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June 27, 2014

Jason Ramos, Senior Environmental Scientist
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

Re: Broad Beach Restoration: Long Term Shore and Dune Restoration Project at Broad Beach in Malibu, CA (Ref: W26420). Third SLC Notice of Incomplete Application and Request for Additional Information Dated 8/22/13

Dear Mr. Ramos:

On behalf of the Broad Beach Geologic Hazard Abatement District (BBGHAD), we attach additional responses to the California State Land Commission's (SLC) letter of May 20, 2014 ("May Letter") addressed to Mr. Kenneth Ehrlich. This letter supplements the letter submitted on June 20, 2014. Moffatt & Nichol (BBGHAD engineer) provides the requested, additional information below:

Biological Resources (Marine) Deadline: By or Before Monday, 6/30/14

- **May 20 2014 Letter Requested Information:** *In addition to the supplemental marine habitat surveys, please provide a marine habitat map similar to slide 29 presented at the April 29, 2014 marine habitat meeting illustrating the new delineated habitat areas within the nourishment footprint and within the indirect burial footprint at an appropriate depth and duration to determine significant loss of sensitive species and habitats.*

BBGHAD Response:

The BBGHAD biologist team conducted supplemental marine habitat surveys in May and June 2014. These supplemental surveys involved side scan sonar to delineate habitat types and diver surveys of nearshore marine habitat types at the project site to ground truth the sonar survey and collect additional qualitative and quantitative data. The BBGHAD also caused the completion of an intensive (100% saturation) intertidal black abalone survey, and resulted in no black abalone being documented. The results of these surveys were submitted to the SLC on June 20, 2014. The following figures are provided to illustrate the mapped biological resources to date, model predicted direct and indirect impact footprints as well as bathymetry.

1. The habitats predicted to be directly impacted by the nourishment footprint, per the definitions provided in BBGHAD response on the following pages, are depicted in **Attachment 1: Mapped Marine Resources –Project Footprint Direct Impact Area**
2. The estimated indirect impacts predicted, both permanent and temporary, per the definitions provided in BBGHAD response on the following pages, are depicted on **Attachment 2: Mapped Marine Resources –Project Footprint Indirect Impact Area**
3. A third sheet depicts the limits of both direct and indirect impact areas in relation to all identified habitats. This sheet is titled **Attachment 3: Mapped Marine Resources – Direct and Indirect Impact Area**.

- **May 20 2014 Letter Requested Information:** *Please provide a quantification of sensitive species and habitat areas significantly impacted due to sand burial and turbidity.*

BBGHAD Response:

The tables on the following pages indicate the estimated predicted areas of both direct and indirect impacts from the proposed project. The BBGHAD bases these habitat impact acreages on a combination of the most current habitat data (June 2014), prior intertidal survey data (2013), as well as, aerial photography data (Kelp 2013). Actual impacts will be determined by a monitoring program customized for the site with input from regulatory agencies.

Turbidity is not anticipated to significantly impact sensitive species and habitats since the material will have a median grain size diameter of 0.85 mm which is coarser than the existing beach grain size and will be trucked in and placed as dry material. Dredged material which has a much faster rate of placement and dilution due to pumping from offshore barges has much greater potential to release suspended fines into the near shore and create turbidity. Dredged material will not be used for the proposed project. Turbidity will be monitored in accordance with an approved monitoring plan and appropriate actions taken to avoid and/or minimize impacts.

Table 1 - Estimated Predicated Areas of Impact Due to Direct Fill (within Nourishment Footprint)

	Temporary Impact	Permanent Impact
Habitat Detail	**Area (acres)**	**Area (acres)**
Surf Grass*	0.00	0.96
Kelp (2014)	0.00	0.00
Kelp attached to bedrock**	0.00	0.00
Eel Grass (May 2014)	0.00	0.00
Rocky Outcrops	0.00	0.02
Bedrock Intertidal	0.00	0.03
Bedrock Subtidal	0.00	0.00
Cobble/Rubble Intertidal	0.00	1.20
Cobble/Rubble Subtidal	0.00	0.06
Boulder Field	0.00	0.71
Trancas Lagoon Mouth	0.00	0.00
Sandy Bottom Intertidal	20.50	2.25
Sandy Bottom Subtidal	13.50	0.00
Dunes	0.95	0.80
Sandy Beach	0.00	1.02

* Overlaps with Bedrock Intertidal
**Overlaps with Kelp Canopy

Table 2 - Estimated Predicated Areas of Impact Due to Indirect Fill (Includes Area Within and Beyond Nourishment Footprint)

	Temporary Impact	Permanent Impact
Habitat Detail	**Area (acres)**	**Area (acres)**
Surf Grass*	0.96	0.96
Kelp (2014)	3.50	1.70
Kelp attached to bedrock**	2.30	0.88
Eel Grass (May 2014)	0.00	0.00
Rocky Outcrops	0.00	0.02
Bedrock Intertidal	0.00	1.91
Bedrock Subtidal	0.16	0.08
Cobble/Rubble Intertidal	0.00	1.37
Cobble/Rubble Subtidal	2.80	2.60
Boulder Field	0.00	0.71
Trancas Lagoon Mouth	0.00	0.00
Sandy Bottom Intertidal	22.80	2.25
Sandy Bottom Subtidal	51.80	0.00
Dunes	0.95	0.80
Sandy Beach	0.00	1.02

* Overlaps with Bedrock Intertidal
**Overlaps with Kelp Canopy

- **May 20 2014 Letter Requested Information:** *Please explain how the sand depth and duration significance threshold or thresholds were derived for all the sensitive species and habitats analyzed and delineated, relevant support studies, any projects that have used the threshold(s), and why a single or multiple thresholds are appropriate for all the sensitive species and habitats analyzed and delineated. If more than one threshold is used, illustrate on the map each threshold take line.*

BBGHAD Response:

The BBGHAD has incorporated findings of the supplemental habitat surveys conducted by the BBGHAD team in May-June 2014 into previously compiled biological resource habitat maps to more comprehensively characterize all existing habitats at the project site. Project impacts on existing resources are separated into direct impact areas which correspond to the footprint of the proposed project (revetment, sandbags, beach nourishment and dune building material). Direct project impacts are further differentiated into permanent and temporary impact areas

within the nourishment footprint. The habitats impacted by the nourishment footprint are depicted in Attachment 1: Mapped Marine Resources –Project Footprint Direct Impact Area

The area predicted to be indirectly impacted by the proposed project extends further seaward than the direct impact footprint. The area of indirect impact is estimated using model predictions for depth and duration of sand cover. The BBGHAD biologists at Chambers Group Inc. indicated for each habitat the potential for recovery of native flora and fauna and submitted their findings as estimated impact analyses. (Ref: Chambers Group Survey Reports and Responses to CCC Comments, previously submitted to SLC). Accordingly, the area of indirect impact is identified as being likely to be permanently or temporarily impacted by project activities.

The thresholds for temporary and permanent impacts are defined differently for different habitats. **Permanent impact acreage for marine habitats is defined as the area of each habitat predicted to be buried by 12 inches or more of sand at 1 year following placement.** This depth of coverage is based on model predictions and is identical to other large scale beach nourishment projects, RBSP I and II, and USACE Feasibility Studies. **Temporary impact acreage for marine habitats is defined as the area of each habitat predicted to be buried by 12 inches or less of sand at 1 year following initial placement.** There is a recognized uncertainty regarding model predictions for depth of cover, but conservative assumptions were used. It is noteworthy that similar assumptions were employed for RBSP I and were found to overestimate potential impacts. The extent of indirect impacts, both permanent and temporary, per the above definitions is depicted on Attachment 2: Mapped Marine Resources –Project Footprint Indirect Impact Area.

Sandy, unconsolidated subtidal and intertidal habitats, although covered with more than 1 ft of material at 1 year, were not denoted as areas of permanent impacts because sandy bottomed habitats are expected to experience only temporary impacts from additional sand fill. Dune habitat was considered to be permanently impacted by that portion of the 2010 emergency revetment placed on top of predominantly degraded foredune habitat. The BBGHAD considers this material a permanent impact as the former dune area cannot recover and function as dune habitat. The dune area immediately adjacent landward to the revetment is considered to have been temporarily impacted by revetment and sandbag building activities but is expected to recover following cessation of revetment construction activities.

A third map depicts the limits of both direct and indirect impact areas in relation to all identified habitats and is provided as Attachment 3: Mapped Marine Resources – Direct and Indirect Impact Area. The enclosed materials respond to the additional marine habitat survey information requests. Please contact us with additional questions or comments.

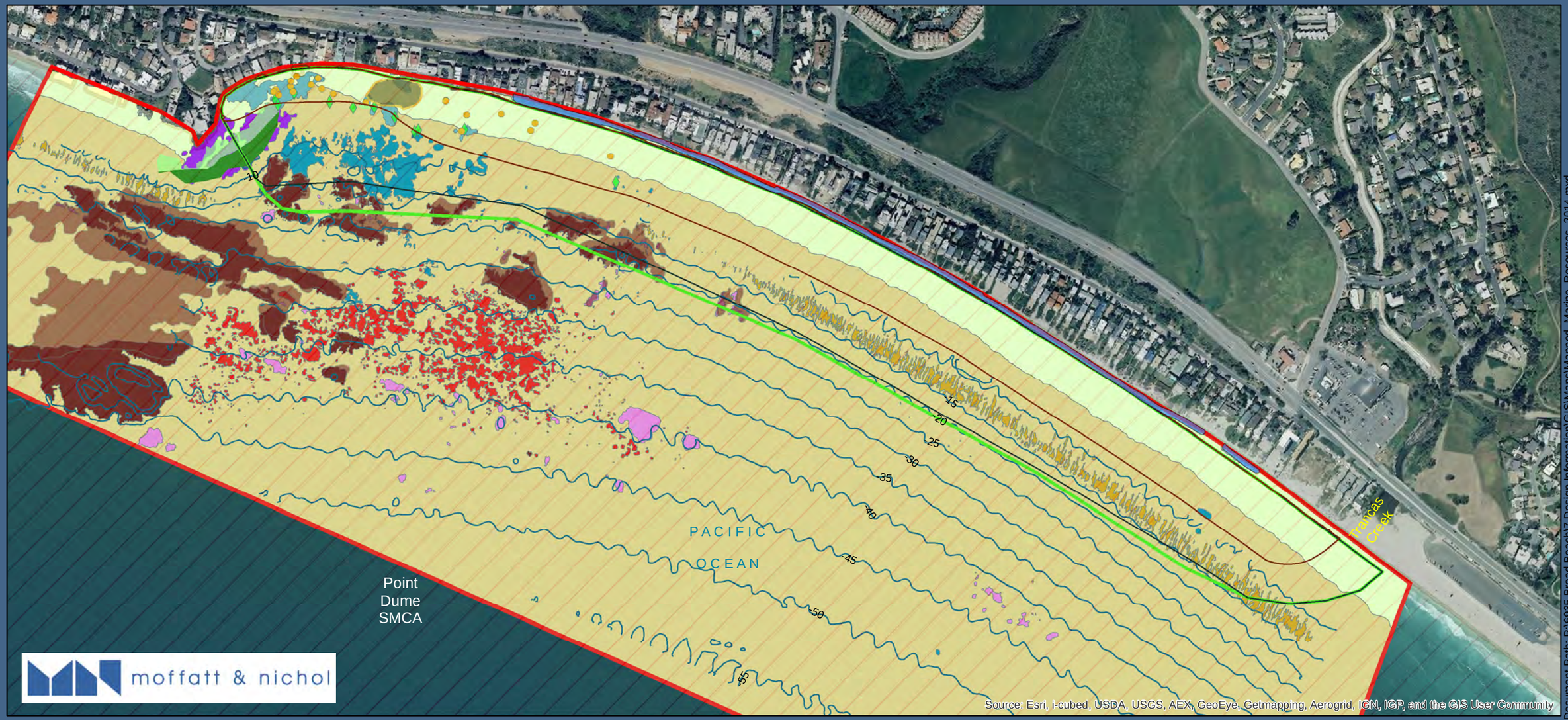
Sincerely,

MOFFATT & NICHOL

Russell H. Boudreau, P.E.
Project Manager

C: BBGHAD

Attachment 1: Mapped Marine Resources – Project Footprint Direct Impact Area
Attachment 2: Mapped Marine Resources – Project Footprint Indirect Impact Area
Attachment 3: Mapped Marine Resources – Direct and Indirect Impact Area



Document Path: P:\6935 Broad Beach\7 Design Information\GIS\Maps\Mapped_Marine_Resources_2014.mxd

Legend

- Emergency Revetment Footprint
- Proposed Beach Nourishment Footprint (Direct Impact)
- Point Dume SMCA
- Permanent Impact Area (Indirect)
- Temporary Impact Area (Indirect)
- Boulder Field
- Rocky OutCrops
- Observed Surfgrass Points
- Observed Surfgrass
- Extrapolated Surfgrass
- Contours_5ft
- Survey Area

Habitat Groups - 2014 Survey

- Bedrock with Kelp, Marine: Subtidal: Rock Bottom
- Bedrock, Marine: Intertidal: Rock Bottom
- Bedrock, Marine: Subtidal: Rock Bottom
- Rubble/Cobble, Marine: Intertidal: Rock Bottom
- Rubble/Cobble, Marine: Subtidal: Rock Bottom
- Sand, Marine: Intertidal: Unconsolidated Bottom
- Sand, Marine: Subtidal: Unconsolidated Bottom
- Shell Hash, Marine: Subtidal: Unconsolidated Bottom
- Kelp Canopy
- Eelgrass (May 2014)

Notes:

1. Marine resource mapping was done in coordination with Chambers Group, Inc.
2. Marine habitat temporary impact is defined as area covered by less than 1 FT of material at one year post-construction.
3. Marine habitat prmanent impact is defined as area covered by 1 FT or more of material at one year post-construction.
4. Contour elevations are in reference to MLLW datum.

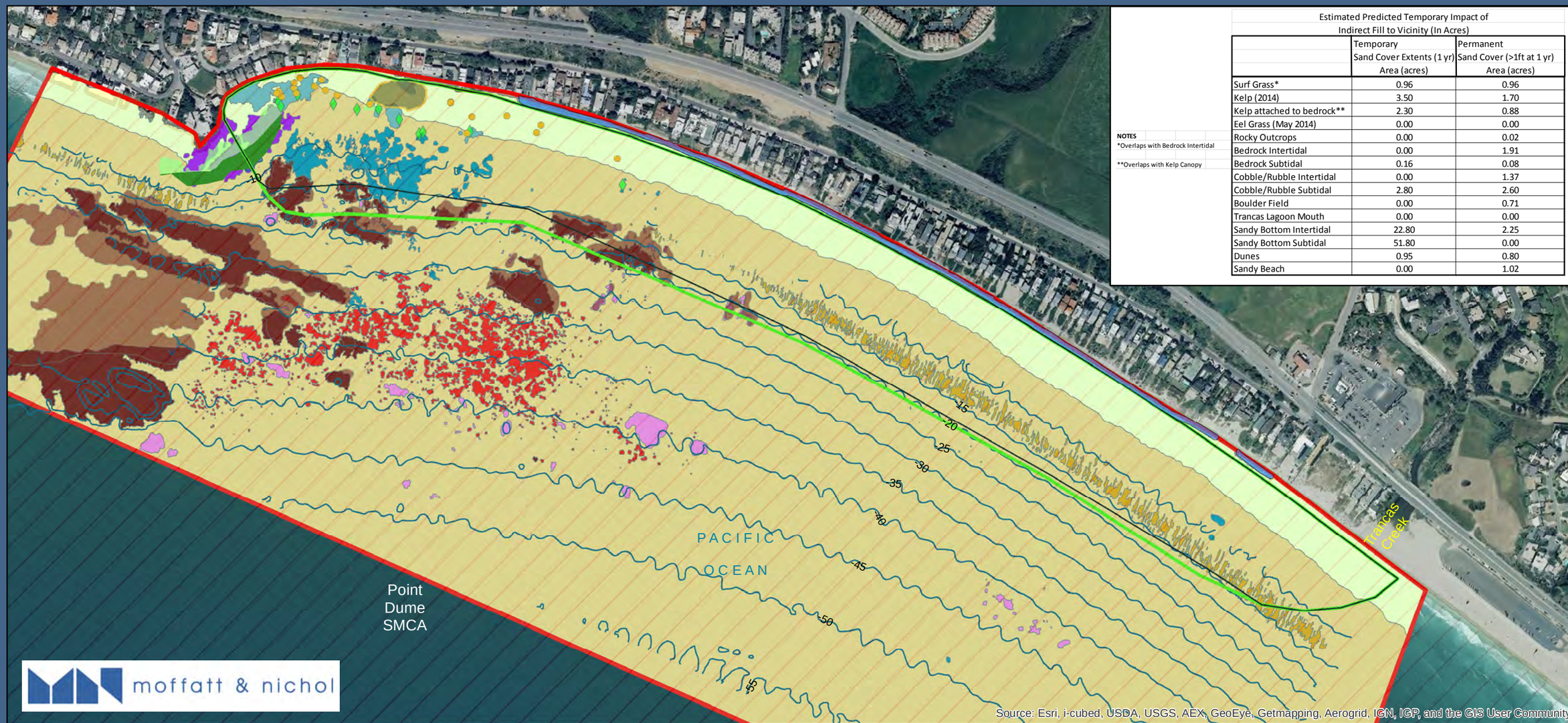
N

0 125 250 500 750 1,000 Feet

1" = 500'

Broad Beach
Mapped Marine Resources
Project Footprint Direct and Indirect Impact Area

Date Prepared/Revised: June 26, 2014



Estimated Predicted Temporary Impact of
Indirect Fill to Vicinity (In Acres)

	Temporary Sand Cover Extents (1 yr) Area (acres)	Permanent Sand Cover (>1ft at 1 yr) Area (acres)
Surf Grass*	0.96	0.96
Kelp (2014)	3.50	1.70
Kelp attached to bedrock**	2.30	0.88
Eel Grass (May 2014)	0.00	0.00
Rocky Outcrops	0.00	0.02
Bedrock Intertidal	0.00	1.91
Bedrock Subtidal	0.16	0.08
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Dunes	0.95	0.80
Sandy Beach	0.00	1.02

NOTES
*Overlaps with Bedrock Intertidal

**Overlaps with Kelp Canopy

Document Path: P:\6935 Broad Beach\7 Design Information\GIS\Maps\Mapped_Marine_Resources_Indirect_2014.mxd

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- Kelp Canopy
- Eelgrass (May 2014)

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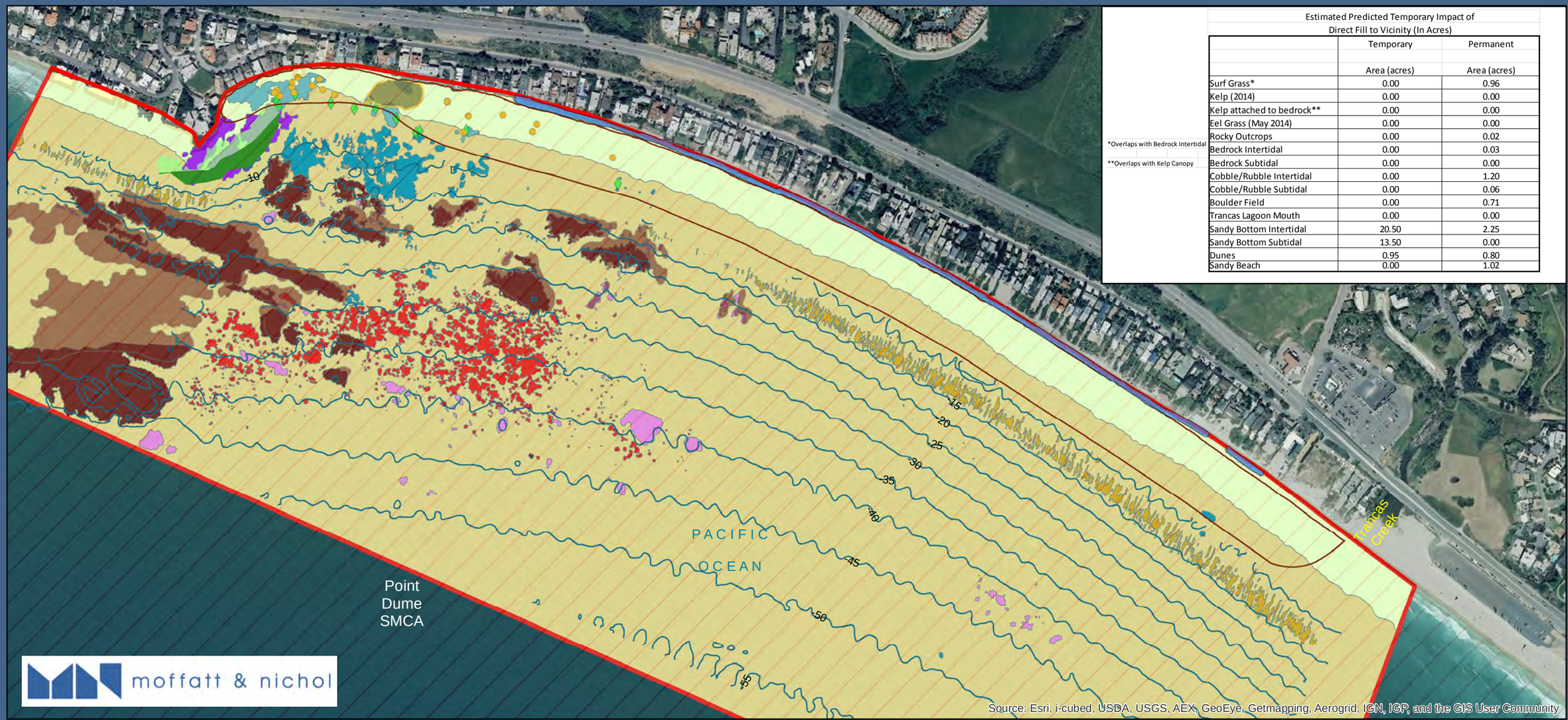
Project Footprint Indirect Impact Area

Date Prepared/Revised: June 26, 2014



Estimated Predicted Temporary Impact of
Direct Fill to Vicinity (In Acres)

	Temporary	Permanent
	Area (acres)	Area (acres)
Surf Grass*	0.00	0.96
Kelp (2014)	0.00	0.00
Kelp attached to bedrock**	0.00	0.00
Eel Grass (May 2014)	0.00	0.00
Rocky Outcrops	0.00	0.02
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