be used to initiate dike construction at Polaris Point Cell B in conjunction with 30,000 cy of soil made available at the site during site preparation. Approximately 11,000 cy of the dredged material from this project would be considered NSOD, comprised of 5,500 cy not suitable for beneficial use and 5,500 cy suitable for beneficial use; these materials would be placed in Field 5 Cell A and Field 3, respectively. The remaining 27,100 cy of clean dredged material would be used to further construct dikes at Field 3.

In 2014, no dredging or beneficial use of dredged material would occur.

Table 3. Dredged Material Management Calculation

Placement Sites and Alternatives	Design Capacity (CY)	On-Site Material (CY)	Existing Capacity (CY)	Status	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	REMAINING CAPACITY (CY)
					Dredge Volumes in Cubic Yards (CY)																					
Upland Dewatering Sites																										
Ship Repair Facility (EXISTING)																										
OPERATING LIFE - Placement at Site	16,000	0	0	FULL	0	0	0	0	0	16,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OPERATING LIFE - Mined for Beneficial Use					0	0	0	0	0	-16,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Orote Airfield (EXISTING)																										
OPERATING LIFE - Placement at Site	71,900	0	0	FULL	0	0	0	0	0	71,900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OPERATING LIFE - Mined for Beneficial Use					0	0	0	0	0	-71,900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Field 5a (EXISTING) (NSOD and Not Suitable for Beneficial Use)					Design	On-Site Material																				
CONSTRUCTION (Dike Volume)	134,000	180,000	134,000	Not Available	0	134000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OPERATING LIFE (Internal Volume)	230,000		230,000	Available	0	1,650	0	5,500	0	90,475	68,338	0	18,563	0	35,750	0	825	0	0	0	0	0	0	0	0	8,900
Field 5b (NSOD and Not Suitable for Beneficial Use)					Design	On-Site Material + From Field 5a																				
CONSTRUCTION (Dike Volume)	86,000	40,000	46,000	Not Available	0	86000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OPERATING LIFE (Internal Volume)- Placement at Site	223,000		223,000	Available	0	0	0	0	0	0	0	0	0	0	0	0	0	16,500	0	5,500	23,375	0	18,563	0	35,750	123,313
Polaris Point A																										
CONSTRUCTION (Dike Volume)	73,000	15,000	58,000	Available	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58,000
OPERATING LIFE (Internal Volume)	78,000		78000	Available	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	78,000
Polaris Point B							Design																			
CONSTRUCTION (Dike Volume)	103,000	30,000	73,000	Available	0	0	0	5,900	0	67,100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OPERATING LIFE (Internal Volume) - Placement at Site	187,000		187,000	Available	0	0	0	0	0	187,000	20,000		40,000	0	177,625	0	4,950	55,050	0	33,000	27,000	0	40,000	0	40,000	0
OPERATING LIFE (Internal Volume) - Mined for Beneficial Use					0	0	0	0	0	0	-20,000	-20,000	-20,000	-158,000	-19,625	-20,000	-20,000	-20,000	-20,000	-20,000	-20,000	-20,000	-20,000	-20,000	-20,000	
Field 3 (NSOD but Suitable for Beneficial Use)					Design																					
CONSTRUCTION (Dike Volume)	129,000	40,000	89,000	Available	0	9900	0	27100	0	52,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OPERATING LIFE (Internal Volume) - Placement at Site	297,000		297,000	Available	0	1,650	0	5,500	0	90,475	68,338	0	18,563	0	35,750	0	825	16,500	0	5,500	23,375	0	18,563	0	35,750	160,738
OPERATING LIFE (Internal Volume) - Mined for Beneficial Use					0	0	0	0	0	-7,150	0	0	0	-20,000	-157,375	0	0	0	0	0	0	0	0	0	0	
Beneficial-Use Options																										
Daily Cover - Navy Sanitary Landfill (EXISTING)																										
OPERATING LIFE	40,000		40,000	Available	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	40,000
Daily Cover - Layon Landfill (EXISTING)																										
OPERATING LIFE	380,000		380,000	Available	NA	NA	0	0	0	0	20,000	20,000	20,000	20,000	0	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	100,000
Magazine Construction Ordnance Annex																										
CONSTRUCTION													Design													
OPERATING LIFE	47,000		47,000	Available	0	0	0	0	0	0	0	0	0	47,000	0	0	0	0	0	0	0	0	0	0	0	0
Magazine Construction Orote Peninsula (MILCON P-425)																										
CONSTRUCTION									Design																	
OPERATING LIFE	102,000		102,000	Available	0	0	0	0	0	95,050	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,950
NMS USMC Munitions Storage Area (11 magazines)																										
CONSTRUCTION													Design													
OPERATING LIFE	53,000		53,000	Available	0	0	0	0	0	0	0	0	0	53,000	0	0	0	0	0	0	0	0	0	0	0	0
Andersen AFB USMC Munitions Storage Area (12 magazines)																										
CONSTRUCTION													Design													
OPERATING LIFE	58,000		58,000	Available	0	0	0	0	0	0	0	0	0	58,000	0	0	0	0	0	0	0	0	0	0	0	0
Andersen AFB Army Munitions Storage Area (8 magazines)																										
CONSTRUCTION														Design												
OPERATING LIFE	17,000		17,000	Available	0	0	0	0	0	0	0	0	0	0	17,000	0	0	0	0	0	0	0	0	0	0	
Route 15 Training Complex Firing Range																										
CONSTRUCTION														Design												
OPERATING LIFE	160,000		160,000	Available	0	0	0	0	0	0	0	0	0	0	160,000	0	0	0	0	0	0	0	0	0	0	0
Ocean Disposal																										
Ocean Disposal Site (EXISTING)																										
OPERATING LIFE (1,000,000 MCY/year)	21,000,000		21,000,000	Available	0	0	0		0	148,850	390,025	0	71,375	0	36,875			43,950			113,250		71,375		174,500	19,949,800
TOTAL	23,484,900		23,272,000			13,200	0	44,000	0	723,800	546,700	0	148,500	0	286,000	0	6,600	132,000	0	44,000	187,000	0	148,500	0	286,000	20,525,700
						Planning & Design			Construction		##,###	NSOD - Not Suitable for Ocean Disposal					##,###	Clean Material			-##,###	Material Removed From Site for Beneficial Use				

In 2015, coordination of beneficial use projects and construction dredging projects would be required. The beneficial use of 16,000 cy of dewatered dredged material from SRF, 71,900 cy of dewatered dredged material from Orote Airfield and and 7,150 cy of dewatered dredged material from Field 3 may be used in magazine construction on Orote Peninsula. Together, dewatered dredged material from all three of these locations would provide only 95,050 cy of material for beneficial use in magazine construction; an additional 6,950 cy of material would be needed to complete construction. The beneficial use of material from SRF, Orote Airfield and Field 3 would need to be completed prior to the initiation of construction dredging at X-Ray Wharf and the CVN capable berth. Construction dredging would generate a total of 723,800 cy of dredged material (accounting for a 10% contingency). Approximately 180,950 cy of the dredged material from these two projects would be considered NSOD, comprised of 90,475 cy not suitable for beneficial use and 90,475 cy suitable for beneficial use; these materials would be placed in Field 5 Cell A and Field 3, respectively. The completion of dikes at Polaris Point Cell B and Field 3 would require approximately 67,100 cy and 52,000 cy of clean dredged material, respectively. Approximately 16,000 cy of dredged material may be placed back into SRF, 71,900 cy of dredged material may be placed back into Orote Airfield. Polaris Point Cell B could be filled to capacity (187,000 cy) and the remaining 148,850 cy of dredged material would be placed at the ocean disposal site.

In 2016, coordination of beneficial use projects and maintenance dredging projects would be required. The beneficial use of approximately 20,000 cy of dewatered dredged material from Polaris Point Cell B may be used for landfill daily cover at Layon Landfill. The beneficial use of material from Polaris Point Cell B, may need to be completed prior to the initiation of maintenance and construction dredging projects. Maintenance dredging of MDP-02 and MDP-04 and construction dredging of Sierra Wharf would generate a total of 546,700 cy of dredged material (accounting for a 10% contingency). Approximately 136,675 cy of the dredged material from these three projects would be considered NSOD, comprised of 68,338 cy not suitable for beneficial use and 68,338 cy suitable for beneficial use; these materials would be placed in Field 5 Cell A and Field 3, respectively. After replacing 20,000 cy of dredged material in Polaris Point Cell B, the remaining 390,025 cy of dredged material would be placed at the ocean disposal site.

In 2017, no dredging is planned. Approximately 20,000 cy of dredged material may be mined from Polaris Point Cell B and beneficially used as daily cover at the Layon Landfill.

In 2018, coordination of beneficial use projects and maintenance dredging projects would be required. The beneficial use of approximately 20,000 cy of dewatered dredged material from Polaris Point Cell B may be used for landfill daily cover at Layon Landfill. The beneficial use of material from Polaris Point Cell B may need to be completed prior to the initiation of maintenance dredging. Maintenance dredging of MDP-06 and MDP-09 would generate a total of 148,500 cy dredged material (accounting for a 10% contingency). Approximately 37,125 cy of the dredged material from these two projects would be considered NSOD, comprised of 18,563 cy not suitable for beneficial use and 18,563 cy suitable for beneficial use; these materials would be placed in Field 5 Cell A and Field 3, respectively. After placing 40,000 cy into Polaris Point Cell B, the remaining 71,375 cy of dredged material would be placed at the ocean disposal site.

In 2019, no dredging is planned. Approximately 178,000 cy of dewatered dredged material may be beneficially used for various projects. The beneficial use of approximately 20,000 cy of

dewatered dredged material from Field 3 may be used for landfill daily cover at Layon Landfill. The beneficial use of approximately 158,000 cy of dewatered dredged material from Polaris Point Cell B may be used in the construction of three separate magazine projects. Approximately 47,000 cy of material may be beneficially used in one of two magazine construction projects at NMS, while an additional 53,000 cy of material may be beneficially used in the second magazine construction project at NMS. Approximately 58,000 cy of material may be beneficially used in magazine construction at Andersen AFB.

In 2020, coordination of beneficial use projects and maintenance dredging projects would be required. The beneficial use of approximately 177,000 cy of dewatered dredged material from Polaris Point Cell B and Field 3 may be used for magazine construction at Andersen AFB and the Firing Range backstops at the Route 15 Training Complex. The beneficial use of material from these two sites may need to be completed prior to the initiation of maintenance dredging. Maintenance dredging of MDP-07 and MDP-08 would generate a total of 286,000 cy of dredged material (accounting for a 10% contingency). Approximately 71,500 cy of the dredged material from these two projects would be considered NSOD, comprised of 35,750 cy not suitable for beneficial use and 35,750 cy suitable for beneficial use; these materials would be placed in Field 5 Cell A and Field 3, respectively. Approximately 177,625 cy of dredged material can be placed back into Polaris Point Cell B. The remaining 36,875 cy of dredged material would be placed at the ocean disposal site.

In 2021, no dredging is planned. Approximately 20,000 cy of dredged material may be mined from Polaris Point Cell B and beneficially used as daily cover at the Layon Landfill.

In 2022, coordination of beneficial use projects and maintenance dredging projects would be required. The beneficial use of approximately 20,000 cy of dewatered dredged material from Polaris Point Cell B may be used for landfill daily cover at Layon Landfill. The beneficial use of material from Polaris Point Cell B may need to be completed prior to the initiation of maintenance dredging. Maintenance dredging along Delta and Echo Wharves would generate a total of 6,600 cy of dredged material (accounting for a 10% contingency). Approximately 1,650 cy of the dredged material from these two projects would be considered NSOD. Approximately 825 cy of the dredged material NSOD would be considered not suitable for beneficial use and placed in Field 5 Cell A, bringing this site to near capacity. The other 825 cy of dredged material NSOD would be considered suitable for beneficial use and would be placed in Field 3. The remaining 4,950 cy of dredged material would be placed at Polaris Point Cell B.

In 2023, coordination of beneficial use projects and maintenance dredging projects would be required. The beneficial use of approximately 20,000 cy of dewatered dredged material from Polaris Point Cell B may be used for landfill daily cover at Layon Landfill. The beneficial use of material from Polaris Point Cell B may need to be completed prior to the initiation of maintenance dredging. Maintenance dredging of MDP-03 and MDP-05 would generate a total of 132,000 cy of dredged material (accounting for a 10% contingency). Approximately 33,000 cy of the dredged material from these two projects would be considered NSOD, comprised of 16,500 cy not suitable for beneficial use and 16,500 cy suitable for beneficial use; these materials would be placed in Field 5 Cell B and Field 3, respectively. Approximately 55,050 cy may be placed at Polaris Point Cell B. The remaining 43,950 cy of dredged material would be placed at the ocean disposal site.

In 2024, no dredging is planned. Approximately 20,000 cy of dredged material may be mined from Polaris Point Cell B and beneficially used as daily cover at the Layon Landfill.

In 2025, coordination of beneficial use projects and maintenance dredging projects would be required. The beneficial use of approximately 20,000 cy of dewatered dredged material from Polaris Point Cell B may be used for landfill daily cover at Layon Landfill. The beneficial use of material from Polaris Point Cell B may need to be completed prior to the initiation of maintenance dredging. Maintenance dredging of MDP-01 would generate a total of 44,000 cy of dredged material (accounting for a 10% contingency). Approximately 11,000 cy of the dredged material from these two projects would be considered NSOD, comprised of 5,500 cy not suitable for beneficial use and 5,500 cy suitable for beneficial use; these materials would be placed in Field 5 Cell B and Field 3, respectively. The remaining 33,000 cy of dredged material would be placed at Polaris Point Field B.

In 2026, coordination of beneficial use projects and maintenance dredging projects would be required. The beneficial use of approximately 20,000 cy of dewatered dredged material from Polaris Point Cell B may be used for landfill daily cover at Layon Landfill. The beneficial use of material from Polaris Point Cell B may need to be completed prior to the initiation of maintenance dredging. Maintenance dredging of MDP-02 and MDP-04 would generate approximately 187,000 cy of dredged material (accounting for a 10% contingency). Approximately 46,750 cy of the dredged material from these two projects would be considered NSOD, comprised of 23,375 cy not suitable for beneficial use and 23,375 cy suitable for beneficial use; these materials would be placed in Field 5 Cell B and Field 3, respectively. Approximately 27,000 cy of material would be placed at Polaris Point Cell B to bring that upland dewatering site back to capacity. The remaining 113,250 cy of material would be placed at the ocean disposal site.

In 2027, no dredging is planned. Approximately 20,000 cy of dredged material may be mined from Polaris Point Cell B and beneficially used as daily cover at the Layon Landfill.

In 2028, coordination of beneficial use projects and maintenance dredging projects would be required. The beneficial use of approximately 20,000 cy of dewatered dredged material from Polaris Point Cell B may be used for landfill daily cover at Layon Landfill. The beneficial use of material from Polaris Point Cell B may need to be completed prior to the initiation of maintenance dredging. Maintenance dredging of MDP-06 and MDP-09 would generate approximately 148,500 cy of dredged material (accounting for a 10% contingency). Approximately 37,125 cy of the dredged material from these two projects would be considered NSOD, comprised of 18,563 cy not suitable for beneficial use and 18,563 cy suitable for beneficial use; these materials would be placed in Field 5 Cell B and Field 3, respectively. Approximately 40,000 cy of material would be placed at Polaris Point Cell B to bring that upland dewatering site back to capacity. The remaining 71,375 cy of material would be placed at the ocean disposal site.

In 2029, no dredging is planned. Approximately 20,000 cy of dredged material may be mined from Polaris Point Cell B and beneficially used as daily cover at the Layon Landfill.

In 2030, coordination of beneficial use projects and maintenance dredging projects would be required. The beneficial use of approximately 20,000 cy of dewatered dredged material from Polaris Point Cell B may be used for landfill daily cover at Layon Landfill. The beneficial use of material from Polaris Point Cell B may need to be completed prior to the initiation of maintenance dredging. Maintenance dredging of MDP-07 and MDP-08 would generate approximately 286,000 cy of dredged material (accounting for a 10% contingency). Approximately 71,500 cy of the dredged material from these two projects would be considered NSOD, comprised of 35,750 cy not suitable for beneficial use and 35,750 cy suitable for beneficial use; these materials would be placed in Field 5 Cell B and Field 3, respectively. Approximately 40,000 cy of material would be placed at Polaris Point Cell B to bring that upland dewatering site back to capacity. The remaining 174,650 cy of material would be placed at the ocean disposal site.

In summary, over the course of the twenty year period evaluated (2010 – 2030), approximately 710,050 cy of dredged material may be beneficially used (Figure 9). During that same period approximately 1,050,200 cy of dredged material may be disposed at the ocean disposal site. Although this averages to approximately 51,467 cy per year, ocean disposal of dredged material would only occur in 8 of the 20 years, with a minimum volume of 36,875 cy and a maximum volume of 390,025 cy planned for disposal in any single year. Upland dewatering sites Polaris Point Cell B, SRF, and Orote Airfield would be at capacity. Field 5 Cell A would be near capacity, with capacity for approximately 8,900 cy of dredged material NSOD and not suitable for beneficial use. Field 5 Cell B would have the capacity for the placement of 123,313 cy of dredged material NSOD and not suitable for beneficial use. Field 3 would have the capacity for the placement of 160,738 cy of dredged material NSOD but suitable for beneficial use. Polaris Point Cell A would never have been built, maintaining the capacity for the placement of 58,000 cy of clean material in the construction of dikes and the placement of 78,000 cy of dredged material. This site is reserved the placement of an emergency dredging project, or for a specific type of material (i.e., having distinct geotechnical or chemical properties that requires or benefits it being segregated).

The additional 1,383,000 cy of dredged material from the eastern shore of Inner Apra Harbor was not included in this calculation. Given the assumption that 25% of all dredged material is considered NSOD, this would require an additional 345,750 cy of material to be managed in an upland dewatering site. With the existing dredging needs identified, the upland dewatering sites identified to take dredged material NSOD (either suitable or not suitable for use in future beneficial use projects) would not be able to handle an additional 172,875 cy of material each. A greater need for beneficial use alternatives and/or upland placement sites would be required for this material. The remaining 1,037,250 cy would likely be suitable for disposal at the designated ocean disposal site.

Figure 9. Summary of Upland Dewatering Site Management Calculation, Apra Harbor, Guam

5.0 CONCLUSIONS

This Framework evaluated the U.S. Navy's dredging needs from 2010 through 2030 and presents a scenario for dredged material management with an emphasis on beneficial use of dredged material. This Framework reviews previous dredged material management studies conducted within Apra Harbor, designated proposed upland dewatering sites to accept specific classification of dredged material. Further, it illustrates that although dredged material may be beneficially used or placed in an upland environment, ocean disposal, when necessary, is a practical and viable management alternative for suitable, (i.e., clean) dredged materials.

- Combining existing maintenance and construction dredging requirements and assumptions about future maintenance and construction dredging projects, approximately 2,567,000 cy of sediment may be dredged from Apra Harbor between 2010 and 2030.
- Assuming approximately 25% of all dredged material is potentially NSOD, 642,000 cy of sediment must be placed in designated upland dewatering sites. Approximately 321,000 cy of that sediment may be suitable for beneficial use. Field 5 Cell A and Cell B, and Field 3 were designated as upland dewatering sites to contain dredged material NSOD and combined have the capacity to hold approximately 750,000 cy of material. Field 5 Cell A and Cell B were designated to contain dredged material NSOD and unsuitable for beneficial use; whereas, material placed in Field 3 may be suitable for beneficial use.
- The remaining 1,925,000 cy of sediment is likely clean (i.e., suitable for ocean disposal). This material may preferentially be used for construction of upland dewatering site dikes (220,000 cy), or beneficial use projects (710,000 cy). The remaining volume of dredged material (995,000 cy) may be placed at the ocean disposal site. In this calculation, one of the upland dewatering sites was not constructed; therefore, the volume of material required for dike construction was available to be placed at the ocean disposal site.
- Since Orote Airfield and SRF upland dewatering sites are presently at capacity and due to their limited capacity relative to Polaris Point Cell B, Polaris Point Cell B was identified as a viable alternative for placement of clean dredged material for future beneficial use projects. Polaris Point Cell A was reserved for a potential emergency dredging project or for a specific type of dredged material.

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