de maximis, Inc.
1322 Scott Street, Suite 104
San Diego, California 92106
Phone 619.546.8377

VIA E-Mail and US Mail

September 16, 2013

David W. Gibson
Executive Officer
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, California 92123-4340

Re: Quarterly Progress Report No. 6
San Diego Shipyard Sediment Site
Cleanup and Abatement Order No. R9-2012-0024
Geotracker Site ID No. T10000003580

Dear Mr. Gibson:

This Quarterly Progress Report is submitted to the San Diego Regional Water Quality Control Board (Water Board) on behalf of the National Steel and Shipbuilding Company (NASSCO) and BAE Systems San Diego Ship Repair Inc. (BAE Systems). The San Diego Shipyard Sediment Site Group (Group) is currently comprised of all Dischargers, though the Project Team is currently comprised of NASSCO and BAE Systems; additional Discharger representatives may join the Project Team in the future. This Quarterly Progress Report summarizes the activities performed in relation to the San Diego Shipyard Sediment Site during the reporting period between June 16, 2013 and September 15, 2013. This information is submitted in compliance with the Water Boardôs Cleanup and Abatement Order (CAO) No. R9-2012-0024 Section E for the San Diego Shipyard Sediment Site.

As set forth in the CAO, this Quarterly Progress Report is divided into the following subject areas:

- Description of actions taken during previous quarter
- Results of sampling, tests, and all other verified or validated data
- Description of data collection and field activities scheduled for the next two quarters and information relating to the progress of the work
- Any modifications to the Remedial Action Plan or other work plans proposed to or approved by the Water Board during the previous quarter
- Unresolved delays encountered or anticipated that may affect Water Board-approved schedule and actions to mitigate

PROGRESS REPORT

Description of Actions Taken During Previous Quarter

- Continued working on addressing comments and provided supporting necessary information, input, and data to finalize permit applications that have been submitted in previous quarter which include:
    - 401 Certification-Water Board
    - Report of Waste Discharge- Water Board
    - Tenant Project ï San Diego Unified Port District
    - Coastal Development Permit-San Diego Unified Port District
    - Dredging Lease-California State Lands Commission
    - 404/Section 10-U. S. Army Corps of Engineers
        - Public Notice Language
        - Clean Cover Specification
        - Environmental Assessment
- Prepared preliminary Eelgrass Mitigation Plans for South (overview to be presented in the pre-construction survey report).
- Finalized marine structural activities, including diver survey of location and condition of certain underwater features, performed structural capacity assessment, and performed marine structural evaluation work.
- Finalized base maps, sediment management area (SMA) design, Continued with SMA site access and use agreements negotiation with property owners.
- South Sediment samples collected during the last progress report period were analyzed and evaluated as part of landfill acceptance.
- Conducted design activities including preparation of basis of design report and completion of Final Designs (conformed for South), refined dredge volumes, established clean cover volumes, and determined sediment handling/transport specifics.
- Completed dredging contractor selection process for the South.
- Started dredging contractor selection process for the North and expect to make selection this coming quarter
- Implemented CRP planning including performing community survey, prepared draft survey report, initiated project hotline and website.
- Prepared for and held Public Meeting No. 1 on September 10th 2013
- Submitted Permit Registration Documents for the NPDES General Permit for storm water Discharges Associated with Construction and Land Disturbance Activities to the State Water Board via SMARTS and received a Waste Discharger Identification number on September 5, 2013.
- Completed the pre-construction eelgrass survey and surveillance-level *Caulerpa taxifolia* survey within the South Shipyard on September 5, 2013, a copy of this report is provided as shown below.

- Provided the San Diego Water Board with a copy of the final plans and reports required pursuant to the Remedial Action Plan and the Mitigation Monitoring and Reporting Program on September 3, 2013 via Geotracker and on September 4 via FEDEX. Public meeting held September 10, 2013 as required by the Community Relations Plan, Appendix E of the RAP. The following documents were provided:
    - MMRP-required documents for both North and South:
        - Dredging Management Plan (for approval and verification of MMRP MM #s 4.2.9 and 4.3.2); approval needed by September 11, 2013)
        - Sediment Management Plan (for verification of MMRP MM # 4.3.6)
        - Communication Plan (for verification of MMRP MM # 4.3.5)
        - Contingency Plan (for verification of MMRP MM # 4.3.3)
        - Traffic Control Plan (for verification of MMRP MM # 4.3.8)
        - Hazardous Material Transportation Plan (for verification of MMRP MM # 4.3.7)
        - Construction Stormwater Pollution Prevention Plan for S Lane (for verification of MMRP MM # 4.2.12)
    - RAP required documents for the South (North documents will be prepared once a contractor is selected):
        - Final Design: Basis of Design Memorandum, Plans, and Specifications (for information and verification of MMRP MM #s 4.2.7, and 4.6.1 through 4.6.15), and Project Schedule (for information)
        - Site-specific Health and Safety Plan (for information)
        - Demolition Plan (for information)
        - Comprehensive Environmental Management Plan (includes the Environmental Protection Plan, Water Management and Treatment Plan, and the Cover Material Placement Plan) (for information)
        - Construction Quality Control Plan (for information)
        - Borrow Source Characterization (for verification)
        - Biological Assessment and Essential Fish Habitat Evaluation Report (for information)
    - Also, provided details outlining the in-situ sampling procedures submitted to the landfill operator in application for pre-approval for land disposal (Letter to Landfill Regarding Insitu Pre-approval).
- Received Waste Discharge Requirements and 401 Water Quality Certification, Order No. R9-2013-0093 on July 10, 2013.
- Received Port CDP for South Shipyard on August 8, 2013; received Port CDP for North Shipyard on August 23, 2013. Revised CDP amendment for the South Shipyard Site was issued on September 13, 2013. The North CDP Amendment is in the process of being executed.
- Received fully-executed CSLC Dredge Lease for North and South Shipyards on August 5, 2013.
- S-Lane Federal Consistency with CZMA coordination was completed.

- Corp Individual Permit (IP) for South Shipyard issued on September 13, 2013. The North Shipyard Site Corp IP Permit process is ongoing.

Results of Sampling, Tests, and All Other Verified or Validated Data

- South sediment chemistry results were received, reviewed, and evaluated against landfill acceptance criteria (Attached). This information is summarized in Attachment 1. Note due to file size this is provided on CD-ROM.
- Pre-Construction *Caulerpa taxifolia* Survey in Support of the San Diego Shipyard Sediment Matter-South Site, dated September 9, 2013 is provided as Attachment 2.
- Pre-Construction Eelgrass Report for the San Diego Shipyard Sediment Matter ï South Site, dated September 15, 2013 is provided as Attachment 3.

Description of Data Collection and Field Activities Scheduled for the Next Two Quarter*s and Informati*on Relating to the Progress of the Work

- Select dredge contractor for the North
- Complete permitting for the North
- Continue with implementation of the approved CRP
- Provide pre-construction notifications and documentation as required by project regulatory documents and construction permits.
- Conduct pre-construction least tern and other special status species survey
- Initiate sediment cleanup activities on or about September 17, 2013
- Provide construction notifications, documentation and data as required by project regulatory documents and construction permits.
- North contractor bids are under evaluation. Certain construction elements proposed by bidders may require additional permit condition evaluation and potential permit modifications.

Any Modifications to the Remedial Action Plan or Other Work Plans Proposed to or Approved by the Water Board During the Previous Quarter

- None beyond those discussed above

Unresolved Delays Encountered or Anticipated that May Affect Water Board-Approved Schedule and Actions to Mitigate

- The City of San Diego has not yet agreed to fund any future costs of cleanup; rather, it continues to litigate. The impact on schedule remains uncertain.

Should there be any questions regarding this Quarterly Progress Report, please do not hesitate to contact me at 619-546-8377 ext. 103 or at mpalmer@demaximis.com.

Sincerely,

Mike Palmer
Project Coordinator

cc: Mike Chee, NASSCO (Via Email)
Shaun Halvax, BAE Systems San Diego Ship Repair Inc. (Via Email)
David Templeton, Anchor QEA (Via Email)

CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name	Signature	Date
NASSCO		
S. HALVAX	S Halvax	9/16/2013
Print Name	Signature	Date
BAE Systems		

CERTIFICATION STATEMENT

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

T. MICHAEL CHEE	Michael Chee	9/14/13
Print Name	Signature	Date
NASSCO		
Print Name	Signature	Date
BAE Systems		

Duty to Use Registered Professional

This Progress Report was prepared under the direction of qualified professionals in accordance with the California Business and Professions Code Sections 6735, 7835, and 7835.1.

Michael A Palmer 9/16/2013

Michael A Palmer, PG 5915 Project Coordinator	Signature	Date

ATTACHMENT 1
SUMMARY OF SEDIMENT SAMPLING AND ANALYTICAL DATA, SOUTH SHIPYARD
(PROVIDED ON CD ROM)

ATTACHMENT 2 PRE-CONSTRUCTION *CAULERPA TAXIFOLIA* SURVEY IN SUPPORT OF THE SAN DIEGO SHIPYARD SEDIMENT MATTER-SOUTH SITE

Merkel & Associates, Inc.
5434 Ruffin Road, San Diego, CA 92123
Tel: 858/560-5465 • Fax: 858/560-7779
e-mail: associates@merkelinc.com

September 9, 2013
M&A #13-008-02

San Diego Bay Environmental Restoration Fund-South
C/O *de maximis, inc.*
1322 Scott Street, Suite 104
San Diego, CA 92106
Attn: Mr. Mike Palmer

RE: Pre-Construction *Caulerpa taxifolia* Survey in Support of the San Diego Shipyard Sediment Matter – Cleanup and Abatement Order No. R9-2012-0024 South Shipyard Sediment Cleanup Project

Dear Mr. Palmer:

This letter serves to report the results of the pre-construction *Caulerpa* survey conducted for the San Diego Shipyard Sediment Matter – Cleanup and Abatement Order NO. R9-2010-0024 South Shipyard Sediment Cleanup Project in San Diego Bay, California.

The *Caulerpa* survey was performed on September 5, 2013 per the *Caulerpa* Control Protocol (Version 4) (Figure 1). I am pleased to report that *Caulerpa* was not found within the survey area. The completed *Caulerpa* survey form is attached to this document. This survey will complete your pre-construction survey obligation for *Caulerpa* and is valid for construction activities in the project area initiated within the next 90 days.

I hope your construction activities proceed in a safe and timely manner. If you have any questions regarding the enclosed documents or this letter, feel free to contact me at (858) 560-5465.

Sincerely,

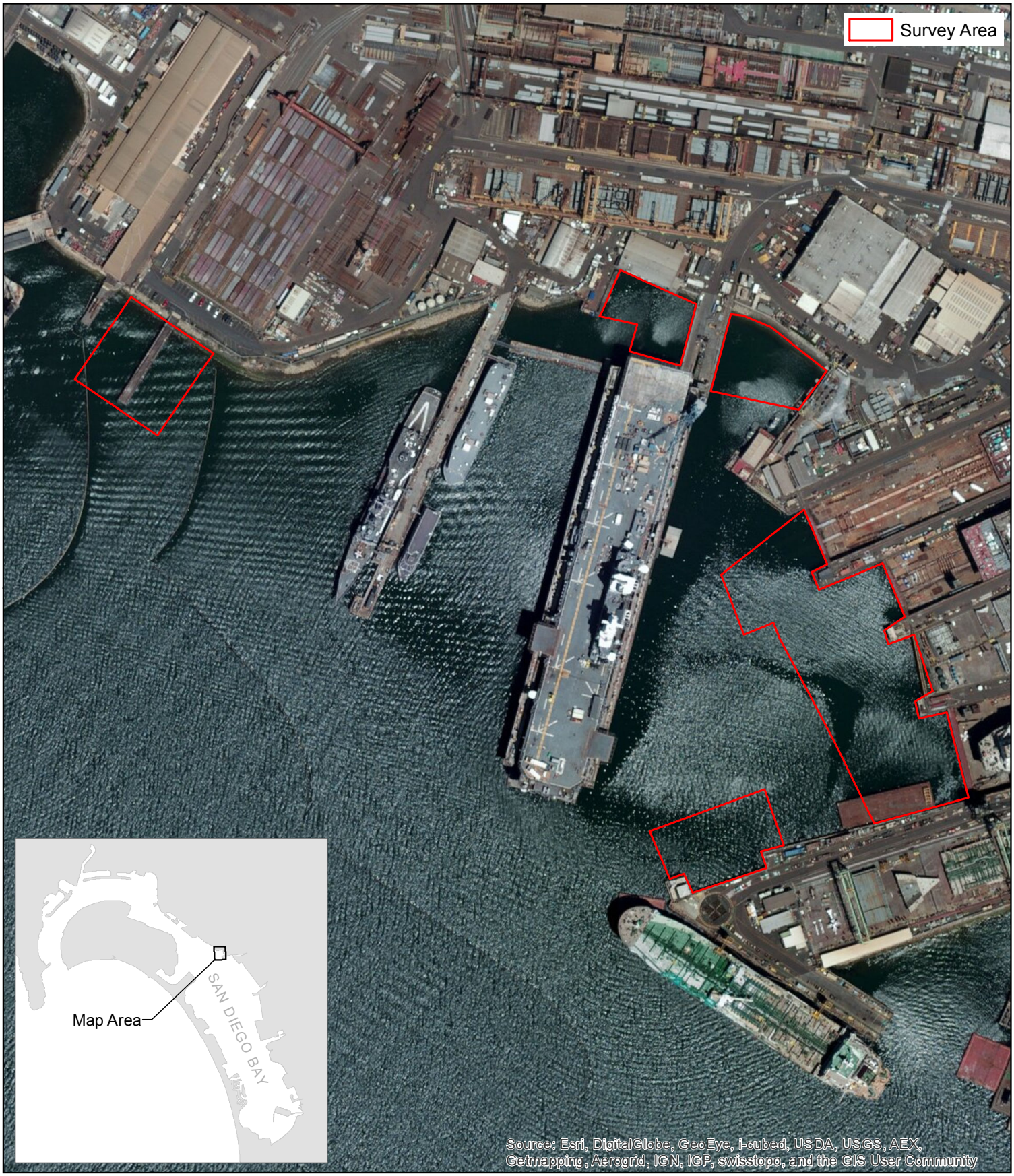
Keith W. Merkel
Principal Consultant

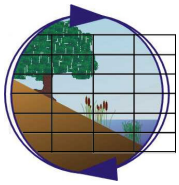
Caulerpa Survey Reporting Form

This form is required to be submitted for any surveys conducted for the invasive exotic alga *Caulerpa taxifolia* that are required to be conducted under federal or state permits and authorizations issued by the U.S. Army Corps of Engineers or Regional Water Quality Control Boards (Regions 8 & 9). The form has been designed to assist in controlling the costs of reporting while ensuring that the required information necessary to identify and control any potential impacts of the authorized actions on the spread of *Caulerpa*. Surveys required to be conducted for this species are subject to modification through publication of revisions to the *Caulerpa* survey policy. It is incumbent upon the authorized permittee to ensure that survey work is following the latest protocols. For further information on these protocols, please contact: Bryant Chesney, National Marine Fisheries Service (NOAA Fisheries), (562) 980-4037, or William Paznokas, California Department of Fish & Wildlife, (858) 467-4218.

Report Date:	September 9, 2013
Name of bay, estuary, lagoon, or harbor:	San Diego Bay, San Diego
Specific Location Name: (address or common reference)	National Steel and Shipbuilding Company (NASSCO) Shipyard
Site Coordinates: (UTM, Lat./Long., datum, accuracy level, and an electronic survey area map or hard copy of the map **must** be included)	The survey area included the five areas of the NASSCO shipyard designated as the Remedial Footprint (See Figure 1) 32° 41.396'N 117° 8.560'W 32° 41.407'N 117° 8.373'W 32° 41.395'N 117° 8.334'W 32° 41.296'N 117° 8.294'W 32° 41.248'N 117° 8.353'W
Survey Contact: (Name, phone, e-mail)	Keith Merkel, (858) 560-5465, kmerkel@merkelinc.com
Personnel Conducting Survey (if other than above): (name, phone, e-mail)	Jordan Volker (Caulerpa Certified diver) Ph: 858-560-5465; email: jvolker@merkelinc.com Kira Withy-Allen (*Caulerpa* Certified diver) Ph: 858-560-5465, email: kwithyallen@merkelinc.com
Permit Reference: (ACOE Permit No., RWQCB Order or Cert. No.)	
Is this the first or second survey for this project?	First, only
Was *Caulerpa* Detected?: (if *Caulerpa* is found, please immediately contact NOAA Fisheries or CDFG personnel identified above)	_____**Yes, Caulerpa was found at this site and** _____**has been contacted on** _____ **date.** _____X_____**No, Caulerpa was not found at this site.**

Description of Permitted Work: (describe briefly the work to be conducted at the site under the permits identified above)	The San Diego Regional Water Quality Control Board (RWQCB) issued a Cleanup and Abatement Order No. R9-2012-0024 (CAO) in March of 2012 that calls for the remediation of marine sediments containing pollutants along the eastern shore of central San Diego Bay. In response to this CAO, mechanical dredging with landfill disposal will be conducted to remove impacted sediments from all accessible portions of the Shipyard Sediment Site. Dredging will be supplemented, where necessary, by localized placement of clean sand cover in cleanup areas.	
Description of Site: (describe the physical and biological conditions within the survey area at the time of the survey and provide insight into variability, if known. Please provide units for all numerical information).	*Depth range:*	2-30 feet MLLW
	Substrate type:	Silt and some shell hash
	Temperature:	~70°
	Salinity:	~34 ppt
	Dominant flora:	Red foliose algae *(Gracilaria),* eelgrass *(Zostera marina),* sea lettuce *(Ulva lactuca)*
	Dominant fauna:	Sponges (*porifera*)
	Exotic species encountered (including any other Caulerpa species):	Bryozoan *(Zoobotryon verticillatum)*
	Other site description notes:	
Description of Survey Effort: (please describe the surveys conducted including type of survey (SCUBA, remote video, etc.) and survey methods employed, date of work, and survey density (estimated percentage of the bottom actually viewed). Describe any limitations encountered during the survey efforts.	*Survey date and time period:*	September 5, 2013 11:00 – 16:00
	Horizontal visibility in water:	3-10 feet
	Survey type and methods:	An ROV with a ultra short baseline navigation system and video camera was used to survey the bottom within the survey area. SCUBA was also used in areas where eelgrass was located and areas inaccessible to boats (Figure 1)
	Survey personnel:	Jordan Volker Kira Withy-Allen
	Survey density:	>20%
	Survey limitations:	None
Other Information: (use this space to provide additional information or references to attached maps, reports, etc.)	See attached Project Vicinity Map	





***Caulerpa* Survey - September 5, 2013**

San Diego Shipyard Sediment Remediation - South Yard

Figure 1

ATTACHMENT 3

PRE-CONSTRUCTION EELGRASS REPORT FOR THE SAN DIEGO SHIPYARD SEDIMENT MATTER ï SOUTH SITE

Merkel & Associates, Inc.
5434 Ruffin Road, San Diego, CA 92123
Tel: 858/560-5465 • Fax: 858/560-7779
e-mail: associates@merkelinc.com

September 15, 2013
M&A #13-008-02

San Diego Bay Environmental Restoration Fund-South
C/O *de maximis, inc.*
1322 Scott Street, Suite 104
San Diego, CA 92106
Attn: Mr. Mike Palmer

Re: Pre-Construction Eelgrass Report for the San Diego Shipyard Sediment Matter – Cleanup and Abatement Order No. R9-2012-0024 South Shipyard Sediment Cleanup Project

Dear Mr. Palmer:

This letter report serves to transmit information regarding the pre-construction eelgrass (*Zostera marina*) survey completed for the San Diego Shipyard South Sediment Matter on September 5, 2013. The survey located 9 m^2 of eelgrass near the timber pier at the westerly end of the yard and 7 m^2 of eelgrass within the berthwall drydock area.

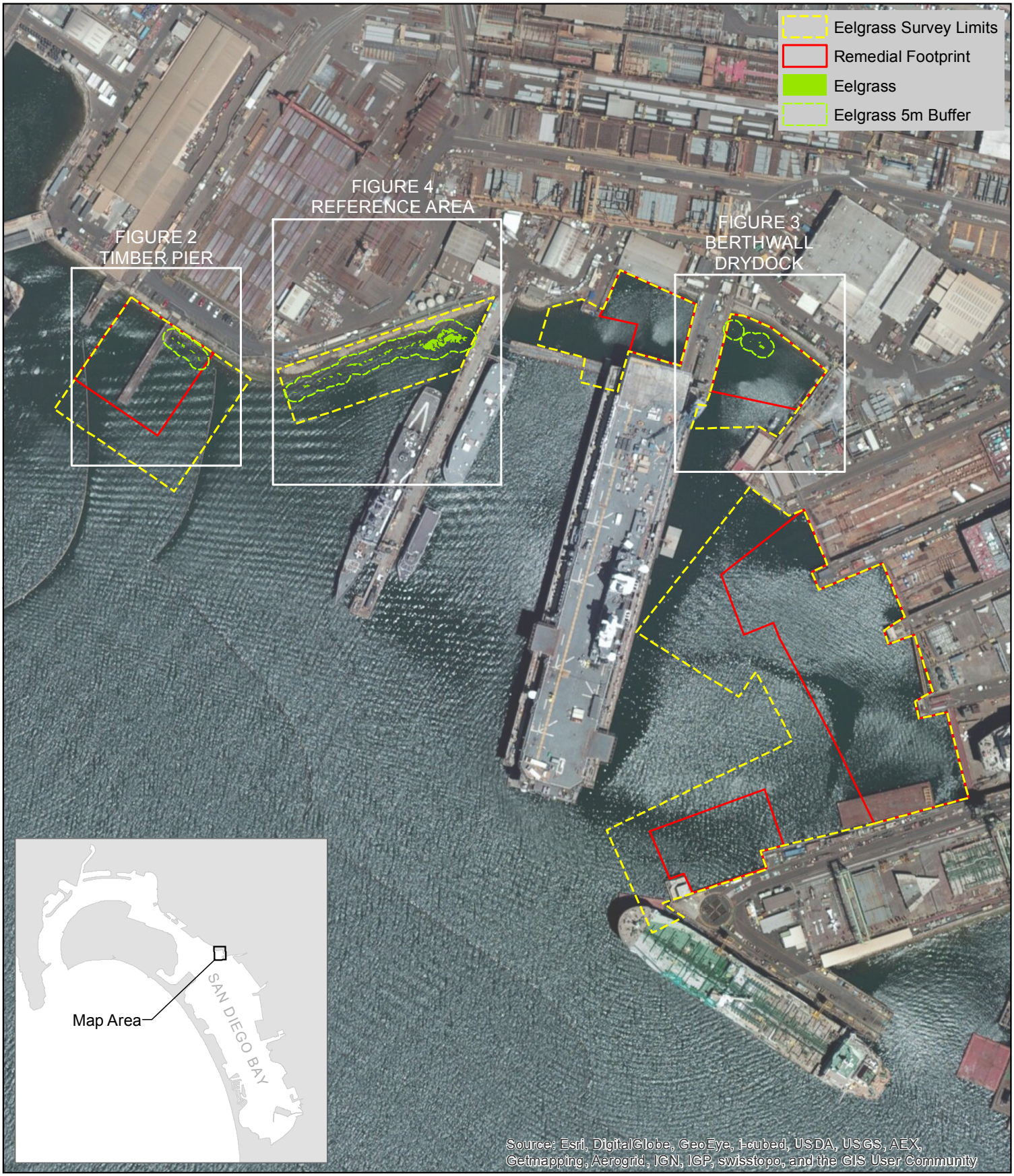
PURPOSE AND INTRODUCTION

Merkel & Associates Inc. (M&A) has been retained by the San Diego Bay Environmental Restoration Fund – South (South Trust) to conduct a pre-construction eelgrass survey in support of the San Diego Regional Water Quality Control Board (RWQCB) Cleanup and Abatement Order No. R9-2012-0024 (CAO) South shipyard sediment cleanup project. The CAO was issued by the RWQCB in March 2012 and calls for the remediation of marine sediments containing pollutants along the eastern shore of central San Diego Bay. The purpose of this survey was to provide a quantitative assessment of the eelgrass communities within the vicinity of the National Steel and Shipbuilding Company (NASSCO) shipyard in conformance with the Southern California Eelgrass Mitigation Policy (SCEMP).

PROJECT LOCATION AND SURVEY AREA

The NASSCO shipyard is located on approximately 126 acres of tidelands property in and along San Diego Bay (46 acres offshore and 80 acres on land). The eelgrass survey area included the five areas of potential effect (APE) within the NASSCO shipyard designated in the Project's Remedial Action Plan (Anchor QEA 2012) as the Remedial Footprint (Figure 1).

As outlined in the SCEMP, an eelgrass reference site was established between the Timber Pier APE and the Berthwall/Drydock APE within which eelgrass occurs. This reference area is located approximately 230 feet away from any of the clean-up areas. This site was selected based on proximity to, and similarity in, biological characteristics to the APEs. The reference site was surveyed at the same time as the APEs and will be used to monitor natural variability in eelgrass resources to account for any natural changes or fluctuations in the project bed area or density.



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Pre-Construction Eelgrass Survey - September 2013

San Diego Shipyard Sediment Remediation - South Yard

Figure 1

SURVEY METHODOLOGY

M&A staff, Kira Withy-Allen and Jordan Volker, conducted the pre-construction eelgrass survey on September 5, 2013. Data were collected using interferometric sidescan sonar, which provided an acoustic backscatter image of the seafloor within the project and reference areas. Interpretation of the backscatter data allowed for an assessment of the distribution of eelgrass. Sidescan backscatter data were acquired at a frequency of 468 kHz scanning out 35 meters on both the starboard and port channels for a 70-m wide swath. The survey was conducted by running parallel transects that were spaced to allow for overlap between adjoining sidescan swaths. Transects were performed until the entirety of the survey areas were captured in the survey report. All data were collected in latitude and longitude using the North American Datum of 1983 (NAD 83), converted to the Universal Transverse Mercator system in meters (UTM). Following completion of the survey, sidescan sonar traces were joined together and geographically registered. Eelgrass was then digitized as a theme to calculate the amount of eelgrass coverage and show its distribution.

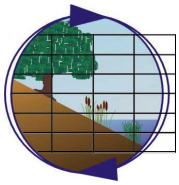
A SCUBA diver verified the sidescan data and made observational notes on the condition of the existing eelgrass. The diver also collected eelgrass density data at the Project and Reference sites to assess the density and health of eelgrass. Data were collected by randomly placing a 1/16th square meter quadrat within each of the surveyed eelgrass beds. Eelgrass leaf-shoot densities were calculated by counting the numbers of turions (leaf shoots) within the sampled quadrats.

SURVEY RESULTS

Very little eelgrass was noted within the project work areas. A total of 9 m^2 of eelgrass was detected within the northwestern most remediation site at the timber pier (Figure 2). Eelgrass was located east of the existing timber pier with patches commencing approximately 4 meters easterly of the timber pier and extending up to 22 meters to the east of the pier. The present eelgrass occurrence is limited to five small patches, believed to be six individual plants. This is a seasonally expected increase in eelgrass at this site since the April 2013 baseline survey that revealed less than 4 m^2 of eelgrass at this site. At that time, one of the plants observed supported only three turions with additional plants also remaining very sparse. During the pre-construction survey, eelgrass density within this area was 74.4±59.9 turions/m^2 (n=20). All of the eelgrass was found at the toe of, and interspersed with, existing riprap from the revetment shoreline. Some of the eelgrass appears to be rooted in silt over the top of protruding rock that rises above the existing sediment level. *Sargassum muticum* attached to the rip rap is interspersed with eelgrass and likely is a factor controlling the distribution of eelgrass at this location.

A total of 7 m^2 of eelgrass was detected within the northeastern most remediation site between the berthwall and the drydock (Figure 3). Eelgrass turion densities within this bed were 51.2±30.18 turions/m^2 (n=20). This eelgrass was not observed during the April 2013 baseline survey, although the area was examined in-depth. It is believed that, like the eelgrass at the timber pier, eelgrass at this site was in a seasonal state of decline at the time of the survey and had not emerged to a detectable state early in the season.

A total of 156 m^2 of eelgrass was detected within the reference site (Figure 4). Eelgrass turion densities within the reference site were 134.4±77.2 turions/m^2 (n=20). This bed was observed during the April 2013 survey, but was not near any of the project work areas so it was not mapped. The extent of the eelgrass along the shoreline has increased since it's detection during baseline surveys. The principal expansion has been linearly to the west along the shoreline. In April, this bed was limited to a moderately well-developed patch at the east end of the reference site.



Pre-Construction Eelgrass Survey - September 2013
Timber Pier

San Diego Shipyard Sediment Remediation - South Yard

Figure 2

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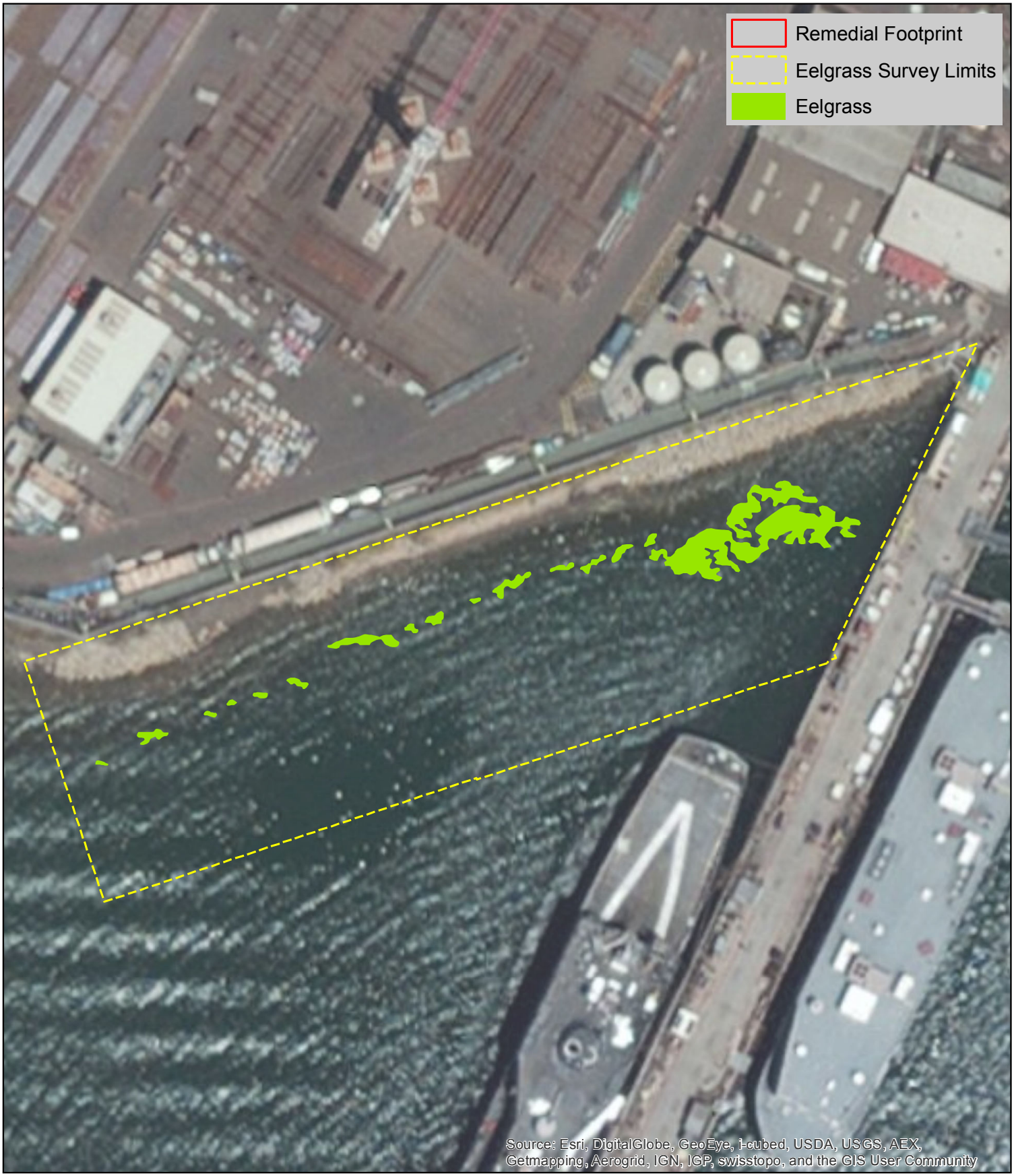
Pre-Construction Eelgrass Survey - September 2013
Berthwall/Drydock
San Diego Shipyard Sediment Remediation - South Yard

Figure 3



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Pre-Construction Eelgrass Survey - September 2013
Reference Area
San Diego Shipyard Sediment Remediation - South Yard

Figure 4

DISCUSSION AND RECOMMENDATIONS

Eelgrass Impact Avoidance and Minimization

The pre-construction surveys revealed the presence of a very small amount of eelgrass within the clean-up areas. In all cases, this eelgrass was located close to the existing shoreline revetment, either intermixed with revetment stone, over the top of buried revetment, or within approximately 10 feet of what is believed to be the toe of the existing revetted slopes. Because of the location of this eelgrass, it is expected that any dredging that retains the existing slope armoring area would not directly impact eelgrass and thus could potentially conserve eelgrass *in situ*. In order to protect eelgrass in place, it is recommended that the following measures be considered with respect to the broader needs for site remediation. If practical, these should be implemented to protect eelgrass and avoid eelgrass compensatory mitigation requirements.

The recommendations to address eelgrass on the south yard are as follows:

1) Include a dredge buffer of at least 10 feet from the existing eelgrass;

2) Conduct a post-construction eelgrass survey within 30 days of completion of work. The timeframe for this survey should be specific to the work at the remediation areas supporting eelgrass. This is recommended due to the likelihood that the existing bed is highly variable and may go up or down in scale over short periods of time in a manner that is unrelated to the remediation work. For this reason, the most accurate assessment of potential impacts from the clean-up could be determined within the narrowest temporal window around potentially impacting activities.

3) For work near the eelgrass, drive posts along the dredge boundary to attach a turbidity curtain outboard of the posts such that it does not drag over the eelgrass as would potentially occur with a free hanging curtain. On September 5 and 6, Merkel & Associates placed 2-inch PVC posts along with attached floating buoys along the outer edges of the existing eelgrass in preparation for construction. Dredge the area outboard of the curtain working away from shore such that the time period of curtain present at this proximate location may be minimized.

4) Once the dredging has moved away from the shoreline approximately 50 feet, relocate the curtain away from the shore such that greater water circulation is provided in this area. The goal should be to minimize the time over which circulation along this section of shoreline is impaired and to minimize the potential generation of turbidity that could redeposit sediments on the eelgrass leaves.

Eelgrass Impact Mitigation (if required)

Based on the pre-construction survey, it is anticipated that up to 16 m^2 of eelgrass may be impacted by the remediation work. However, the remediation work would result in placement of clean sands along the shoreline edge of the dredged footprint at the interface of slope revetment. This sand placement is not contrary to the needs for effective eelgrass restoration into the same remediation areas. As such, if the project were to impact eelgrass, the site conditions developed post-construction would be conducive to an on-site reestablishment of eelgrass within the remediation areas. As such, given the small area of potential impact, and the anticipated conditions that would be developed following the remedial clean-up actions, the following outlines a conceptual mitigation plan for eelgrass, in the event impacts were to occur. For purposes of this plan, it has been assumed that the full extent of eelgrass

would be lost as a result of the work. However, the ultimate impact to eelgrass may be less than the amount estimated and would be determined based substantially on the results of pre-construction and post-construction eelgrass surveys, considering also the changes in reference site eelgrass beds as a means of controlling for regional variability in eelgrass habitat condition over the same survey period.

In the event impacts to eelgrass were determined to have occurred, eelgrass restoration would be conducted through use of bareroot eelgrass planting unit restoration methods. Based on the 1.2:1 eelgrass replacement ratio outlined in the SCEMP, the project will require the creation of approximately 20 m^2 of eelgrass habitat as mitigation for these impacts if all eelgrass is ultimately impacted by the work.

Transplant Sites

The transplant sites to be used for mitigation, if required, would be within the clean up area of the Timber Pier at the westerly most end of the NASSCO shipyard facility. This area is large enough to support an initial restoration planting of approximately 8 times the anticipated mitigation need, assuming portions of the rip-rap toe stone are covered in sand as a part of the clean-up work. The oversizing of the mitigation site as an initial establishment sizing would provide capacity for some eelgrass losses to occur while still achieving the ultimate restoration objectives.

Donor Sites

Donor eelgrass for the transplant is to be derived from the far easterly portion of the identified reference area (Figure 4) for the project, and the reference area would be shortened from the present size to exclude areas serving as donor sites for the restoration.

In order to prevent any adverse impacts to the donor beds, no more than 10% of the eelgrass within any donor bed will be harvested; this will allow the beds to recover quickly. These donor beds have been primarily selected based on a number of factors:

1) Proximity to the transplant receiver site that favors both logistic convenience and selection of appropriate plant materials for the area;
2) Suitability of donor site size and eelgrass density to provide necessary transplant materials;
3) Recovery potential for the donor site; and,
4) Accessibility of the donor site and diver safety.

Reference Sites

The eelgrass reference site for the pre-construction and post-construction surveys would serve as the reference site for a proposed mitigation, if required. The reference bed would be truncated to exclude the area used for donor eelgrass harvesting to perform the mitigation. Monitoring of the reference area would be conducted coincident with the monitoring of the transplant area. Changes in the reference area over time would be considered to represent natural environmental variability when evaluating the performance of the transplant area.

Restoration Method

Prior to commencing eelgrass transplantation work, a letter of permission to harvest and plant eelgrass will be obtained from the California Department of Fish and Wildlife (CDFW).

Bare-root eelgrass plant material will be salvaged from the donor bed by "raking" rhizomes out of the surface sediment layers and loosely filling a mesh bag with salvaged material. In collecting eelgrass, care will be taken to work the rhizomes free as opposed to ripping the plants free of the sediment. This will preserve as much root material as possible. Salvaging is a mobile exercise and divers will move systematically through an area and collect/groom no more than 10% of the plant material. Salvaged materials should consist of no less than three healthy internodal segments with well-developed root initiates and vigorous shoots. More intact rhizome segments and roots are preferred for use in the planting unit bundles.

The proposed mitigation plan will utilize anchored bare-root transplant units. Bare-root transplants are the preferred means of transplanting eelgrass in most situations, and anchored bare- root units are the principal planting units used in large-scale restoration projects at the current time. The survival of such planting units has been shown to be quite high when properly prepared (Fonseca *et al.* 1982; Merkel 1987, 1990a). Similarly, bare-root units have shown an ability to rapidly expand and colonize bare substrate (Merkel 1990b). In addition to offering high unit survival and rapid expansion rates, bare-root units can be prepared with limited damage to the donor bed. Unlike plug extractions, bare-root units can be prepared using materials collected without substantial sediment disturbance. Each transplant unit for the project work will consist of 6-10 turions.

The anchors used in this program will be biodegradable and pliable anchors such as those developed initially for transplants in Mission Bay's Sail Bay (Merkel 1987) and which have subsequently been used in more than 60 eelgrass restoration projects throughout California, Oregon, Washington, and Alaska. These units have been used in more than a ten restoration projects within San Diego Bay.

Planting will be on 1-meter planting centers using divers working on a defined planting grid oriented parallel to shore and terminating at the edges of the mitigation sites. This layout will allow for ease of tracking work progress and completion of quality control reviews. The plant materials will be planted by excavating a hole in the sediments with a small trowel or by hand. The anchor will be planted parallel to the sediment surface and the root/rhizome bundle will be planted approximately 1 to 2 inches below the sediment surface with the anchor being placed approximately 5 inches below the sediment surface. During planting, spot checks of the plantings will be made to ensure proper planting depth and firmness of the anchoring system.

The timing of the planting will be determined based on the time of completion of the remediation work in relation to the eelgrass growing season. Upon completion of the planting effort, a monitoring program should be initiated and continued for a 60-month (5-year) period as outlined in the SCEMP. Aerial extent and density of the transplanted eelgrass and control sites should be monitored using the same sidescan sonar and diver techniques discussed above for the pre-construction survey.

The monitoring program would be conducted at intervals of 6, 12, 24, 36, 48, and 60-months post-transplant. When monitoring dates fall outside of the normal eelgrass-growing season, dates should be shifted to coincide with the growing season to ensure that valuable information on growth and survival is collected. For each monitoring interval, a draft monitoring report should be prepared and submitted to the Corps within 15 days of completion of the monitoring survey. Within 30 days of completion of the monitoring interval, a final report shall be submitted, incorporating or addressing any Corps comments received.

Monitoring reports should include information from previous monitoring intervals, including numerical comparisons and graphical presentations of changing bed configurations. Graphical comparisons will include generalized bathymetry. The monitoring report should include an analysis of any declines or expansions in eelgrass coverage based on physical conditions of the site, as well as any other significant observations. Finally, the monitoring report should provide a prognosis for the future of the eelgrass bed and should identify the timing for the next monitoring period.

Mitigation Success Criteria

Mitigation should be deemed successful when it has met the success criteria outlined in the SCEMP. Criteria for determination of transplant success should be based upon a comparison of vegetation coverage (area) and density (turions per square meter) between the reference sites and the transplant sites. The extent of vegetation cover is defined as the area where eelgrass is present and where gaps in coverage are less than one meter between individual turion clusters. Density of shoots is identified as the number of turions per meter, as measured from representative areas within the control or transplanted beds. Key success criteria are as follows:

A) A minimum of 70 percent areal coverage and 30 percent density should be achieved after the first year.
B) A minimum of 85 percent areal coverage and 70 percent density should be achieved after the second year.
C) A minimum of 100 percent areal coverage and 85 percent density should be achieved for the third, fourth, and fifth years.

Areas that do not meet the above success criteria may be revegetated, and again monitored until the final goal is achieved. Should replanting of the areas at the project site fail to meet the success criteria; reconstruction of portions of the mitigation site may be required to carry out this revegetation. Should the reference area fail or decline alongside the mitigation area for reasons outside the control of the Corps, the Corps should not be held responsible for similar declines in the mitigation area.

POST-CONSTRUCTION SURVEY

A subsequent post-construction eelgrass survey will be conducted within 30 days of completion of cleanup. If you have any questions regarding the results of this investigation, please contact me.

Sincerely,

Keith W. Merkel
Principal Consultant

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