CITY OF NEWPORT BEACH
100 Civic Center Drive
Newport Beach, California 92660
949 644-3001 | 949 644-3020 FAX
newportbeachca.gov

October 14, 2016

Dr. Linda Candelaria, PhD
California Regional Water Quality Control Board, Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3348

RE: Regional Board Meeting- October 28, 2016

Basin Plan Amendments to Incorporate Total Maximum Daily Loads for Copper and Non-TMDL Action Plans for other Metals in Newport Bay

Dear Dr. Candelaria:

These comments are in response to the notice we received on August 25, 2016, advising that the California Regional Water Quality Control Board, Santa Ana Region ("Regional Board") will consider adopting Amendments to the Water Quality Control Plan for the Santa Ana River Basin ("Amendments") to incorporate Total Maximum Daily Loads ("TDMLs") for copper and non-TDML Action Plans for other metals in Newport Bay.

First, let me reiterate our sincere appreciation for the Regional Board's work in improving water quality in the Santa Ana River watershed. You have been an important partner with us – and we with you – in these efforts.

However, the pending Copper TMDL has us greatly concerned.

As you know, the City of Newport Beach ("City") provided written and oral comments to you on July 24, 2015, when staff included Newport Bay Copper/Metals TDMLs as an informational item on the Regional Board's regular agenda. At that time, we advised the Regional Board the City was concerned about the proposal to require the City and others to restrict or ban the use of *legally-available* copper-based antifouling paints (AFP) through a new TMDL. In particular, we outlined to the Board that the implementation plan was both unenforceable and a circumvention of the legal role and rights of the Department of Pesticide Regulation ("DPR"), which is the exclusive regulator of pesticides, including copper AFP. We urged you to confer with the City and engage in a meaningful dialogue about the current copper levels in Newport Bay and the development of meaningful Amendments.

Respectfully, we do not believe that this consultation about the practical impacts of the proposed implementation plan to our community and our harbor was robust or meaningful.

We have since conferred with DPR's Pesticide Registration Branch. While we are paraphrasing our discussion, they confirmed DPR's status as the exclusive regulator of pesticides in California. Specifically, Environmental Scientist Carlos Gutierrez with the Pesticide Registration Branch explained that DPR is required to investigate actual or potential significant adverse effects to people *or the environment* resulting from the use of pesticides. Mr. Gutierrez shared our concern that the Regional Board appeared to be poised to take an action to regulate AFP, and that it was doing so on a piecemeal basis as opposed to working with DPR on a unified approach that could be implemented on a state-wide basis. Finally, Mr. Gutierrez confirmed that DPR has determined that establishing a maximum allowable leach rate of 9.5 $\mu g/cm^2/day$ may be the most effective way to reduce copper in California waters. (*See also,* Department of Pesticide Regulation Memorandum dated September 12, 2016.)

We believe that the proposed Amendments have the following significant problems:

- The Amendments seem to be underdeveloped, in part because they rely on data that is out-of-date, incorrect and overly conservative;

- The Amendments are impractical if not impossible for the City to effectively implement; and

- In light of the above, we believe if the proposed Amendments are adopted as proposed, the action may be the subject of litigation.

This is important enough that we believe we need to approach the full Regional Board with our concerns. Therefore, on October 28, 2016, we will urge the Board to consider our information and take a different action than suggested by staff.

Generally, our request will be as follows:

1. Do not adopt the TMDL at this time.

2. Select an additional review period – up to four (4) years – for the Board staff, the City, DPR, and other stakeholders/dischargers to have a meaningful discussion about additional testing and monitoring, education, best management practices, the implementation timeline for DPR's updated AFP regulations, and more, with the goal of coming back to the Regional Board with more robust data and implementation ideas.

The City commits to participating thoroughly in that discussion provided that all of the parties do so collaboratively, as has been our collective spirit in the past.

To support this request, we have attached memorandums identifying the deficiencies in the proposed Amendments. To briefly summarize, the inadequacy of the proposed Basin Plan Amendments span a wide array of legal and technical issues, including but not limited to the following:

- The Copper TMDL unlawfully attempts to force local agencies to solve a conflict caused by the Regional Board's failure to convince the Legislature or its sister state agencies to ban copper AFP.

- The Copper TMDL is unlawful because alternatives to copper AFP are not effective or available.

- The margin of safety is too large and unsupported and the data relied upon is inadequate.

- The phased implementation schedule is unreasonable, unsupported and would force substantial early investments that may be unnecessary.

- The Copper TMDL imposes unfunded state mandates.

- It is improper to promulgate a TMDL for the entire bay when only certain areas within the bay may be even arguably impaired.

- The substitute environmental document fails to comply with the California Environmental Quality Act ("CEQA") and CEQA's implementing guidelines.

However well intended, the Amendments seem flawed, preempted, give substandard consideration to current conditions and technical analyses, and violate CEQA. Among other things, the information included in the attachments establishes there may in fact not be a copper impairment (either in the water or sediment), and that no implementation plan is necessary at this time.

Again, we are providing this information in recognition of our strong history of collaboration with the Regional Board. Our continued commitment to evaluate and resolve water quality issues of concern is evidenced by our history of voluntary and cooperative efforts in the watershed. Specific to copper, these efforts include, but are not limited to:

- Contracting with (and funding) Anchor QEA Consultants to provide professional/technical assistance with research/testing/analysis in an effort to better understand and define any potential copper-related issues in Newport Bay.

- Conducting two independent harbor-wide water column sample tests for Copper (July 2015 & February 2016).

- Conducting five toxicity tests in areas of higher copper concentrations (all showed no toxicity).

- Conducting boat zone testing to better assess copper bottom paint leachate concentration degradation.

- Visiting, observing and reviewing the experimental vessel skirt/vacuum hull bottom cleaning operation in Santa Cruz, CA.

- Meeting with bottom paint applicators and shipyards to better understand available paints, application process, re-application rates, and cost of copper and non-copper AFPs.

- Since 2010, and with your assistance, financing and completing significant dredging efforts to remove sediments/legacy contaminants, and to improve flushing and circulation, thus improving the overall water quality of Newport Bay.

- Developing a web page to educate boat owners and provide updated copper water quality information.

For these and other reasons, and to continue our history of working cooperatively rather than in adversarial proceedings, we respectfully request that you and your Board staff colleagues consider our recommendation that the Regional Board not adopt the Amendments on October 28, 2016. Additional time will allow us to further discuss our concerns and our going-forward ideas to return to the Regional Board at a later date with more robust data and a well-thought out implementation plan.

Please know that we appreciate the Board's fine work and we as a community remain willing and ready to discuss the development of Amendments that incorporate a justified and grounded implementation plan to address actual water quality concerns in the Newport Bay.

Sincerely,

Dave Kiff
City Manager
City of Newport Beach

Enclosures:

Attachment 1:	Anchor QEA, TDML Loading Calculations, October12, 2016
Attachment 2:	Anchor QEA, TDMLs and Non-TDML Action Plans, October 13, 2016
Attachment 3:	Anchor QEA, Current Sediment, Water and Tissue Data, October 13, 2016
Attachment 4:	Anchor QEA, Random Sample Points Methodology, July 10, 2015
Attachment 5:	Anchor QEA, Newport Bay Copper Study: Winter 2016
Attachment 6:	Anchor QEA, Technical Comments, October 14, 2016
Attachment 7:	Greg Newmark, Meyers Nave, October 14, 2016
Attachment 8:	Declaration of Chris Miller
Attachment 9:	City of Newport Beach Letter to US EPA, September 16, 2016
Attachment 10:	Department of Pesticide Regulation, Memorandum, September 12, 2016

Cc: Kurt V. Berchtold, Executive Director
Terri Reeder, Chief Coastal Waters Planning Section
Joanne Schneider, Assistance Director
Mayor and City Councilmembers
Aaron C. Harp, City Attorney
David A. Webb, Public Works Director
Amanda Carr, Deputy Director, OC Environmental Resources

ANCHOR QEA

27201 Puerta Real, Suite 350
Mission Viejo, California 92691
Phone 949.347.2780
www.anchorqea.com

MEMORANDUM

To:	Leonie Mulvihill and Chris Miller, City of Newport Beach	**Date:**	October 12, 2016
From:	Andrew Martin and Shelly Anghera, Ph.D., Anchor QEA, LLC	**Project:**	150243-16.01
Re:	TMDL Loading Calculations from Copper Antifouling Boat Paint and Resulting Allocations		

INTRODUCTION

The Staff Report for Basin Plan Amendments for Copper Total Maximum Daily Loads (TMDLs) and Non-TMDL Metals Action Plans for Zinc, Mercury, Arsenic and Chromium in Newport Bay, California (Staff Report; RWQCB Santa Ana 2016) specified dissolved copper loading from boats to Newport Bay was estimated to be 36,000 pounds (lbs) per year (yr). A review of the calculation for the dissolved copper load was conducted based on available published information. Based on the best defensible assumptions for each of the variables in the calculation, it is believed the copper loading predicted from boats as described in the TMDL is greatly over-estimated.

The first section of this memorandum provides an overview of the methods and assumptions used within the Staff Report to generate the copper loading from boats and then addresses calculation errors in the Staff Report. The second section recommends more appropriate and defensible alternative assumptions for daily leach rate, boat hull cleaning requirements, and number of vessels within Newport Bay to calculate a more accurate copper loading from copper antifouling paint (AFP).

STAFF REPORT METHOD FOR CALCULATING DISSOLVED COPPER LOAD FROM BOATS TO NEWPORT BAY

The following elements describe the methods and calculations that were the basis for the Staff Report's determination of the total dissolved copper load from boats in Newport Harbor. For each step of the calculation, the general approach is presented and discrepancies

with the calculations are identified. Supporting each step of the calculation (with text in *italics*), the corrected results are presented.

- **Step 1 - Identify a leach rate.** To determine the dissolved copper load from boats to Newport Bay, the Staff Report uses a maximum leach rate of 9.5 micrograms per square centimeters per day (µg/cm^2/day) – assuming appropriate best management practices (BMPs) were used during hull cleaning. The Staff Report applied this rate to both epoxy and ablative-type paint products.
- **Step 2 – Convert daily leach rate to yearly leach rate.** The Staff Report specifies a yearly leach rate of 3,505.1 µg/cm^2/yr for epoxy-type paints and a yearly leach rate of 3,499.7 µg/cm^2/yr for ablative-type paints. The Staff Report fails to identify the discrepancy for having two different yearly leach rates because the number of days in a year should be constant for both types of paint. Furthermore, the Staff Report incorrectly calculates a yearly leach rate. The number of days in a year is 365 (considering adjustments for an extra day due to leap year every 4 years, it may be reasonable to consider a value of 365.25). By dividing the Staff Report yearly leach rate values (3,505.1 µg/cm^2/yr and 3,499.7 µg/cm^2/yr) by the maximum leach rate (9.5 µg/cm^2/day) used, the results suggest that there are 368.96 and 368.39 days in a year.
  - *The correct yearly leach rate for epoxy and ablative-type paint products should be 3,467.5 µg/cm^2/yr (using the more accurate 365 days per year constant).*
- **Step 3 – Convert yearly leach rate to total loading (lbs) per boat.** The Staff Report used an average hull length (40 feet) and width (13 feet) taken from Earley (2013) and then applied a wetted hull surface area factor (0.85). Appropriate conversion factors from the unit area of square centimeters to average boat wetted hull surface area (in square feet) and from micrograms to pounds were necessary. The Staff Report correctly applied these calculations and presented a result of 3.17 lbs/boat/yr.
  - *Applying these same calculations to the corrected yearly leach rate (presented in Step 2 above) would result in a value of 3.14 lbs/boat/yr. This would ultimately result in a **net decrease** in the calculated copper load.*
- **Step 4 – Calculate an average condition for epoxy and ablative-type paints (using BMP methods).** Assuming 80% of the boats in Newport Harbor use epoxy-type paints and 20% use ablative-type paints, a weighted average can be calculated. In the Staff

Report, because the same leach rate was used for epoxy and ablative-type paints, this calculation is not necessary, and the Staff Report presents the same value of 3.17 lbs/boat/yr. However, for future scenarios discussed herein, this proportion of vessels using epoxy to ablative-type paints is maintained and meaningful in the discussion of the total dissolved copper load from boats.

- **Step 5 – Adjust calculations to address boat hull cleaning using non-BMP methods (e.g., scouring pads).** The Staff Report relies on a conclusion from the Earley (2013) study that indicates boat hull cleaning using BMP methods (soft cloths) results in 25.6% and 31.9% less dissolved copper into the water column for epoxy and ablative-type paints, respectively, than for boat hull cleaning using non-BMP methods. This adjustment could be made to the daily leach rate or to the calculated loading (in lbs)/year; the Staff Report chose the latter. However, the Staff Report incorrectly applied these percent reductions. The Earley (2013) study indicated BMP methods resulted in a specific percentage **less than** non-BMP methods (i.e., the percent reduction was based on the non-BMP leach rate [or non-BMP loading]). The Staff Report multiplied the percent reduction by the BMP loading, rather than correctly multiplying the percent reduction by the non-BMP loading—which the Staff Report was attempting to calculate. Because only the BMP loading was known, the Staff Report should have used the Earley (2103) study to determine the correct percent increase in dissolved copper loading from boat hull cleaning using non-BMP methods compared to using BMP methods. This percent increase was 34.3% and 46.9% for epoxy and ablative-type paints, respectively. Based on the incorrect methodology, the Staff Report results suggest loading values of 3.99 lbs/boat/yr and 4.18 lbs/boat/yr for epoxy and ablative-type paints when non-BMP boat hull cleaning methods are used.
  - *If the Staff Report had correctly applied the results from the Earley (2013) study, the loading values should have been 4.21 lbs/boat/yr and 4.61 lbs/boat/yr. This would ultimately result in a **net increase** in the calculated copper load.*
- **Step 6 – Calculate an average condition for epoxy and ablative-type paints (using non-BMP methods).** Similar to Step 4, assuming 80% of the boats in Newport Harbor use epoxy-type paints and 20% use ablative-type paints, a weighted average can be calculated. Therefore, based on the Staff Report approach, the average copper loading when non-BMP methods are used was 4.02 lbs/boat/yr.

- *If the Staff Report had correctly applied the results from the Earley (2013) study, the average loading value should have been 4.29 lbs/boat/yr. Again, this would ultimately result in a **net increase** in the calculated copper load.*

- **Step 7 – Calculate a total copper loading from boats.** The Staff Report assumes 50% of the vessels have their boat hulls cleaned with BMP methods and the remaining 50% of vessels have their boat hulls cleaned with non-BMP methods. Based on this assumption, the Staff Report suggests a total copper loading of approximately 3.60 lbs/boat/yr. The Staff Report further assumes a total of 10,000 boats present in Newport Bay. Therefore, the total copper loading from boats is equivalent to 36,000 lbs/yr.
  - *If the Staff Report had correctly applied the results from the Earley (2013) study, the average loading value should have been 3.71 lbs/boat/yr. Applying this value to the Staff Report's account of the total number of vessels (10,000), then the total copper loading from boats should have been 37,100 lbs/yr. This would ultimately result in a **net increase** in the calculated copper load from the 36,000 lbs/yr presented in the Staff Report.*

A summary of the Staff Report (as-is and adjusted) copper loading rates (per boat/yr and total/yr) is presented in Table 1 (see "Staff Report" and "Staff Report Adjusted" columns).

ALTERNATIVE CONSIDERATIONS FOR CALCULATING DISSOLVED COPPER LOAD FROM BOATS TO NEWPORT BAY

Leach Rates

The Earley (2013) study developed leach rates for dissolved and total copper from boat hulls that were cleaned with or without appropriate BMPs using copper-based AFPs that were "representative of the most commonly utilized paints for recreational boats in California." Anchor QEA believes it is more appropriate to use these published leach rates for recreational boats in California as a starting point for calculating loads from recreational boats. Using the total and dissolved copper loading rate for a 3-year life cycle and adjusting to a daily rate, the following leach rates were derived:

- Epoxy-type paints using BMPs during boat hull cleaning
  - Dissolved copper = 6.47 $\mu g/cm^2/day$

- Ablative-type paints using BMPs during boat hull cleaning
  - Dissolved copper = 6.85 µg/cm^2/day
- Epoxy-type paints using non-BMP methods during boat hull cleaning
  - Dissolved copper = 8.69 µg/cm^2/day
- Ablative-type paints using non-BMP methods during boat hull cleaning
  - Dissolved copper = 10.07 µg/cm^2/day

Following the same steps in calculations as the Staff Report, the dissolved copper loading would be 2.56 lbs/boat/yr (or 25,600 lbs/boat/yr). These calculations were presented in the Staff Report (Appendix 6, top of page 154) and included in Table 1 for comparison (see "Earley 2013 Total Cu" and "Earley 2013 Dissolved Cu" columns).

We expect this value to be reduced through the implementation of the Department of Pesticide Regulations (DPR) recommendations for maximum allowable leach rate for copper AFPs. DPR's memorandum for determining a maximum allowable leach rate (DPR EMB 2014) found that leach rates for 169 copper AFP products ranged from 1.0 to 29.6 µg/cm^2/day with a mean of 11.1 µg/cm^2/day, and that 58% of these products did not currently meet the recommended maximum allowable leach rate of 9.5 µg/cm^2/day. Therefore, 42% of these products are already below the 9.5 µg/cm^2/day maximum allowable leach rate. Assuming the distribution of AFP products on the market is similar to the distribution of AFP on boats, then a weighted mean of the Staff Report[1] and the Earley (2013) study[2] can be calculated to provide a more reasonable alternative estimate of the total dissolved copper loading[3]. The results of this reasonable alternative calculation suggest total dissolved copper leach rate would be reduced to 2.75 lbs/boat/year (*or 2.73 lbs/boat/year using adjusted values*). For a detailed summary of the calculation results, see Table 1, "Reasonable Alternative" columns.

[1] Staff Report approach represents 58% of the available paints being reformulated to have a maximum leach rate of 9.5 µg/cm^2/day.

[2] Earley study uses readily available paints that represent 42% of the current market that meet the maximum allowable leach rate. These paints are 6.47 to 6.85 µg/cm^2/day for epoxy and ablative-type paints using BMPs, respectively.

[3] The other paints evaluated in Earley (2013) do not meet the DPR requirements for leach rate and non-BMP limited leach rates and were excluded from the calculation.

Number of Vessels

The Staff Report assumes 10,000 boats are moored or berthed within Newport Bay. The City of Newport Beach used aerial photography to document the number of vessels typically moored or berthed within Newport Bay. The results of that survey suggest only 4,470 vessels greater than 18 feet are moored or berthed in Newport Bay (Miller 2016). While boat hulls in Newport Bay have not been tested to confirm the presence of copper in the AFPs, copper is currently used in 90% of marine AFPs in California and worldwide (Singhasemanon et al. 2009; Blossom 2015); therefore, only 4,023 boats should be considered in calculating the dissolved copper load from boats. The loading calculation should be revised to reflect a more accurate number of boats with copper AFP. Adjusting the total number of vessels used in the calculation, the total dissolved copper load (in lbs/yr) ranges from approximately 10,311 lbs/yr based on the Earley (2013) study to 14,475 lbs/yr based on the Staff Report (see Table 1, rows for assumed vessel numbers).

Best Management Practices

The Staff Report developed the dissolved copper loading estimate assuming 50% of boats are cleaned using BMP methods and 50% are cleaned using non-BMP methods. This scenario contradicts the DPR EMB (2014) recommendation of a "maximum allowable leach rate for AFP products at 9.5 μg/cm^2/day under the condition that in-water hull cleaners follow CPDA's [California Professional Divers Association's] BMP method with soft-pile carpet…" Therefore, it is overly conservative to assume any boats will be cleaned using non-BMP methods. The calculation to assess loading from copper AFP should be revised to account for 100% of boat hull cleanings using approved BMP methods. Adjusting the boat hull cleaning approach to use only recommended BMPs in the calculation, the total dissolved copper load (in lbs/yr) ranges from 8,702 lbs/yr based on the Earley (2013) study to 12,762 lbs/yr based on the Staff Report (see Table 1, row for "Total Annual Copper Load Assuming Cleaning Events Consist of 100% with BMPs and 0% without BMPs"). Using a reasonable alternative estimate described above, the total dissolved copper loading is approximately 11,057 lbs/yr (*or 10,979 lbs/yr using adjusted values*).

Margin of Safety

The standard approach to calculate the TMDL is to quantify waste load allocations (WLAs) and load allocations (LAs) and add a margin of safety (MOS); in this case, the Regional Water Quality Control Board choose 20%. The Staff Report provides references for the derivation of the WLA for municipal separate storm sewer system water permittees, California Department of Transportation, other National Pollutant Discharge Elimination System permittees, agriculture runoff, and open space runoff, and provides a reference for LA for air deposition. The Staff Report then calculates a WLA for boats by solving the equation. The Staff Report incorrectly applies an MOS in the TMDL equation. The Staff Report calculates a 20% MOS based on the TMDL value (11,646 lbs Cu/yr), rather than calculating the MOS on the sum of the WLA and LA. This approach underestimates the allocation for one or more types of WLA or LAs. The MOS can be correctly determined by dividing the Total TMDL value of 11,646 lbs/yr by 1.2 and subtracting that quotient from the Total TMDL value instead of simply multiplying by 0.2. This results in an MOS of 1,941 lbs/yr[4] (instead of 2,329 lbs/yr as currently presented in the Staff Report). This is a difference of 388 lbs/yr. Because the Staff Report appears to be solving for the Cu LA for boats, it is reasonable to assume the LA for boats should be 6,448 lbs/yr[5]. In Table 1, the row titled "Corrected Allowable Annual Copper Load for Newport Bay (lbs/yr) from Boats" and the two rows beneath it, detail the percent reduction in copper AFP necessary to meet the LA.

Alternative MOS values should be considered because a change to 10% MOS would have significant impacts on the need for management alternatives. A 10% MOS would be 1,059 lbs/yr (instead of 2,329 lbs/yr as currently presented in the Staff Report). This is a difference of 1,270 lbs/yr. Because the Staff Report appears to be solving for the Cu LA for boats, it is reasonable to assume the LA for boats should be 7,330 lbs/yr. In Table 1, the row titled "Adjusted MOS of 10% Annual Copper Load for Newport Bay (lbs/yr) from Boats" and the two rows beneath it, detail the percent reduction in copper AFP necessary to meet the LA.

[4] Calculated as 11,646 lbs/yr - ((11,646 lbs/yr)/1.2)

[5] This calculation can be checked by multiplying the MOS by the new WLA and LA and should equal the Total TMDL value as such: 0.2 x (3,176 lbs/yr [sub-total of tributary or storm drain WLAs and LAs] + 6,529 lbs/yr [corrected sub-total of boatyard WLAs and Boats and Other LAs to properly apply MOS factor]) yields an MOS of 1,941 lbs/yr. Applying these values to the TMDL equation (TMDL = ΣWLA +ΣLA + MOS) yields a TMDL value of 3,176 lbs/yr + 6,529 lbs/yr + 1,941 lbs/yr = 11,646 lbs/yr.

Implementation Considerations

It is important to properly quantify the LA for boats to understand the appropriate implementation requirements to meet the proposed TMDL. A comparison of the percent reductions required to meet the TMDL using the Staff Report LA for boats and the adjusted LA for boats based on corrected MOS calculations is presented in Table 1. The Staff Report suggests dissolved copper loadings from boats would need to be reduced by 83% to meet the TMDL numeric target of 3.1µg/liter dissolved copper. Applying reasonable alternative approaches to the leach rate, appropriate vessel inventory and boat hull cleaning methods, and a corrected LA for boats, dissolved copper loadings from boats would only need to be reduced by 41% to meet the TMDL. Further, if an alternative MOS of 10% is applied, then dissolved copper loadings from boats would only need to be reduced by 33% to meet the TMDL numeric target.

SUMMARY

The Staff Report presents values for dissolved copper loadings from boats and an LA for boats in Newport Bay that are based on incorrect calculations and assumptions. Using information contained within the Staff Report, the DPR EMB 2014 Memorandum, and the Earley (2013) study, Anchor QEA determined new dissolved copper loadings and an LA for boats using corrected formulas and reasonable assumptions. The results of this analysis demonstrates the Staff Report overestimates the dissolved copper loadings from boats through use of overly conservative assumptions. This results in underestimating the LA for boats and requires a much greater reduction in dissolved copper from boats in Newport Bay than is necessary.

REFERENCES

Blossom, N., 2015. *Copper in the Ocean Environment*. Prepared by American Chemet Corporation. Available from: http://www.chemet.com/assets/1/6/Copper_and_the_Ocean_Environment.pdf.

DPR EMB (Department of Pesticide Regulation Environmental Monitoring Branch), 2014. *Determination of Maximum Allowable Leach Rate and Mitigation Recommendations for Copper Antifouling Paints per AB 425*. Memorandum to Brian R. Leahy, DPR, from David Duncan, EMB. January 30, 2014.

Earley, P.J., B.L. Swope, K. Barbeau, R. Bundy, J.A. McDonald, and I. Rivera-Duarte, 2013. Life Cycle Contributions of Copper from Vessel Painting and Maintenance Activities. *Biofouling: The Journal of Bioadhesion and Biofilm Research*, DOI: 10.1080/08927014.2013.841891.

Miller, C., 2016. Declaration of Chris Miller. October 12, 2016.

RWQCB (Regional Water Quality Control Board) Santa Ana, 2016. *Staff Report – Basin Plan Amendments for Copper TMDLs and Non-TMDL Metals Action Plans for Zinc, Mercury, Arsenic and Chromium in Newport Bay, California*. August 30, 2016.

Singhasemanon, N., E. Pyatt, and J. Bacey, 2009. *Monitoring for Indicators of Antifouling Paint Pollution in California Marinas*. DPR, California Environmental Protection Agency, Environmental Monitoring Branch. EH08-05. June 2009. Available from: http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/eh0805.pdf.

Table 1
Calculated Copper Loading from Copper Antifouling Paints in Newport Bay

Loading Scenario	Total Annual Copper Load Per Boat					
	Staff Report	**Staff Report Adjusted[1A, 1B]**	**Earley 2013 Total Cu**	**Earley 2013 Dissolved Cu**	**Reasonable Alternative[7] (58% Staff Report + 42% Earley 2013 Dissolved Cu)**	**Reasonable Alternative[7] (58% Staff Report Adjusted + 42% Earley 2013 Dissolved Cu)**
80% Epoxy/20% Ablative with Cleaning BMPs	3.17	*3.14*	2.59	2.16	2.75	*2.73*
80% Epoxy/20% Ablative without Cleaning BMPs[2]	4.02	*4.29*	3.85	2.96	--[8]	--[8]
Total (50% With BMPs and 50% Without BMPs)	3.60	*3.71*	3.22	2.56	--[8]	--[8]
Total for Alternate Scenario (100% With BMPs and 0% Without BMPs)[3]	3.17	*3.14*	2.59	2.16	2.75	*2.73*
	Total Annual Copper Load Assuming Cleaning Events Consist of 50% with BMPs and 50% without BMPs (lbs/year)					
10,000 vessels[4]	35,981.5	*37,135.3*	32,188.7	25,629.0	--[8]	--[8]
4,470 vessels[5]	16,083.7	16,599.5	14,388.3	11,456.1	--[8]	--[8]
4,023 vessels[6]	14,475.4	14,939.5	12,949.5	10,310.5	--[8]	--[8]
	Total Annual Copper Load Assuming Cleaning Events Consist of 100% with BMPs and 0% without BMPs (lbs/year)					
10,000 vessels[4]	31,721.6	*31,390.8*	25,859.8	21,630.3	27,483.2	*27,291.4*
4,470 vessels[5]	14,179.5	14,031.7	11,559.3	9,668.7	12,285.0	*12,199.3*
4,023 vessels[6]	12,761.6	12,628.5	10,403.4	8,701.9	11,056.5	*10,979.3*
Staff Report Allowable Annual Copper Load for Newport Bay (lbs/yr) from Boats	6,060					
Percent reduction necessary to meet Allowable Annual Copper Load assuming 10,000 vessels with 50% BMP/50% non-BMP (%)	83.16%	*83.68%*	81.17%	76.35%	--[8]	--[8]
Percent reduction necessary to meet Allowable Annual Copper Load assuming 4,023 vessels with 100% BMP/0% non-BMP (%)	52.51%	*52.01%*	41.75%	30.36%	45.19%	*44.81%*
Corrected Allowable Annual Copper Load for Newport Bay (lbs/yr) from Boats	6,448					
Percent reduction necessary to meet Corrected Allowable Annual Copper Load assuming 10,000 vessels with 50% BMP/50% non-BMP (%)	82.08%	*82.64%*	79.97%	74.84%	--[8]	--[8]
Percent reduction necessary to meet Corrected Allowable Annual Copper Load assuming 4,023 vessels with 100% BMP/0% non-BMP (%)	49.47%	*48.94%*	38.02%	25.90%	41.68%	*41.27%*
Adjusted MOS of 10% Annual Copper Load for Newport Bay (lbs/yr) from Boats	7,330					
Percent reduction necessary to meet Corrected Allowable Annual Copper Load assuming 10,000 vessels with 50% BMP/50% non-BMP (%)	79.63%	*80.26%*	77.23%	71.40%	--[8]	--[8]
Percent reduction necessary to meet Corrected Allowable Annual Copper Load assuming 4,023 vessels with 100% BMP/0% non-BMP (%)	42.56%	*41.96%*	29.54%	15.77%	33.70%	*33.24%*

Notes:

1A. The annual leachate rate was incorrectly calculated for epoxy and ablative type paints. Using a per day rate of 9.5 µg/cm^2, the annual rate should be 3,467.5 µg/cm^2/yr for both types of paint, instead of the 3,505.1 and 3,499.7 µg/cm^2/yr listed for epoxy and ablative paints, respectively. This resulted in a net decrease in the calculated loading rates.

1B. The % increase due to copper loading from non-BMP cleaning events was incorrectly calculated. The Staff Report used the percent reduction value derived from the Earley 2013 study (25.6% and 31.9% for dissolved copper for epoxy and ablative paints, respectively). This value percent reduction value underestimates the amount of copper loading from non-BMP cleaning events. Instead, a percent increase value should have been used (34% and 47%, respectively). This resulted in a net increase in the calculated loading rates.

2. For the Earley 2013 scenarios, reported data for non-BMP results were used rather than relying on a calculated percent increase/decrease relative to reported data with BMPs.

3. The Staff Report did not include a 100% BMP + 0% non-BMP scenario. This scenario was calculated using Staff Report results for comparisons to other scenarios.

Table 1
Calculated Copper Loading from Copper Antifouling Paints in Newport Bay

4. Staff Report assumed 10,000 vessels within Newport Bay.

5. Current estimate of number of vessels in Newport Bay is 4,470 (Miller 2016).

6. 90% of current number of vessels in Newport Bay (4,023) have copper-based paints; the remaining 10% do not have copper-based paints.

7. The Reasonable Alternative is based on the DPR EMB (2014) study that indicated 58% of AFP products did not currently meet the maximum allowable leach rate of 9.5 µg/cm^2/yr; therefore, 42% of AFP products did meet this standard. Assuming the distribution of AFP products is similar to the distribution of AFP on boats, a weighted average was calculated as 0.58 x Staff Report + 0.42 x Earley 2013. The leach rate presented in the Earley 2013 study was found to be representative of the remaining 42% of vessels.

8. The use of the maximum allowable leach rate for AFP products at 9.5 µg/cm^2/day is only allowed under the condition that in-water hull cleaners follow the California Professional Divers Association's BMP method with soft-pile carpet (DPR EMB 2014); therefore only 100% BMP scenarios are included.

Italic text indicates adjusted rates.

-- = not applicable

AFP = antifouling paint

BMP = best management practice, use of soft pile pads

Cu = copper

DPR EMB = Department of Pesticide Regulation Environmental Monitoring Branch

lbs/yr = pounds per year

MOS = margin of safety

ANCHOR QEA

27201 Puerta Real, Suite 350
Mission Viejo, California 92691
Phone 949.347.2780
www.anchorqea.com

MEMORANDUM

To:	Leonie Mulvihill and Chris Miller, City of Newport Beach	**Date:**	October 11, 2016
From:	Andrew Martin, Adam Gale, and Shelly Anghera, Ph.D., Anchor QEA, LLC	**Project:**	150243-16.01
Re:	Newport Bay Copper (Cu) TMDLs and Non-TMDL Action Plans for Zinc (Zn), Mercury (Hg), Arsenic (As), and Chromium (Cr)		

The Staff Report for Basin Plan Amendments for Copper Total Maximum Daily Loads (TMDLs) and Non-TMDL Metals Action Plans for Zinc, Mercury, Arsenic, and Chromium in Newport Bay, California (Staff Report; RWQCB Santa Ana 2016a) identifies in-water hull cleaning diver certification, evaluation and augmentation to boater education programs, and continued compliance monitoring activities within Newport Bay as a means for assessing the effects of implementation strategies identified within the TMDL, among other pertinent details and implementation requirements. The Staff Report further identifies special studies to understand the potential ongoing contaminant loading from sediments, algae, and other vegetation.

LOBBYING

The TMDL requires responsible parties to assist the Regional Water Quality Control Board (RWQCB) in efforts to gain state and federal support for removal of Cu antifouling paint (AFP) from distribution. The effort would likely include support from the City of Newport Beach (City) attorney, City staff, and lobbyist groups, as well as science-based memorandums from the technical support team. The estimated cost to the City is estimated to be $50,000 per year.

REQUIRED IMPLEMENTATION PLAN DEVELOPMENT

Within 3 months of the approved TMDL, the following two plans need to be developed:

1. Copper AFP Reduction Implementation Plan: Develop an implementation plan and schedule to reduce Cu discharges from Cu AFPs. Specifically, within 3 months of the approved TMDL, the dischargers shall submit one or more implementation plan(s) and schedule(s) to achieve reductions of Cu discharges from Cu AFPs, and then

implement the plan(s) and schedule(s) after approval from the RWQCB. The estimated cost to develop a copper AFP reduction implementation plan is $100,000.

2. Sediment Remediation Implementation Plan: Within 3 months of the approved TMDL, the dischargers shall submit an implementation plan and schedule to correct Cu sediment impairment in areas that exceed the Effects Range Median sediment guideline for Cu, including the Turning Basin and South Lido Channel. This plan will include consideration of other metals (i.e., zinc and mercury). The estimated cost to develop a sediment remediation implementation plan is $75,000.

REQUIRED MONITORING AND SPECIAL STUDIES

The proposed plan shall include recommended corrective strategies for areas of known sediment impairment, and monitoring and evaluation necessary to determine: 1) the effectiveness of the corrective actions on sediment Cu impairment; and 2) the extent of sediment zinc and mercury (and Cu) impairment in areas of Newport Bay that have not been monitored (especially in marina and boatyard areas).

The following cost estimate was developed in response to the compliance monitoring and special study recommendations identified in the Staff Report. The proposed program is a reasonable approach consistent with monitoring requirements defined in other regional TMDL programs (e.g., the Los Angeles and Long Beach Harbor Waters Toxics TMDL).

This cost estimate assumes a 5–year monitoring program that would be subject to refinement (i.e., adaptive management) at the end of each contract period based on results of the previous 5 years of data. Costs were based on typical staffing requirements, and 2016 rates were used for analytical laboratory, vessel support, and other subcontractor support. This cost estimate assumes a 4% annual escalation rate to address a variety of factors such as an industry-average inflation rate and unforeseen program support needs such as extensive coordination and communication with regulatory agencies and regional monitoring groups, and changes in subcontractor fees as a result of subcontractor and equipment availability.

The major elements of the compliance monitoring activities and special studies (and relative frequency) consist of the following:

- Compliance monitoring
  - Water quality (three times annually)
  - Sediment quality (once biennially)
  - Fish/mussel tissue quality (once biennially)
- Special studies
  - Contaminant loading from sediment (once)
  - Contaminant loading from vegetation (once)

For the purposes of this cost estimate, a hypothetical 5-year schedule is shown in Table 1. The monitoring year is based on the wet season and begins in July and end in June. Reporting for that year is provided by December.

Table 1
5-Year Schedule of Compliance Monitoring Activities and Special Studies

Event	2017/18				2018/19				2019/20				2020/21				2021/22				2022/23			
	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp
CM – WQ	●	●	●		●	●	●		●	●	●		●	●	●		●	●	●		□	□	□	
CM – Sed	●								●								●							
CM – F/M	●								●								●							
SS – SedLoad					●																			
SS – VegLoad					●																			
Reporting						●				●				●				●				●		

Notes:
CM = compliance monitoring
F = fall (October to December)
F/M = fish/mussel tissue quality
Sed = sediment quality
SedLoad = loading from sediment
WQ = water quality
SS = special study
Sp = spring (April to June)
Su = summer (July to September)
VegLoad = loading from vegetation
W = winter (January to March)
● = Event required within 5-year contract cycle; included in this cost estimate
□ = Event not included in this cost estimate; part of subsequent contract cycle

Compliance Monitoring Activities

Specific components and assumptions of each of the compliance monitoring activities are provided in the following subsections.

Water Quality

- Three events annually (two wet weather and one dry weather)
  - The first qualifying storm after October 1 and a second qualifying storm after January 1 will be targeted
  - The dry weather event will occur during the Summer with a minimum antecedent dry period of 72 hours
- Analytical chemistry for all events
  - Total and dissolved metals
  - Total organic carbon (TOC)
  - Dissolved organic carbon (DOC)
  - Total suspended solids (TSS)
  - Field parameters (pH, temperature, dissolved oxygen, conductivity/salinity, and turbidity)
- Water column toxicity only during the first wet weather event
  - *Mytilus* development (chronic) marine water test
- Fifteen stations
  - Three specified tributary stations (San Diego Creek, Santa Ana Delhi, and Big Canyon Wash)
  - Twelve randomly selected stations throughout Upper and Lower Newport Bay
    - Random selection based on the Southern California Regional Bight Monitoring Program protocols
- Two quality assurance/quality control (QA/QC) samples

Sediment Quality

- One event biennially (dry weather)
- Analytical chemistry

  - Total metals
  - TOC
  - Grain size
- Sediment toxicity
  - 10-day amphipod sediment test
- Fifteen stations
  - Three specified tributary stations (San Diego Creek, Santa Ana Delhi, and Big Canyon Wash)
  - Twelve randomly selected stations throughout Upper and Lower Newport Bay
    - Random selection based on the Southern California Regional Bight Monitoring Program protocols
- Two QA/QC samples

Fish/Mussel Quality

- One event biennially (dry weather)
- Analytical chemistry
  - Total metals
  - % lipids
  - % moisture
- Two fish species
  - Three fish composite samples per station
- One mussel species
  - Three mussel composite samples per station
- Four randomly selected stations
  - Two in Upper Newport Bay
  - Two in Lower Newport Bay

Special Studies

Specific components and assumptions of each of the special studies are provided in the following subsections.

Contaminant Loading from Sediment

Determine the flux of contaminants of concern from bedded sediment to the water column.

- One field event
- Development of a study-specific monitoring plan to supplement the compliance monitoring Sampling and Analysis Plan (SAP)
- Co-located bulk sediment, porewater, and overlying water analytical chemistry
  - Total metals
  - Dissolved metals (in porewater and overlying water only)
  - TOC
  - DOC (in porewater and overlying water only)
  - TSS (in overlying water only)
  - Grain size (in sediment only)
  - Total solids (in sediment only)
- Three randomly selected stations
- One QA/QC sample

Contaminant Loading from Vegetation

Determine the flux of contaminants of concern from algae and other marine vegetation to the water column.

- Historical data review and scientific literature search on contaminant flux from vegetation to water column
- Reconnaissance effort with dive team to identify potential sample locations and document evidence of decaying vegetation
- One field event
- Development of a study-specific monitoring plan to supplement the compliance monitoring SAP
- Vegetation samples to include root and shoot biomass

  - Target healthy and decaying vegetation
- Co-located bulk sediment, overlying water, and vegetation analytical chemistry for each type of vegetation (healthy and decaying)
  - Total metals
  - Dissolved metals (in overlying water only)
  - TOC (in sediment and overlying water only)
  - DOC (in overlying water only)
  - Grain size (in sediment only)
  - Total solids/% moisture (in sediment and vegetation only)
- Ten targeted stations (targeted in areas of known algae and other vegetation)
- One QA/QC sample

Supporting Tasks

Several tasks would be required on an annual basis regardless of the scheduled compliance monitoring activities or special studies. The effort for each of these tasks is scaled relative to the amount of field work and samples collected.

- Compliance monitoring plan development (Year 1 costs only)
  - SAP
  - Health and Safety Plan
  - Quality Assurance Project Plan
- Data validation and management
  - U.S. Environmental Protection Agency Level 2A data validation
  - Database support
  - Development of California Environmental Data Exchange Network (CEDEN)-formatted files for submittal to State Water Resources Control Board
- Annual reporting
  - Data report including field observations, summary of analytical chemistry, and toxicity results with comparisons to applicable criteria
- Status update meetings

  - Four meetings per year with City staff

- Project management
  - Approximately 5% of overall project costs

Required Monitoring and Special Studies Cost Estimate

The estimated costs associated with the program outlined in the preceding sections is provided in Table 2.

Table 2
Cost Estimate for 5-Year Compliance Monitoring and Special Study Program in Support of the Newport Bay TMDL

	Year 1	Year 2	Year 3	Year 4	Year 5
SAP/HASP/QAPP	$35,000	--	--	--	--
CM – WQ	$121,000	$126,500	$132,000	$137,500	$143,000
CM – Sed	$74,250	--	$80,500	--	$88,000
CM – F/M	$68,750	--	$71,500	--	$74,250
SS – SedLoad	--	$44,000	--	--	--
SS – VegLoad	--	$99,000	--	--	--
Data Validation and Management	$40,000	$40,000	$45,000	$30,000	$47,500
Status Update Meetings	$7,500	$8,000	$8,500	$9,000	$9,500
Annual Reporting	$30,000	$95,500	$32,500	$22,500	$35,000
Project Management	$19,000	$21,000	$18,500	$10,000	$20,000
Annual Total	**$395,500**	**$434,000**	**$388,500**	**$209,000**	**$417,250**

Notes:
CM = compliance monitoring
F/M = fish/mussel tissue quality
HASP = Health and Safety Plan
QAPP = Quality Assurance Project Plan
SAP = Sampling and Analysis Plan
Sed = Sediment quality
SedLoad = Loading from sediment
SS = Special study
VegLoad = Loading from vegetation
WQ = Water quality

The 5-year program cost estimate is $1,844,250.

In-Water Hull Cleaning Diver Certification Program and Continue Education Program(s)

The Basin Plan Amendment (BPA; RWQCB Santa Ana 2016b) outlines steps to apply oversight and enforcement to the implementation tasks and to augment existing boater education programs. The specific implementation tasks include:

- *Implementation Task 1.2.2.2: Require all underwater hull cleaners to use BMPs including soft cloths or hull cleaning containment methods, and develop a diver certification program A plan and schedule to identify, implement and enforce the use of BMPs by all underwater hull cleaners, by a certification, permit or licensing system, that includes education, training and certification of all underwater hull cleaners. Additional BMPs that include hull cleaning in slip liners or dry dock storage may also be included.*
- *Implementation Task 1.2.2.5: Continue Education Program(s) for Boaters, Boatyards and Marinas Identify and evaluate existing boater and/or boat related education program(s) in the Bay, and revise those programs as necessary to include the following tasks, at a minimum: (1) Cu water quality issues and TMDL requirements; (2) Transitioning from Cu to nontoxic AFPs including costs, availability and efficacy of nontoxic AFPs/coatings; conversion costs from Cu to nontoxic AFPs; application and maintenance costs; and hull cleaning costs; (3) Nontoxic AFP use requirements including recommended BMPs for hull cleaning and frequency of cleaning; (4) BMPs requirements for all underwater hull cleaners; (5) Use of lower leach rate Cu AFPs with leach rates at or below 9.5 μg/cm^2 /d. (6) Conditions and requirements instituted by the State Lands Commission, the City of Newport Beach and Orange County to reduce Cu AFP discharges to achieve TMDL requirements by responsible parties (e.g. new conditions in marina lease agreements and marina slip agreements; hull cleaning permits or licenses that include BMP requirements); (7) Potential boat storage options, and containment systems for boat cleaning and/or storage (e.g. slip liners).*

Specific details outlining each of the implementation tasks are outlined in Table 3. The overall program implementation through a 5-year period is presented in Table 4.

Table 3
Outline to Develop and Implement In-Water Hull Cleaning Diver Certification Program and Continue Education Program(s) in Support of the Newport Bay TMDL

Implementation Plan Task	Specific Task	Implementation Responsibility	Description	Approximate Costs
1.2.2.2	Require all underwater hull cleaners to use best management practices (BMPs) including soft cloths or hull cleaning containment methods, and develop a diver certification program	Underwater hull cleaner to implement new cleaning tools; additional cleaning time.	Similar to the Port of San Diego, the City can develop a permit system that is issued on an annual basis for all hull cleaning vendors to service vessels in Newport Harbor. The application process includes the following: • Development of BMP Plan – The plan would describe methods to clean, tools to use, and cleaning schedules, and all employees, agents, and independent contractors must follow. • In-water Hull Cleaning Training – Businesses can either self-train their employees using the BMP Plan they develop or take a course on hull cleaning. However, formal certification is not required. The required proof of training includes dates of training, names of persons trained, and the written materials used for the training. Any new employees, agents, and representatives, including independent contractors, must be trained before performing in-water hull cleaning activities for the business. • Issuance of diver identification cards • $250/year permit processing fee	Increased costs to in-water hull cleaners include developing the permit application materials and the processing and fee ($250/year). Additional BMPs could affect the cleaning time and therefore generate less profit. Depending on the size of the vessel and whether it is a sailboat or power boat, costs range from $50 for a smaller boat (30 feet) up to several hundred for larger sailboats. With implementation of this program, in-water hull cleaning costs will likely increase and be passed to the customer.
	A plan and schedule to identify, implement, and enforce the use of BMPs by all underwater hull cleaners, by a certification, permit, or licensing system, that includes education, training, and certification of all underwater hull cleaners. Additional BMPs that include hull cleaning in slip liners or dry dock storage may also be included.	City to develop and implement diver certification program.	The City would be responsible for developing and implementing a certification/permit program. The program would likely be managed by Harbor Resources and include the following: • Schedule to implement the certification/permitting • Develop and adopt regulation to require certification/permits for in-water hull cleaning. • Establish BMPs – use existing resources (such as Port of San Diego) and new BMPs based on research evaluated through other basin amendment tasks. • Develop permit application materials, including application form, BMP template, website, and tracking materials. • Website with instructions and access to electronic application materials. • Staff to implement and enforce the certification/permit program. Enforcement of the program could include inspections at local paint inspection suppliers and boatyards to inspect materials, products, and feedback.	The Port of San Diego currently has 52 certified/permitted in-water hull companies. This equates to approximately $13,000/year in permit fees; however, it is likely that the majority of those costs goes to a very small portion of actually processing the permits. Develop Implementation Plan Program – approximately $120,000. Implement and enforce Implementation Program – approximately $100,000/year. This assumes one staff at $120/hour for 16 hours/week.

Implementation Plan Task	Specific Task	Implementation Responsibility	Description	Approximate Costs
1.2.2.5	Continue Education Program(s) for Boaters, Boatyards, and Marinas. Identify and evaluate existing boater and/or boat-related education program(s) in the Bay, and revise those programs as necessary to include the following tasks, at a minimum: (1) Cu water quality issues and TMDL requirements (2) Transitioning from Cu to nontoxic AFPs including costs, availability, and efficacy of nontoxic AFPs/coatings; conversion costs from Cu to nontoxic AFPs; application and maintenance costs; and hull cleaning costs (3) Nontoxic AFP use requirements including recommended BMPs for hull cleaning and frequency of cleaning (4) BMPs requirements for all underwater hull cleaners (5) Use of lower leach rate Cu AFPs with leach rates at or below 9.5 µg/cm^2/d (6) Conditions and requirements instituted by the State Lands Commission, the City, and Orange County to reduce Cu AFP discharges to achieve TMDL requirements by responsible parties (e.g., new conditions in marina lease agreements and marina slip agreements, and hull cleaning permits or licenses that include BMP requirements) (7) Potential boat storage options, and containment systems for boat cleaning and/or storage (e.g., slip liners)	City to develop and maintain Continue Education Program.	Specific Education Program updates listed in tasks 1 through 7 are part of other implementation tasks outlined in the basin plan amendment; therefore, this implementation task does not require new information to address tasks 1 through 7. Review of existing education programs developed for boatyards, boaters, and marinas. Goal is to evaluate the status of each and to prepare an implementation plan to determine what requires updates or establishment of a new education program. The implementation program will likely include the following: • Public outreach meetings – several meetings with commercial, residential, and general public. • City informational website updates – components of the website would match tasks 1 through 7. • Postings at marinas, boat/shipyards, and marine retail stores (WestMarine). • Grants – Copper Hull Paint Conversion Project. In San Diego, the Port developed a similar program in concert with the RWQCB. To offset the costs for commercial and recreational boaters, individual grants can help offset costs associated with stripping the existing copper hull paint from participating boats and/or applying non-biocide hull paint. A Project Assessment and Evaluation Plan was developed at the initiation of the project to summarize how the project's performance was to be assessed, evaluated, and reported to fulfill grant agreement requirements.	• Evaluate existing education programs and develop Implementation Program Plan – approximately $45,000. • Public outreach meetings – assume 4 meetings with each meeting costing approximately $7,500 for a total of $30,000. • City informational website updates – initial website development is approximately $10,000 and then quarterly updates at approximately $5,000. $25,000/year for the first year and then $20,000/year. • Postings at marinas – develop postings, printing, and installation. Approximately $15,000. • Grants – Approximately $75,000 to develop the Project Assessment and Evaluation Plan, including coordination with the RWQCB. Cost to implement the grant program would be determined at a later date.

Table 4
Overall Program Costs to Develop and Implement In-Water Hull Cleaning Diver Certification Program and Continue Education Program(s) in Support of the Newport Bay TMDL

	Year 1	Year 2	Year 3	Year 4	Year 5
Implementation Task 1.2.2.2: Diver Certification Plan and Implementation					
Develop Diver Certification Program	$120,000	--	--	--	--
Implement and Enforce Diver Certification Program	$100,000	$100,000	$100,000	$100,000	$100,000
Implementation Task 1.2.2.5: Continue Education Program(s) for Boaters, Boatyards, and Marinas					
Evaluate Existing Education Programs and Develop Implementation Program Plan	$45,000	--	--	--	--
Public Outreach Meetings (assume 4 meetings per year)	$30,000	$30,000	$30,000	$30,000	$30,000
City Informational Website	$25,000	$20,000	$20,000	$20,000	$20,000
Postings at Marinas and Boatyards	$15,000	--	--	--	--
Grants – Develop the Project Assessment and Evaluation Plan	$75,000	--	--	--	--
Annual Total	**$410,000**	**$150,000**	**$150,000**	**$150,000**	**$150,000**

SUMMARY

The total costs to comply with the implementation tasks identified within the BPA and Staff Report are totaled in Table 5.

Table 5
Overall Program Costs to Implement Required Elements in Support of the Newport Bay TMDL

Required Implementation Tasks	Year 1	Year 2	Year 3	Year 4	Year 5
Implementation Tasks 1.2.1 and 2.1 Costs to Develop Implementation Plans	$175,000	--	--	--	--
Implementation Task 1.2.2.6 Work with DPR and USEPA	$50,000	$50,000	$50,000	$50,000	$50,000
Implementation Tasks 1.2.2.4, 2.1, 3.2, 4.1, 5.1, 6.1, and 6.2. for Compliance Monitoring and Special Studies	$395,500	$434,000	$388,500	$209,000	$417,250
Implementation Task 1.2.2.2: Diver Certification Plan and Implementation	$220,000	$100,000	$100,000	$100,000	$100,000
Implementation Task 1.2.2.5: Continue Education Program(s) for Boaters, Boatyards, and Marinas	$190,000	$50,000	$50,000	$50,000	$50,000
Annual Cost	**$1,030,500**	**$634,000**	**$588,500**	**$409,000**	**$617,250**

REFERENCES

RWQCB (Regional Water Quality Control Board) Santa Ana, 2016a. *Staff Report – Basin Plan Amendments for Copper TMDLs and Non-TMDL Metals Action Plans for Zinc, Mercury, Arsenic and Chromium in Newport Bay, California*. August 30, 2016.

RWQCB Santa Ana, 2016b. *Draft Attachment A to Resolution No. R8-2016-0059. Amendments to the Water Quality Control Plan –Santa Ana Region to incorporate the Newport Bay Copper (Cu) TMDLs, and Non-TMDL Action Plans for Zinc (Zn), Mercury (Hg), Arsenic (As) and Chromium (Cr)*. September 2016.

ANCHOR QEA

27201 Puerta Real, Suite 350
Mission Viejo, California 92691
Phone 949.347.2780
www.anchorqea.com

MEMORANDUM

To:	Leonie Mulvihill and Chris Miller, City of Newport Beach	**Date:**	October 13, 2016
From:	Andrew Martin, Steve Cappellino, and Shelly Anghera, Ph.D., Anchor QEA, LLC	**Project:**	150243-16.01
Re:	Current and Relevant Sediment, Water, and Tissue Data to Support the Newport Bay Copper (Cu) TMDLs and Non-TMDL Action Plans for Zinc (Zn), Mercury (Hg), Arsenic (As), and Chromium (Cr)		

The Staff Report for Basin Plan Amendments for Copper Total Maximum Daily Loads (TMDLs) and Non-TMDL Metals Action Plans for Zinc, Mercury, Arsenic, and Chromium in Newport Bay, California (Staff Report; RWQCB Santa Ana 2016) identifies several data sources to support metal listing of water, sediment, and tissue in the Upper and Lower Newport Bay. Most of the data presented were older than 10 years and were collected prior to significant dredging activities that took place in the Upper and Lower Newport Bay.

The State Water Resources Control Board recommends data must be less than 5 years for sediment quality assessments. For dredging evaluations, the U.S. Environmental Protection Agency and Regional Water Quality Control Board (RWQCB) require data to be less than 3 years old for issuance of permits. Only one study (Orange County Coastkeeper and Candelaria 2014) with data less than 5 years old was included in the Staff Report (RWQCB Santa Ana 2016).

There are several relevant and current studies that are representative of current conditions that were not included in Staff Report. Those studies are as follows:

- OC Monitoring Program – Stormwater and Estuary programs from 2006 to present
- Rhine Channel Post-Remediation Study (Anchor QEA 2011)
- Federal Dredging Post-Sediment Condition (Anchor QEA 2013)
- Southern California Bight 2013 Regional Monitoring Program (SCCWRP 2015, 2016)

This memorandum was developed to summarize the best available data that should be used to assess current condition in the Upper and Lower Newport Bay.

ORANGE COUNTY COASTKEEPER AND CANDELARIA

A description of the Orange County Coastkeeper and Candelaria (2014) study is provided in the Staff Report (RWQCB Santa Ana 2016). Surface sediment and bottom water samples were collected from 15 areas in Newport Bay in October 2012, March 2013, and August 2013.

Sediment Results

A total of 44 samples were collected for sediment in the 15 areas. All sediment samples were analyzed for metals. Copper exceeded the Effects Range Median (ERM) value of 270 parts per million (ppm) in seven samples collected at three sampling areas (Harbor Marina, Lido Village, and Lido Yacht Anchorage). Mercury exceeded the ERM value of 0.7 parts per billion (ppb) in seven samples collected in four sampling areas (Harbor Marina, Lido Village, Lido Yacht Anchorage, and Balboa Island Channel). Zinc exceeded the ERM value of 410 ppm in two samples collected at two sampling areas (Harbor Marina and Lido Village).

Toxicity testing was conducted at all sites where ERM exceedances for metals had been previously measured. During the last sampling event, sediment toxicity was evaluated using the 10-day amphipod (*Eohaustorius estuarius*) survival test at the six sites that had the highest metal concentrations. No toxicity was observed in the six toxicity tests conducted.

Water Results

A total of 30 water samples were collected near the sediment surface in the 15 areas in October 2012 and March 2013 (15 samples for each event). All water samples were analyzed for metals. The copper California Toxics Rule (CTR) value of 3.1 micrograms per liter (µg/L) was exceeded in four samples, all of which occurred in the October 2012 event. No copper CTR exceedances occurred in the March 2013 event.

Summary of Findings

A summary of the ERM exceedances is provided in Table 1. Sediment toxicity was conducted at all the stations that had ERM exceedances for the measured metals. No sediment toxicity was observed. Therefore, this study does not support the listing of copper, zinc, and mercury as recommended in the Staff Report. These findings can be used to support the delisting of sediment toxicity in the Lower Newport Bay.

OC MONITORING PROGRAM – STORMWATER AND ESTUARY PROGRAMS FROM 2011 TO PRESENT

The Orange County Stormwater Program, implemented by the County of Orange, the Orange County Flood Control District, and the cities of Orange County, is a comprehensive approach to satisfying requirements set forth in the National Pollutant Discharge Elimination System permits R8-2009-0030 and R9-2009-2002 that are administered by the Santa Ana RWQCB and San Diego RWQCB, respectively. The program has a variety of components, some of which include inspections and enforcement at commercial and industrial facilities, public education, and water quality monitoring at outfalls within Newport Bay. The program is currently in its fourth permit term.

The Water Quality Monitoring Program element of the Orange County Stormwater Program has several goals to address the following key concerns:

- Is the water safe to drink?
- Is it safe to swim in the waters?
- Is it safe to eat fish and shellfish from the waters?
- Are the aquatic ecosystems health?

These questions are answered through the assessment of environmental data collected as part of the following Water Quality Monitoring Program elements:

- **Long-term mass emissions** monitoring to determine annual contaminant loading in surface runoff
- **Estuary and wetlands** monitoring to assess the impact of municipal separate storm sewer system discharges on aquatic habitat in estuarine or brackish waters
- **Bacteria and pathogens** monitoring to assess impacts of stormwater and non-stormwater runoff on recreational beneficial uses
- **Urban stream bioassessment** monitoring to assess the quality of aquatic habitats
- **Dry weather reconnaissance** monitoring to detect the presence of illicit discharges/illicit connections

This data review focuses on the sediment chemistry and toxicity results generated as part of the estuary and wetlands element of the Water Quality Monitoring Program. The estuary and

wetlands element includes quarterly dry weather sediment quality monitoring at seven locations within Newport Bay (four locations in Lower Newport Bay and three in Upper Newport Bay). During each quarterly event, sediment samples are collected for analytical chemistry (conventionals, metals, polycyclic aromatic hydrocarbons [PAHs], polychlorinated biphenyls [PCBs], organochlorine pesticides, organophosphate pesticides, and pyrethroids) and sediment toxicity (using a 10-day amphipod [*Eohaustorius estuarius*] survival test). Once per year, an additional sediment toxicity test (using a 48-hour bivalve [*Mytilus galloprovincialis*] sediment-water interface test) and benthic community analyses is conducted.

Sediment Quality Results

Publically available data from the Orange County Public Works website supporting the OC Watersheds monitoring program were reviewed (OC Public Works 2016). Since 2011, the quarterly dry weather sediment quality monitoring program has collected 139 samples in seven locations in Upper and Lower Newport Bay (Figure 1). Copper, arsenic, chromium, and zinc did not exceed respective ERM values in any of these samples (Figure 2). Mercury was the only contaminant measured at concentrations greater than its ERM value (Figure 2), and this occurred at only one station in the Rhine Channel (LNBRIN).

Since 2011, the quarterly dry weather sediment quality monitoring program has conducted 96 sediment toxicity tests. Each station was tested 15 times with the exception of stations LNBRIN (n = 7) and UNBCHB (n = 14). Of those 96 sediment toxicity tests, 18 had a toxic response (i.e., survival less than 80%). Trends in the sediment toxicity results are illustrated in Figure 3 for Upper and Lower Newport Bay. The graphs show typically non-toxic conditions during the last 5 years.

Summary of Findings

A summary of the ERM exceedances is provided in Table 1. ERM exceedances have only occurred within the Rhine Channel since 2011. Sediment toxicity did not co-occur with any metal ERM exceedances except for two events in the Rhine Channel (station LNBRIN). Toxicity has not been observed in the last three sampling events in the Rhine Channel (LNBRIN). This study does not support the sediment listing for copper, zinc, and mercury in the Lower Newport Bay as recommended in the Staff Report. These findings can be used to

support the delisting of sediment toxicity in the Lower Newport Bay and the Upper Newport Bay as it relates to metals. Compliance with sediment toxicity should not be associated with any metal TMDL. This monitoring program supports the management of Rhine Channel as a separate waterbody, independent of a metals TMDL.

RHINE CHANNEL POST-REMEDIATION STUDY

The Rhine Channel, located in lower Newport Bay, was identified during the 2002 Toxics TMDL as a source of impaired sediments for several metals and organochlorine pesticides. At that time, it was listed as a separate waterbody for regulatory management. In the 2011 TMDL revisions, the Rhine Channel was removed from the list of impaired areas in Newport Bay for OC pesticides based on the assumption that sediment remediation was forthcoming and that all contaminated material would be soon removed.

In late 2011, the City of Newport Beach (City) began dredging within the Rhine Channel to remove impacted sediments. Because of constraints associated with the structural integrity of the bulkheads, and private property access issues, the City was forced to limit dredging to center parts of the channel and was not able to excavate areas within 20 to 50 feet of the bulkhead. The goal for the project was to remove as much of the impacted sediment as possible to take advantage of an available disposal site within the Port of Long Beach (Port). Approximately 80,000 cubic yards (cy) were removed over 3 months and delivered to the Port for sequestration. Figure 4 shows the dredge footprint as a color isopach of sediment removal thicknesses where darker oranges and reds represent the thickest dredge cut and blue shows areas that were not dredged. Post construction monitoring of the surface sediments showed that a clean surface was achieved over all dredged area and it was estimated that approximately 80% of the surface area of the Rhine Channel had been remediated. Areas not dredged along the bulkheads continued to be impacted after dredging was completed. The City and the RWQCB are currently working together to review the significance of the remaining impacted material and determine if additional focused dredging or capping is warranted to comply with the intent of the original TMDL.

During the development of the post-construction sampling plan, the RWQCB insisted that samples be collected in a stratified random fashion to ensure that samples were collected from both dredged and non-dredged areas in an effort to provide representative data for

existing conditions. Figure 5 shows the locations of the surface sediment samples collected to verify TMDL compliance. The number and location of these stations was not weighted to match the percentage of the area dredged and instead were randomly spread across the site. As expected, the stations that were positioned outside of the dredge footprint continued to show elevated concentrations for multiple constituents. Mercury was elevated post-construction even within the dredge areas due to re-suspension of residuals from un-dredged areas into the deeper channel running down the middle of the Rhine.

Sediment Quality Results

A total of 12 stations were tested for metals, pesticides, and PCBs in the surface and subsurface sediments. Surface samples were compared to the TMDL numeric values to determine compliance and yielded the following results, as presented in Table 2: 8 of the 12 surface samples exceeded the copper ERM, all 12 samples exceeded the mercury ERM, and 3 of the 12 samples exceeded the zinc ERM. No arsenic, cadmium, chromium, or nickel ERM exceedances were observed with any of the samples. No toxicity testing was conducted as part of this investigation.

Further evaluation of the data shows that the samples collected outside of the dredge footprint (stations 12, 13, 14, and 15) represent the highest concentrations measured for most analytes. For example, all three of the zinc ERM exceedances were for stations outside of the dredge area; the three highest copper concentrations observed were for these same three stations; and three of the four highest mercury concentrations were measured outside the dredge area. The results of this data show that the Rhine Channel continues to be one of the primary sources of legacy contaminant sources in Lower Newport Bay, with concentrations many times those observed in other areas. Significant volumes of contaminants were removed under this program, but some remain and will need to be further managed by the City in cooperation with the RWQCB. That effort should continue to occur as a separate effort from the rest of the Bay.

Summary of Findings

A summary of the ERM exceedances is provided in Table 1. This monitoring program supports the management of Rhine Channel as a separate waterbody, independent of a metals TMDL.

FEDERAL DREDGING POST SEDIMENT CONDITION

Beginning in May 2012 and continuing into January 2013, the City, the County of Orange, and the U.S. Army Corps of Engineers dredged a large area within Lower Newport Bay to take advantage of a disposal area at the Port and a source of funds from all three entities. The project included two phases that targeted the removal of approximately 1.3 million cy of sediment; 1 million was determined suitable for ocean disposal and the remaining 300,000 was suitable only for confined disposal. The unsuitable material was delivered to the Port and placed into the Middle Harbor fill site with the material from the Rhine Channel (removed just prior to the federal dredging project). Figure 6 shows the areas within Lower Newport Bay that were dredged under this program.

Following the nearly year-long dredging effort, the City was asked to conduct a post-construction sediment collection program to document existing conditions of the sediment surface for the purpose of updating the RWQCB's TMDL database for Newport Bay. It was assumed at that time that the new sediment data would replace the previous values observed for the various dredge units used in conjunction with toxicity tests to determine sediment suitability. Eleven stations were selected for testing as shown in Figure 6.

Sediment Quality Results

Metals were detected in all samples as shown in Table 3. At one station, mercury measured 1 milligram per kilogram (mg/kg), slightly above the ERM value of 0.71 mg/kg. All other metal values were less than ERM values. Copper and zinc values were considered estimates for all stations because the percent recovery values for the associated matrix spike/matrix spike duplicate were less than the project control limits, indicating a potentially low bias. Estimated values were considerably less than the respective ERM values.

The post-construction sampling also included toxicity testing using the sediment-water interface test with bivalves (*Mytilus galloprovincialis)*. All 11 stations were tested in four batches, each with a laboratory control. Mean percent normal alive embryos in the controls ranged from 79.3 to 94.1%, meeting the criterion of 70% normal alive. Results for test sediments were control-normalized (divided by control survival). Mean percent normal

alive embryos ranged from 81.2 to 113% in test sediments. Test sediment values were statistically compared to their respective controls, and no significant differences were found.

Summary of Findings

These data show that large portions of Lower Newport Bay were dredged during 2012 and 2013 for navigation and contaminant removal and the results were successful. More than 300,000 cy of contaminated sediment were removed, and the post-construction testing verified that the final surface concentrations were not only below the ERM but also exhibited no toxicity to a species very sensitive to metals (especially copper). A summary of the ERM exceedances is provided in Table 3. The one ERM exceedance that was detected, mercury, was only 0.3 ppb above the ERM and was almost an order of magnitude lower than the concentrations observed in the Rhine Channel. This study does not support the sediment listing for copper, zinc, and mercury in the Lower Newport Bay as recommended in the Staff Report. These findings can be used to support the delisting of sediment toxicity in the Lower Newport Bay and the Upper Newport Bay as it relates to metals. Compliance with sediment toxicity should not be associated with any metal TMDL. This monitoring program supports the management of Rhine Channel as a separate waterbody, independent of a metals TMDL.

BIGHT '13 SEDIMENT QUALITY OBJECTIVE ASSESSMENT (SCCWRP 2015)

The Southern California Bight (SCB) is the approximate 400 miles of coastline from Point Conception in Santa Barbara County to Cabo Colnett in Ensenada, Mexico. The Southern California Coastal Water Research Project (SCCWRP) coordinates multiple agencies and organizations to conduct an extensive monitoring program within the SCB every 5 years. The most recent monitoring program occurred in 2013 (i.e., Bight '13). The Bight program began in 1994, and data gathered during monitoring events has allowed for long-term tracking of benthic communities, fisheries, water quality, sediment chemistry and toxicity, and the general health of the SCB over time.

The Bight '13 program consisted of several key study elements, including the following:

- Nutrients
- Contaminant Impact Assessment (CIA; i.e., Coastal Ecology)
- Shoreline Microbiology

- Marine Protected Areas
- Trash and Debris

The CIA was designed to understand the existing condition of the benthic environment and biological resources in the SCB. This goal was achieved by developing a robust sampling program to determine the extent, magnitude, and trends of direct effects from sediment contaminants, and indirect risks of sediment contaminants to seabirds. For the purposes of this review, only sampling approach and results from the CIA were reviewed, as this element of the Bight '13 program is the most relevant to the Newport Bay TMDL.

In the Bight '13 program, nearly 400 sites throughout the SCB were sampled to accomplish the goal and objectives of the CIA. Specifically, in Newport Bay, nine sites were sampled: four in Lower Newport Bay and five in Upper Newport Bay. It should be noted that none of the Bight '13 stations were located in Rhine Channel. At each location, the top 5 centimeters of sediment were collected with a Van Veen grab sampler. Samples were submitted for sediment chemistry (conventionals, metals, PAHs, organochlorine pesticides, PCBs, and polybrominated dipheynyl ethers), benthic community analysis, and sediment toxicity (using a 10-day amphipod [*Eohaustorius estuarius*] survival test and a 48-hour bivalve [*Mytilus galloprovincialis*] sediment-water interface test). In addition, trawls were conducted to determine fish and macroinfauna community structure and assess gross fish pathology.

Sediment Quality Results

Nine samples were collected as part of the Bight '13 monitoring program within Newport Bay (SCCWRP 2016). None of the metals of concern (copper, arsenic, chromium, mercury, or zinc) exceeded ERM values from any of these stations. The toxicity line of evidence was categorized as moderate at two stations in Upper Newport Bay and as high at one station in Upper Newport Bay. All other Newport Bay stations were determined to be non-toxic. In 2014, SCCWRP resampled the station categorized as having high toxicity in 2013 in order to conduct a toxicity investigation evaluation. The follow-up testing showed no occurrence of toxicity.

Summary of Findings

Metals were not present in sediments at concentrations greater than the ERM as summarized in Table 1. The observed moderate toxicity in two out of nine samples was not paired with ERM exceedances of any metal; therefore, there is no direct linkage between metals in sediment to benthic impairments, nor dissolved copper (fluxed from sediment) in overlying water to aquatic organisms. This study does not support the sediment listing for copper, zinc, and mercury in the Lower Newport Bay as recommended in the Staff Report. These findings can be used to support the delisting of sediment toxicity in the Lower Newport Bay and the Upper Newport Bay as it relates to metals. Compliance with sediment toxicity should not be associated with any metal TMDL. This monitoring program supports the management of Rhine Channel as a separate waterbody, independent of a metals TMDL.

FISH TISSUE DATA ON CEDEN

CEDEN is a central location to find and share information from various monitoring programs and includes water quality, aquatic habitat, and wildlife health data. CEDEN aggregates this data and makes it accessible to environmental managers and the public. Tissue data from Newport Bay collected after 2006 are available on CEDEN (http://www.ceden.org/) and were collected as part of the Newport Bay Watershed Bio Trend Monitoring Program from 2007 through 2010, Surface Water Ambient Monitoring Program in 2009, and the State's Mussel Watch Program in 2010. These data may not be reflective of current conditions, but they are the most recent data available and can be used to demonstrate the range of metals that may be considered background conditions for Newport Bay and the Orange County coastal region.

Tissue Summary

Tables 4, 5, and 6 provide a summary of three monitoring programs. Figure 7 shows the concentration of mercury in fish outside of the harbor to fish inside Newport Bay. Figure 8 shows concentrations of arsenic and cadmium in fish outside of the harbor to fish inside Newport Beach.

Summary of Findings

Fish tissue from fish caught inside Newport Bay are similar to or less than fish tissue of fish caught just outside of the bay and along the Southern California coast. Therefore, fish caught in Newport Bay do not appear to be exposed to any additional metals that may be associated with Newport Harbor. The CEDEN database also includes mussel data; a more thorough data review should be included in any future tissue assessments for Newport Harbor.

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Table 1
Summary of Sediment Quality Results for Evaluations Less than 5 Years Old in Upper and Lower Newport Bay

Study	Sediment Samples	ERM Exceedances for Copper	ERM Exceedances for Mercury	ERM Exceedances for Zinc	ERM Exceedances for Arsenic	ERM Exceedances for Chromium	Toxicity Tests	Toxic Samples
Orange County Coastkeeper and Candelaria (2014)	44	7	7	2	0	0	6[1]	0[1]
Bight '13	9	0	0	0	0	0	91 + 1[1,3] 9[2]	4[1,4] 0[2]
Federal Dredging Post Sediment Condition (Anchor QEA 2013)	11	0	1	0	0	0	11[1] 11[2]	0[1] 0[2]
OC Monitoring (2011 to 2016) 139 sediment samples, 96 toxicity samples	139	0	7 (all in Rhine Channel)	0	0	0	96[1] 19[2]	18[1,4] 0[2]
Rhine Channel Post Remediation Study (Anchor QEA 2011)	12	8	12	3	0	0	--	--
Summary for Lower and Upper Newport Bay	215	15	27	5	0	0	122[1] 39[2]	22[1,4] 0[2]
Summary for Lower and Upper Newport Bay without Rhine Channel	196	7	8	2	0	0	120[1] 32[2]	20[1,4] 0[2]

Notes:
1 = 10-day amphipod acute test
2 = 48-hour sediment/water interface *Mytilus* development test
3 = Station B13-8274 was toxic in the 2013 assessment and retested in 2014 for potential toxicity investigation evaluation testing. Survivorship was normal in the 2014 reassessment.
4 = Toxic response does not co-occur with ERM exceedance in metals, except for two instances in the Rhine Channel where Hg exceeds the ERM.
-- = not evaluated

Table 2
Results of Physical and Chemical Analyses of Surface Sediment Grab Samples

Location Name	TMDL Numeric Targets	ERL	ERM	RC-02	RC-04	RC-06	RC-08	RC-10	RC-11	RC-12	RC-13	RC-14	RC-15	RC-16	RC-17
Sample ID				RC-02-SG	RC-04-SG	RC-06-SG	RC-08-SG	RC-10-SG	RC-11-SG	RC-12-SG	RC-13-SG	RC-14-SG	RC-15-SG	RC-16-SG	RC-17-SG
Sample Date				12/11/2012	12/11/2012	12/11/2012	12/11/2012	12/11/2012	12/11/2012	12/12/2012	12/12/2012	12/12/2012	12/12/2012	12/12/2012	12/12/2012
Depth				0 - 2 cm	0 - 2 cm	0 - 2 cm	0 - 2 cm	0 - 2 cm	0 - 2 cm	0 - 2 cm	0 - 2 cm	0 - 2 cm	0 - 2 cm	0 - 2 cm	0 - 2 cm
Conventional Parameters (percent)															
Total organic carbon	--	--	--	**1.6**	**2**	**1.6**	**1**	**0.92**	**1.2**	**2.3**	**2.4**	**2**	**2.4**	**1.6**	**1.4**
Total solids	--	--	--	**37**	**30.6**	**35.4**	**47.2**	**51**	**40.5**	**29.1**	**25.8**	**29.4**	**27.3**	**34.7**	**37.6**
Grain Size (percent)															
Gravel (>2 mm)	--	--	--	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U
Sand (2.00 mm - 1.00 mm)	--	--	--	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U
Sand, Coarse	--	--	--	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U
Sand, Medium	--	--	--	0 U	0 U	0 U	0 U	**0.33**	0 U	0 U	0 U	0 U	0 U	0 U	0 U
Sand, Fine	--	--	--	0 U	**0.7**	0 U	0 U	**10.6**	0 U	**0.05**	0 U	**0.42**	**0.88**	0 U	0 U
Sand, Very Fine	--	--	--	**2.64**	**7.36**	**1.54**	**0.3**	**8.96**	**0.81**	**4.55**	**2.49**	**5.41**	**2.8**	**1.11**	**0.42**
Silt	--	--	--	**59.3**	**53.44**	**53.31**	**58.05**	**51.39**	**58.73**	**52.18**	**54.65**	**50.17**	**55.5**	**57.81**	**57.44**
Fines (silt + clay)	--	--	--	**97.36**	**91.94**	**98.46**	**99.7**	**80.11**	**99.19**	**95.41**	**97.51**	**94.17**	**96.32**	**98.89**	**99.58**
Clay, <5 micron	--	--	--	**38.06**	**38.5**	**45.15**	**41.65**	**28.72**	**40.46**	**43.22**	**42.85**	**44**	**40.82**	**41.08**	**42.14**
Metals (mg/kg)															
Arsenic	--	8.2	70	**8.36**	**11.5**	**8.93**	**7.27**	**6.54**	**6.89**	**16.5**	**19.1**	**15.9**	**14.4**	**10.9**	**8.22**
Cadmium	--	1.2	9.6	**0.496**	**0.541**	**0.617**	**0.388**	**0.403**	**0.314**	**0.912**	**0.877**	**0.833**	**0.841**	**0.778**	**0.736**
Chromium	52	81	370	**16.7**	**33**	**17.4**	**14.3**	**15.7**	**18.7**	**35.3**	**41.6**	**35.8**	**42.2**	**29.8**	**28.3**
Copper	18.7	34	270	**400**	**428**	**399**	**220**	**166**	**178**	**673**	**862**	**605**	**624**	**318**	**249**
Lead	30.2	46.7	218	**80.4 J**	**84.5 J**	**71.3 J**	**44.2 J**	**34.8 J**	**28.5 J**	**118**	**127**	**96.4**	**101**	**63.1**	**41.3**
Mercury	0.13	0.15	0.71	**5.2**	**3.9**	**2.8**	**2.3**	**1.6**	**1.1**	**5.6**	**6.3**	**4.9**	**4.3**	**3**	**1.3**
Nickel	--	20.9	51.6	**7.82**	**17.3**	**8.63**	**8.5**	**7.82**	**10.9**	**20.1**	**23.2**	**20.6**	**23.1**	**19.6**	**16.5**
Selenium	--	--	--	0.0987 U	0.119 U	**0.321**	0.0774 U	0.0716 U	0.0902 U	**1.26**	**0.991**	**0.933**	**1.64**	**0.604**	**0.844**
Zinc	124	150	410	**257 J**	**285 J**	**280 J**	**165 J**	**160 J**	**155 J**	**430**	**486**	**370**	**425**	**283**	**280**

Notes:

USEPA Stage 2A data validation was completed by Anchor QEA.
Results are reported in dry weight basis.
Totals are calculated as the sum of all detected results (U=0). If all results are not detected, the highest detection limit value is reported as the sum.
Total chlordane is the sum of alpha-chlordane and gamma-chlordane only.
Total DDx is the sum of 4,4'-DDD, 4,4'-DDE, 4,4'-DDT 2,4'-DDD, 2,4'-DDE, and 2,4'-DDT if measured.
Total PCB congeners is the total of all PCB congeners listed in this table.
Detected concentration is greater than TMDL numeric targets
Detected concentration is greater than ERL screening level
Detected concentration is greater than ERM screening level

Bold = detected result
-- = not reported or not applicable
cm = centimeters
ERL = effects range low
ERM = effects range median
J = estimated value
mg/kg = milligrams per kilogram
mm = millimeter
U = compound analyzed but not detected at greater than the detection limit
TMDL = total maximum daily load
All non-detect results are reported at the method detection limit.

Table 3
Results of the Chemical Analyses of Surface Sediment Grab Samples for the Federal Channel Post-Dredge Condition

	Sediment Quality Guideline (ERM)	Phase I Station IDs									Phase II Station IDs	
		LW	LE	Y1	Y2	NC	WL	BR	CG	BE	LS	Y3
Conventional Parameters (percent)												
Total organic carbon	--	**1.8**	**1.7**	**1.4**	**1.4**	**1.7**	**1.7**	**1.3**	**0.74**	**1.7**	**1.8**	**1.9**
Total solids	--	**40.6**	**41.9**	**46.9**	**45.7**	**42.5**	**41.2**	**54.1**	**69.2**	**42.5**	**39.4**	**39.6**
Grain Size (percent)												
Gravel (>2 mm)	--	--	--	--	--	--	--	--	--	--	0 U	0 U
Sand (2.00 - 1.00 mm)	--	--	--	--	--	--	--	--	**1.42**	--	0 U	0 U
Sand, Coarse	--	--	--	--	--	--	--	--	**8.02**	--	0 U	0 U
Sand, Medium	--	--	**0.12**	--	--	**0.06**	--	**1.76**	**22.81**	--	0 U	0 U
Sand, Fine	--	**0.05**	**6.31**	**1.06**	**0.56**	**3.78**	--	**7.8**	**29.01**	**1.24**	0 U	0 U
Sand, Very Fine	--	**3.74**	**6.11**	**9.13**	**4.61**	**5.4**	**0.27**	**11.99**	**11.31**	**2.7**	0 U	0 U
Silt	--	**66.2**	**60.05**	**63.37**	**64.32**	**62.29**	**66.83**	**56.96**	**19.41**	**62.02**	0 U	**47.33**
Clay, <5 micron	--	**30.01**	**27.41**	**26.45**	**30.51**	**28.47**	**32.9**	**21.48**	**8.01**	**34.04**	**100**	**100**
Fines (silt + clay)	--	**96.21**	**87.46**	**89.82**	**94.83**	**90.76**	**99.73**	**78.45**	**27.42**	**96.06**	**100**	**52.67**
Metals (mg/kg)												
Arsenic	70	**8.06**	**8.07**	**7.45**	**6.78**	**7.23**	**8.14**	**4.08**	**3.34**	**7.97**	**7.51**	**7.99**
Cadmium	9.6	**1.15**	**1.35**	**1.38**	**1.58**	**1.45**	**1.44**	**1.02**	**0.51**	**1.2**	**1.21**	**1.44**
Chromium	370	**37.2**	**46.8**	**25.2**	**36.3**	**37.5**	**42.1**	**23.7**	**11.7**	**41.9**	**35.3**	**30.3**
Copper	270	**93.6 J**	**95 J**	**76.3 J**	**72.1 J**	**93.9 J**	**103 J**	**56 J**	**39.6 J**	**135 J**	**91.4**	**74.8**
Lead	218	**31.2**	**31.9**	**23.4**	**24.8**	**31.1**	**32.3**	**17.8**	**8.97**	**46.6**	**31.5**	**24.5**
Mercury	0.71	**0.15**	**0.15**	**0.11**	**0.096**	**0.13**	**0.22**	**0.1**	**0.12**	**1**	**0.282**	**0.117**
Nickel	51.6	**25.2**	**26.8**	**18.9**	**27.8**	**23.7**	**26.3**	**15.7**	**7.77**	**25.5**	**21.6**	**20.9**
Selenium	4	**0.75 J**	**0.665 J**	**0.262 J**	**0.722 J**	**0.664 J**	**0.692 J**	**0.36 J**	**0.188 J**	**0.648 J**	**0.612**	**0.433**
Tin	48	**3.19**	**3.34**	**1.95**	**3.16**	**2.96**	**3.02**	**1.91**	**1.1**	**3.51**	**2.04**	**2.09**
Zinc	410	**215 J**	**217 J**	**175 J**	**172 J**	**209 J**	**229 J**	**155 J**	**78.5 J**	**206 J**	**194**	**182**

Notes:
Results are reported in dry weight basis
Totals are calculated as the sum of all detected results (U=0). If all results are not detected, the highest method detection limit value is reported as the sum.
Total PAH is the sum of the 25 PAH compounds analyzed for this sampling event.
Total PCB Congeners is the sum of all reported PCB congeners.
Total Chlordane includes alpha-chlordane (cis-chlordane), beta-chlordane (trans-chlordane), cis-nonaclor, trans-nonaclor, and oxychlordane.
Total DDX is the sum of 4,4'-DDD, 4,4'-DDE, 4,4'-DDT 2,4'-DDD, 2,4'-DDE, and 2,4'-DDT.
Detected concentration is greater than Work Plan Sediment Guidelines
Non-detected concentration is above one or more identified screening levels

Bold = Detected result
J = Estimated value
U = Compound analyzed but not detected above detection limit. Undetected results are reported at the method detection limit.
-- No criteria exists
ERM = effects range median
mg/kg = milligrams per kilogram
mm = millimeter
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl

Table 4
Mercury Concentrations in Fish Sourced from Along the Orange County Coast (SWAMP 2009) Relative to Screening Levels Used in the Staff Report. All fish

Composite Station Code	Composite Common Name	Tissue Prep	Tissue Name	Analyte	Unit	Result
80113SASB	Barred Sand Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.257
80113SASB	Barred Sand Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.25
80114ORCO	Barred Sand Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.247
80111CCSA	Barred Sand Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.229
80114ORCO	Barred Sand Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.226
80114ORCO	Barred Sand Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.217
80113SASB	Barred Sand Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.207
80114ORCO	Barred Sand Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.207
80111CCSA	Barred Sand Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.205
80114ORCO	Barred Sand Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.185
80111CCSA	Barred Sand Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.145
80113SASB	Barred Sand Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.131
80114ORCO	Barred Sand Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.127
80114ORCO	Barred Sand Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.126
80113SASB	Barred Surfperch	Skin off	Fillet	Mercury, Total	µg/g ww	0.123
80113SASB	Barred Surfperch	Skin off	Fillet	Mercury, Total	µg/g ww	0.08
80113SASB	Barred Surfperch	Skin off	Fillet	Mercury, Total	µg/g ww	0.077
80113SASB	Barred Surfperch	Skin off	Fillet	Mercury, Total	µg/g ww	0.074
80113SASB	Barred Surfperch	Skin off	Fillet	Mercury, Total	µg/g ww	0.062
80113SASB	Barred Surfperch	Skin off	Fillet	Mercury, Total	µg/g ww	0.06
80113SASB	Barred Surfperch	Skin off	Fillet	Mercury, Total	µg/g ww	0.058
80113SASB	Barred Surfperch	Skin off	Fillet	Mercury, Total	µg/g ww	0.051
80113SASB	Barred Surfperch	Skin off	Fillet	Mercury, Total	µg/g ww	0.05
80111CCSA	Brown Smooth-hound Shark	Skin off	Fillet	Mercury, Total	µg/g ww	1.45
80111CCSA	Brown Smooth-hound Shark	Skin off	Fillet	Mercury, Total	µg/g ww	1.45
80113SASB	Brown Smooth-hound Shark	Skin off	Fillet	Mercury, Total	µg/g ww	0.715
80113SASB	Chub Mackerel	Skin off	Fillet	Mercury, Total	µg/g ww	0.052
80111CCSA	Chub Mackerel	Skin off	Fillet	Mercury, Total	µg/g ww	0.047
80111CCSA	Chub Mackerel	Skin off	Fillet	Mercury, Total	µg/g ww	0.047
80113SASB	Chub Mackerel	Skin off	Fillet	Mercury, Total	µg/g ww	0.042
80111CCSA	Chub Mackerel	Skin off	Fillet	Mercury, Total	µg/g ww	0.041
80111CCSA	Chub Mackerel	Skin off	Fillet	Mercury, Total	µg/g ww	0.041

Composite Station Code	Composite Common Name	Tissue Prep	Tissue Name	Analyte	Unit	Result
80111CCSA	Chub Mackerel	Skin off	Fillet	Mercury, Total	µg/g ww	0.038
80111CCSA	Chub Mackerel	Skin off	Fillet	Mercury, Total	µg/g ww	0.038
80114ORCO	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.345
80114ORCO	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.243
80113SASB	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.218
80113SASB	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.201
80111CCSA	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.199
80113SASB	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.192
80114ORCO	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.186
80111CCSA	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.185
80114ORCO	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.174
80111CCSA	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.157
80114ORCO	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.156
80114ORCO	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.156
80113SASB	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.155
80111CCSA	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.143
80114ORCO	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.139
80114ORCO	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.137
80111CCSA	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.133
80111CCSA	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.126
80111CCSA	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.126
80114ORCO	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.118
80114ORCO	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.113
80114ORCO	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.113
80114ORCO	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.111
80111CCSA	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.109
80113SASB	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.107
80111CCSA	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.106
80113SASB	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.105
80113SASB	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.103
80111CCSA	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.102
80114ORCO	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.102
80111CCSA	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.086
80114ORCO	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.079
80111CCSA	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.077

Composite Station Code	Composite Common Name	Tissue Prep	Tissue Name	Analyte	Unit	Result
80111CCSA	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.076
80113SASB	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.063
80113SASB	Kelp Bass	Skin off	Fillet	Mercury, Total	µg/g ww	0.038
80113SASB	Spotfin Croaker	Skin off	Fillet	Mercury, Total	µg/g ww	0.046
80111CCSA	White Croaker	Skin off	Fillet	Mercury, Total	µg/g ww	0.199
80111CCSA	White Croaker	Skin off	Fillet	Mercury, Total	µg/g ww	0.196
80111CCSA	White Croaker	Skin off	Fillet	Mercury, Total	µg/g ww	0.152
80114ORCO	White Croaker	Skin off	Fillet	Mercury, Total	µg/g ww	0.131

Notes:
µg/g = microgram per gram wet weight

Table 5
Arsenic and Cadmium Concentrations from Mussels Collected in the Ocean in the Vicinity of Newport Bay (California State Mussel Watch Program 2010)

Analyte	Station	Result	Unit
As	NBWJ/Newport Beach-West Jetty	1.733	µg/g wet weight
As	ABWJ/Anaheim Bay-West Jetty	1.603	µg/g wet weight
As	SDHI/San Diego-Harbor Island	0.962	µg/g wet weight
As	DNPT/Dana Point	2.145	µg/g wet weight
As	CCSB/Crystal Cove State Beach	1.904	µg/g wet weight
Cd	SDHI/San Diego-Harbor Island	0.303	µg/g wet weight
Cd	ABWJ/Anaheim Bay-West Jetty	0.178	µg/g wet weight
Cd	CCSB/Crystal Cove State Beach	0.275	µg/g wet weight
Cd	DNPT/Dana Point	0.368	µg/g wet weight
Cd	NBWJ/Newport Beach-West Jetty	0.407	µg/g wet weight

Notes:
µg/g = microgram per gram
As = arsenic
Cd = cadmium

Table 6
Metals Concentrations in Fish Collected as Part of the Newport Bay Watershed Bio Trend Monitoring Program from 2007 through 2010 and Downloaded from CEDEN

Station	Sampling Date	Common Name	Tissue Prep	Tissue Type	Analyte	Unit	Result	Qual	MDL
801SARPOL	7/10/2008	California Halibut	Skin on	Not recorded	Arsenic	µg/g ww	0.55	=	0.02
801SARJAM	6/20/2007	California Halibut	Skin on	Not recorded	Arsenic	µg/g ww	0.32	=	0.02
801SARJAM	8/12/2008	California Killifish	Skin on	Not recorded	Arsenic	µg/g ww	0.48	=	0.02
801SARPOL	6/19/2007	Shiner Surfperch	Skin on	Not recorded	Arsenic	µg/g ww	0.96	=	0.02
801SARPOL	6/19/2007	Spotted Sand Bass	Skin off	Not recorded	Arsenic	µg/g ww	0.58	=	0.02
801SARPOL	7/10/2008	Spotted Sand Bass	Skin off	Not recorded	Arsenic	µg/g ww	0.29	=	0.02
801SARJAM	5/25/2010	Top Smelt	Skin off	Not recorded	Arsenic	µg/g ww	0.41	=	0.02
801SARJAM	8/12/2008	Top Smelt	Skin on	Not recorded	Arsenic	µg/g ww	0.59	=	0.02
801SARPOL	7/10/2008	California Halibut	Skin on	Not recorded	Cadmium	µg/g ww		ND	0.002
801SARJAM	8/12/2008	California Killifish	Skin on	Not recorded	Cadmium	µg/g ww		ND	0.002
801SARPOL	6/19/2007	Shiner Surfperch	Skin on	Not recorded	Cadmium	µg/g ww	0.027	=	0.002
801SARPOL	6/19/2007	Spotted Sand Bass	Skin off	Not recorded	Cadmium	µg/g ww	0.005	=	0.002
801SARPOL	7/10/2008	Spotted Sand Bass	Skin off	Not recorded	Cadmium	µg/g ww		ND	0.002
801SARJAM	8/12/2008	Top Smelt	Skin on	Not recorded	Cadmium	µg/g ww	0.013	=	0.002
801SARJAM	5/25/2010	Top Smelt	Skin off	Not recorded	Cadmium	µg/g ww	0.007	=	0.002
801SARJAM	6/20/2007	California Halibut	Skin on	Not recorded	Chromium	µg/g ww	0.46	=	0.15
801SARPOL	6/19/2007	Shiner Surfperch	Skin on	Not recorded	Chromium	µg/g ww	0.75	=	0.15
801SARPOL	6/19/2007	Spotted Sand Bass	Skin off	Not recorded	Chromium	µg/g ww	0.7	=	0.15
801SARJAM	8/12/2008	Top Smelt	Skin on	Not recorded	Chromium	µg/g ww	0.55	=	0.15
80112NWPT	6/16/2009	Black Perch	Skin off	Fillet	Mercury	µg/g ww	0.047	=	0.012
80112NWPT	6/17/2009	Black Perch	Skin off	Fillet	Mercury	µg/ g ww	0.041	=	0.012
80112NWPT	6/16/2009	Shiner Surfperch	Skin off	Fillet	Mercury	µg/g ww	0.051	=	0.012

Station	Sampling Date	Common Name	Tissue Prep	Tissue Type	Analyte	Unit	Result	Qual	MDL
80112NWPT	6/16/2009	Shiner Surfperch	Skin off	Fillet	Mercury	µg/g ww	0.041	=	0.012
80112NWPT	7/25/2009	Spotted Sand Bass	Skin off	Fillet	Mercury	µg/g ww	0.245	=	0.012
80112NWPT	7/25/2009	Spotted Sand Bass	Skin off	Fillet	Mercury	µg/g ww	0.207	=	0.012
80112NWPT	7/25/2009	Spotted Sand Bass	Skin off	Fillet	Mercury	µg/g ww	0.202	=	0.012
80112NWPT	7/25/2009	Spotted Sand Bass	Skin off	Fillet	Mercury	µg/g ww	0.195	=	0.012
80112NWPT	6/16/2009	Spotted Sand Bass	Skin off	Fillet	Mercury	µg/g ww	0.167	=	0.012
80112NWPT	7/25/2009	Spotted Sand Bass	Skin off	Fillet	Mercury	µg/g ww	0.16	=	0.012
80112NWPT	7/25/2009	Spotted Sand Bass	Skin off	Fillet	Mercury	µg/g ww	0.122	=	0.012
80112NWPT	7/25/2009	Spotted Sand Bass	Skin off	Fillet	Mercury	µg/g ww	0.12	=	0.012
80112NWPT	7/25/2009	Spotted Sand Bass	Skin off	Fillet	Mercury	µg/g ww	0.09	=	0.012
80112NWPT	7/25/2009	Spotted Sand Bass	Skin off	Fillet	Mercury	µg/g ww	0.085	=	0.012
80112NWPT	10/21/2009	White Croaker	Skin off	Fillet	Mercury	µg/g ww	0.232	=	0.012
80112NWPT	10/21/2009	White Croaker	Skin off	Fillet	Mercury	µg/g ww	0.227	=	0.012
80112NWPT	10/21/2009	White Croaker	Skin off	Fillet	Mercury	µg/g ww	0.221	=	0.012
801SARPOL	7/10/2008	California Halibut	Skin on	Not recorded	Zinc	µg/g ww	369	=	0.8
801SARJAM	6/20/2007	California Halibut	Skin on	Not recorded	Zinc	µg/g ww	13.3	=	0.8
801SARJAM	8/12/2008	California Killifish	Skin on	Not recorded	Zinc	µg/g ww	24.8	=	0.8
801SARPOL	6/19/2007	Shiner Surfperch	Skin on	Not recorded	Zinc	µg/g ww	21	=	0.8
801SARPOL	6/19/2007	Spotted Sand Bass	Skin off	Not recorded	Zinc	µg/g ww	8.05	=	0.8
801SARPOL	7/10/2008	Spotted Sand Bass	Skin off	Not recorded	Zinc	µg/g ww	6.32	=	0.8
801SARJAM	8/12/2008	Top Smelt	Skin on	Not recorded	Zinc	µg/g ww	33.7	=	0.8
801SARJAM	5/25/2010	Top Smelt	Skin off	Not recorded	Zinc	µg/g ww	31	=	0.8

Notes:
µg/g = microgram per gram wet weight
MDL = method detection limit
ND = non detect

FIGURES

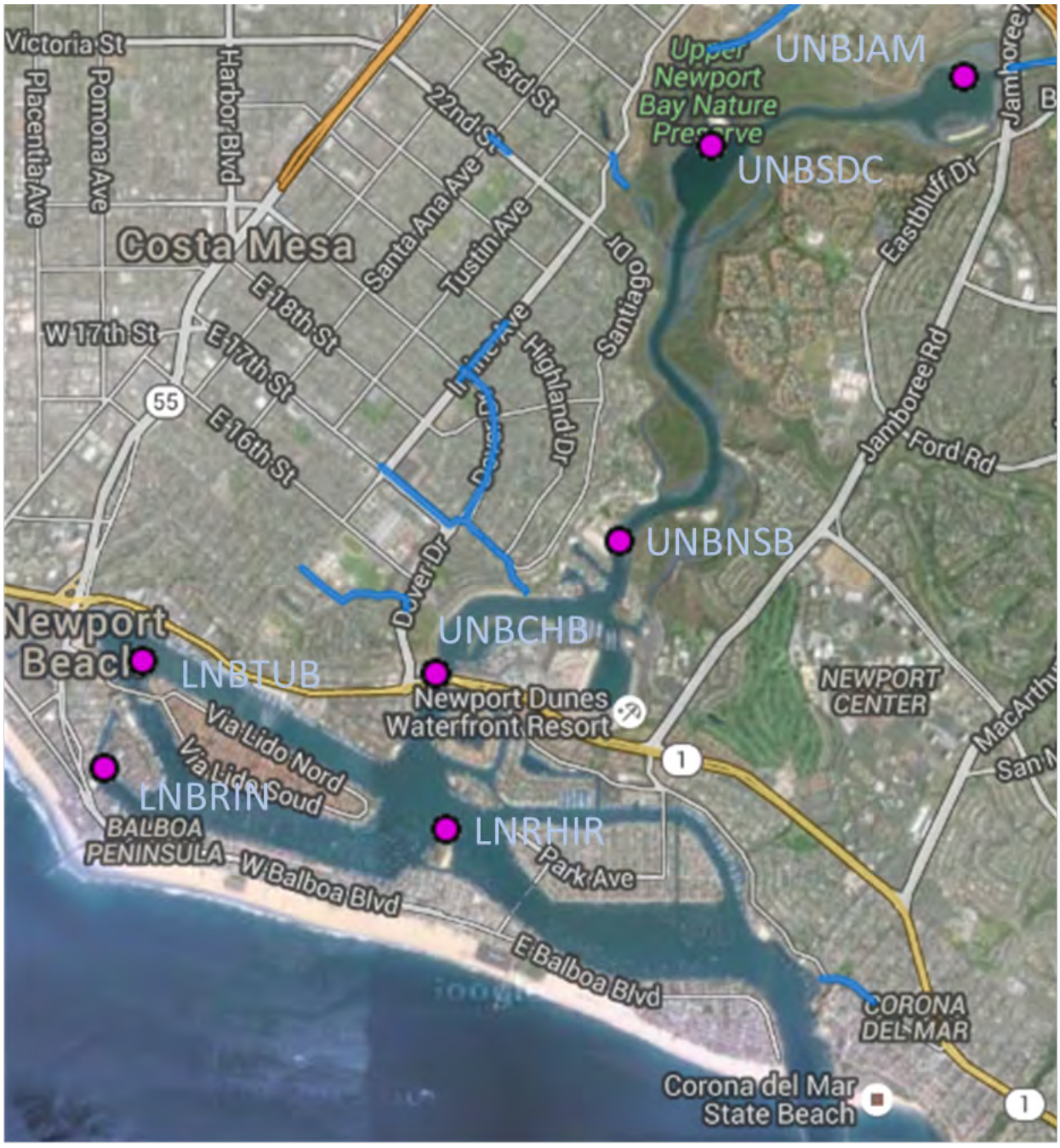

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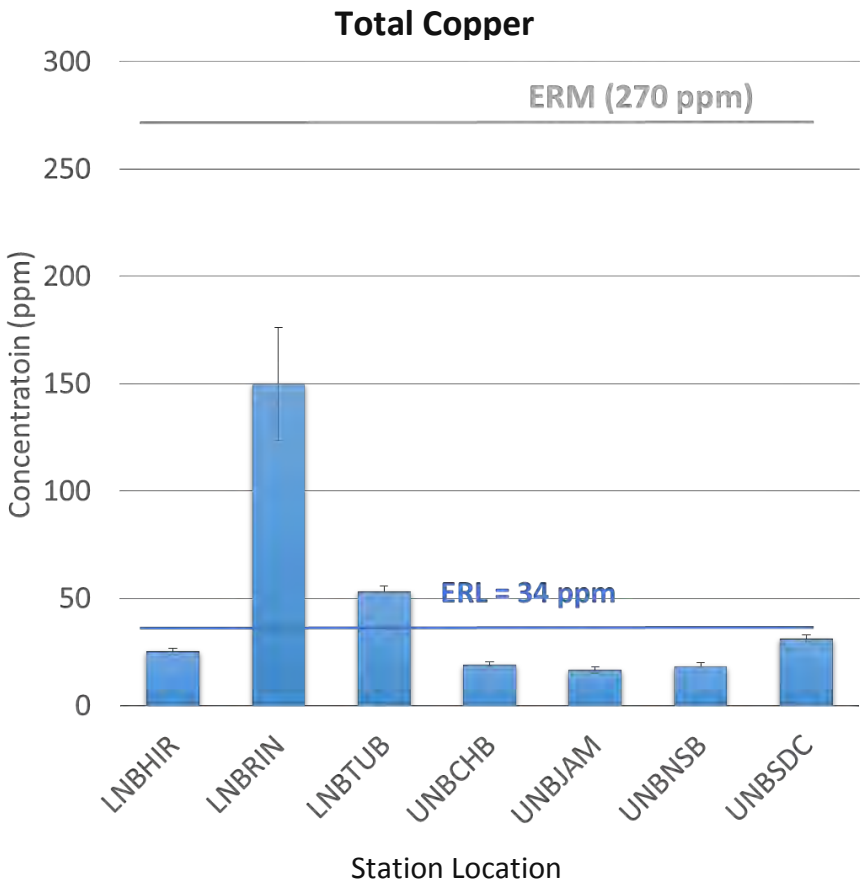
Figure 1
Vicinity Map and Station Locations for OC Monitoring Program
Newport Bay Copper TMDLs and Non-TMDL Action Plans
City of Newport Beach



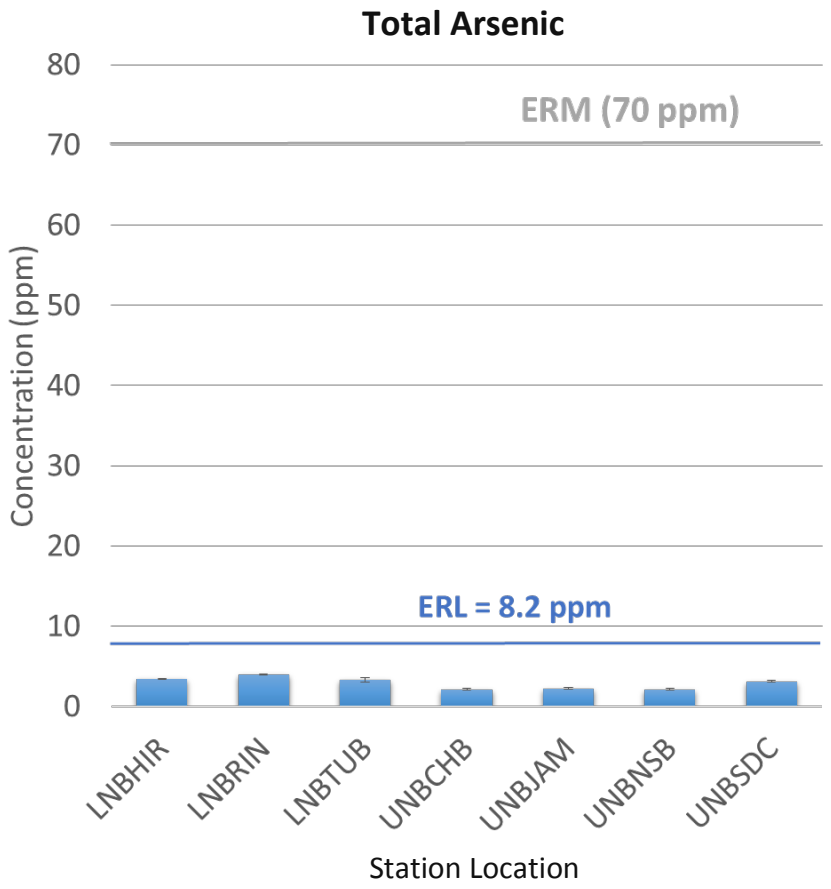


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Figure 2
Summary of Metals Concentrations in Newport Bay Sediment Relative to ERM Values
Newport Bay Copper TMDLs and Non-TMDL Action Plans
City of Newport Beach

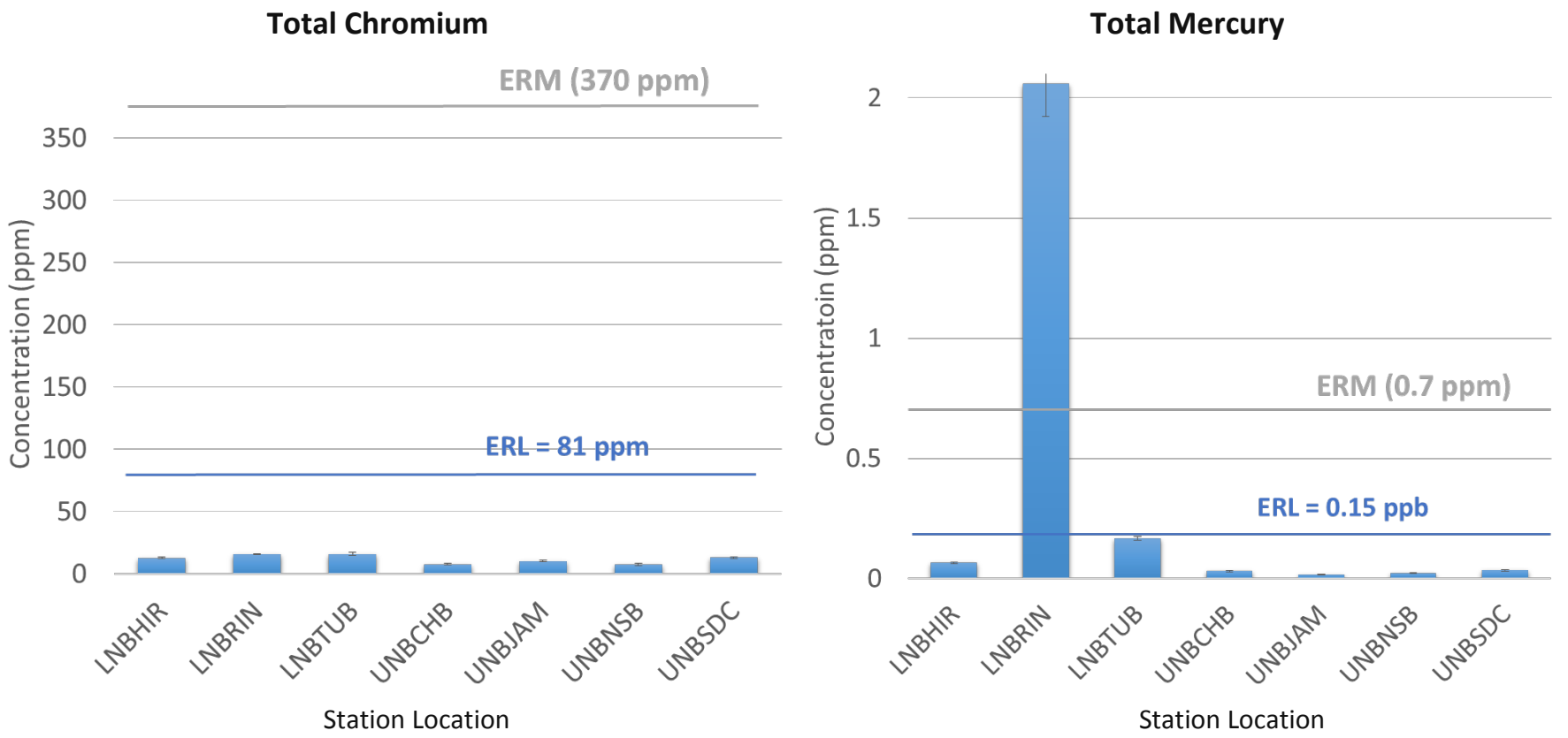

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Figure 2
Summary of Metals Concentrations in Newport Bay Sediment Relative to ERM Values
Newport Bay Copper TMDLs and Non-TMDL Action Plans
City of Newport Beach

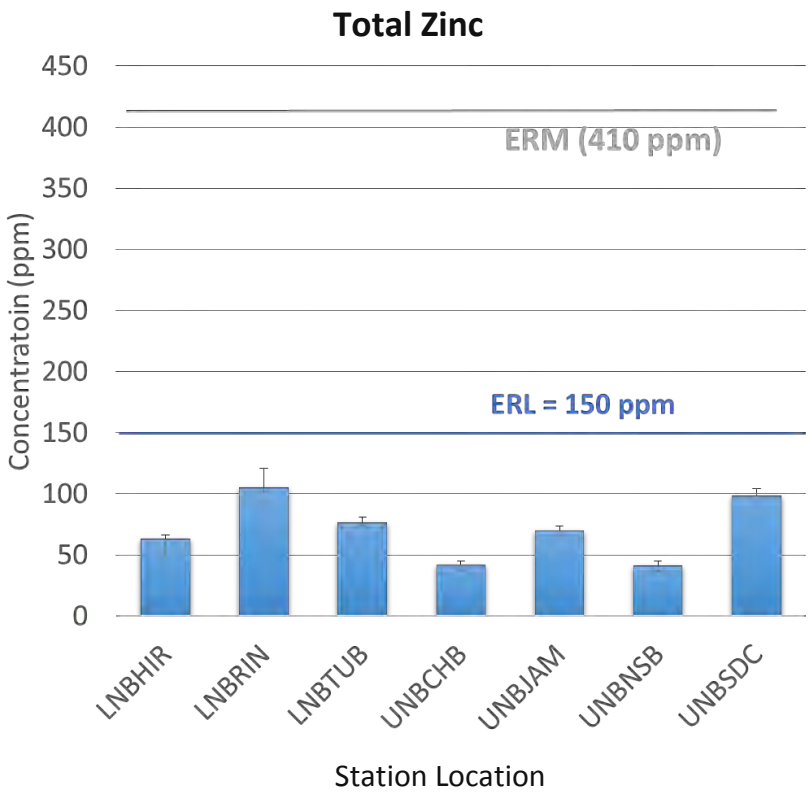

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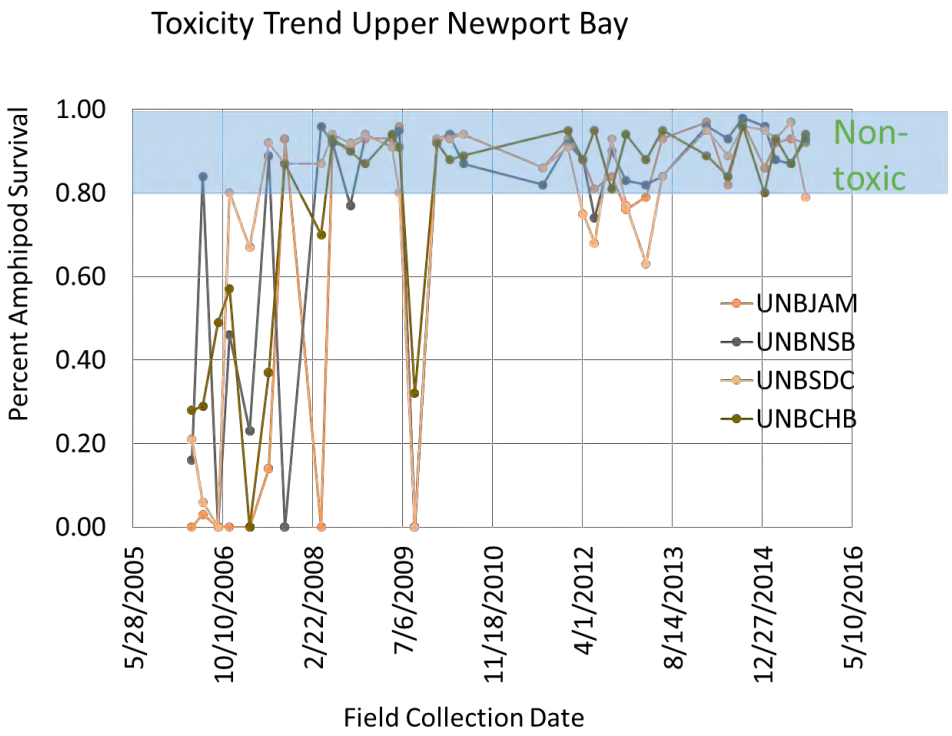
Figure 2
Summary of Metals Concentrations in Newport Bay Sediment Relative to ERM Values
Newport Bay Copper TMDLs and Non-TMDL Action Plans
City of Newport Beach



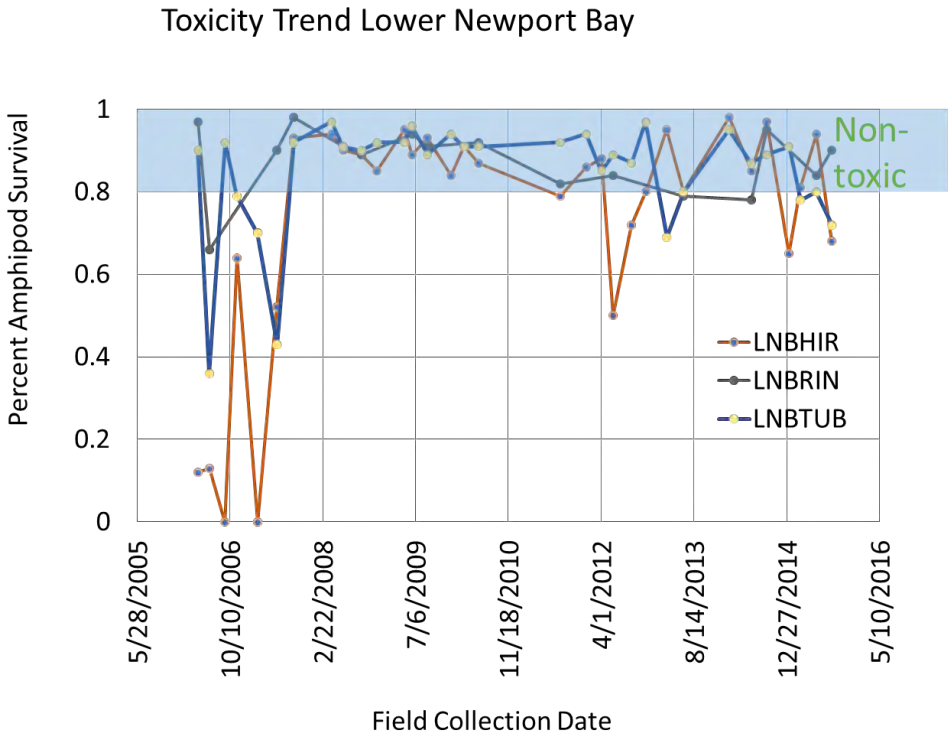


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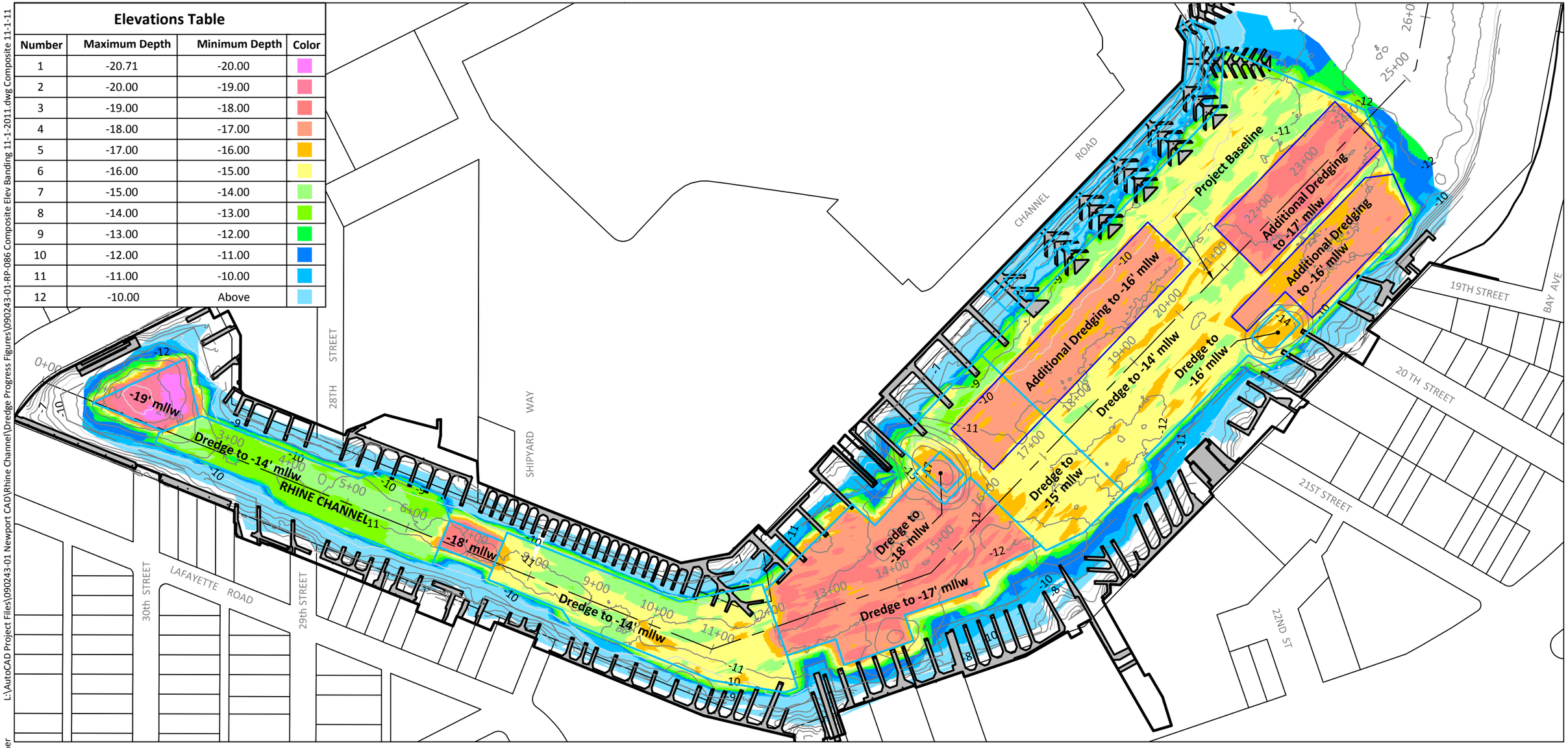
Figure 3
Sediment Toxicity Trends in Newport Bay
Newport Bay Copper TMDLs and Non-TMDL Action Plans
City of Newport Beach

Elevations Table			
Number	Maximum Depth	Minimum Depth	Color
1	-20.71	-20.00	
2	-20.00	-19.00	
3	-19.00	-18.00	
4	-18.00	-17.00	
5	-17.00	-16.00	
6	-16.00	-15.00	
7	-15.00	-14.00	
8	-14.00	-13.00	
9	-13.00	-12.00	
10	-12.00	-11.00	
11	-11.00	-10.00	
12	-10.00	Above	



L:\AutoCAD Project Files\090243-01 Newport CAD\Rhine Channel\Dredge Progress Figures\090243-01-RP-086 Composite Elev Banding 11-1-2011.dwg Composite 11-1-11

Nov 15, 2013 9:00am mpratschner

SOURCE: Drawing prepared from City of Newport Beach and ESRI basemaps, and all Dutra surveys performed as of November 1, 2011.
HORIZONTAL DATUM: California State Plane, Zone 6, NAD83, feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

NOTES:
Contours shown are from pre-dredge bathymetric survey conducted by Gahagan & Bryant Associates, Inc., on July 1, 2011.

LEGEND:

- Dredge Footprint
- Additional Dredging
- Limits of Work (Top of Slope)
- Existing Docks

0 150
Scale in Feet

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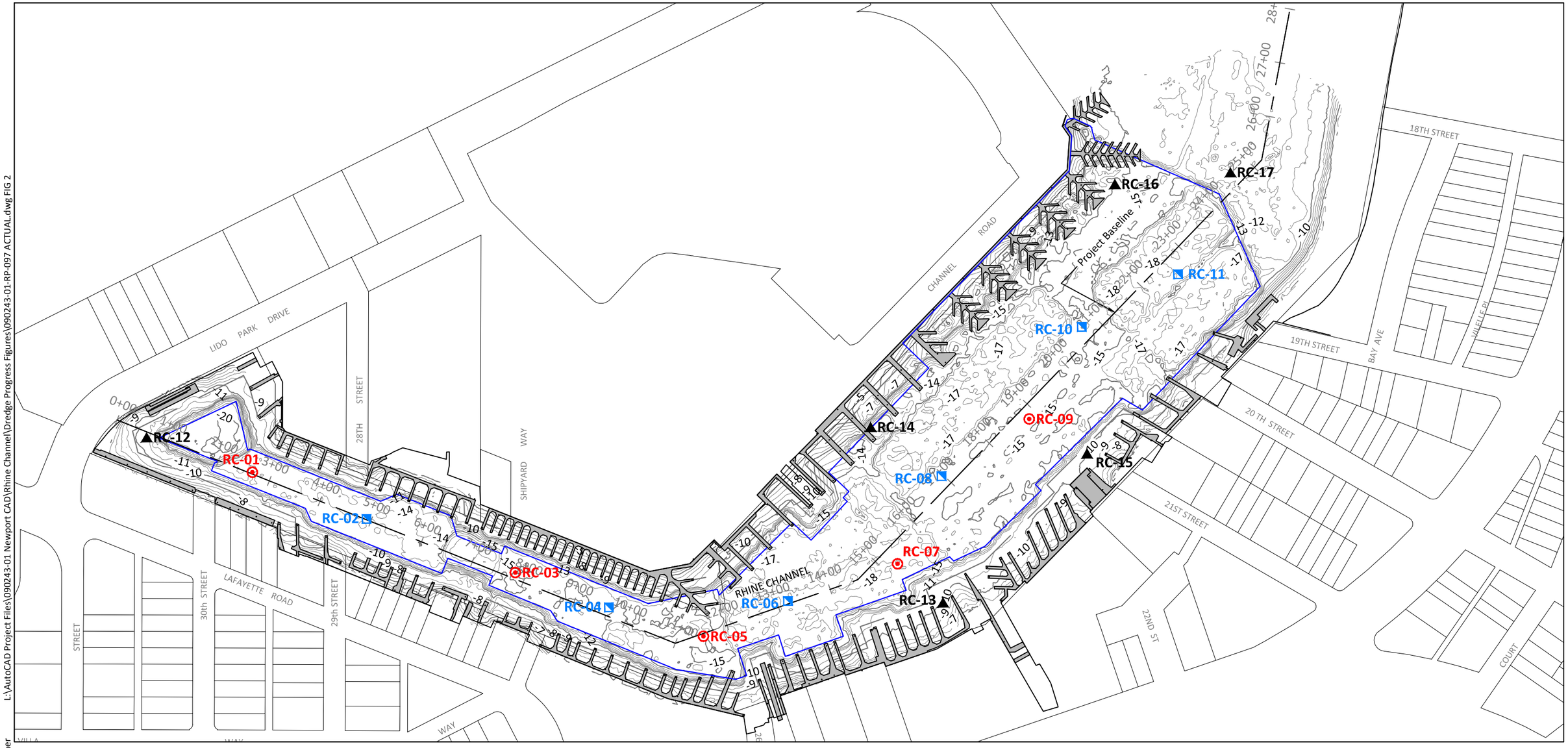
Figure 4
Dredge Depths and Final Elevations within Rhine Channel
Newport Bay Copper TMDL and Non-TMDL Action Plans
City of Newport Beach



SOURCE: Drawing prepared from City of Newport Beach and ESRI basemaps, and all Dutra Surveys performed as of November 1, 2011.
HORIZONTAL DATUM: California State Plane, Zone 6, NAD83, feet.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

NOTES:
Contours shown are from post-dredge bathymetric survey conducted by Gahagan & Bryant Associates, Inc., on November 2, 2011.

LEGEND:

- ⊙RC-# Actual Sampling Locations for Sediment Coring
- ▲RC-# Actual Sampling Locations for Surface Sediment
- ◥RC-# Actual Sampling Locations for Sediment Coring and Surface Sediment
- -10 Post-Dredge Bathymetry
- Dredge Boundary

0 180
Scale in Feet

L:\AutoCAD Project Files\090243-01 Newport CAD\Rhine Channel\Dredge Progress Figures\090243-01-RP-097 ACTUAL.dwg FIG 2
Nov 15, 2013 9:03am mpratschner

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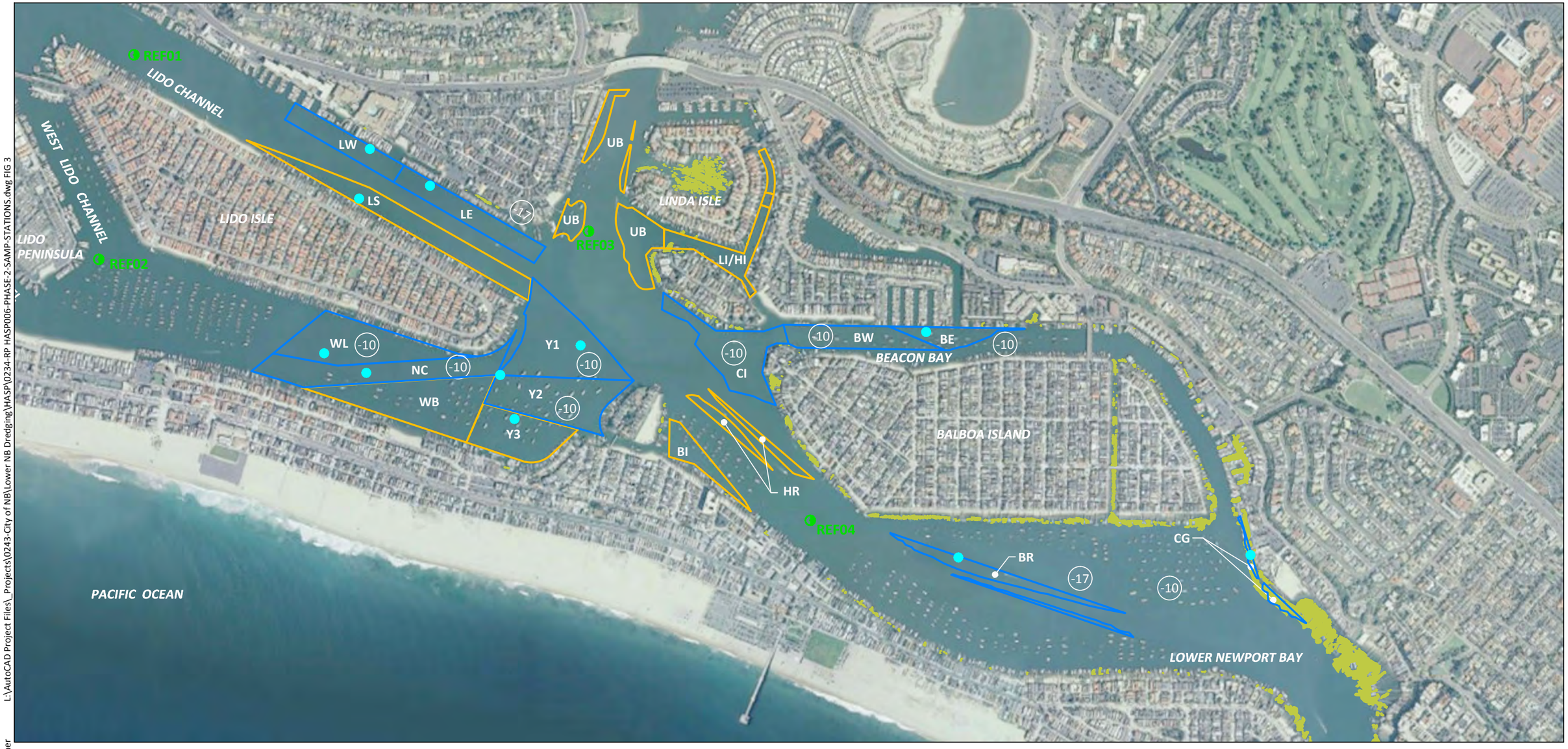
Figure 5
Post-Dredge Bathymetric Data and Actual Sampling Locations
Newport Bay Copper TMDLs and Non-TMDL Action Plans
City of Newport Beach



SOURCE: Drawing prepared from Bing maps. Dredge units from U.S. Army Corps of Engineers.
HORIZONTAL DATUM: California State Plane, Zone 6, NAD83.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

LEGEND:

- Phase I Dredge Unit
- Phase II Dredge Unit
- -10 Dredge Depth
- REF# Reference Site
- Sampling Locations

0 1000
Scale in Feet

L:\AutoCAD Project Files_Projects\0243-City of NB\Lower NB Dredging\HASP\0234-RP HASP006-PHASE-2-SAMP-STATIONS.dwg FIG 3
Jul 19, 2013 11:52am mpratschner

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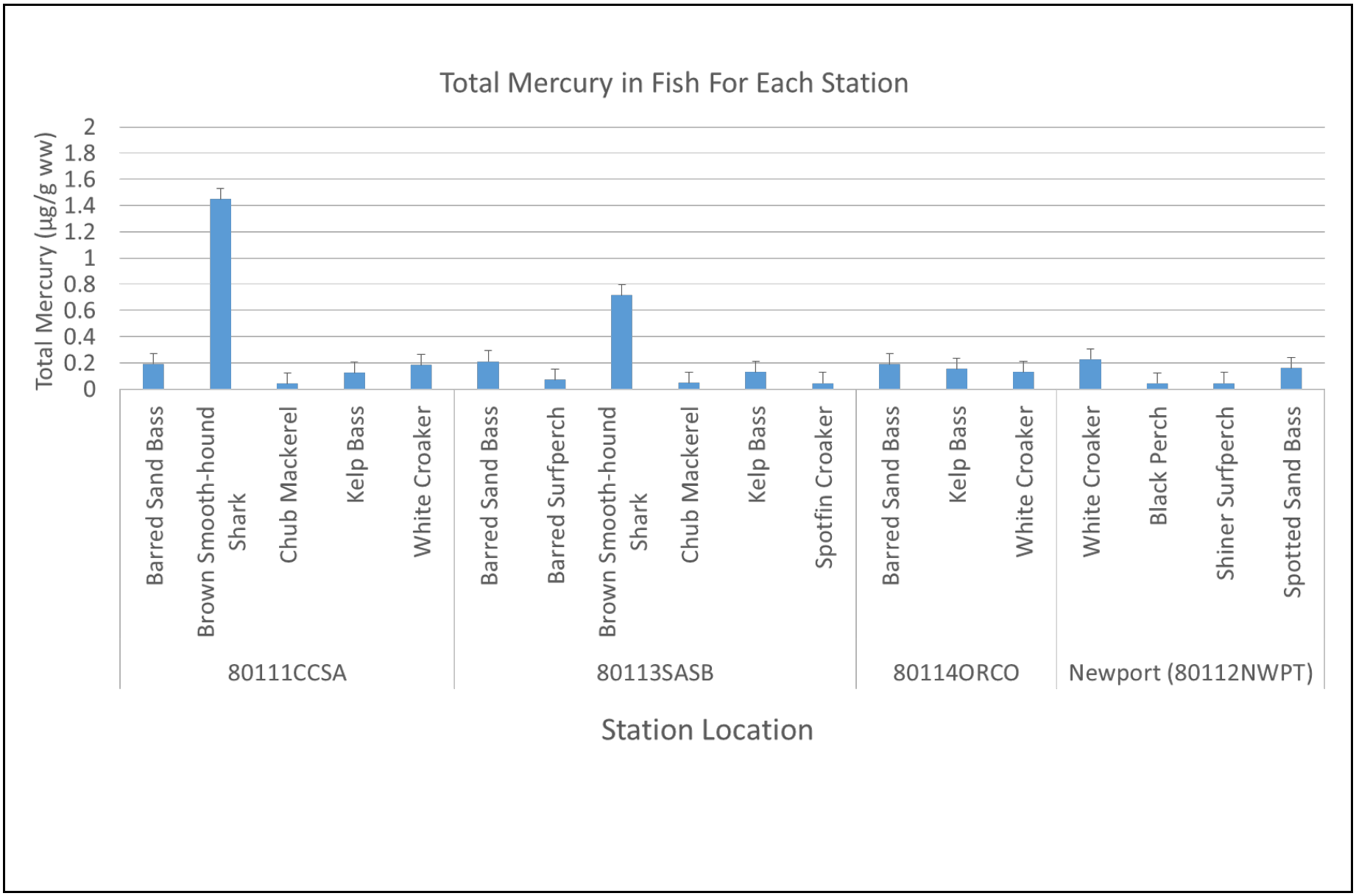
Figure 6
Post-Dredge Sediment Sampling Locations
Newport Bay Copper TMDLs and Non-TMDL Action Plans
City of Newport Beach



S:\PROJECTS\City_of_Newport_Beach\C-6111_On-call_2015-2017(150243-01)\Copper TMDL Support\Current Data Memo\Fig 7 Total Mercury.docx

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Figure 7
Total Mercury in Fish for Each Station
Newport Bay Copper TMDLs and Non-TMDL Action Plans
City of Newport Beach

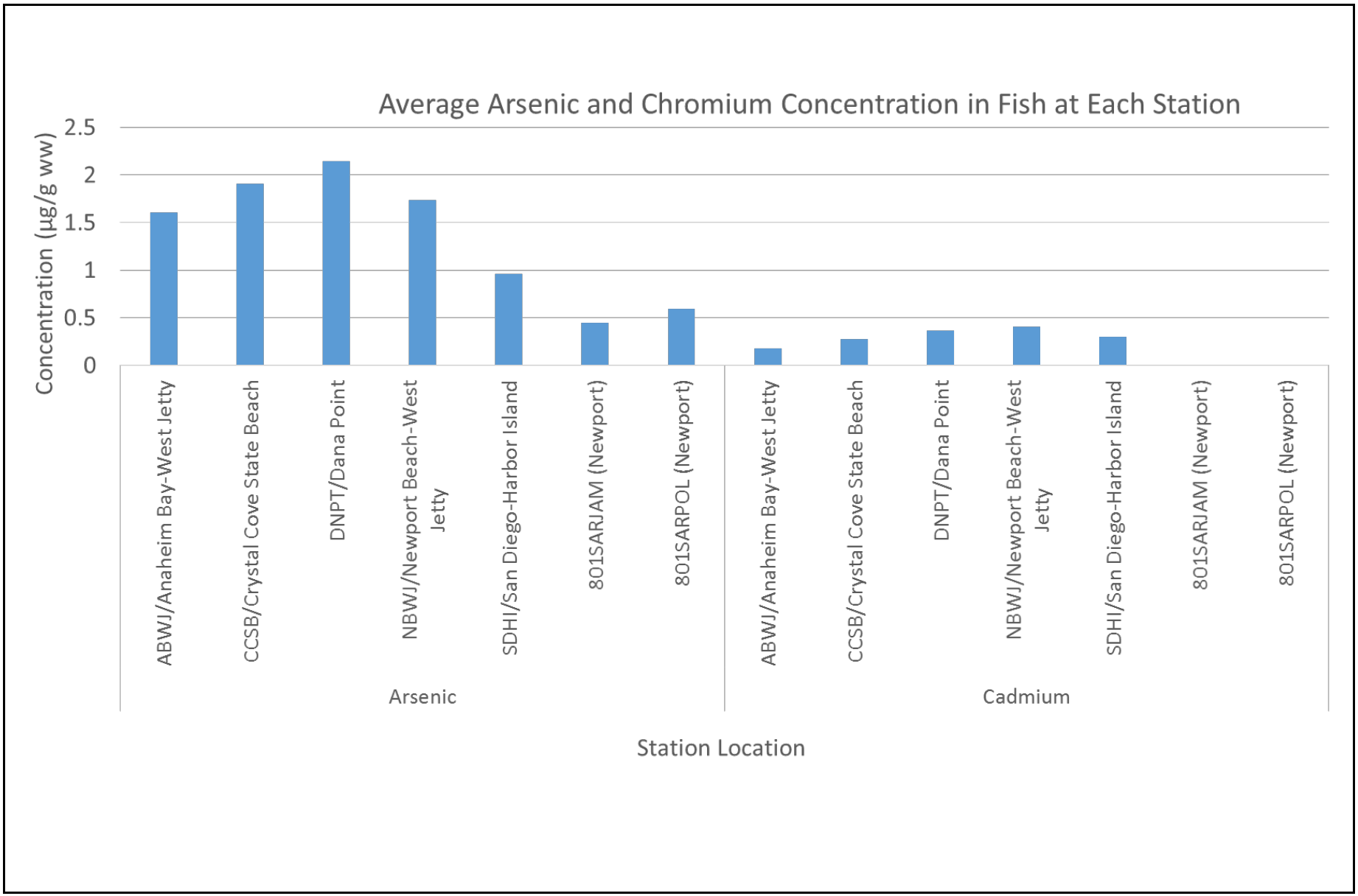

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Figure 8
Average Arsenic and Chromium Concentration in Fish at Each Station
Newport Bay Copper TMDLs and Non-TMDL Action Plans
City of Newport Beach

ANCHOR QEA

27201 Puerta Real, Suite 350
Mission Viejo, California 92691
Phone 949.347.2780
www.anchorqea.com

MEMORANDUM

To:	Bob Stein, Assistant City Engineer; Chris Miller, Harbor Resources Manager; and Dave Webb, Public Works Director, City of Newport Beach	**Date:**	July 10, 2015
From:	Shelly Anghera, Ph.D., and Chris Gardner, Anchor QEA	**Project:**	150243-01.04
Cc:	Chris Osuch, Anchor QEA		
Re:	Random Sample Points Methodology		

In 1996, Newport Bay (the Bay) was listed on the 303 (d) list for metals, pesticides, and organic pollutants. A total maximum daily load (TMDL) for metals is currently required for dissolved copper, lead, and zinc in the Upper and Lower Bay as well as the Rhine Channel. The TMDL is being updated to include an implementation plan requiring the conversion of 87% of the boats to non-copper-based paints to address water quality concerns for dissolved copper in Newport Bay.

Numeric targets for metals in the Bay are adopted from the California Toxics Rule (CTR). The CTR chronic target for dissolved copper for saltwater is 3.1 micrograms per liter (L). Previous investigations within the Bay have identified elevated copper concentrations in water from boat paint. However, these investigations sampled water adjacent to boats and were not designed to capture representative copper concentrations throughout the extent of the Bay. Anchor QEA designed a sampling plan whereby water samples were collected from 40 discrete locations that were randomly selected from within the sampling extent presented in Figure 1. Collecting water samples from randomly-generated locations will enable the establishment of a general condition of copper concentration throughout the Bay with a high degree of objectivity.

METHODS

Randomized Sampling Design Method

ArcGIS 10.2 geographic information systems (GIS) software was used to delineate the sample extent area and generate the random sample locations from which water samples were

collected for copper analysis. The generation of the random sample locations was accomplished using the *Create Random Points* tool within ArcGIS's ArcToolbox module (Esri 2015). This tool enables a user to generate random points within a constraining feature class (a polygon) and ensures that these random points are spaced no closer than a specified distance. The tool's relevant parameters for our analysis were as follows:

- **Constraining Feature Class** – A feature class whose shape defines the area within which the random sample locations will be generated. This feature class corresponds to the Sampling Extent polygon presented in Figure 1.
- **Number of Points** – The desired number of random sample points to generate within the Constraining Feature Class.
- **Minimum Allowed Distance** – The minimum distance in feet between the sample points that are generated within the Constraining Feature Class.

The *Create Random Points* tool works by first partitioning the polygon representing the Constraining Feature Class into triangles of varying sizes, using a standard polygon partitioning algorithm. To place the first point in the polygon, one of the triangles in the polygon is randomly selected. The probability of selecting a particular triangle is influenced by the size of the triangle, such that the larger the triangle, the higher the probability the triangle will be selected. Two legs of the triangle become the two axes from which to place the random point. Random values are then selected along each of the two legs, and a point is produced within the triangle using these two values. Then another triangle within the polygon representing the constrained extent is randomly selected, and the process repeats itself until the number of desired random samples is generated.

A Constraining Feature Class polygon was digitized from high-resolution orthographic photos to enclose the in-water areas of the Bay and Beacon Bay up to the approximate shoreline, extending northward to a point just south of the Newport Aquatic Center (Figure 1). This polygon was then fed into the *Create Random Points* tool as the Constraining Feature Class parameter. Values of "40" and "300 ft." were entered for the Number of Points and Minimum Allowed Distance parameters, respectively, and the tool was executed, producing a point feature class containing the 40 randomly generated sample points. Fields named "Latitude" and "Longitude" were added to the attribute table of this

feature class and were populated with each point's latitude and longitude values in units of decimal degrees.

Field Sample Collection Methods

Water samples were collected for chemical analysis using a 3-L Van Dorn bottle oriented horizontally. Samples were collected mid-depth at each station. Each sample was analyzed for dissolved copper. Water column chemistry was performed by Eurofins Environmental Laboratories, Inc., located in Garden Grove, California.

Results

The results of chemical analyses are presented in Table 1. Chemical concentrations were compared to water quality criteria. Raw data are provided in the complete chemistry reports (Attachment A forthcoming).

REFERENCES

Esri, 2015. ArcGIS Resources, *Create Random Points*. Accessed: June 30, 2015. Available from: http://resources.arcgis.com/en/help/main/10.2/index.html#//00170000002r000000.

Table 1
Newport Bay Metals TMDL Water Quality Copper Study

Sample ID	Sample Date	Latitude	Longitude	Copper (µg/L)
NB-01-063015	6/30/2015	32.60132	-117.88972	1.64
NB-02-070115	7/1/2015	32.61472	-117.92678	6.4
NB-03-070115	7/1/2015	32.61140	-117.9072	2.14
NB-04-063015	6/30/2015	32.59537	-117.87962	0.287
NB-05-063015	6/30/2015	32.61003	-117.9219	5.51
NB-06-070115	7/1/2015	32.61073	-117.90926	2.11
NB-07-063015	6/30/2015	32.62070	-117.93562	5.75
NB-08-063015	6/30/2015	32.60003	-117.88053	0.309
NB-09-070115	7/1/2015	32.60782	-117.90701	1.89
NB-10-063015	6/30/2015	32.60769	-117.90376	2.81
NB-11-070115	7/1/2015	32.61177	-117.90393	2.66
NB-12-070115	7/1/2015	32.60734	-117.91168	2.64
NB-13-063015	6/30/2015	32.60861	-117.88832	3.72
NB-14-070115	7/1/2015	32.61642	-117.92587	4.65
NB-15-063015	6/30/2015	32.60958	-117.89508	4.07
NB-16-063015	6/30/2015	32.60288	-117.88453	3.44
NB-17-070115	7/1/2015	32.60430	-117.88895	0.739
NB-18-063015	6/30/2015	32.61393	-117.90273	3.66
NB-19-070115	7/1/2015	32.61381	-117.91540	2.37
NB-20-063015	6/30/2015	32.61060	-117.92328	5.73
NB-21-063015	6/30/2015	32.62030	-117.93361	5.2
NB-22-063015	6/30/2015	32.60190	-117.88824	2.29
NB-23-070115	7/1/2015	32.61749	-117.92578	3.36
NB-24-063015	6/30/2015	32.62057	-117.9015	3.16
NB-25-070115	7/1/2015	32.61209	-117.90503	1.81
NB-26-063015	6/30/2015	32.61388	-117.90468	4.99
NB-27-063015	6/30/2015	32.59855	-117.88043	0.303
NB-28-070115	7/1/2015	32.61352	-117.91277	1.95
NB-29-070115	7/1/2015	32.61830	-117.92445	3.02
NB-30-070115	7/1/2015	32.61348	-117.90565	2.36
NB-31-063015	6/30/2015	32.61959	-117.92596	3.52
NB-32-063015	6/30/2015	32.60501	-117.90134	2.6
NB-33-063015	6/30/2015	32.60936	-117.92439	5.63
NB-34-063015	6/30/2015	32.60105	-117.89430	2.26

Sample ID	Sample Date	Latitude	Longitude	Copper (µg/L)
NB-35-063015	6/30/2015	32.60098	-117.88608	0.992
NB-36-070115	7/1/2015	32.61057	-117.91887	4.13
NB-37-063015	6/30/2015	32.60299	-117.89870	1.3
NB-38-063015	6/30/2015	32.60676	-117.90237	2.42
NB-39-063015	6/30/2015	32.61538	-117.90313	4.6
NB-40-070115	7/1/2015	32.61692	-117.92275	3.2

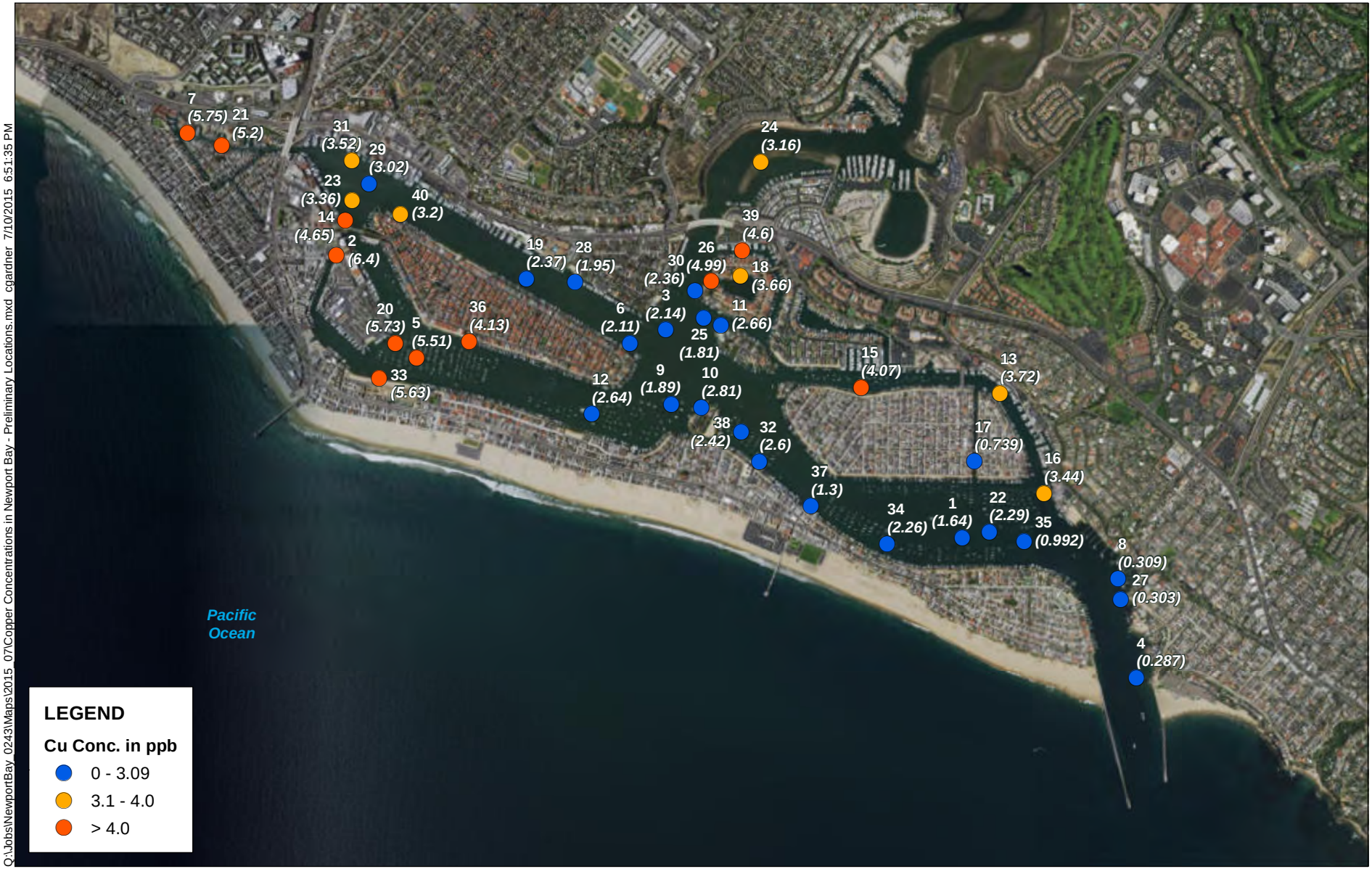
Notes:

Detected concentration is greater than California Toxics Rule screening level (3.1 µg/L)

µg/L microgram per liter

TMDL total maximum daily load

FIGURE



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ANCHOR QEA

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Figure 1
Dissolved Copper Concentrations
Frame 1 of 4
Newport Bay Copper Study
City of Newport Beach

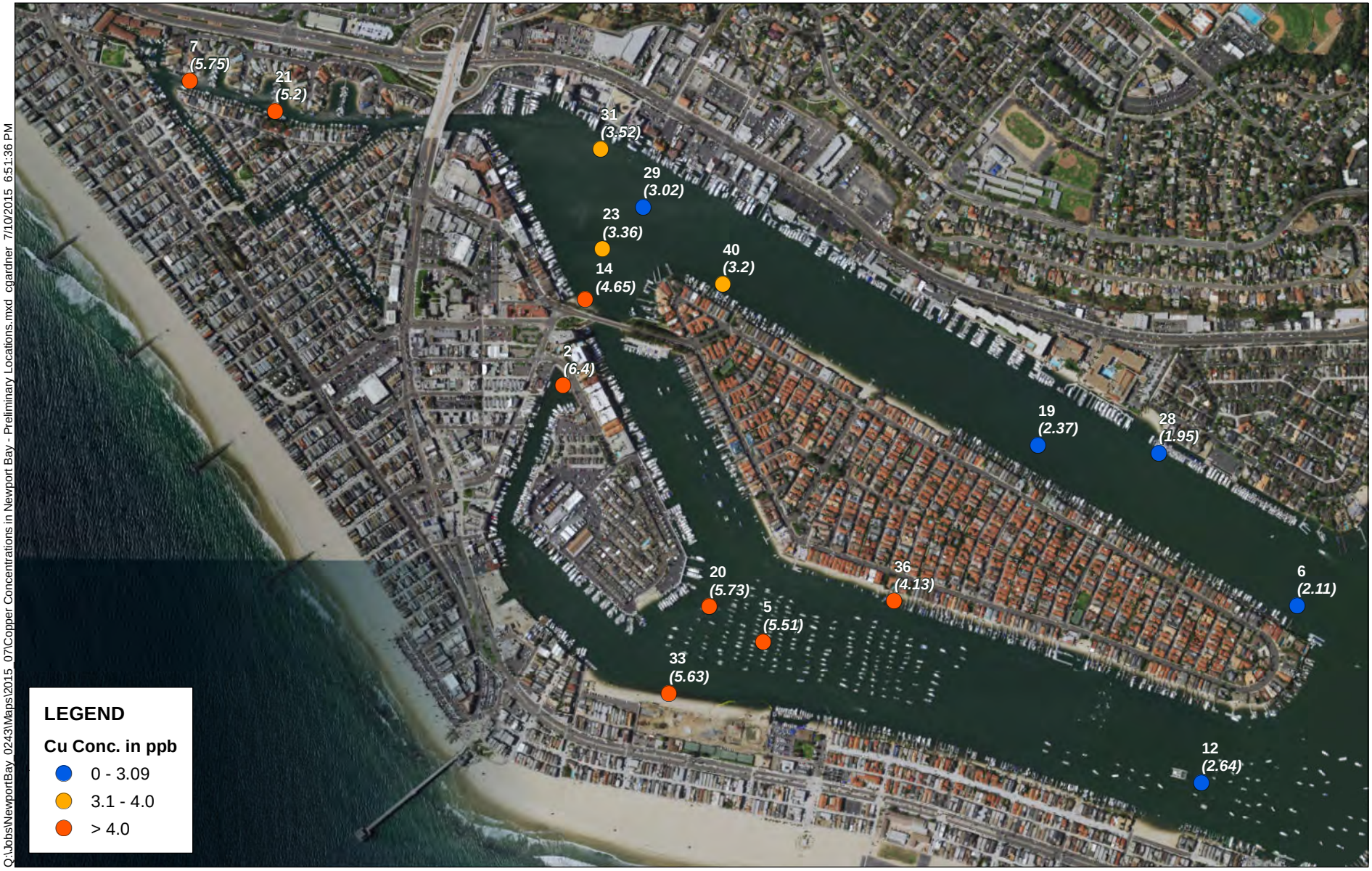

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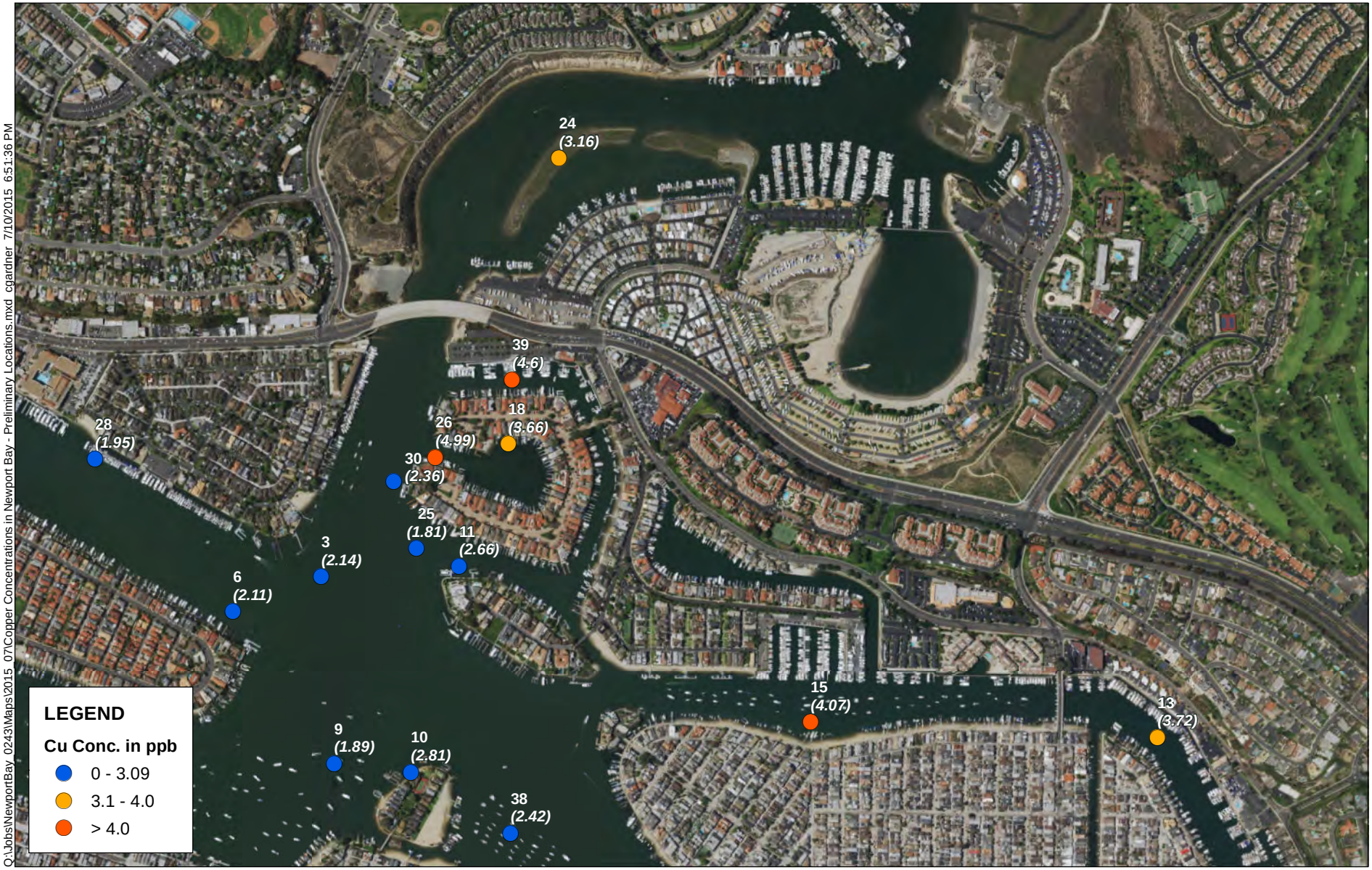
Figure 1
Dissolved Copper Concentrations
Frame 2 of 4
Newport Bay Copper Study
City of Newport Beach



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Feet
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Figure 1
Dissolved Copper Concentrations
Frame 3 of 4
Newport Bay Copper Study
City of Newport Beach

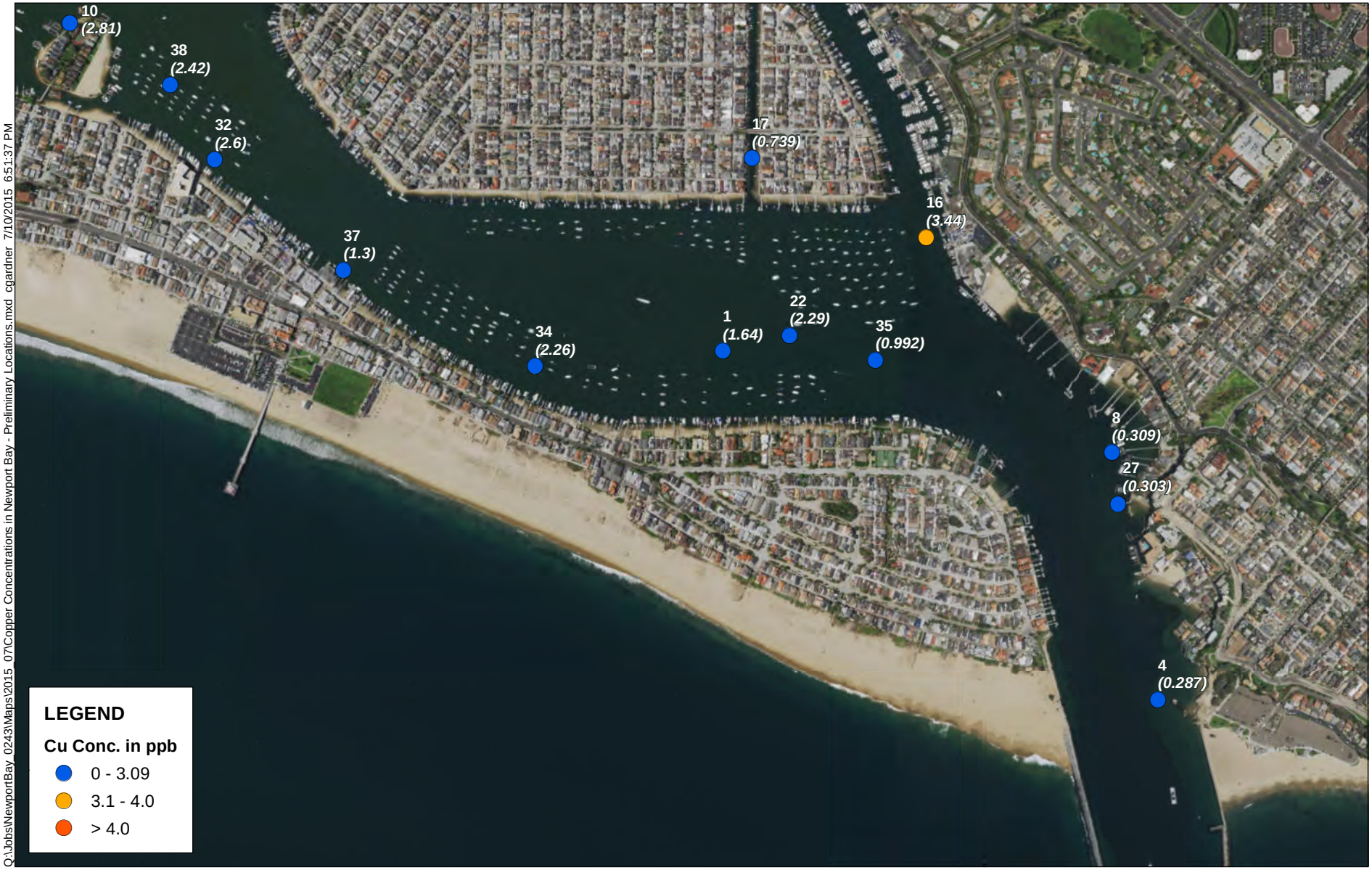

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Figure 1
Dissolved Copper Concentrations
Frame 4 of 4
Newport Bay Copper Study
City of Newport Beach

ANCHOR QEA

27201 Puerta Real, Suite 350
Mission Viejo, California 92691
Phone 949.347.2780
www.anchorqea.com

MEMORANDUM

To:	Robert Stein, Ph.D., Assistant City Engineer; Chris Miller, Harbor Resources Manager; and Dave Webb, Public Works Director, City of Newport Beach	**Date:**	March 25, 2016
From:	Shelly Anghera, Ph.D., and Chris Osuch, Anchor QEA, LLC	**Project:**	160243-01.01
Re:	Newport Bay Copper Study: Winter 2016		

In 1996, Newport Bay (the Bay) was listed on the Clean Water Act Section 303(d) List for metals, pesticides, and organic pollutants. A total maximum daily load (TMDL) for metals is currently required for dissolved copper, lead, and zinc in the Upper and Lower Bay as well as the Rhine Channel. The TMDL is being updated to include an implementation plan requiring the conversion of 87% of the boats to non-copper-based paints to address water quality concerns for dissolved copper in the Bay. Numeric targets for metals in the Bay are adopted from the California Toxics Rule (CTR). The CTR chronic target for dissolved copper for saltwater is 3.1 micrograms per liter (µg/L). Previous investigations within the Bay have identified elevated copper concentrations in water from boat paint.

SURVEY OF COPPER WITHIN NEWPORT BAY

In June 2015, Anchor QEA, LLC, designed a sampling plan whereby water samples were collected from 40 discrete locations that were randomly selected from within the sampling extent presented in Figure 1 (Anchor QEA 2015). Collecting water samples from randomly generated locations enables the establishment of a general condition of copper concentration throughout the Bay with a high degree of objectivity. Results of the June 2015 study showed water quality exceedances for copper in portions of the harbor (Anchor QEA 2015).

In February 2016, the study was repeated to further evaluate dissolved copper patterns throughout the harbor. This study includes monitoring at the same 40 locations to assess the general dissolved copper conditions in the Bay.

FOCUSED BOAT HULL INFLUENCE

In addition to the 40 previous monitoring locations, 14 new targeted locations at specific distances from around two specified vessels were sampled. The goal of this sampling was to assess the movement of copper away from the hull of the vessel, both upcurrent and downcurrent. These two vessels have recently applied copper-based antifouling paint that represents potential sources of copper to the water column. The two moorings selected are located on the edge of a mooring field in an area of unrestricted circulation.

METHODS

Survey of Copper within Newport Bay: Sampling Design Method

ArcGIS 10.2 geographic information systems (GIS) software was used to delineate the sample extent area and generate the random sample locations from which water samples were collected for copper analysis. The generation of the random sample locations was accomplished using the *Create Random Points* tool within ArcGIS's ArcToolbox module (Esri 2015), following methods described in the June 2015 study report (Anchor QEA 2015). A total of 40 randomly generated stations were designated for sampling throughout the Bay. Sampling locations are shown in Figure 1.

Focused Boat Hull Influence: Sampling Design Method

Two vessels, located at moorings A-154 and A-124, were selected for an additional 14 sampling locations (Figure 2). These vessels represent potential sources of copper to the water column. Sampling was designed such that these locations were sampled during a slack tide to isolate inputs from a source other than the moored vessel and focus on its input of copper to the Bay. Samples were collected 1 foot below the water's surface at the following locations:

- 0.5, 3, and 10 feet off the stern
- 0.5 and 3 feet off the bow
- 0.5 foot off both the port and starboard sides

This sampling approach was designed to study the distance from the vessel that copper may dilute in the water column.

Field Sample Collection Methods

Water samples were collected for copper and dissolved organic carbon (DOC) analyses using a 6-L Van Dorn bottle oriented horizontally. The Van Dorn bottle was decontaminated prior to sample collection at each station. Samples were collected mid-depth at each station. Water samples were placed in coolers with ice and stored at less than 4 °C until delivery to the appropriate laboratory for analysis. Proper chain-of-custody procedures were followed.

Each sample was analyzed for dissolved copper. Dissolved copper analysis was performed by Eurofins Calscience, Inc. (ECI), located in Garden Grove, California. DOC samples were shipped overnight to Analytical Resources Inc. (ARI), located in Tukwila, Washington. Upon receipt, DOC samples were filtered and preserved for potential analysis following the receipt of dissolved copper results from ECI. Samples with elevated copper concentrations (greater than CTR [3.1 µg/L]) were analyzed for DOC. DOC in the water column provides an indication of the bioavailability of copper that may be toxic to marine life.

RESULTS

Survey of Copper within Newport Bay

The results of chemical analyses for both June 2015 and February 2016 are presented in Table 1 for comparison. Chemical concentrations were compared to CTR water quality criteria. In February 2016, samples were collected on February 10 and February 11, when tide height ranged from 0.3 to 5.0 feet. Copper concentrations during this event ranged from 0.27 to 12.7 µg/L (Figure 3), and DOC concentrations ranged from 1.40 to 2.20 mg/L. In June 2015, samples were collected on June 30 and July 1, when tide height ranged from 2.2 to 3.2 feet. Copper concentrations during this event ranged from 0.3 to 6.4 µg/L. Raw data are provided in the complete chemistry reports (Attachment A).

For ocean conditions, DOC concentrations often range from 0.9 to 1.1 mg/L. The higher the DOC the higher the binding potential of copper to the organics, therefore, making the copper not bioavailable. Models are currently being evaluated by the Environmental Protection Agency to examine the relationship between observed copper concentrations within water that contains a specified concentration of DOC to predict the bioavailable fraction of copper. It is hoped that in the future this method will be available to assess

compliance with the water quality standard through estimation of the bioavailable fraction of copper. These data are provided to allow for that comparison in the future.

Focused Boat Hull Influence

The results of chemical analyses for the February 2016 boat-specific sampling are presented in Table 2. Copper concentrations ranged from 0.374 to 0.962 µg/L for the vessel at mooring A-154 and from 0.509 to 0.743 µg/L for the vessel at mooring A-124. Copper concentrations for specified distances from each vessel are shown in Figure 4.

REFERENCES

Anchor QEA, 2015. *Memorandum: Random Sample Points Methodology*. Newport Bay Copper Sampling in Support of the Newport Bay Metals TMDL. Prepared for the City of Newport Beach. July 2015.

Esri, 2015. ArcGIS Resources, *Create Random Points*. Accessed: June 30, 2015. Available from: http://resources.arcgis.com/en/help/main/10.2/index.html#//00170000002r000000.

TABLES

Table 1
Newport Bay Metals TMDL Water Quality Copper Survey

Sample ID	February 2016				June 2015
	Latitude	Longitude	Copper (µg/L)	DOC (mg/L)	Copper (µg/L)
NB-01-021016	33.60130	-117.88969	0.404	--	1.64
NB-02-021116	33.61462	-117.92666	12.7	2.11	6.4
NB-03-021116	33.61147	-117.90715	1.84	--	2.14
NB-04-021016	33.59432	-117.87975	0.217	--	0.287
NB-05-021116	33.60973	-117.92178	5.42	2.20	5.51
NB-06-021116	33.61071	-117.90928	1.66	--	2.11
NB-07-021116	33.62078	-117.9359	6.53	1.51	5.75
NB-08-021016	33.59997	-117.8054	0.27	--	0.309
NB-09-021116	33.60785	-117.90751	2.17	--	1.89
NB-10-021116	33.60771	-117.90388	1.08	--	2.81
NB-11-021116	33.61181	-117.90389	2.31	--	2.66
NB-12-021116	33.60726	-117.91162	3.05	--	2.64
NB-13-021016	33.60888	-117.88866	1.96	--	3.72
NB-14-021116	33.61638	-117.92596	3.99	2.24	4.65
NB-15-021016	33.60951	-117.89503	3.06	--	4.07
NB-16-021016	33.60288	-117.88488	0.83	--	3.44
NB-17-021016	33.60436	-117.88898	0.441	--	0.739
NB-18-021016	33.61384	-117.90271	2.96	--	3.66
NB-19-021116	33.61382	-117.9153	2.09	--	2.37
NB-20-021116	33.61057	-117.92326	7.54	2.10	5.73
NB-21-021116	33.62030	-117.93366	5.91	2.10	5.2
NB-22-021016	33.60190	-117.88818	0.251	--	2.29
NB-23-021116	33.61758	-117.92582	3.28	2.06	3.36
NB-24-021016	33.62063	-117.90151	1.64	--	3.16
NB-25-021116	33.61208	-117.90498	1.94	--	1.81
NB-26-021016	33.61390	-117.90464	2.82	--	4.99
NB-27-021016	33.59538	-117.88033	0.401	--	0.303
NB-28-021116	33.61351	-117.91273	2.52	--	1.95
NB-29-021116	33.61832	-117.92446	2.81	--	3.02
NB-30-021116	33.61346	-117.90563	1.87	--	2.36
NB-31-021116	33.61961	-117.92598	2.77	--	3.52
NB-32-021016	33.60496	-117.90132	1.54	--	2.6
NB-33-021116	33.60946	-117.9258	8.19	1.54	5.63
NB-34-021016	33.60131	-117.88967	0.491	--	2.26

Sample ID	February 2016				June 2015
	Latitude	Longitude	Copper (µg/L)	DOC (mg/L)	Copper (µg/L)
NB-35-021016	33.60087	-117.88622	0.304	--	0.992
NB-36-021116	33.61055	-117.91897	5.02	1.40	4.13
NB-37-021016	33.60308	-117.89871	1.41	--	1.3
NB-38-021016	33.60670	-117.90240	1.93	--	2.42
NB-39-021016	33.61384	-117.90356	4.86	1.67	4.6
NB-40-021116	33.61697	-117.92274	3.09	--	3.2

Notes:

Detected concentration is greater than California Toxics Rule screening level (3.1 µg/L)

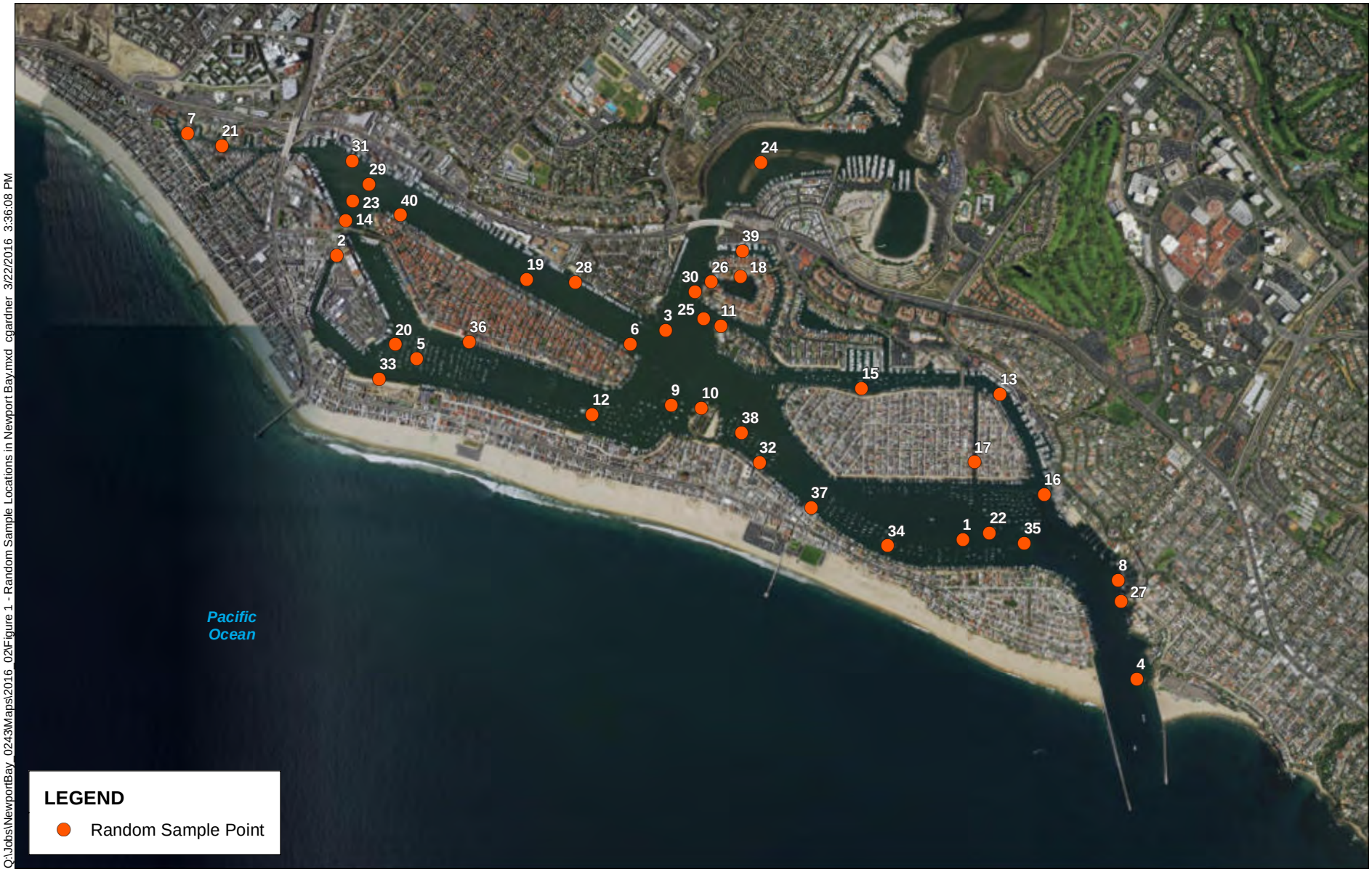
-- Not applicable
µg/L microgram per liter
DOC dissolved organic carbon
mg/L milligram per liter
TMDL total maximum daily load

Table 2
Focused Vessel Study on Moorings A-154 and A-124

Sample ID	Sample Date	Latitude	Longitude	Copper (µg/L)
NB-BL15401-021016	2/10/2016	33.60100	-117.89209	0.567
NB-BL15402-021016	2/10/2016	33.60100	-117.89209	0.374
NB-BL15403-021016	2/10/2016	33.60100	-117.89209	0.504
NB-BL15404-021016	2/10/2016	33.60100	-117.89209	0.81
NB-BL15405-021016	2/10/2016	33.60100	-117.89209	0.823
NB-BL15406-021016	2/10/2016	33.60100	-117.89209	0.962
NB-BL15407-021016	2/10/2016	33.60100	-117.89209	0.338
NB-RD12401-021016	2/10/2016	33.60086	-117.891009	0.509
NB-RD12402-021016	2/10/2016	33.60086	-117.891009	0.557
NB-RD12403-021016	2/10/2016	33.60086	-117.891009	0.539
NB-RD12404-021016	2/10/2016	33.60086	-117.891009	0.563
NB-RD12405-021016	2/10/2016	33.60086	-117.891009	0.743
NBRD12406-021016	2/10/2016	33.60086	-117.891009	0.579
NBRD12407-021016	2/10/2016	33.60086	-117.891009	0.583

Note:
µg/L microgram per liter

FIGURES



Q:\Jobs\NewportBay_0243\Maps\2016_02\Figure 1 - Random Sample Locations in Newport Bay.mxd cgardner 3/22/2016 3:36:08 PM

ANCHOR QEA

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Figure 1
Random Sample Locations
Frame 1 of 4
Newport Bay Copper Study
City of Newport Beach

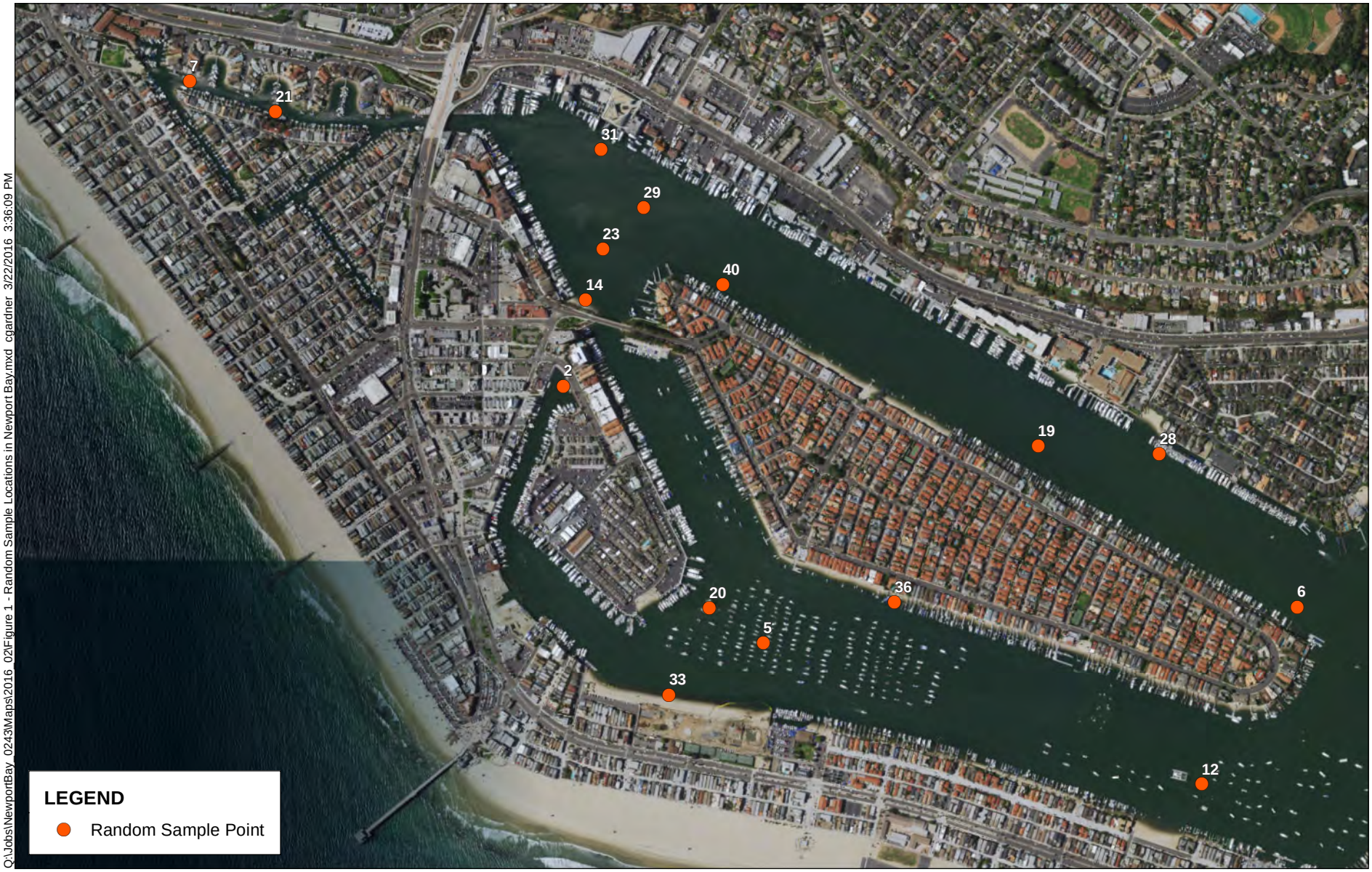

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Figure 1
Random Sample Locations
Frame 2 of 4
Newport Bay Copper Study
City of Newport Beach

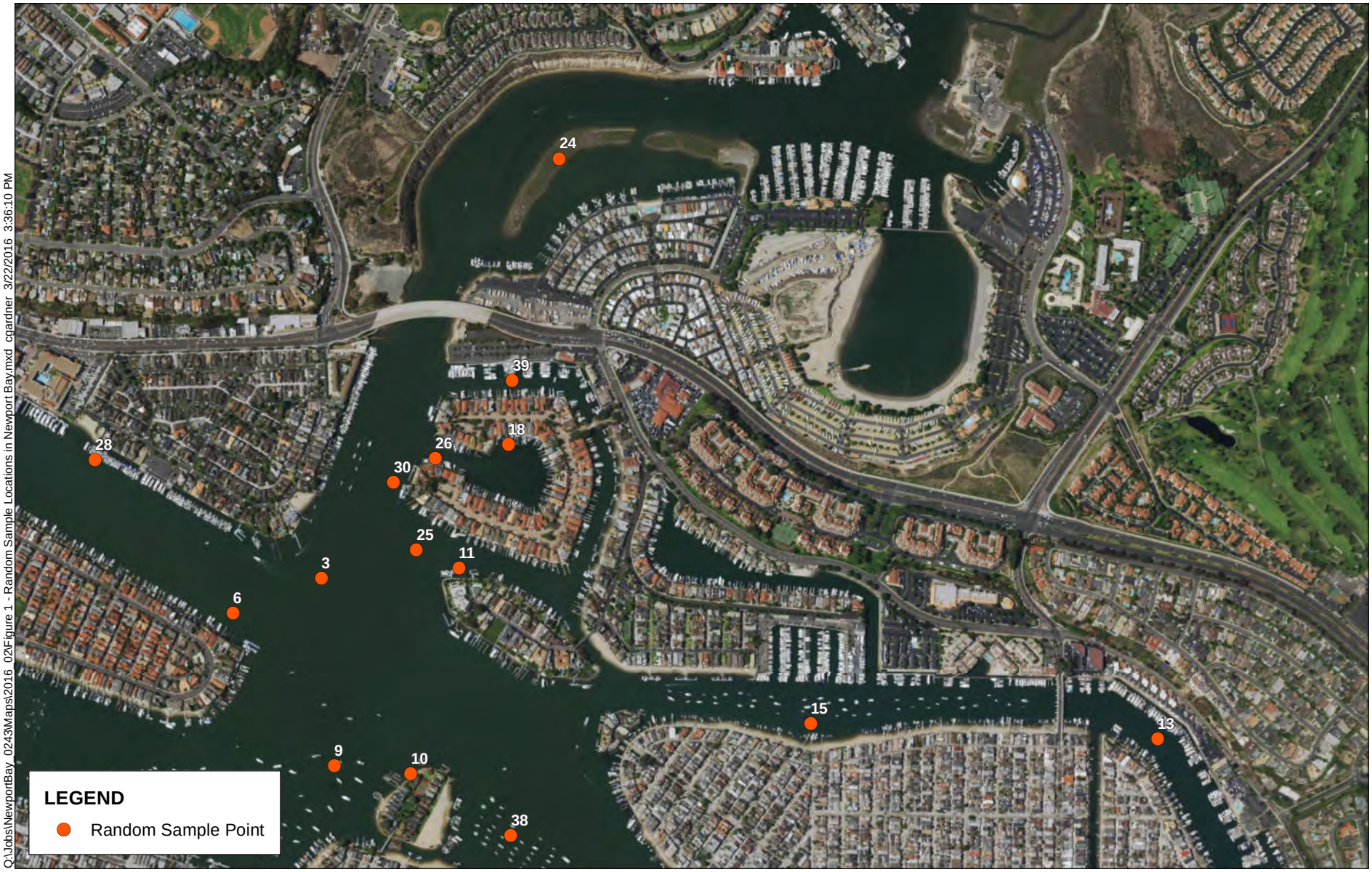

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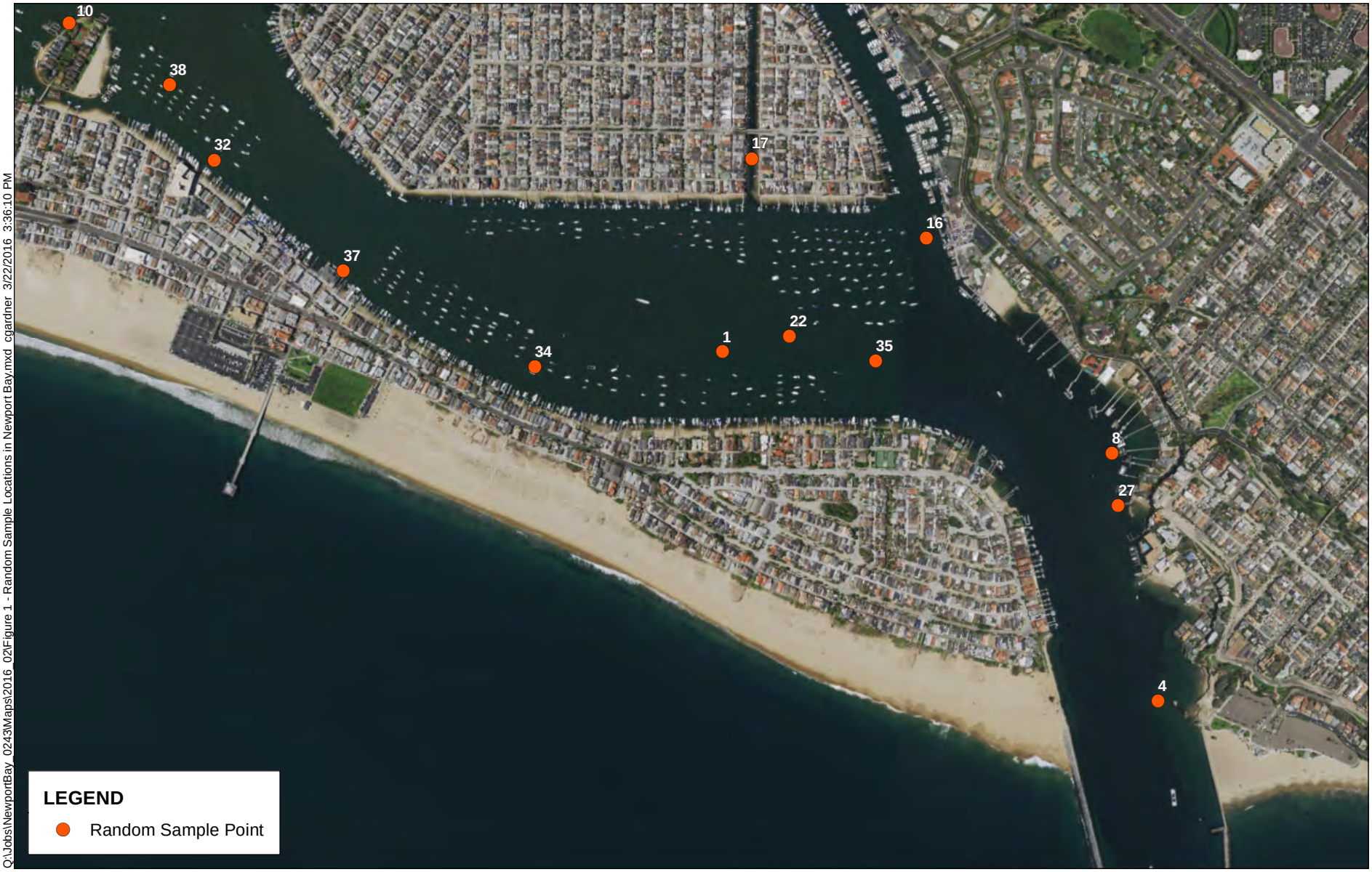
Figure 1
Random Sample Locations
Frame 3 of 4
Newport Bay Copper Study
City of Newport Beach



Q:\Jobs\NewportBay_0243\Maps\2016_02\Figure 1 - Random Sample Locations in Newport Bay.mxd cgardner 3/22/2016 3:36:10 PM

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Figure 1
Random Sample Locations
Frame 4 of 4
Newport Bay Copper Study
City of Newport Beach

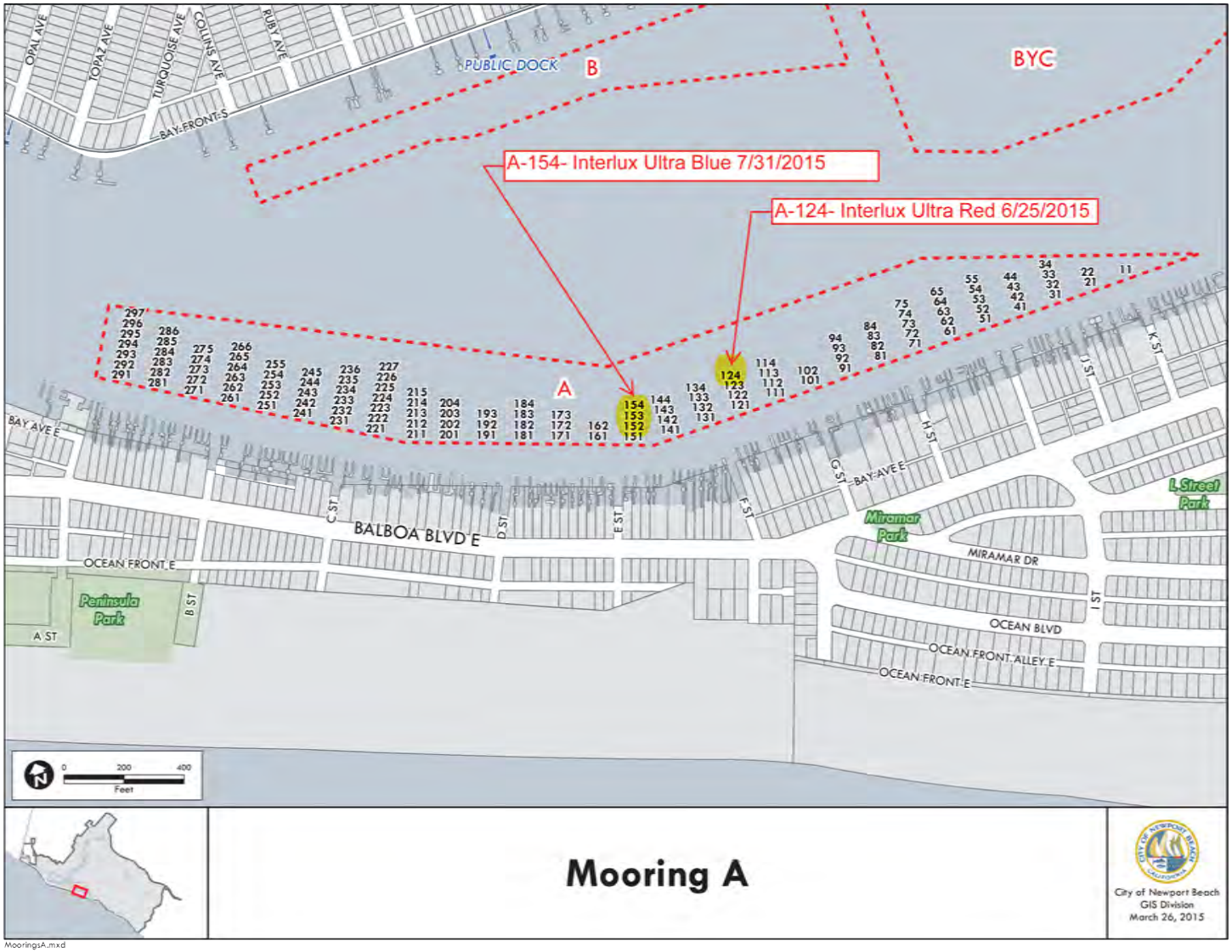

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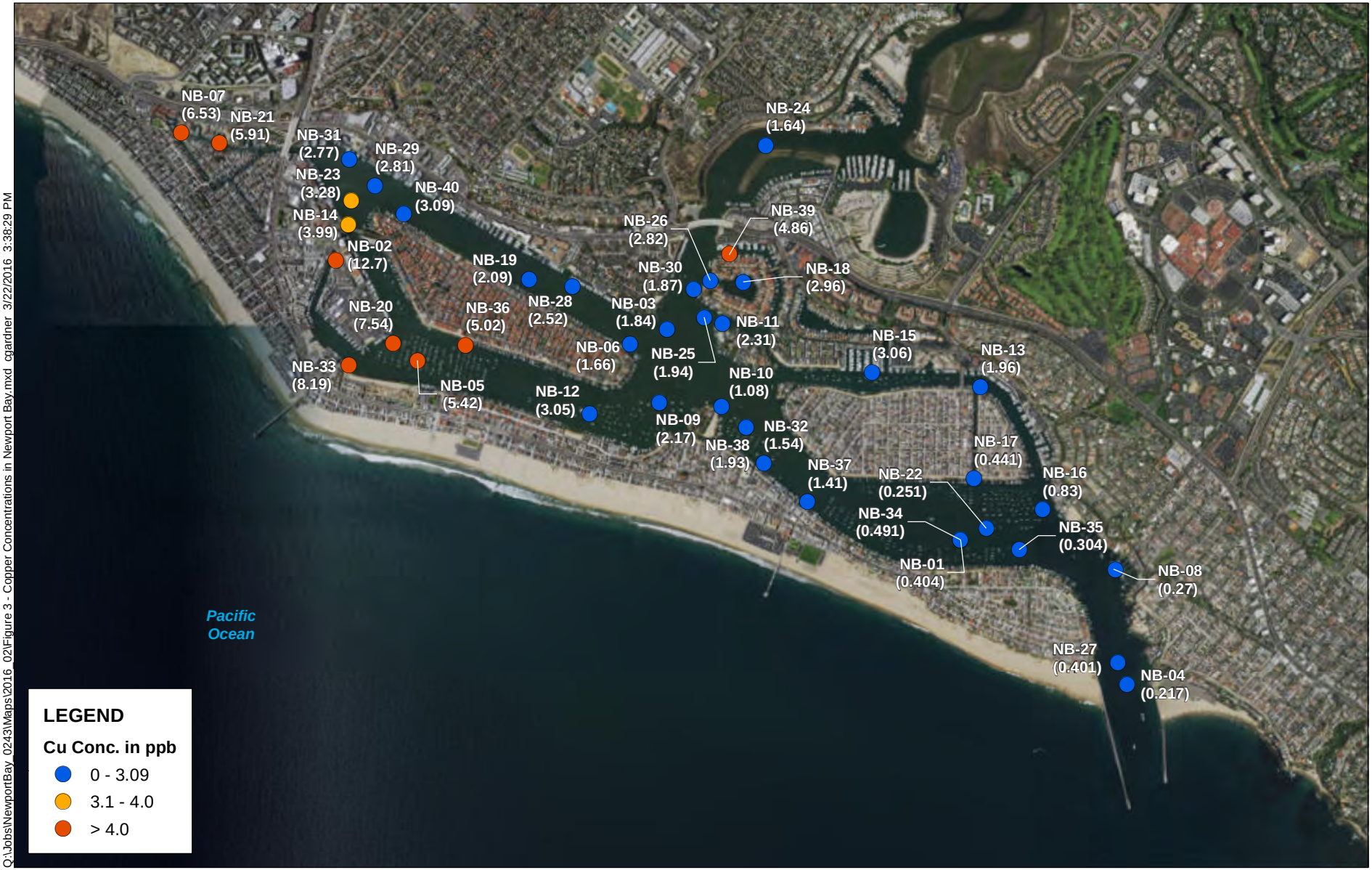
Figure 2
Focused Vessel Mooring Field
Newport Copper Study
City of Newport Beach



Q:\Jobs\NewportBay_0243\Maps\2016_02\Figure 3 - Copper Concentrations in Newport Bay.mxd cgardner 3/22/2016 3:38:29 PM

ANCHOR QEA

Feet
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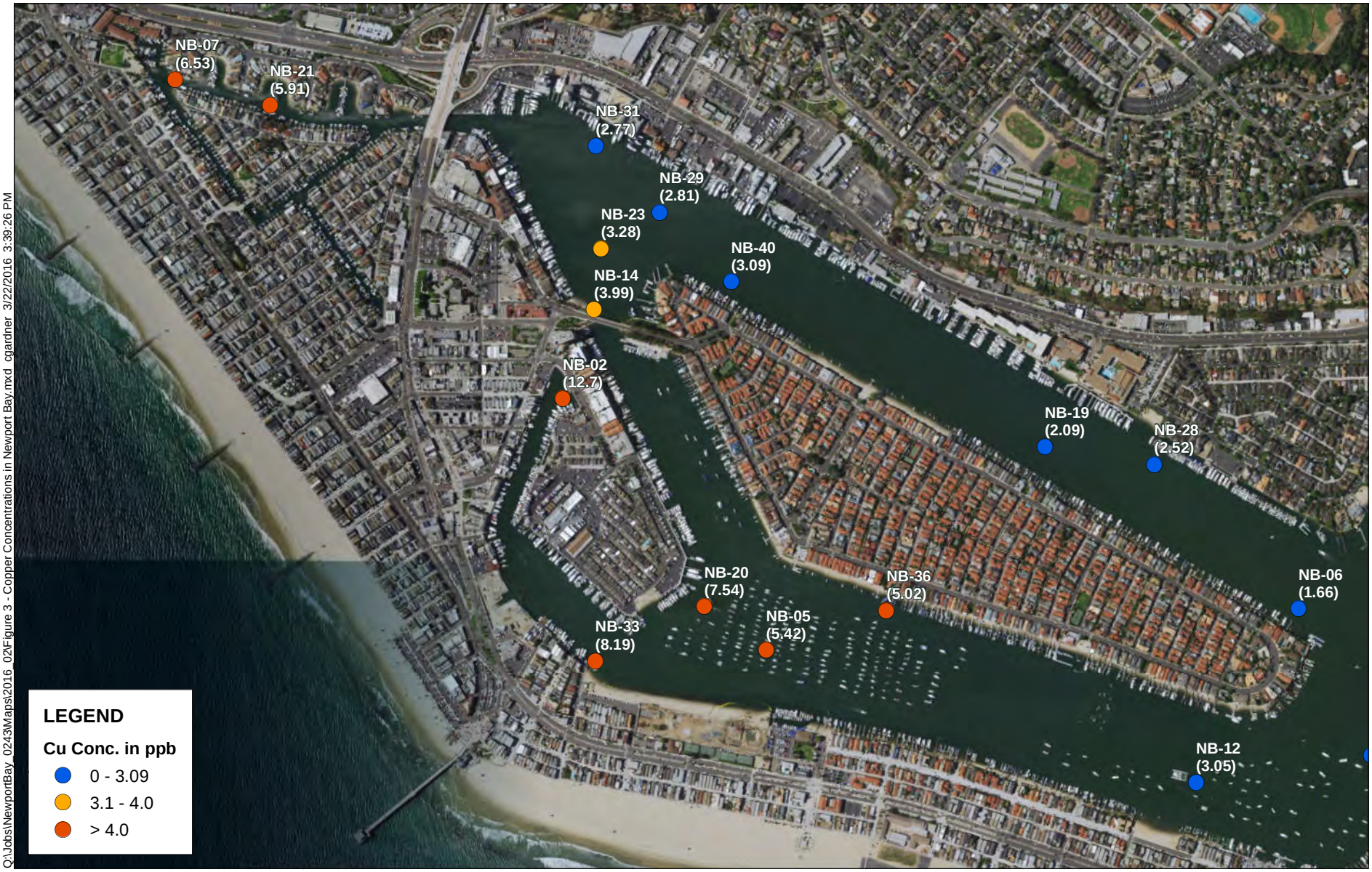
Figure 3
Dissolved Copper Concentrations
Frame 1 of 4
Newport Bay Copper Study
City of Newport Beach

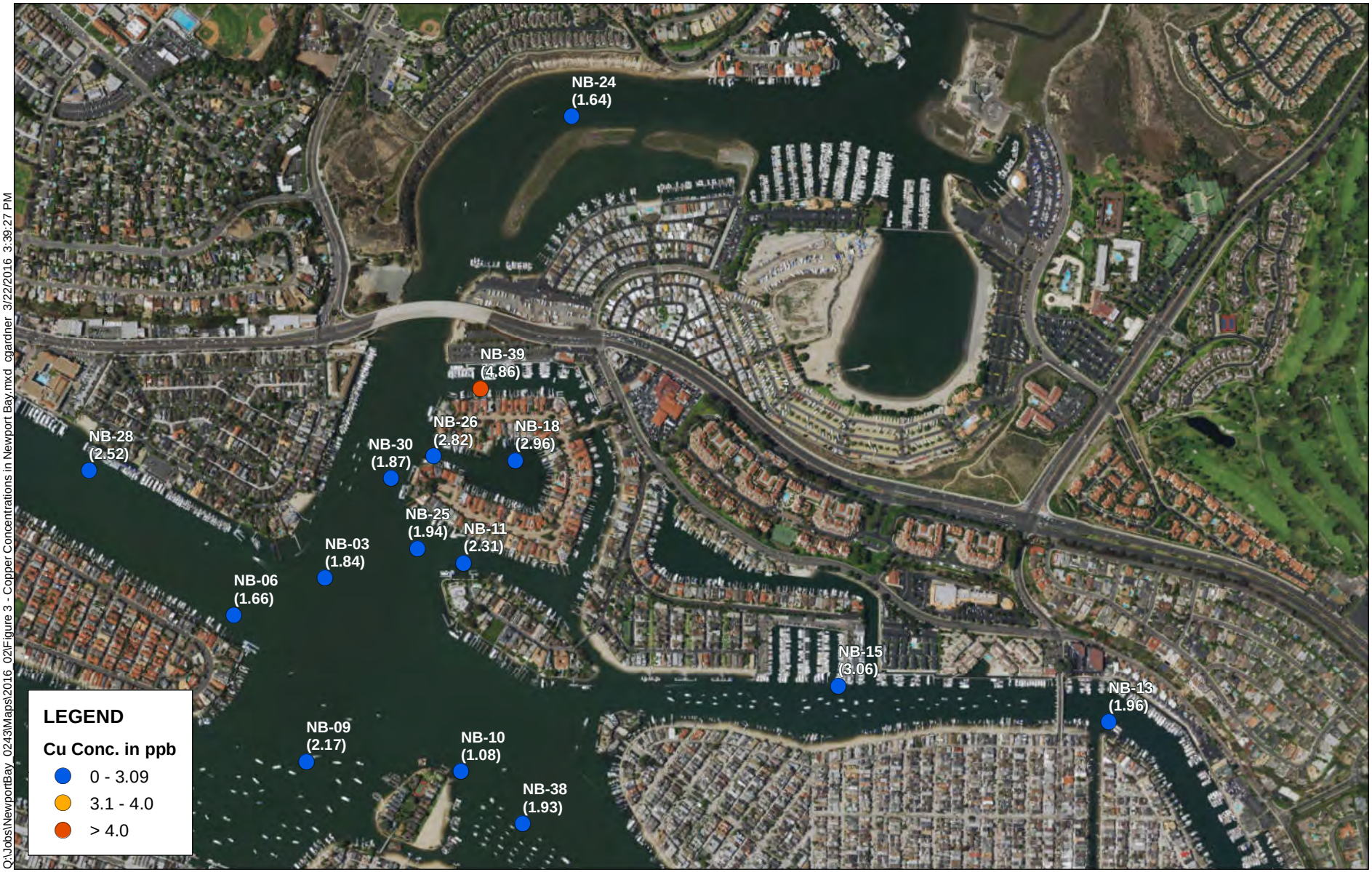


Q:\Jobs\NewportBay_0243\Maps\2016_02\Figure 3 - Copper Concentrations in Newport Bay.mxd cgardner 3/22/2016 3:39:26 PM

ANCHOR QEA

Feet
0 500 1,000 2,000

Figure 3
Dissolved Copper Concentrations
Frame 2 of 4
Newport Bay Copper Study
City of Newport Beach

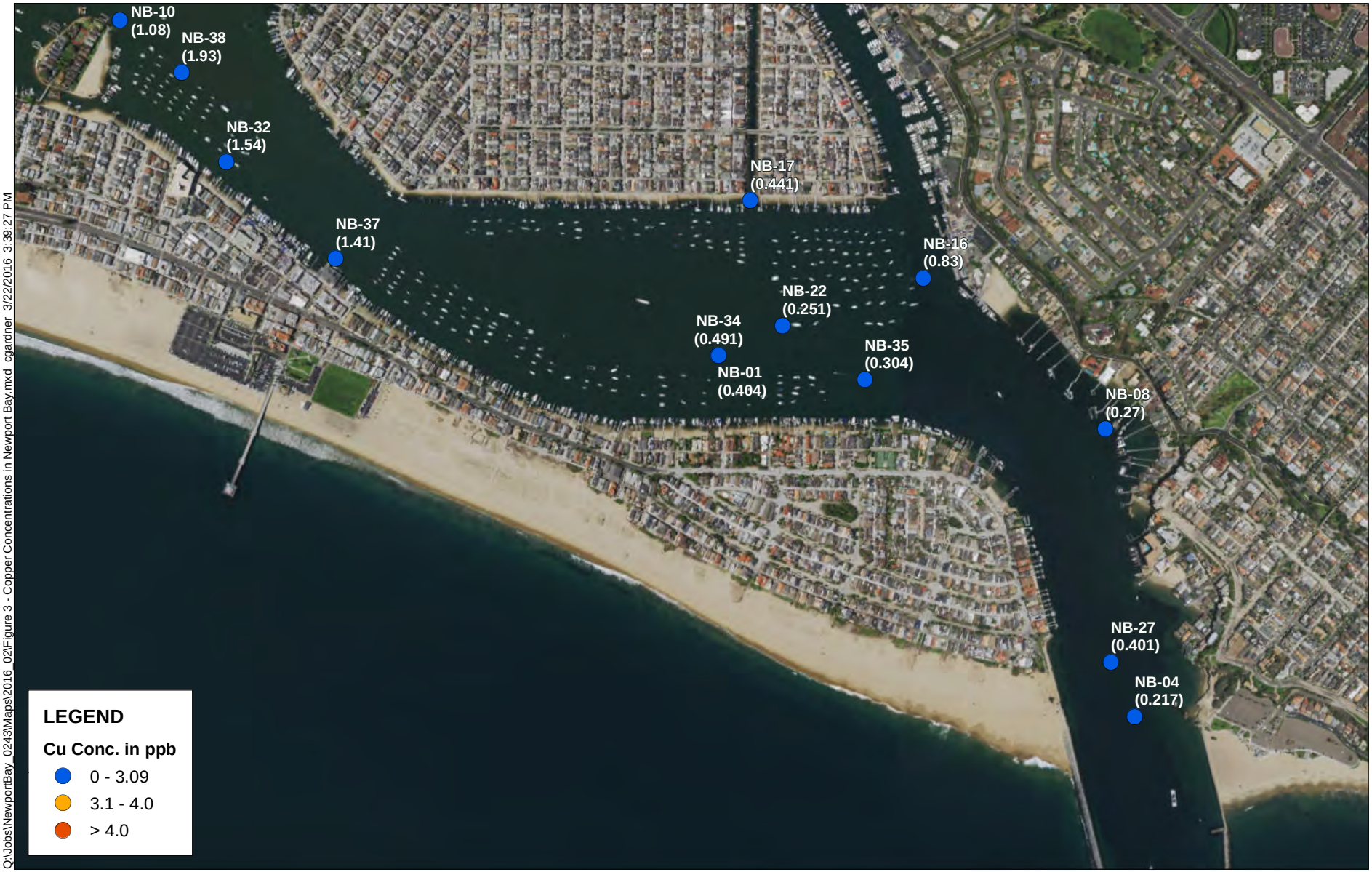


Q:\Jobs\NewportBay_0243\Maps\2016_02\Figure 3 - Copper Concentrations in Newport Bay.mxd cgardner 3/22/2016 3:39:27 PM

ANCHOR QEA

Feet
0 500 1,000 2,000

Figure 3
Dissolved Copper Concentrations
Frame 3 of 4
Newport Bay Copper Study
City of Newport Beach

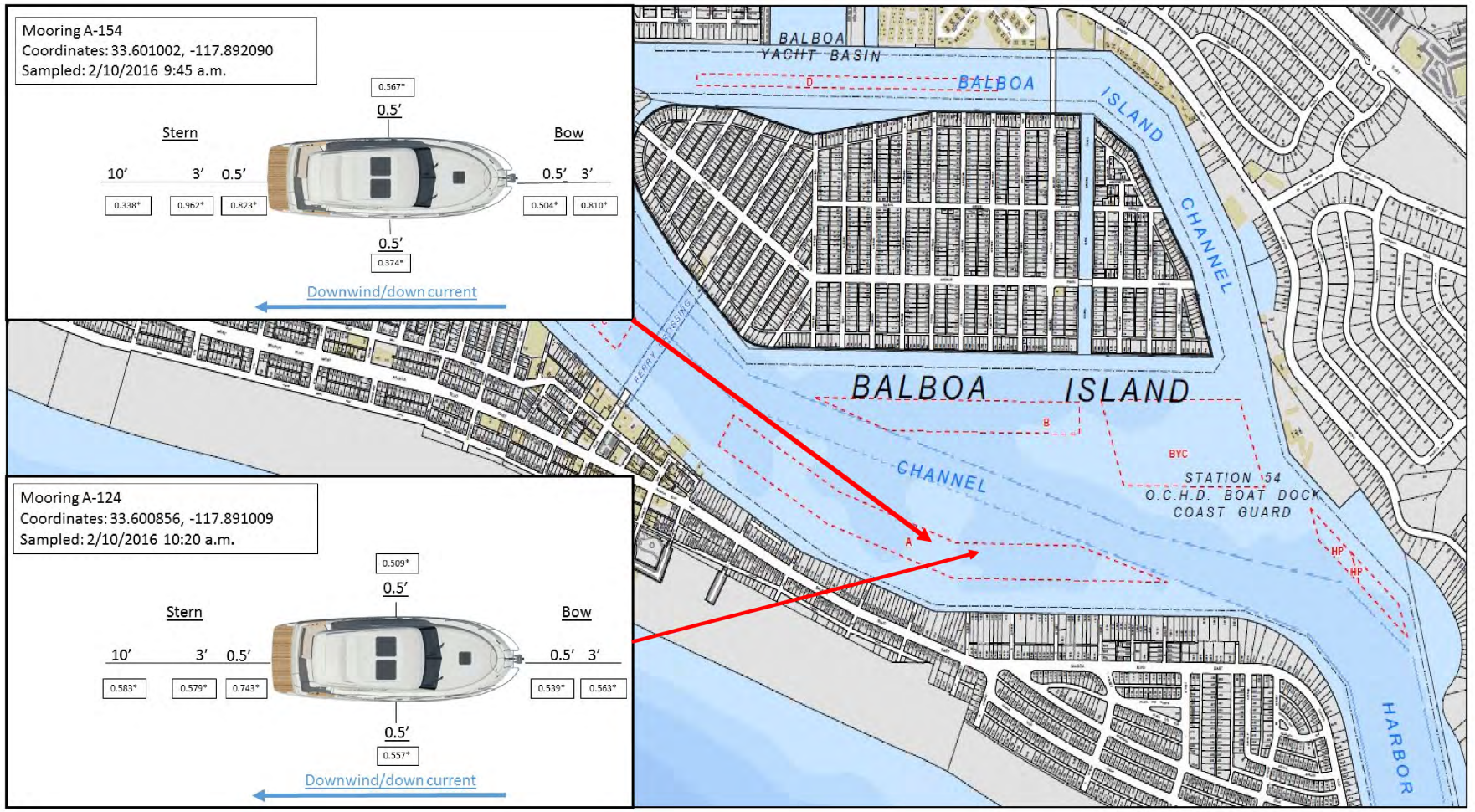


Q:\Jobs\NewportBay_0243\Maps\2016_02\Figure 3 - Copper Concentrations in Newport Bay.mxd cgardner 3/22/2016 3:39:27 PM

ANCHOR QEA

Feet
0 500 1,000 2,000

Figure 3
Dissolved Copper Concentrations
Frame 4 of 4
Newport Bay Copper Study
City of Newport Beach



S:\PROJECTS\City_of_Newport_Beach\C-6111_On-call_2015-2017(150243-01)\Newport_Copper_Study(BG 04)\Deliverables\Winter 2016\Figures for memo\Figure 4.docx

ANCHOR QEA

Figure 4
Focused Vessel Copper Concentrations
Newport Copper Study
City of Newport Beach

ATTACHMENT A
CHEMISTRY REPORTS

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WORK ORDER NUMBER: 16-02-0869

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: ANCHOR QEA, LLC

Client Project Name: Newport Bay Metals TMDL WQ

Attention: Chris Osuch
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Approved for release on 02/22/2016 by:
Carla Hollowell
Project Manager

ResultLink

Email your PM

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Client Project Name: Newport Bay Metals TMDL WQ
Work Order Number: 16-02-0869

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Work Order Narrative

Work Order: 16-02-0869 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 02/10/16. They were assigned to Work Order 16-02-0869.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

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Sample Summary

Client:	ANCHOR QEA, LLC 27201 Puerta Real, Suite 350 Mission Viejo, CA 92691-8306	Work Order:	16-02-0869
		Project Name:	Newport Bay Metals TMDL WQ
		PO Number:	
		Date/Time Received:	02/10/16 17:22
		Number of Containers:	34
Attn:	Chris Osuch		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
NB-22-021016	16-02-0869-1	02/10/16 11:51	1	Aqueous
NB-01-021016	16-02-0869-2	02/10/16 11:55	1	Aqueous
NB-34-021016	16-02-0869-3	02/10/16 12:02	1	Aqueous
NB-37-021016	16-02-0869-4	02/10/16 12:07	1	Aqueous
NB-32-021016	16-02-0869-5	02/10/16 12:20	1	Aqueous
NB-38-021016	16-02-0869-6	02/10/16 12:29	1	Aqueous
NB-15-021016	16-02-0869-7	02/10/16 13:42	1	Aqueous
NB-13-021016	16-02-0869-8	02/10/16 13:50	1	Aqueous
NB-39-021016	16-02-0869-9	02/10/16 14:30	2	Aqueous
NB-18-021016	16-02-0869-10	02/10/16 14:39	1	Aqueous
NB-RD124-01-021016	16-02-0869-11	02/10/16 10:20	1	Aqueous
NB-RD124-02-021016	16-02-0869-12	02/10/16 10:20	1	Aqueous
NB-RD124-03-021016	16-02-0869-13	02/10/16 10:20	1	Aqueous
NB-RD124-04-021016	16-02-0869-14	02/10/16 10:20	1	Aqueous
NB-RD124-05-021016	16-02-0869-15	02/10/16 10:20	1	Aqueous
NB-RD124-06-021016	16-02-0869-16	02/10/16 10:20	1	Aqueous
NB-RD124-07-021016	16-02-0869-17	02/10/16 10:20	1	Aqueous
NB-27-021016	16-02-0869-18	02/10/16 11:07	1	Aqueous
NB-08-021016	16-02-0869-19	02/10/16 11:20	1	Aqueous
NB-35-021016	16-02-0869-20	02/10/16 11:31	1	Aqueous
NB-24-021016	16-02-0869-21	02/10/16 08:22	2	Aqueous
NB-17-021016	16-02-0869-22	02/10/16 09:01	1	Aqueous
NB-04-021016	16-02-0869-23	02/10/16 09:25	1	Aqueous
NB-BL15401-021016	16-02-0869-24	02/10/16 09:45	1	Aqueous
NB-BL15402-021016	16-02-0869-25	02/10/16 09:45	1	Aqueous
NB-BL15403-021016	16-02-0869-26	02/10/16 09:45	1	Aqueous
NB-BL15404-021016	16-02-0869-27	02/10/16 09:45	1	Aqueous
NB-BL15405-021016	16-02-0869-28	02/10/16 09:45	1	Aqueous
NB-BL15406-021016	16-02-0869-29	02/10/16 09:45	1	Aqueous
NB-BL15407-021016	16-02-0869-30	02/10/16 09:45	1	Aqueous
NB-26-021016	16-02-0869-31	02/10/16 14:50	1	Aqueous

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Analytical Report

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/10/16
Work Order: 16-02-0869
Preparation: EPA 3005A Filt.
Method: EPA 1640
Units: ug/L

Project: Newport Bay Metals TMDL WQ

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-22-021016	**16-02-0869-1-A**	**02/10/16 11:51**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 19:59**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.251	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-01-021016	**16-02-0869-2-A**	**02/10/16 11:55**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 20:07**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.404	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-34-021016	**16-02-0869-3-A**	**02/10/16 12:02**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 20:15**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.491	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-37-021016	**16-02-0869-4-A**	**02/10/16 12:07**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 20:23**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	1.41	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-32-021016	**16-02-0869-5-A**	**02/10/16 12:20**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 20:30**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	1.54	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-38-021016	**16-02-0869-6-A**	**02/10/16 12:29**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 20:38**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	1.93	0.0300	0.00898	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/10/16
Work Order: 16-02-0869
Preparation: EPA 3005A Filt.
Method: EPA 1640
Units: ug/L

Project: Newport Bay Metals TMDL WQ

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-15-021016	**16-02-0869-7-A**	**02/10/16 13:42**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 20:46**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	3.06	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-13-021016	**16-02-0869-8-A**	**02/10/16 13:50**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 20:53**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	1.96	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-39-021016	**16-02-0869-9-A**	**02/10/16 14:30**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/17/16 06:15**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	4.86	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-18-021016	**16-02-0869-10-A**	**02/10/16 14:39**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 21:01**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	2.96	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-RD124-01-021016	**16-02-0869-11-A**	**02/10/16 10:20**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 21:40**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.509	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-RD124-02-021016	**16-02-0869-12-A**	**02/10/16 10:20**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 21:47**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.557	0.0300	0.00898	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/10/16
Work Order: 16-02-0869
Preparation: EPA 3005A Filt.
Method: EPA 1640
Units: ug/L

Project: Newport Bay Metals TMDL WQ

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-RD124-03-021016	**16-02-0869-13-A**	**02/10/16 10:20**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 21:55**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.539	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-RD124-04-021016	**16-02-0869-14-A**	**02/10/16 10:20**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 22:03**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.563	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-RD124-05-021016	**16-02-0869-15-A**	**02/10/16 10:20**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 22:10**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.743	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-RD124-06-021016	**16-02-0869-16-A**	**02/10/16 10:20**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 22:18**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.579	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-RD124-07-021016	**16-02-0869-17-A**	**02/10/16 10:20**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 22:26**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.583	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-27-021016	**16-02-0869-18-A**	**02/10/16 11:07**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 22:33**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.401	0.0300	0.00898	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/10/16
Work Order: 16-02-0869
Preparation: EPA 3005A Filt.
Method: EPA 1640
Units: ug/L

Project: Newport Bay Metals TMDL WQ

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-08-021016	**16-02-0869-19-A**	**02/10/16 11:20**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 22:41**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.270	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-35-021016	**16-02-0869-20-A**	**02/10/16 11:31**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 23:20**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.304	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-24-021016	**16-02-0869-21-A**	**02/10/16 08:22**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/17/16 06:23**	**160211L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	1.64	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-17-021016	**16-02-0869-22-A**	**02/10/16 09:01**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 23:27**	**160211L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.441	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-04-021016	**16-02-0869-23-A**	**02/10/16 09:25**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 23:35**	**160211L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.217	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-BL15401-021016	**16-02-0869-24-A**	**02/10/16 09:45**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 23:43**	**160211L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.567	0.0300	0.00898	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/10/16
Work Order: 16-02-0869
Preparation: EPA 3005A Filt.
Method: EPA 1640
Units: ug/L

Project: Newport Bay Metals TMDL WQ

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-BL15402-021016	**16-02-0869-25-A**	**02/10/16 09:45**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 23:50**	**160211L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.374	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-BL15403-021016	**16-02-0869-26-A**	**02/10/16 09:45**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 23:58**	**160211L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.504	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-BL15404-021016	**16-02-0869-27-A**	**02/10/16 09:45**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/12/16 00:06**	**160211L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.810	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-BL15405-021016	**16-02-0869-28-A**	**02/10/16 09:45**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/12/16 00:13**	**160211L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.823	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-BL15406-021016	**16-02-0869-29-A**	**02/10/16 09:45**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/12/16 00:21**	**160211L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.962	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-BL15407-021016	**16-02-0869-30-A**	**02/10/16 09:45**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/12/16 01:00**	**160211L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	0.338	0.0300	0.00898	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/10/16
Work Order: 16-02-0869
Preparation: EPA 3005A Filt.
Method: EPA 1640
Units: ug/L

Project: Newport Bay Metals TMDL WQ

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-26-021016	**16-02-0869-31-A**	**02/10/16 14:50**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/12/16 01:07**	**160211L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	2.82	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-823-183**	**N/A**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 18:35**	**160211L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	ND	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-823-184**	**N/A**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 18:50**	**160211L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	ND	0.0300	0.00898	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Quality Control - Spike/Spike Duplicate

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/10/16
Work Order: 16-02-0869
Preparation: EPA 3005A Filt.
Method: EPA 1640

Project: Newport Bay Metals TMDL WQ

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
NB-39-021016	**Sample**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/17/16 06:15**	**160211S01**
NB-39-021016	**Matrix Spike**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/17/16 06:31**	**160211S01**
NB-39-021016	**Matrix Spike Duplicate**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/17/16 07:09**	**160211S01**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	4.857	0.5000	5.086	4X	5.586	4X	50-150	4X	0-20	Q

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

ANCHOR QEA, LLC	Date Received:	02/10/16
27201 Puerta Real, Suite 350	Work Order:	16-02-0869
Mission Viejo, CA 92691-8306	Preparation:	EPA 3005A Filt.
	Method:	EPA 1640
Project: Newport Bay Metals TMDL WQ		Page 2 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
NB-24-021016	**Sample**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/17/16 06:23**	**160211S02**
NB-24-021016	**Matrix Spike**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/17/16 07:17**	**160211S02**
NB-24-021016	**Matrix Spike Duplicate**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/17/16 07:25**	**160211S02**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	1.644	0.5000	2.558	183	2.701	211	50-150	5	0-20	3

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/10/16
Work Order: 16-02-0869
Preparation: EPA 3005A Filt.
Method: EPA 1640

Project: Newport Bay Metals TMDL WQ

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-823-183	**LCS**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 19:05**	**160211L01F**
099-15-823-183	**LCSD**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 19:13**	**160211L01F**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	0.5000	0.5374	107	0.5279	106	70-130	2	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/10/16
Work Order: 16-02-0869
Preparation: EPA 3005A Filt.
Method: EPA 1640

Project: Newport Bay Metals TMDL WQ

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-823-184	**LCS**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 19:21**	**160211L02F**
099-15-823-184	**LCSD**	**Aqueous**	**ICP/MS 05**	**02/11/16**	**02/11/16 19:29**	**160211L02F**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	0.5000	0.5178	104	0.5230	105	70-130	1	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Glossary of Terms and Qualifiers

Work Order: 16-02-0869 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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CHAIN OF CUSTODY RECORD

WO # / LAB USE ONLY: **16-02-0869**

DATE: 2/10/16

PAGE: 1 OF 4

LABORATORY CLIENT: **Anchor QEA**	CLIENT PROJECT NAME / NUMBER: Newport Bay Metals TMDL WQ
ADDRESS: **27201 Puerta Real, Suite 350**	P.O. NO.: 150243-01.04
CITY: **Mission Viejo** STATE: **CA** ZIP: **92691**	PROJECT CONTACT: Chris Osuch
TEL: **949.347.2780** E-MAIL: cosuch@anchorqea.com	SAMPLER(S): (PRINT) C. Dolphin, N. Kennedy

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☐ STANDARD

☐ COELT EDF | GLOBAL ID: | LOG CODE:

SPECIAL INSTRUCTIONS:
Report down to the MDL
Filter at laboratory upon receipt

REQUESTED ANALYSES

Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	EPA 1640 Dissolved Cu	MS/MSD
1	NB-22-021016	2/10/16	1157	WAT	1	X			X	
2	NB-01-021016		1155		1	X			X	
3	NB-34-021016		1202		1	X			X	
4	NB-37-021016		~~1205~~ 1207		1	X			X	
5	NB-32-021016		1220		1	X			X	
6	NB-30-021016		1229		1	X			X	
7	NB-15-021016		1342		1	X			X	
8	NB-13-021016		1350		1	X			X	
9	NB-39-021016		1430		2	X			X	X
10	NB-18-021016		1439		1	X			X	

Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date: 2/10/16	Time: 1722
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:

06/02/14 Revision

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CHAIN OF CUSTODY RECORD

WO # / LAB USE ONLY: 16-02-0869

DATE: 2/10/16

PAGE: 2 OF 4

LABORATORY CLIENT: Anchor QEA

ADDRESS: 27201 Puerta Real, Suite 350

CITY: Mission Viejo STATE: CA ZIP: 92691

TEL: 949.347.2780 E-MAIL: cosuch@anchorqea.com

CLIENT PROJECT NAME / NUMBER: Newport Bay Metals TMDL WQ

P.O. NO.: 150243-01.04

PROJECT CONTACT: Chris Osuch

SAMPLER(S): (PRINT) C. Dolphin, N. Kennedy

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):

☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☐ STANDARD

☐ COELT EDF GLOBAL ID: LOG CODE:

SPECIAL INSTRUCTIONS:

Report down to the MDL

Filter at laboratory upon receipt

REQUESTED ANALYSES

Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	EPA 1640 Dissolved Cu	MS/MSD
11	NB-RD-BC124-01-021016	2/10/16	1020	WAT	1	X			X	
12	NB-RD-BC124-02-021016		1020		1	X			X	
13	NB-RD-BC124-03-021016		1020		1	X			X	
14	NB-RD-BC124-04-021016		1020		1	X			X	
15	NB-RD-BC124-05-021016		1020		1	X			X	
16	NB-RD-BC124-06-021016		1020		1	X			X	
17	NB-RD-BC124-07-021016		1020		1	X			X	
18	NB-27-021016		1107		1	X			X	
19	NB-08-021016		1120		1	X			X	
20	NB-35-021016		1131		1	X			X	

Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
		2/10/16	1722
Relinquished by: (Signature) N. Kennedy 2/10/16		Date:	Time: 1715 2/10/16
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:

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CHAIN OF CUSTODY RECORD

WO # / LAB USE ONLY: 16-02-0869

DATE: 2/10/16

PAGE: 3 OF 4

LABORATORY CLIENT: Anchor QEA

ADDRESS: 27201 Puerta Real, Suite 350

CITY: Mission Viejo STATE: CA ZIP: 92691

TEL: 949.347.2780 E-MAIL: cosuch@anchorqea.com

CLIENT PROJECT NAME / NUMBER: Newport Bay Metals TMDL WQ

P.O. NO.: 150243-01.04

PROJECT CONTACT: Chris Osuch

SAMPLER(S): (PRINT) C. Dolphin, N. Kennedy

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):

☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☑ STANDARD

☐ COELT EDF GLOBAL ID: LOG CODE:

SPECIAL INSTRUCTIONS:

Report down to the MDL

Filter at laboratory upon receipt

REQUESTED ANALYSES

Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	EPA 1640 Dissolved Cu	MS/MSD
21	NB-24-021016	2/10/16	0822	WAT	2				X	X
22	NB-17-021016		0901		1				X	
23	NB-04-021016		0925		1				X	
24	NB-BL15401-021016		0945		1				X	
25	NB-BL15402-021016		0945		1				X	
26	NB-BL15403-021016		0945		1				X	
27	NB-BL15404-021016		0945		1				X	
28	NB-BL15405-021016		0945		1				X	
29	NB-BL15406-021016		0945		1				X	
30	NB-BL15407-021016	↓	0945	↓	1				X	

Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date: 2/10/16	Time: 1722
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:

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CHAIN OF CUSTODY RECORD

WO # / LAB USE ONLY: 16-02-0869

DATE: 2/10/14

PAGE: 4 OF 4

LABORATORY CLIENT: **Anchor QEA**

ADDRESS: **27201 Puerta Real, Suite 350**

CITY: **Mission Viejo** STATE: **CA** ZIP: **92691**

TEL: **949.347.2780** E-MAIL: cosuch@anchorqea.com

CLIENT PROJECT NAME / NUMBER: Newport Bay Metals TMDL WQ

P.O. NO.: 150243-01.04

PROJECT CONTACT: Chris Osuch

SAMPLER(S): (PRINT) C. Dolphin, N. Kennedy

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):

☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☐ STANDARD

☐ COELT EDF

GLOBAL ID:

LOG CODE:

SPECIAL INSTRUCTIONS:

Report down to the MDL

Filter at laboratory upon receipt

REQUESTED ANALYSES

Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	EPA 1640 Dissolved Cu	MS/MSD
31	N13-26-021016	2/10/14	1456	WAT	1	Y			X	

Relinquished by: (Signature) — Received by: (Signature/Affiliation) — Date: 2/10/14 — Time: 1722

Relinquished by: (Signature) — Received by: (Signature/Affiliation) — Date: — Time:

Relinquished by: (Signature) — Received by: (Signature/Affiliation) — Date: — Time:

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WORK ORDER NUMBER: 16-02- 0869

SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: Anchor QEA

DATE: 02 / 10 / 2016

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC4B (CF: +0.3°C); Temperature (w/o CF): 2.7 °C (w/ CF): 3.0 °C; ☐ Blank ☑ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter Checked by: 836

CUSTODY SEAL:

Cooler ☐ Present and Intact ☐ Present but Not Intact ☑ Not Present ☐ N/A Checked by: 836

Sample(s) ☐ Present and Intact ☐ Present but Not Intact ☑ Not Present ☐ N/A Checked by: 836

SAMPLE CONDITION:	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Sampling date ☐ Sampling time ☐ Matrix ☐ Number of containers			
☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☐	☑	☐
Sample container(s) intact and in good condition	☑	☐	☐
Proper containers for analyses requested	☑	☐	☐
Sufficient volume/mass for analyses requested	☑	☐	☐
Samples received within holding time	☑	☐	☐
Aqueous samples for certain analyses received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation chemical(s) noted on COC and/or sample container	☑	☐	☐
Unpreserved aqueous sample(s) received for certain analyses			
☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals			
Container(s) for certain analysis free of headspace	☐	☐	☑
☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)			
☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE: (Trip Blank Lot Number: _____)

Aqueous: ☐ VOA ☐ VOA**h** ☐ VOA**na$_2$** ☐ 100PJ ☐ 100PJ**na$_2$** ☐ 125AGB ☐ 125AGB**h** ☐ 125AGB**p** ☐ 125PB

☐ 125PB**znna** ☐ 250AGB ☐ 250CGB ☐ 250CGB**s** ☑ 250PB ☐ 250PB**n** ☐ 500AGB ☐ 500AGJ ☐ 500AGJ**s**

☐ 500PB ☐ 1AGB ☐ 1AGB**na$_2$** ☐ 1AGB**s** ☐ 1PB ☐ 1PB**na** ☐ _____ ☐ _____ ☐ _____ ☐ _____

Solid: ☐ 4ozCGJ ☐ 8ozCGJ ☐ 16ozCGJ ☐ Sleeve (_____) ☐ EnCores® (_____) ☐ TerraCores® (_____) ☐ _____

Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ _____ **Other Matrix** (_____): ☐ _____ ☐ _____

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag

Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO_3, **na** = NaOH, **na$_2$** = $Na_2S_2O_3$, **p** = H_3PO_4, **s** = H_2SO_4, **u** = ultra-pure, **znna** = $Zn(CH_3CO_2)_2$ + NaOH

Labeled/Checked by: 836

Reviewed by: 1064

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WORK ORDER NUMBER: 16-02- 0809

SAMPLE ANOMALY REPORT

DATE: 02 / 10 / 2016

SAMPLES, CONTAINERS, AND LABELS:

- ☐ Sample(s) NOT RECEIVED but listed on COC
- ☑ Sample(s) received but NOT LISTED on COC
- ☐ Holding time expired (list client or ECI sample ID and analysis)
- ☐ Insufficient sample amount for requested analysis (list analysis)
- ☐ Improper container(s) used (list analysis)
- ☐ Improper preservative used (list analysis)
- ☐ No preservative noted on COC or label (list analysis and notify lab)
- ☐ Sample container(s) not labeled
- ☐ Client sample label(s) illegible (list container type and analysis)
- ☐ Client sample label(s) do not match COC (comment)
  - ☐ Project information
  - ☐ Client sample ID
  - ☐ Sampling date and/or time
  - ☐ Number of container(s)
  - ☐ Requested analysis
- ☐ Sample container(s) compromised (comment)
  - ☐ Broken
  - ☐ Water present in sample container
- ☐ Air sample container(s) compromised (comment)
  - ☐ Flat
  - ☐ Very low in volume
  - ☐ Leaking (not transferred; duplicate bag submitted)
  - ☐ Leaking (transferred into ECI Tedlar™ bags*)
  - ☐ Leaking (transferred into client's Tedlar™ bags*)

* Transferred at client's request.

Comments

(-32) Received 1-250ml plastic container, labeled as WB-16-021016, 2/10/16@1139 (not on COC)

MISCELLANEOUS: (Describe)

Comments

HEADSPACE:

(Containers with bubble > 6 mm or ¼ inch for volatile organic or dissolved gas analysis)

ECI Sample ID	ECI Container ID	Total Number**	ECI Sample ID	ECI Container ID	Total Number**

(Containers with bubble for other analysis)

ECI Sample ID	ECI Container ID	Total Number**	Requested Analysis

Comments: _____

Reported by: 1054

Reviewed by: SB6

** Record the total number of containers (i.e., vials or bottles) for the affected sample.

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WORK ORDER NUMBER: 16-02-0975

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: ANCHOR QEA, LLC

Client Project Name: Newport Bay Metals TMDL WQ

Attention: Chris Osuch
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Approved for release on 02/24/2016 by:
Carla Hollowell
Project Manager

ResultLink

Email your PM

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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Client Project Name: Newport Bay Metals TMDL WQ
Work Order Number: 16-02-0975

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Work Order Narrative

Work Order: 16-02-0975 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 02/11/16. They were assigned to Work Order 16-02-0975.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

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Sample Summary

Client:	ANCHOR QEA, LLC 27201 Puerta Real, Suite 350 Mission Viejo, CA 92691-8306	Work Order:	16-02-0975
		Project Name:	Newport Bay Metals TMDL WQ
		PO Number:	
		Date/Time Received:	02/11/16 14:34
		Number of Containers:	23
Attn:	Chris Osuch		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
NB-07-021116	16-02-0975-1	02/11/16 08:52	1	Aqueous
NB-21-021116	16-02-0975-2	02/11/16 08:58	1	Aqueous
NB-02-021116	16-02-0975-3	02/11/16 09:20	1	Aqueous
NB-33-021116	16-02-0975-4	02/11/16 09:30	1	Aqueous
NB-05-021116	16-02-0975-5	02/11/16 09:40	1	Aqueous
NB-20-021116	16-02-0975-6	02/11/16 09:49	1	Aqueous
NB-36-021116	16-02-0975-7	02/11/16 10:00	2	Aqueous
NB-14-021116	16-02-0975-8	02/11/16 10:10	1	Aqueous
NB-23-021116	16-02-0975-9	02/11/16 10:18	1	Aqueous
NB-31-021116	16-02-0975-10	02/11/16 10:33	1	Aqueous
NB-25-021116	16-02-0975-11	02/11/16 11:55	1	Aqueous
NB-11-021116	16-02-0975-12	02/11/16 12:00	1	Aqueous
NB-29-021116	16-02-0975-13	02/11/16 10:29	1	Aqueous
NB-40-021116	16-02-0975-14	02/11/16 10:40	1	Aqueous
NB-19-021116	16-02-0975-15	02/11/16 10:50	1	Aqueous
NB-28-021116	16-02-0975-16	02/11/16 10:52	1	Aqueous
NB-06-021116	16-02-0975-17	02/11/16 11:03	1	Aqueous
NB-03-021116	16-02-0975-18	02/11/16 11:07	1	Aqueous
NB-12-021116	16-02-0975-19	02/11/16 11:17	1	Aqueous
NB-09-021116	16-02-0975-20	02/11/16 11:25	1	Aqueous
NB-10-021116	16-02-0975-21	02/11/16 11:30	1	Aqueous
NB-30-021116	16-02-0975-22	02/11/16 11:49	1	Aqueous

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Analytical Report

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/11/16
Work Order: 16-02-0975
Preparation: EPA 3005A Filt.
Method: EPA 1640
Units: ug/L

Project: Newport Bay Metals TMDL WQ

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-07-021116	**16-02-0975-1-A**	**02/11/16 08:52**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 18:32**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	6.53	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-21-021116	**16-02-0975-2-A**	**02/11/16 08:58**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 19:10**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	5.91	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-02-021116	**16-02-0975-3-A**	**02/11/16 09:20**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 19:18**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	12.7	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-33-021116	**16-02-0975-4-A**	**02/11/16 09:30**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 19:26**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	8.19	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-05-021116	**16-02-0975-5-A**	**02/11/16 09:40**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 19:33**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	5.42	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-20-021116	**16-02-0975-6-A**	**02/11/16 09:49**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 19:41**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	7.54	0.0300	0.00898	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/11/16
Work Order: 16-02-0975
Preparation: EPA 3005A Filt.
Method: EPA 1640
Units: ug/L

Project: Newport Bay Metals TMDL WQ

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-36-021116	**16-02-0975-7-B**	**02/11/16 10:00**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 17:45**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	5.02	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-14-021116	**16-02-0975-8-A**	**02/11/16 10:10**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 19:49**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	3.99	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-23-021116	**16-02-0975-9-A**	**02/11/16 10:18**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 19:57**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	3.28	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-31-021116	**16-02-0975-10-A**	**02/11/16 10:33**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 20:04**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	2.77	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-25-021116	**16-02-0975-11-A**	**02/11/16 11:55**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 20:12**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	1.94	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-11-021116	**16-02-0975-12-A**	**02/11/16 12:00**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/19/16 00:27**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	2.31	0.0300	0.00898	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/11/16
Work Order: 16-02-0975
Preparation: EPA 3005A Filt.
Method: EPA 1640
Units: ug/L

Project: Newport Bay Metals TMDL WQ

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-29-021116	**16-02-0975-13-A**	**02/11/16 10:29**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/19/16 00:34**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	2.81	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-40-021116	**16-02-0975-14-A**	**02/11/16 10:40**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/19/16 00:42**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	3.09	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-19-021116	**16-02-0975-15-A**	**02/11/16 10:50**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/19/16 01:21**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	2.09	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-28-021116	**16-02-0975-16-A**	**02/11/16 10:52**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/19/16 01:29**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	2.52	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-06-021116	**16-02-0975-17-A**	**02/11/16 11:03**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/19/16 01:36**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	1.66	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-03-021116	**16-02-0975-18-A**	**02/11/16 11:07**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/19/16 01:44**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	1.84	0.0300	0.00898	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/11/16
Work Order: 16-02-0975
Preparation: EPA 3005A Filt.
Method: EPA 1640
Units: ug/L

Project: Newport Bay Metals TMDL WQ

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-12-021116	**16-02-0975-19-A**	**02/11/16 11:17**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/19/16 01:52**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	3.05	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-09-021116	**16-02-0975-20-A**	**02/11/16 11:25**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/19/16 01:59**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	2.17	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-10-021116	**16-02-0975-21-A**	**02/11/16 11:30**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/19/16 02:07**	**160217L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	1.08	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
NB-30-021116	**16-02-0975-22-A**	**02/11/16 11:49**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/19/16 02:15**	**160217L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	1.87	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-823-188**	**N/A**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 16:05**	**160217L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	ND	0.0300	0.00898	1.00	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-823-187**	**N/A**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 16:20**	**160217L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Copper	ND	0.0300	0.00898	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Quality Control - Spike/Spike Duplicate

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/11/16
Work Order: 16-02-0975
Preparation: EPA 3005A Filt.
Method: EPA 1640

Project: Newport Bay Metals TMDL WQ

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
16-02-1063-1	**Sample**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 17:38**	**160217S01**
16-02-1063-1	**Matrix Spike**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 17:53**	**160217S01**
16-02-1063-1	**Matrix Spike Duplicate**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 18:01**	**160217S01**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	1.789	0.5000	2.279	98	2.386	119	50-150	5	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

ANCHOR QEA, LLC	Date Received:	02/11/16
27201 Puerta Real, Suite 350	Work Order:	16-02-0975
Mission Viejo, CA 92691-8306	Preparation:	EPA 3005A Filt.
	Method:	EPA 1640
Project: Newport Bay Metals TMDL WQ		Page 2 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
NB-36-021116	**Sample**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 17:45**	**160217S02**
NB-36-021116	**Matrix Spike**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 18:09**	**160217S02**
NB-36-021116	**Matrix Spike Duplicate**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 18:16**	**160217S02**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	5.020	0.5000	5.230	4X	5.430	4X	50-150	4X	0-20	Q

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/11/16
Work Order: 16-02-0975
Preparation: EPA 3005A Filt.
Method: EPA 1640

Project: Newport Bay Metals TMDL WQ

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-823-188	**LCS**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 16:28**	**160217L01F**
099-15-823-188	**LCSD**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 16:36**	**160217L01F**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	0.5000	0.5768	115	0.5827	117	70-130	1	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

ANCHOR QEA, LLC
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691-8306

Date Received: 02/11/16
Work Order: 16-02-0975
Preparation: EPA 3005A Filt.
Method: EPA 1640

Project: Newport Bay Metals TMDL WQ

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-823-187	**LCS**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 16:44**	**160217L02F**
099-15-823-187	**LCSD**	**Aqueous**	**ICP/MS 05**	**02/17/16**	**02/18/16 16:51**	**160217L02F**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Copper	0.5000	0.5802	116	0.5394	108	70-130	7	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Glossary of Terms and Qualifiers

Work Order: 16-02-0975 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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CHAIN OF CUSTODY RECORD

WO # / LAB USE ONLY: **16-02-0975**

DATE: 2/11/16

PAGE: 1 OF 3

LABORATORY CLIENT: **Anchor QEA**

ADDRESS: **27201 Puerta Real, Suite 350**

CITY: **Mission Viejo** STATE: **CA** ZIP: **92691**

TEL: **949.347.2780** E-MAIL: cosuch@anchorqea.com

CLIENT PROJECT NAME / NUMBER: Newport Bay Metals TMDL WQ

P.O. NO.: 150243-01.04

PROJECT CONTACT: Chris Osuch

SAMPLER(S): (PRINT) C. Dolphin, N. Kennedy

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):

☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ STANDARD

☐ COELT EDF GLOBAL ID: LOG CODE:

SPECIAL INSTRUCTIONS:

Report down to the MDL

Filter at laboratory upon receipt

REQUESTED ANALYSES

Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	EPA 1640 Dissolved Cu	MS/MSD
1	NB-07-021116	2/11/16	0852	WAT	1				X	
2	NB-21-021116		0858		1				X	
3	NB-02-021116		0920		1				X	
4	NB-33-021116		0930		1				X	
5	NB-05-021116		0940		1				X	
6	NB-20-021116		0949		1				X	
7	NB-30-021116		1000		2				X	X
8	NB-14-021116		1010		1				X	
9	NB-23-021116		1018		1				X	
10	NB-31-021116		1033		1				X	

Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
	EEI	2/10/16 11 AM	1345
	ECL	021116	1434

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CHAIN OF CUSTODY RECORD

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WO # / LAB USE ONLY: 6-02-0975

DATE: 2/11/16

PAGE: 2 OF 3

LABORATORY CLIENT: Anchor QEA	CLIENT PROJECT NAME / NUMBER: Newport Bay Metals TMDL WQ
ADDRESS: 27201 Puerta Real, Suite 350	P.O. NO.: 150243-01.04
CITY: Mission Viejo STATE: CA ZIP: 92691	PROJECT CONTACT: Chris Osuch
TEL: 949.347.2780 E-MAIL: cosuch@anchorqea.com	SAMPLER(S): (PRINT) C. Dolphin K. Kennedy

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ STANDARD

☐ COELT EDF | GLOBAL ID: | LOG CODE:

SPECIAL INSTRUCTIONS:
Report down to the MDL
Filter at laboratory upon receipt

REQUESTED ANALYSES

Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	EPA 1640 Dissolved Cu	MS/MSD
11	NB-25-021116	2/11/16	1155	WAT	1				X	
12	NB-11-021116	↓	1200	↓	1				X	

Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
M Kennedy	ECL	2/11/16	1345
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:
	ECL	021116	1434
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:

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CHAIN OF CUSTO. RECORD

WO # / LAB USE ONLY: 16-02-0975

DATE: 2/11/16

PAGE: 3 OF 3

LABORATORY CLIENT: Anchor QEA	CLIENT PROJECT NAME / NUMBER: Newport Bay Metals TMDL WQ
ADDRESS: 27201 Puerta Real, Suite 350	P.O. NO.: 150243-01.04
CITY: Mission Viejo STATE: CA ZIP: 92691	PROJECT CONTACT: Chris Osuch
TEL: 949.347.2780 E-MAIL: cosuch@anchorqea.com	SAMPLER(S): (PRINT) C. Dolphin K. Kennedy

TURNAROUND TIME (Rush surcharges may apply to any TAT not "STANDARD"):
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ STANDARD

☐ COELT EDF | GLOBAL ID: | LOG CODE:

SPECIAL INSTRUCTIONS:
Report down to the MDL
Filter at laboratory upon receipt

REQUESTED ANALYSES

Please check box or fill in blank as needed.

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Unpreserved	Preserved	Field Filtered	EPA 1640 Dissolved Cu	MS/MSD
13	NB-29-021116	2/11/16	1029	WAT	1				X	
14	NB-40-021116		1040		1				X	
15	NB-19-021116		1050		1				X	
16	NB-28-021116		1052		1				X	
17	NB-04-021116		1103		1				X	
18	NB-03-021116		1107		1				X	
19	NB-12-021116		1117		1				X	
20	NB-09-021116		1125		1				X	
21	NB-10-021116		1130		1				X	
22	NB-30-021116		1149		1				X	

Relinquished by: (Signature) K. Kennedy	Received by: (Signature/Affiliation) Anchor QEA	Date: 2/11/16	Time: 1845
Relinquished by: (Signature)	Received by: (Signature/Affiliation) ECL	Date: 021116	Time: 1434
Relinquished by: (Signature)	Received by: (Signature/Affiliation)	Date:	Time:

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WORK ORDER NUMBER: 16-02- 0975

SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: ANCHOR QEA

DATE: 02 / 11 / 2016

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC4B (CF: +0.3°C); Temperature (w/o CF): 3.8 °C (w/ CF): 4.1 °C; ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter Checked by: GB

CUSTODY SEAL:

Cooler ☐ Present and Intact ☐ Present but Not Intact ☑ Not Present ☐ N/A Checked by: GB

Sample(s) ☐ Present and Intact ☐ Present but Not Intact ☑ Not Present ☐ N/A Checked by: 1054

SAMPLE CONDITION:	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Sampling date ☐ Sampling time ☐ Matrix ☐ Number of containers			
☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and in good condition	☑	☐	☐
Proper containers for analyses requested	☑	☐	☐
Sufficient volume/mass for analyses requested	☑	☐	☐
Samples received within holding time	☑	☐	☐
Aqueous samples for certain analyses received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation chemical(s) noted on COC and/or sample container	☑	☐	☐
Unpreserved aqueous sample(s) received for certain analyses			
☐ Volatile Organics ☐ Total Metals ☑ Dissolved Metals			
Container(s) for certain analysis free of headspace	☐	☐	☑
☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)			
☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE: (Trip Blank Lot Number: _____)

Aqueous: ☐ VOA ☐ VOA**h** ☐ VOA**na$_2$** ☐ 100PJ ☐ 100PJ**na$_2$** ☐ 125AGB ☐ 125AGB**h** ☐ 125AGB**p** ☐ 125PB

☐ 125PB**znna** ☐ 250AGB ☐ 250CGB ☐ 250CGB**s** ☑ 250PB ☐ 250PB**n** ☐ 500AGB ☐ 500AGJ ☐ 500AGJ**s**

☐ 500PB ☐ 1AGB ☐ 1AGB**na$_2$** ☐ 1AGB**s** ☐ 1PB ☐ 1PB**na** ☐ _____ ☐ _____ ☐ _____ ☐ _____

Solid: ☐ 4ozCGJ ☐ 8ozCGJ ☐ 16ozCGJ ☐ Sleeve (_____) ☐ EnCores® (_____) ☐ TerraCores® (_____) ☐ _____

Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ _____ **Other Matrix** (_____): ☐ _____ ☐ _____

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag

Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO_3, **na** = NaOH, **na$_2$** = $Na_2S_2O_3$, **p** = H_3PO_4, **s** = H_2SO_4, **u** = ultra-pure, **znna** = $Zn(CH_3CO_2)_2$ + NaOH

Labeled/Checked by: 1054

Reviewed by: 836

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Analytical Resources, Incorporated
Analytical Chemists and Consultants

March 15, 2016

Chris Osuch
Anchor QEA
350 Puerta Real, Suite 350
Mission Viejo, CA 92691

RE: Project: Newport Bay Metals TMDL WQ, 150243-01.04
ARI Job No.: AWS3

Dear Mr. Osuch:

Please find enclosed the Chain of Custody records (COCs), sample receipt documentation, and the final results for samples the project referenced above. Ten water samples were removed from archive and logged under ARI job AWS3. For details regarding sample receipt, please refer to the enclosed Cooler Receipt Forms.

The samples were analyzed for dissolved organic carbon, per email request.

One filter blank analyzed on February 29, 2016 had a result greater than the reporting limit due to carry-over from previously analyzed contaminated samples. No filter blank volume remained for analysis. Sample results associated with this filter blank were re-analyzed on March 3, 2016. All data have been reported as is. No corrective action was taken.

There were no other anomalies associated with the analysis of these samples.

An electronic copy of this package will remain on file with ARI. Should you have any questions or problems, please feel free to contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Cheronne Oreiro
Project Manager
(206) 695-6214
cheronneo@arilabs.com
www.arilabs.com

cc: eFile: AWS3

Enclosures

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Subject: Newport Bay DOC Samples
From: Claire Dolphin <cdolphin@anchorqea.com>
Date: 2/26/2016 10:07 AM
To: "cheronneo@arilabs.com" <cheronneo@arilabs.com>
CC: Cindy Fields <cfields@anchorqea.com>, Chris Osuch <cosuch@anchorqea.com>

Hi Cheronne,
As mentioned on the phone, we are ready to run the DOC analyses on the samples shipped to you two weeks ago. We will only run 10 of the samples and those are:
NB-2-021116
NB-5-021116
NB-7-021116
NB-14-021116
NB-20-021116
NB-21-021116
NB-23-021116
NB-33-021116
NB-36-021116
NB-39-021016
Please also run the MS/MSD on station 39, and hold on to the rest of the samples.
Feel free to reach out with any questions.
Thank you,
Claire

Claire Dolphin
Environmental Scientist

ANCHOR QEA, LLC
cdolphin@anchorqea.com
27201 Puerta Real, Suite 350
Mission Viejo, CA 92691
T 949.347.2780
D 949.334.9615

ANCHOR QEA, LLC
www.anchorqea.com

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AVE	Turn-around Requested:	Date: 2/11/14	
ARI Client Company: Anchor QEA, LLC	Phone: 949-347-2780	Page: 1 of 3	
Client Contact: Chris Osuch 350 Puerta Real Suite 350, Mission Viejo, CA 92691		No. of Coolers: 1	Cooler Temps: 4.3°C
Client Project Name: Newport Bay Metals TMDL WQ			
Client Project #: 150243-01.04	Samplers:		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: DOC	MS/MSD							Notes/Comments
NB-07-021114	2/11/14	0852	WAT	1	X								
NB-21-021114		0858		1	X								
NB-02-021114		0920		1	X								
NB-33-021114		0930		1	X								
NB-05-021114		0940		1	X								
NB-20-021114		0949		1	X								
NB-36-021114		1000		2	X	X							
NB-14-021114		1010		1	X								
NB-23-021114		1018		1	X								
NB-31-021114		1033		1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
Filter and preserve upon receipt, then withhold from analysis until further notice	(Signature):	(Signature):	(Signature):	(Signature):
	Printed Name: Nick Kenned	Printed Name: Tyler Rankin	Printed Name:	Printed Name:
	Company: Anchor QEA	Company: ARI	Company:	Company:
	Date & Time: 2/11/14 1230	Date & Time: 2-12-14 1535	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

AVS3 9999

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Date: 2/11/16	
ARI Client Company: Anchor QEA, LLC	Phone: 949-347-2780	Page: 2 of 3	
Client Contact: Chris Osuch 350 Puerta Real Suite 350, Mission Viejo, CA 92691		No. of Coolers: 1	Cooler Temps: 4.3°C
Client Project Name: Newport Bay Metals TMDL WQ			
Client Project #: 150243-01.04	Samplers:		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: DOC	MS/MSD							Notes/Comments
NB-29-021116	2/11/16	1029	WAT	1	X								
NB 40-021116	"	1040	"	1	X								
NB-19-021116	"	1050	"	1	X								
NB-28-021116	"	1052	"	1	X								
NB-06-021116	"	1103	"	1	X								
NB-03-021116	"	1107	"	1	X								
NB-12-021116	"	1117	"	1	X								
NB-09-021116	"	1125	"	1	X								
NB-10-021116	"	1130	"	1	X								
NB-30-021116	"	1149	"	1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
Filter and preserve upon receipt, then withhold from analysis until further notice	(Signature): [signature]	(Signature): [signature]	(Signature)	(Signature)
	Printed Name: Nick Kennedy	Printed Name: Tyler Ranken	Printed Name:	Printed Name:
	Company: Anchor QEA	Company: ARI	Company:	Company:
	Date & Time: 2/11/16	Date & Time: 2-12-16 1535	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:
ARI Client Company: Anchor QEA, LLC	Phone: 949-347-2780
Client Contact: Chris Osuch 350 Puerta Real Suite 350, Mission Viejo, CA 92691	
Client Project Name: Newport Bay Metals TMDL WQ	
Client Project #: 150243-01.04	Samplers:

Date: 2/11/14
Page: 3 of 3
No. of Coolers: 1 Cooler Temps: 4.3°C

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: DOC	MS/MSD							Notes/Comments
NB-25-021114	2/11/14	1155	WAT	1	1								
WB-11-021114	2/11/14	1220	WAT	1	1								

Comments/Special Instructions
Filter and preserve upon receipt, then withhold from analysis until further notice

	Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature)				
Printed Name:	Nick Kennedy	Tyler Rankin		
Company:	Anchor QEA	ARI		
Date & Time:	2/11/14 1230	2-12-16 1535		

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Anchor

COC No(s): _____ (NA)

Assigned ARI Job No: AVZ1

Project Name: Newport Bay Metals

Delivered by: ~~Fed-Ex~~ UPS Courier Hand Delivered Other: _____

Tracking No: 8726 7209 7896 NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 4-3
Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D0052776

Cooler Accepted by: TR Date: 2-12-16 Time: 1535

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ...	(Bubble Wrap) (Wet Ice) (Gel Packs) Baggies Foam Block Paper Other:		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	* (YES)	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: AV Date: 2/12/16 Time: 1605

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

Taken to Conventionals to be filtered into preserved bottles. 2/12/16 @ 1605

NB-07-021116 lid received cracked, no sample volume lost

By: AV Date: 2/12/16

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
• • •	• • •	● ● ●

Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AUV3	Turn-around Requested:	Date: 2/10/14	
ARI Client Company: Anchor QEA, LLC	Phone: 949-347-2780	Page: 3 of 4	
Client Contact: Chris Osuch 350 Puerta Real Suite 350, Mission Viejo, CA 92691		No. of Coolers:	Cooler Temps:
Client Project Name: Newport Bay Metals TMDL WQ			
Client Project #: 150243-01.04	Samplers:		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: DOC	MS/MSD							Notes/Comments
NB-35-021014	2/10/14	1131	WAT	1	X								
NB-16-021016		1139		1	X								
NB-22-021014		1151		1	X								
NB-01-021016		1155		1	X								
NB-34-021016		1202		1	X								
NB-37-021016		1205		1	X								
NB-32-021016		1220		1	X								
NB-38-021016		1225		1	X								
NB-15-021016		1342		1	X								
NB-13-021016		1350		1	X								

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Filter and preserve upon receipt, then withhold from analysis until further notice				
	Printed Name: Rick Kennedy	Printed Name: Francisco G	Printed Name:	Printed Name:
	Company: Anchor QEA	Company: ARI	Company:	Company:
	Date & Time: 2/10/14 1520	Date & Time: 02/11/2016 10:15	Date & Time:	Date & Time:

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AVV3	Turn-around Requested:	Date: 2/10/16	
ARI Client Company: Anchor QEA, LLC	Phone: 949-347-2780	Page: 4 of 4	
Client Contact: Chris Osuch 350 Puerta Real Suite 350, Mission Viejo, CA 92691		No. of Coolers:	Cooler Temps:
Client Project Name: Newport Bay Metals TMDL WQ			
Client Project #: 150243-01.04	Samplers:		

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Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: DOC	MS/MSD							Notes/Comments
NB-39-021016	2/10/16	1430	WAT	2	X	X							
NB-18-021016		1439		1	X								
NB-26-021016		1450		1		X							
NB-													

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
Filter and preserve upon receipt, then withhold from analysis until further notice	(Signature)	(Signature)	(Signature)	(Signature)
	Printed Name: Nick Kennedy	Printed Name: Francisco	Printed Name:	Printed Name:
	Company: Anchor QEA	Company: ARI	Company:	Company:
	Date & Time: 2/10/16 1520	Date & Time: 02/11/2016 10:15	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Anchor

COC No(s): _____ NA

Assigned ARI Job No: AVV3

Project Name: Newport Bay Metals TMDL WQ

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Tracking No: 0200 8726 7209 7889 NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 4.1

Time: 1015

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D00526

Cooler Accepted by: FRANCISCO Date: 02/11/2016 Time: 10:15

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?	(Bubble Wrap) (Wet Ice) Gel Packs Baggies Foam Block Paper Other: _____		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	(YES)	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	(NA)		_____

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

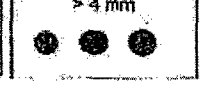
Samples Logged by: TR Date: 2-11-16 Time: 1431

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
		

Small → "sm" (< 2 mm)	
Peabubbles → "pb" (2 to < 4 mm)	
Large → "lg" (4 to < 6 mm)	
Headspace → "hs" (> 6 mm)	

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Conventionals Laboratory Analyst Notes

ARI Job No.: AVV1, AVV3, AVZ1 Client ID: _____

Parameter: DOC Client Project: _____

List problems, concerns, corrective actions and any other pertinent information
All samples filtered and preserved w 0.5ml 9N H_2SO_4 to pH <2.0 and filter blanks. Samples returned to login for Holding.

Analyst Initials:	CPK	Date:	2-15-16

PRESERVATION VERIFICATION 02/29/16
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **AWS3**

PC: Cheronne
VTSR: 02/12/16

Inquiry Number: NONE
Analysis Requested: 02/29/16
Contact: Osuch, Chris
Client: Anchor QEA, LLC
Logged by: TR
Sample Set Used: Yes-481
Validatable Package: LV4
Deliverables:

Project #: 150243-01.04
Project: Newport Bay Metals TMDL WQ
Sample Site:
SDG No:
Analytical Protocol: In-house

DOC*

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
16-3203 **AWS3A**	NB-39-021016											P					Y*					
16-3204 **AWS3B**	NB-07-021116											P										
16-3205 **AWS3C**	NB-21-021116											P										
16-3206 **AWS3D**	NB-02-021116											P										
16-3207 **AWS3E**	NB-33-021116											P										
16-3208 **AWS3F**	NB-05-021116											P										
16-3209 **AWS3G**	NB-20-021116											P										
16-3210 **AWS3H**	NB-36-021116											P										
16-3211 **AWS3I**	NB-14-021116											P										
16-3212 **AWS3J**	NB-23-021116											P										

P=pass

*2-29-16 CRL

AWS3_SDS1

Checked By TR Date 2-29-16

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AWS3
Client: Anchor QEA, LLC
Project Event: 150243-01.04
Project Name: Newport Bay Metals TMDL WQ

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	NB-39-021016	AWS3A	16-3203	Water	02/10/16 14:30	02/12/16 15:35
2.	NB-07-021116	AWS3B	16-3204	Water	02/11/16 08:52	02/12/16 15:35
3.	NB-21-021116	AWS3C	16-3205	Water	02/11/16 08:58	02/12/16 15:35
4.	NB-02-021116	AWS3D	16-3206	Water	02/11/16 09:20	02/12/16 15:35
5.	NB-33-021116	AWS3E	16-3207	Water	02/11/16 09:30	02/12/16 15:35
6.	NB-05-021116	AWS3F	16-3208	Water	02/11/16 09:40	02/12/16 15:35
7.	NB-20-021116	AWS3G	16-3209	Water	02/11/16 09:49	02/12/16 15:35
8.	NB-36-021116	AWS3H	16-3210	Water	02/11/16 10:00	02/12/16 15:35
9.	NB-14-021116	AWS3I	16-3211	Water	02/11/16 10:10	02/12/16 15:35
10.	NB-23-021116	AWS3J	16-3212	Water	02/11/16 10:18	02/12/16 15:35

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 2/14/2011

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

SAMPLE RESULTS-CONVENTIONALS
AWS3-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: MDC
Reported: 03/15/16

Project: Newport Bay Metals TMDL WQ
Event: 150243-01.04
Date Sampled: 02/10/16
Date Received: 02/12/16

Client ID: NB-39-021016
ARI ID: 16-3203 AWS3A

Analyte	Date Batch	Method	Units	RL	Sample
Dissolved Organic Carbon	03/03/16 030316#1	EPA 9060	mg/L	1.00	1.67

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AWS3-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: CDC
Reported: 03/15/16

Project: Newport Bay Metals TMDL WQ
Event: 150243-01.04
Date Sampled: 02/11/16
Date Received: 02/12/16

Client ID: NB-07-021116
ARI ID: 16-3204 AWS3B

Analyte	Date Batch	Method	Units	RL	Sample
Dissolved Organic Carbon	02/29/16 022916#1	EPA 9060	mg/L	1.00	1.51

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AWS3-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: WC
Reported: 03/15/16

Project: Newport Bay Metals TMDL WQ
Event: 150243-01.04
Date Sampled: 02/11/16
Date Received: 02/12/16

Client ID: NB-21-021116
ARI ID: 16-3205 AWS3C

Analyte	Date Batch	Method	Units	RL	Sample
Dissolved Organic Carbon	02/29/16 022916#1	EPA 9060	mg/L	1.00	2.10

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AWS3-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: ac
Reported: 03/15/16

Project: Newport Bay Metals TMDL WQ
Event: 150243-01.04
Date Sampled: 02/11/16
Date Received: 02/12/16

Client ID: NB-02-021116
ARI ID: 16-3206 AWS3D

Analyte	Date Batch	Method	Units	RL	Sample
Dissolved Organic Carbon	02/29/16 022916#1	EPA 9060	mg/L	1.00	2.11

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AWS3-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: dsh
Reported: 03/15/16

Project: Newport Bay Metals TMDL WQ
Event: 150243-01.04
Date Sampled: 02/11/16
Date Received: 02/12/16

Client ID: NB-33-021116
ARI ID: 16-3207 AWS3E

Analyte	Date Batch	Method	Units	RL	Sample
Dissolved Organic Carbon	02/29/16 022916#1	EPA 9060	mg/L	1.00	1.54

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AWS3-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: ASC
Reported: 03/15/16

Project: Newport Bay Metals TMDL WQ
Event: 150243-01.04
Date Sampled: 02/11/16
Date Received: 02/12/16

Client ID: NB-05-021116
ARI ID: 16-3208 AWS3F

Analyte	Date Batch	Method	Units	RL	Sample
Dissolved Organic Carbon	02/29/16 022916#1	EPA 9060	mg/L	1.00	2.20

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AWS3-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: CMC
Reported: 03/15/16

Project: Newport Bay Metals TMDL WQ
Event: 150243-01.04
Date Sampled: 02/11/16
Date Received: 02/12/16

Client ID: NB-20-021116
ARI ID: 16-3209 AWS3G

Analyte	Date Batch	Method	Units	RL	Sample
Dissolved Organic Carbon	02/29/16 022916#1	EPA 9060	mg/L	1.00	2.10

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AWS3-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: ARI
Reported: 03/15/16

Project: Newport Bay Metals TMDL WQ
Event: 150243-01.04
Date Sampled: 02/11/16
Date Received: 02/12/16

Client ID: NB-36-021116
ARI ID: 16-3210 AWS3H

Analyte	Date Batch	Method	Units	RL	Sample
Dissolved Organic Carbon	02/29/16 022916#1	EPA 9060	mg/L	1.00	1.44

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AWS3-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: WA
Reported: 03/15/16

Project: Newport Bay Metals TMDL WQ
Event: 150243-01.04
Date Sampled: 02/11/16
Date Received: 02/12/16

Client ID: NB-14-021116
ARI ID: 16-3211 AWS3I

Analyte	Date Batch	Method	Units	RL	Sample
Dissolved Organic Carbon	02/29/16 022916#1	EPA 9060	mg/L	1.00	2.24

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
AWS3-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 03/15/16

Project: Newport Bay Metals TMDL WQ
Event: 150243-01.04
Date Sampled: 02/11/16
Date Received: 02/12/16

Client ID: NB-23-021116
ARI ID: 16-3212 AWS3J

Analyte	Date Batch	Method	Units	RL	Sample
Dissolved Organic Carbon	02/29/16 022916#1	EPA 9060	mg/L	1.00	2.06

RL Analytical reporting limit
U Undetected at reported detection limit

MS/MSD RESULTS-CONVENTIONALS
AWS3-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 03/15/16

Project: Newport Bay Metals TMDL WQ
Event: 150243-01.04
Date Sampled: 02/10/16
Date Received: 02/12/16

Analyte	Method	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: AWS3A Client ID: NB-39-021016							
Dissolved Organic Carbon	EPA 9060	03/03/16	mg/L	1.67	20.5	20.0	94.2%
ARI ID: AWS3H Client ID: NB-36-021116							
Dissolved Organic Carbon	EPA 9060	02/29/16	mg/L	1.44	21.2	20.0	98.8%

REPLICATE RESULTS-CONVENTIONALS
AWS3-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: WL
Reported: 03/15/16

Project: Newport Bay Metals TMDL WQ
Event: 150243-01.04
Date Sampled: 02/10/16
Date Received: 02/12/16

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: AWS3A Client ID: NB-39-021016						
Dissolved Organic Carbo	EPA 9060	03/03/16	mg/L	1.67	1.49	11.4%
ARI ID: AWS3H Client ID: NB-36-021116						
Dissolved Organic Carbo	EPA 9060	02/29/16	mg/L	1.44	1.59	9.9%

METHOD BLANK RESULTS-CONVENTIONALS
AWS3-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: WL
Reported: 03/15/16

Project: Newport Bay Metals TMDL WQ
Event: 150243-01.04
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	Blank	ID
Dissolved Organic Carbon	EPA 9060	02/29/16	mg/L	< 0.50 U	
		02/29/16		1.25	FB
		02/29/16		< 0.50 U	
		02/29/16		< 0.50 U	FB
		03/03/16		< 0.50 U	

FB Filtration Blank

STANDARD REFERENCE RESULTS-CONVENTIONALS
AWS3-Anchor QEA, LLC

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized: MC
Reported: 03/15/16

Project: Newport Bay Metals TMDL WQ
Event: 150243-01.04
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Method	Date	Units	SRM	True Value	Recovery
Dissolved Organic Carbon	EPA 9060	02/29/16	mg/L	20.5	20.0	102.5%
ERA #1217-15-04		02/29/16		20.5	20.0	102.5%
		03/03/16		19.5	20.0	97.5%

ANCHOR QEA

27201 Puerta Real, Suite 350
Mission Viejo, California 92691
Phone 949.347.2780
www.anchorqea.com

MEMORANDUM

To:	Leonie Mulvihill and Chris Miller, City of Newport Beach	**Date:**	October 14, 2016
From:	Shelly Anghera, Ph.D., Anchor QEA, LLC	**Project:**	160243-03.01
Re:	Technical Comments Submitted by the City of Newport Beach		

This memorandum summarizes our technical comments on the Staff Report for Basin Plan Amendments for Copper Total Maximum Daily Loads (TMDLs) and Non-TMDL Metals Action Plans for Zinc, Mercury, Arsenic, and Chromium in Newport Bay, California (Staff Report; RWQCB Santa Ana 2016).

Location	Comment
1.1	Rhine Channel is included as part of the Lower Newport Bay; however, the U.S. Environmental Protection Agency's (EPA's) 2002 Total Maximum Daily Load (TMDL) identifies it as its own waterbody. Resolution No. R8-2011-0037 states that Rhine Channel TMDLS are not included in organochlorine compound TMDLs because the impairment will be addressed through dredging. The City of Newport (City) has already dredged more than 90,000 cubic yards (cy). See the TMDL Current Data memorandum dated October 13, 2016. The City requests Rhine Channel continue to be managed separately from this metals TMDL.
3.3 State Board Data Assessment 2006	A review was conducted that concluded that general metals should be delisted and only copper is recommended for listing in Upper and Lower Newport Bay. We believe data that characterize the current conditions support lack of listing for all metals in sediment, tissue, and water with the exception of copper in the water column. We request the Regional Water Quality Control Board (RWQCB) staff correct errors and delist general metal categories for Upper Newport Bay.
Section 3.4 Current 303(d) listing and decisions Table 3.2	We believe sufficient data are available to remove sediment toxicity in Upper Newport Bay and Lower Newport Bay waterbodies with the association of metals. See the TMDL Current Data memorandum dated October 13, 2016. Sediment toxicity is listed with organochlorine; compliance with copper TMDL should not be dependent on sediment toxicity because there is no linkage between copper concentrations and the presence of sediment toxicity. We request the RWQCB staff correct errors and delist general metal categories for Upper Newport Bay. We believe sufficient data are available to remove sediment toxicity in Upper Newport Bay with the association of metals. See the TMDL Current Data memorandum dated October 13, 2016. A TMDL listing for sediment toxicity is included with the organochlorine TMDL.
4.1.2	The use of the California Toxic Rule (CTR) copper value is overly conservative as a tool for predicting adverse impacts to marine organisms within Marina del Rey. We believe a site-specific numeric target should be developed for use in the TMDL. The use of CTR

Location	Comment
	values is widely recognized within the scientific community to be overly conservative for use in a regulatory order and does not appear to be directly linked in any way to potential impacts in Newport Bay. The use of site-specific numeric criteria for metals will allow a clearer and more definitive demonstration of appropriate numeric standards. The use of strong science to demonstrate the linkage between boat paint and marine quality is necessary and required within the TMDL policy. Furthermore, EPA recommends the use of water-effects ratios (WERs) specifically for copper in marine environments when dissolved organic carbon is present. "When the concentration of dissolved organic carbon is elevated, copper is substantially less toxic and use of Water-Effect Ratios might be appropriate." See EPA's Aquatic Life Criteria Table for copper footnote: http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm#cc. We believe the CTR is not being applied appropriately. From the CTR guidance, the 3.1 micrograms per liter (µg/L) value should not be used until a WER is established. Where, as here, the use of the default WER leads to impairment findings that conflict with available toxicity data from the site, it is improper to use the default WER when evidence indicates it is incorrect. (See comments for Section 4.2.4.). Moreover, though the copper TMDL purports to apply the CTR Criteria Continuous Concentration, it fails to accurately apply the regulation as written and adopted by EPA. Specifically, footnote d to the table set forth under 40 C.F.R. § 131.38(b)(1) provides that "Criteria Continuous Concentration (CCC) equals the highest concentration of a pollutant to which aquatic life can be exposed for an extended period of time (4 days) without deleterious effects." There is no evidence that the RWQCB considered whether locations where instantaneous grab samples exceeded the (unadjusted) CTR CCC would actually exceed the CTR value over a 4-day average. This failure to consider the 4-day averaging period is especially significant because samples taken during different tidal events show variation at numerous locations.
4.1.5	The Staff Report provides a discussion regarding federal revisions to the coper water quality objectives. The City submitted comments to EPA and extended those comments to the RWQCB for consideration in potential revisions to the copper water quality objectives. See the Revised Federal Copper Criteria Standard letter from City of Newport Beach, September 16, 2016.
4.1.5	As stated in the Staff Report, "The CTR criteria for dissolved Cu are expressed as a function of the WER. The WER is generally computed as the acute or chronic toxicity value for a pollutant measured in the affected receiving water, divided by the respective acute or chronic toxicity value in laboratory dilution water. A default WER of one (1) is assumed for the purposes of determining the applicable numeric objectives. This means that the numeric values identified in the CTR for dissolved Cu apply, unless an alternative, scientifically defensible WER is developed, approved and applied to modify the numeric value of the objective. If approved, the revised objectives form the basis for discharge requirements and other regulatory actions." CCC criterion continuous concentration is based on the assumption that it is multiplied by the WER for site-specific impairment. CTR is not accurately applied as intended with

Location	Comment
	consideration of site-specific conditions, and the RWQCB has not demonstrated the CTR value without adjustment from a WER is not overly conservative. We believe the CTR is not being applied appropriately. From the CTR guidance, the 3.1 µg/L value should not be used until a WER is established.
Section 4.2.1	Sediment impairment should be removed from the TMDL. Sediment evaluations require the inclusions of all potential contaminants of concern to be managed appropriately. The State developed guidance for assessing sediment quality and RWQCB staff did not follow state guidance. The preponderance of relevant data does not provide any evidence of a linkage between sediment impairment and metals concentrations. Sediment impairment should not be included in a metals TMDL for Newport Bay.
Section 4.2.1 Fish/Mussel Tissue data	Wildlife and human health screening levels used in the Staff Report are not appropriate because they are: (1) not standardized and therefore in some cases were derived differently using different assumptions, depending on the chemical; and (2) not based on recommended screening levels for wildlife and human health screening level evaluations in California. • Wildlife screening should be based on a comparison of the total daily intake of contaminated fish by wildlife receptors relative to dose-based toxicity reference values (i.e., Ecological Soil Screening Levels; see *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments*, EPA 540-R-97-006, 1997). Background concentrations in mussels and fish collected off the coast of Orange County (as part of regional monitoring programs such as Surface Water Ambient Monitoring Program [SWAMP] and California State Mussel Watch programs) should also be evaluated to determine if tissues from Newport Bay are statistically elevated relative to background concentrations. See the TMDL Current Data memorandum dated October 13, 2016. The fish in Newport Bay are equal to or less than the fish located outside of Newport Harbor during 2009 to 2011 monitoring efforts. Many of the fish evaluated in the Staff Report are not residential and are therefore exposed across a wide area; their exposures can be assumed to be coming from regional sources that are not related to Newport Bay. • Human health screening levels were not correctly applied. Screening levels should be based on regional (California) risk-based screening levels that are available through the EPA Region 9 website, as well as appropriate site-specific information. • For evaluation of data for listing purposes, inorganic arsenic in tissue should be measured directly and not estimated when data are being used in a listing determination. The assumption that inorganic arsenic makes up 10% of total arsenic is overly conservative and inappropriate. As indicated by the literature cited in the Staff Report and in many other studies, inorganic arsenic often makes up much less than 10% of the total arsenic. Because inorganic arsenic can be analyzed and quantified, it is imperative that tissue data are collected and analyzed for this arsenic species prior to comparison to screening levels and listing determination.

Location	Comment
Section 4.2.2	Staff did not accurately characterize current condition in Newport Bay. For a detailed review of relevant data, see the TMDL Current Data memorandum dated October 13, 2016. Studies older than 5 years should be removed from determining current conditions. In fact, all data presented in the Staff Report with the exception of OC Coastkeeper & Candelaria (2014) should be removed from the analysis of current condition. More recent data are available and should have been included. A summary of the rationale for removing the studies related to water and sediment quality as descriptors of current condition is summarized below. • Copper Metals Marina Study (2007) – Data are too old and not relevant to current condition. This study should not be included for determining current sediment condition. • Water – Water condition changes constantly; only the most currently available data should be used to evaluate water condition. The City has dissolved copper data less than 18 months old. The Orange County (OC) Monitoring Program currently collects quarterly dissolved copper data from multiple locations in Upper and Lower Newport Bay. • Sediment – Sediment condition has changed. Significant dredging has occurred in both Upper and Lower Newport Bay. Sediment quality has changed over time, which is evident through the recent evaluations summarized in the TMDL Current Data memorandum dated October 13, 2016. Current data are available for the Turning Basin area and Marina sites; therefore, additional data are not required. • OC Stormwater Monitoring Data (2006 – 2009) – Data from 2006 to 2009 are not reflective of current conditions. Therefore, data presented in the Staff Report should be amended to only include the last 5 years of monitoring data that are readily available. – Older data can be used to support trends but should not infer current condition. • Copper Reduction in Lower Newport Bay (2013) – Data were summarized from the OC Monitoring Program for 2009 to 2011, limiting assessment to these years is not reflective of current conditions. Therefore, data presented in the Staff Report should be amended to include only data after 2011. Current monitoring data are readily available. • Sediment Evaluation for Lower Newport Bay Study (Newfields 2009) – Dredge characterization data are not appropriate for defining surficial sediment condition. This study should not be included for determining current sediment condition. Dredge characterization studies characterize sediment cores that do not accurately assess the surface condition. Further, multiple dredge characterization studies have been implemented throughout the harbor; it is not clear why the Staff Report chooses to only present this evaluation.

Location	Comment
	• Newport Bay Sediment Toxicity study (SCCWRP 2004) – Data are not reflective of current condition. This study should not be included for determining current sediment condition. Sediment condition has changed. Significant dredging has occurred in both Upper and Lower Newport Bay. Sediment quality has changed over time, which is detailed in the TMDL Current Data memorandum dated October 13, 2016. • Newport Bay and San Diego Creek Chemistry Study (SCCWRP 2003). – Data are not reflective of current condition. This study should not be included for determining current sediment condition. Sediment condition has changed. Significant dredging has occurred in both Upper and Lower Newport Bay. Sediment quality has changed over time, which is detailed in the TMDL Current Data memorandum dated October 13, 2016.
Section 4.2.2	OC Coastkeeper & Candelaria (2014) support the lack of metals impairment to sediments. • Staff did not accurately summarize the toxicity results for OC Coastkeeper & Candelaria (2014) in Table 4-10 (page 46). Table 4-10 should include the six amphipod toxicity tests that were conducted with no observed toxicity. • The lack of sediment toxicity to amphipods supports the lack of benthic impairment caused by metals. As stated in Section 4.2.1, sediment impairment is determined when there is an exceedance of effects range medians (ERMs) along with sediment toxicity. Therefore, this study supports the lack of sediment impairment related to metals and negates any actions to support sediment remediation actions (Implementation Task 2), monitoring in sediments (Implementation Task 5), and non-TMDL action plans (Table 6.1 of the Basin Plan Amendment [BPA]).
Section 4.2 Data Analysis	Sediment data presented in the Staff Report are not reflective of current condition. See the TMDL Current Data memorandum dated October 13, 2016. • Data representative of current conditions were not included in the Staff Report and should be include the following studies. These studies (with the exception of Rhine Channel) support the lack of impairment to sediment quality by metals and, therefore, support the removal of non-TMDL action plans for zinc, mercury, arsenic, and chromium, as well as sediment quality evaluations and remediation from copper sources in this copper TMDL. Details of all studies are provided in the TMDL Current Data memorandum dated October 13, 2016, and summarized as follows: o OC Monitoring Program – Stormwater and Estuary Programs – 2011 to present (http://ocwatersheds.com/rainrecords/waterqualitydata) ▪ The quarterly program includes 139 samples at seven locations during the last 5 years. There have been no ERM exceedances for copper, zinc, arsenic, or chromium. Only seven ERM exceedances for mercury were found in the Rhine Channel location (LNBRIN). ▪ This monitoring program includes sediment toxicity testing. There have been 96 sediment toxicity tests conducted at

Location	Comment
	seven stations in Lower and Upper Newport Bay in the last 5 years (since January 2011). Stations included LNBHIR, LNBRIN, LNBTUB, UNBCHB, UNBJAM, UNBNSB, and UNBSDC. Each station was tested 15 times, except for LNBRIN (n = 7) and UNBCHB (n = 14). Of those 96, 18 of the tests had a toxic response (i.e., survival less than 80%). Of the 18, two toxic responses occurred in the Rhine Channel (LNBRIN). There has been no toxicity observed in the last three sampling events in the Rhine Channel (LNBRIN), the only location where ERM exceedances of metals are currently found. All other toxic responses occurred in locations where no ERM exceedances of metals were found. ▪ The lack of sediment toxicity to amphipods supports the lack of benthic impairment caused by metals. As stated in Section 4.2.1, sediment impairment is determined when there is an exceedance of ERMs along with sediment toxicity. Therefore, this study supports the lack of sediment impairment related to metals and supports removal of known sediment copper impairment actions (Implementation Task 2), monitoring in sediments (Implementation Task 5), and all the recommended actions within the non-TMDL action plans (Table 6.1 of the BPA). o Rhine Channel Post Remediation Study (Anchor QEA 2012) ▪ Twelve sampling locations were included; 8 samples exceeded copper ERM, 12 samples exceeded mercury ERM, and 3 samples exceeded zinc ERMs. No arsenic and chromium ERM exceedances were found. ▪ Sediment ERM exceedances are present in the Rhine Channel with occasional sediment toxicity. This study supports the approach to manage Rhine Channel separately from rest of Newport Bay. o Federal Dredging Post Sediment Condition (Anchor QEA 2013) ▪ Eleven sampling locations were included; no copper, arsenic, chromium, or zinc ERM exceedances were found. There was only one mercury ERM exceedance. ▪ This study included both sediment and sediment/water interface toxicity testing. No toxicity was observed. ▪ The lack of toxicity in the sediment/water interface test supports the lack of impairment from copper in sediments to overlying water. Therefore, this study supports the lack of sediment impairment related to metals fluxing from sediments and supports the removal of special studies related to copper loading from sediment (Implementation Task 6.1). ▪ The lack of sediment toxicity to amphipods supports the lack of benthic impairment caused by metals. As stated in Section 4.2.1, sediment impairment is determined when there is an

Location	Comment
	exceedance of ERMs along with sediment toxicity. Therefore, this study supports the lack of sediment impairment related to metals and supports removal of known sediment copper impairment actions (Implementation Task 2), monitoring in sediments (Implementation Task 5), and all the recommended actions within the non-TMDL action plans (Table 6.1 of the BPA). o Bight '13 Regional Monitoring Program, Sediment Quality Objective Assessment (SCCWRP 2015) ▪ The study included sediment chemistry analyses at nine stations. Copper, arsenic, chromium, mercury, and zinc were not detected in concentrations greater than the ERM in any sample. ▪ This study included both sediment and sediment/water interface toxicity testing at nine stations. No toxicity was observed at all stations except three. Moderate toxicity was observed in two samples. High toxicity was observed in one sample; however, subsequent resampling at this station indicated no toxicity. ▪ The lack of toxicity in the sediment/water interface test supports the lack of impairment from copper in sediments to overlying water. Therefore, this study supports the lack of sediment impairment related to metals fluxing from sediments and supports the removal of special studies related to copper loading from sediment (Implementation Task 6.1). ▪ The lack of sediment toxicity to amphipods supports the lack of benthic impairment caused by metals. As stated in Section 4.2.1, sediment impairment is determined when there is an exceedance of ERMs along with sediment toxicity. Therefore, this study supports the lack of sediment impairment related to metals and supports removal of known sediment copper impairment actions (Implementation Task 2), monitoring in sediments (Implementation Task 5), and all the recommended actions within the non-TMDL action plans (Table 6.1 of the BPA).
Section 4.2.2 Page 29, Table 4-4	The tissue data presented in the Staff Report are too old and not reflective of current condition. • Food Web Study in Fish (Allen et al. 2008) o Data presented in the Allen et al. (2008) study were collected in the winter of 2005 and the summer of 2006 and, therefore, are more than 10 years ago and are not representative of current exposures to Newport Bay sediment. • Department of Fish and Game Monitoring Data (Frueh & Ichikawa 2007) o Data were collected in July and August 2006 and, therefore, are more than 10 years old and are not representative of current exposures to Newport Bay sediment.

Location	Comment
	• Bioaccumulation Fish Tissue Study (Allen et al. 2004) o Data presented in the Allen et al. (2004) study are more than 10 years ago and are not representative of current exposures to Newport Bay sediment. Further, metals, with the exception of mercury, are not known to bioaccumulate or biomagnify to levels of concern in the Southern California Bight. The old data that are presented in the Staff Report do not indicate that copper or other metals were ever elevated to levels of potential concerns within Newport Bay. For more details on the most recently available tissue data, see the TMDL Current Data memorandum dated October 13, 2016. • More recent studies should be used to support TMDL listing actions. Fish and mussel data from Newport Bay collected after 2006 are available from the State's database, CEDEN (http://www.ceden.org/), and were collected as part of the Newport Bay Watershed Bio Trend Monitoring Program from 2007 through 2010.
Section 4.2.3 Fish/Mussel Tissue summary Page 45	Insufficient data are available to support a listing. In accordance with the State's Listing Policy, "A water segment shall be placed on the section 303(d) list if the tissue pollutant levels in organisms exceed a pollutant-specific evaluation guideline (satisfying the requirements of section 6.1.3) using the binomial distribution as described in section 3.1." (SWRCB 2004). In accordance with the binomial approach, a minimum sample size of 16 is required to evaluate whether there are exceedances of pollutant-specific guidelines. There are insufficient mussel and fish data available for human health and wildlife (fish tissue) listing purposes that are representative of exposure to current sediment conditions; all data collection occurred more than 10 years ago and, therefore, are not representative of current exposures to Newport Bay sediment. For human health, there are fewer than ten samples (and all older than 10 years) upon which listing recommendations are being made. Fish tissue listings are inappropriate because there was no consideration of background fish tissue concentrations of metals prior to listing recommendations. This is critical because background concentrations of mercury, arsenic, and cadmium in fish are elevated above the screening levels used in the Staff Report, based on ocean-collected fish data collected as part of the 2009 SWAMP program (see the TMDL Current Data memorandum dated October 13, 2016).
4.2.2	Sufficient sediment and toxicity data are available to assess impairment from metals. • Thirty-nine sediment/water interface toxicity tests with 48-hour Mytilus development tests have been conducted in Upper and Lower Newport Bay in the last 5 years. No toxicity was observed in any of the tests. The lack of toxicity in the sediment/water interface test supports the lack of impairment from copper in sediments to overlying water. Therefore, this study supports the lack of sediment impairment related to metals fluxing from sediments and supports the removal of special studies related to copper loading from sediment (Implementation Task 6.1). • One hundred twenty-two sediment toxicity tests with 10-day amphipod acute tests have been conducted in Upper and Lower Newport Bay in the last 5

Location	Comment
	years. A toxic response (i.e., survival less than 80%) was detected in 22 samples. However, the toxic response does not co-occur with ERM exceedance in metals, except for two instances in the Rhine Channel where mercury exceeds the ERM. The lack of sediment toxicity to amphipods supports the lack of benthic impairment caused by metals. As stated in Section 4.2.1, sediment impairment is determined when there is an exceedance of ERMs along with sediment toxicity. Therefore, this study supports the lack of sediment impairment related to metals and supports removal of known sediment copper impairment actions (Implementation Task 2), monitoring in sediments (Implementation Task 5), and all the recommended actions within the non-TMDL action plans (Table 6.1 of the BPA). • Wildlife and human health screening levels used in the Staff Report are not appropriate because they are: (1) not standardized and therefore in some cases were derived differently using different assumptions, depending on the chemical; and (2) not based on recommended screening levels for wildlife and human health screening level evaluations in California. A review of available fish tissue does not indicate any accumulation of metals at levels higher than regional concentrations. Therefore, these studies support lack of tissue impairment related to in-bay sources for metals and supports removal of all the recommended actions within the non-TMDL action plans (Table 6.1 of the BPA). We believe Rhine Channel should be managed outside of a metals TMDL. The entire Section 4 needs to be revised to include only current information.
4.2.4	The data do not demonstrate copper or any other metals are causing impairment in the water, sediment, and tissue in Upper and Lower Newport Bay. 1) Although there have been exceedances of the CTR in localized areas of the harbor, there are no toxic responses to suggest that dissolved copper concentrations are causing impacts to the most sensitive of marine organisms. There are 39 sediment/water interface tests conducted in the last 5 years as well as five water column toxicity tests in the last 6 months. No toxicity to the most sensitive toxicity test (48-hour Mytilus development) has been observed. 2) More than 215 sediment samples that represent the current sediment surface condition were evaluated. There are only two instances of a metal ERM exceedance occurring in the 122 sediment toxicity (10-day amphipod acute) tests. Therefore, the sediment and toxicity data do not support the determination of impairment based on the listing policy. 3) Wildlife and human health screening levels used in the Staff Report are not appropriate because they are: (1) not standardized and therefore in some cases were derived differently using different assumptions, depending on the chemical; and (2) not based on recommended screening levels for wildlife and human health screening level evaluations in California. Tissue does not appear to be elevated above regional concentrations. There is an insufficient number of samples to support a fish tissue listing for wildlife or human health.

Location	Comment
	We believe sufficient data are available to delist sediment toxicity. We believe there is insufficient data to support listing of metals in sediments and tissues for all of Newport Bay.
4.2.4 Table 4-13	Table 4-13 is difficult to follow. It is unclear what actions the RWQCB are taking. Table 4-14 provides a clear understanding of the RWQCB's intent to add new listings to the 303(d) list. The Staff Report does not accurately assess the sediment, water, and tissue impairments related to metals and does not support the RWQCB assessment for listing. ▪ Copper, zinc, and mercury in sediments should not be listed on the 303(d) list for Lower Newport Bay. There are insufficient exceedances of ERMs with the presence of toxicity. Only two instances in the last 5 years have found ERM exceedance of a metal with toxicity; both occurred in the Rhine Channel where multiple organic contaminants are also elevated above their respective ERM values. ▪ There are exceedances of dissolved copper CTR; we recommend keeping dissolved copper on the 303(d) list, but a TMDL is not needed. Evidence suggests the Department of Pesticide Regulation (DPR) guidance and regional improvements in water quality will continue to support a healthy marine habitat and provide significant reductions into the future. Water column toxicity has not been demonstrated to be associated with CTR exceedances; therefore, impairment has not been shown. ▪ Arsenic, zinc, copper, and mercury have no reason to be listed on the 303(d) and should be delisted. ▪ Arsenic, zinc, copper, and mercury for fish tissue in either Upper or Lower Newport Bay should not be listed on the 303(d) list. RWQCB staff have not applied appropriate screening criteria and have not demonstrated any potential sources for these compounds to Newport Bay that do not exist off the coast. Levels in the fish are similar to fish in coastal zones outside the influence of Newport Bay sources.
4.3	The Staff Report does not accurately assess the sediment, water, and tissue impairments related to metals and does not support the RWQCB assessment for problem statement.
4.3 Table 4-15	Toxicity in water and sediment have not demonstrated impairment and therefore should be removed from table.
5	A copper TMDL is not needed. There are ongoing programs that will continue reductions of metals to the marine environment for the next 15 years. The effectiveness of ongoing source reductions should be evaluated to determine if additional actions are required. ▪ Past actions have made a lot of progress o Dredging in Upper and Lower Newport Bay o Ongoing municipal separate storm sewer systems (MS4s), source reductions o Clean boating programs o Regional air quality improvements

Location	Comment
	▪ Anticipated and expected future actions that will reduce copper in the coming years include: o Continued MS4 reductions/controls o Brake pad initiative will reduce copper and zinc throughout California o Future maintenance dredging may contribute to deepening of harbor and increases in circulation. o The environment is naturally recovering and will only improve with time. Long-term monitoring programs have demonstrated reductions (e.g., Regional Bight Monitoring Program, California Mussel Watch Program). o DPR paint restrictions will provide significant source reductions that we think will be sufficient to maintain water quality in Newport. If needed, a boater education program and a diver training program may be developed by interested stakeholders.
5.3.1	The loadings from copper antifouling paints (AFPs) were incorrectly calculated (see technical memorandum: Newport Bay TMDL Copper Leachate Draft Memo_101216_v2.PDF). The Staff Report incorrectly calculated loading from copper AFP and failed to consider a range of leach rates from currently available copper AFP on the market, appropriate vessel counts, conditional best management practice (BMP) requirements. • Calculation Errors. 1) The conversion from a daily leach rate to a yearly leach rate used a greater number of days (368.96 and 368.39 for epoxy and ablative-type paints, respectively) than occur in a year (365). This overestimated the calculated loading. 2) The adjustments to the loading rate did not correctly apply findings from the Earley (2013) study. The Earley (2013) study presented percent decreases from non-BMP methods to BMP methods. Because the Staff Report had already calculated loading rates for BMP methods, it should have used data presented in the Earley (2013) report to determine the percent increase from BMP to non-BMP methods in order to calculate loading rates for BMP methods. This underestimated the calculated loading. • Other Considerations. 1) The DPR Environmental Monitoring Branch (EMB) 2014 memorandum identified leach rates from currently available copper AFP that ranged from 1.0 to 29.6 micrograms per square centimeter per day (µg/cm^2/day). It further determined that 58% of these AFP products were greater than the recommended maximum leach rate of 9.5 µg/cm^2/day. This suggests that 42% of the products are already below the maximum recommended leach rate. The Staff Report assumes none of the products currently being used on vessels have leach rates that are below the maximum recommended leach rate. This approach overestimates the loading rates from vessels. 2) The Staff Report is based on 10,000 vessels moored or berthed in Newport Bay. The City of Newport Beach has conducted a review of the available moorings, commercial (marina), and residential slips available and has determined a total of 4,470 vessels occur in Newport Bay. Using 10,000 vessels substantially overestimates the loading rate from vessels. 3) The DPR EMB 2014 memorandum recommended a maximum leach rate of 9.5 µg/cm^2/day provided that boat hull cleaning used suitable BMP methods (soft

Location	Comment
	cloth pile instead of abrasive scour pads). The Staff Report calculated an average loading rate assuming 50% of the vessels were continued to be cleaned with non-BMP methods. This approach overestimates the loading rate from vessels. After adjusting for the incorrect calculations and considering reasonable alternative approaches to the loading calculation, a more accurate loading rate of approximately 11,000 pounds per year (lbs/yr) is expected, rather than a loading rate of approximately 36,000 lbs/yr as stated in the Staff Report.
5.3.4	Bay sediments are not elevated in metals at concentrations above the ERM and are not associated with the presence of sediment toxicity or overlying water toxicity. This section should be removed.
5.3.6	Algae and other vegetation have not been shown to be a concern or a pathway for metals uptake in higher trophic organisms in Newport Bay.
5.4	The City has a hydrodynamic model that can more accurately assess the loading capacity for copper. It should be used.
5.5	A margin of safety (MOS) was not calculated correctly; therefore, load allocations were not accurately calculated for boats within Newport Bay (see technical memorandum: Newport Bay TMDL Copper Leachate Draft Memo_101216_v2.PDF). • MOS. The MOS was incorrectly calculated as 20% of the TMDL, rather than more appropriately calculated as 20% of the sum of the waste load allocation (WLA) and load allocations (LAs). This approach overestimates the MOS and simultaneously underestimates the allocation for one or more types of WLAs or LAs. See other comments provided by the City about the overly conservative use of 20% MOS in the TMDL calculation. • LA for boats. Because the MOS was overestimated, in order to make the TMDL equation equitable (TMDL = WLA + LA + MOS), one or more WLAs or LAs were underestimated. The Staff Report appears to be solving for the copper LA for boats (all other WLA or LA values had corresponding references supporting the development of those values). Therefore, it is reasonable to assume the difference in the overestimated MOS should have been applied to the underestimated LA for boats. As such, the LA for boats should be 6,448 lbs/yr instead of 6,060 lbs/yr. • Alternative MOS. The Staff Report failed to justify a MOS of 20%. Considerations should be made for the use of an alternative MOS value of 10%. Using a similar approach for recalculating the LA for boats as stated above, a 10% MOS would suggest LAs for boats should be 7,330 lbs/yr.
5.5 Table 5.5	Please confirm how the boat LA was calculated. It appears to have been back-calculated from known values for the TMDL, WLAs (for MS4 permittees, CalTrans, Other NPDES permittees, and boatyards), and LAs (for Agricultural runoff, open space runoff, and air deposition).
5.6.1.3.1.4	Conversion to alternative paints is not as easy as RWQCB staff suggest. See other comments provided by the City about the difficulty in purchasing and applying proven paints that are non-toxic.
5.6.2.1	Reginal Board outreach was not sufficient. The TMDL was a surprise to most named responsible parties.

Location	Comment
6.2	Recent sediment chemistry data from the OC Monitoring Program (Mass Loading Station, and Wetland and Estuary elements), Bight '13 Regional Monitoring Program, OC Coastkeeper & Candelaria (2014) study, Federal Dredging Post Sediment Condition study, and Rhine Channel Post Remediation study do not support the justification for arsenic, chromium, mercury, and zinc impairments; therefore, these non-TMDL action plan should be removed from the Staff Report (see TMDL Current Data memorandum dated October 13, 2016). Only Rhine Channel shows elevated metals concentrations relative to ERM guidance values, but the Rhine Channel is subject of an ongoing Cleanup and Abatement Order.
7.0 and BPA Implementation Plan	As provided, the TMDL calculations to estimate harbor loading from boat paint are inaccurate and do not accurately assess the copper AFP reduction measures needed to comply with the CTR. The City or any other discharger cannot develop an implementation plan for copper reductions until the impairment has been defined accurately. The implementation actions have not been proven to be necessary to protect beneficial uses because impairment has not been accurately assessed and demonstrated.
8.3 Cost Considerations	For a summary of the 5-year cost to implement the program without any cost considerations to the boat owners and marina operators, see the TMDL Cost Estimate memorandum dated October 13, 2016. The cost considerations fail to address the full spectrum of requirements under the TMDL, including implementation plan development; compliance monitoring and special studies; in-water hull cleaning diver certification; and continuing education programs for boaters, boatyards, and marinas. Furthermore, a more rigorous economic accounting should be conducted, including providing a range of costs for the specific items mentioned, such as dredging to remediate copper in Lower Newport Bay, ongoing maintenance costs associated with more frequent boat hull painting, and costs to implement specific BMPs. The potential cost impacts were only considered for individual boat owners and not the financial impact to marina operators and the local marina industry. Banning the use of copper-based AFPs may cause most boaters to move to nearby harbors or leave boating because of this financial (and perceived as unnecessary) hardship. Only the wealthiest boaters will be able to afford to stay involved with boating, and they may choose nearby harbors and hurt the local economy by creating unfair impacts on marina owners and businesses. Other harbors are scheduled for copper TMDL considerations, but those TMDLs are years away from being enacted, and when enacted will have years to become compliant. Thereby, the requirements set forth for Newport Bay will affect our community more than 10 years before other harbors are impacted by this legislation.
9.0	This TMDL was not peer reviewed. The RWQCB cannot assume review for the EPA 2002 TMDL that included organics is either reflective or relevant to this copper TMDL.
9.2	The City does not believe the RWQCB has actively or has been willing to work with City. The City has provided comments multiple times and provided data for the last 5 years and the RWQCB has not incorporated the City's opinions or current data. Further Reginal Board outreach was not sufficient. The TMDL was a surprise to most named responsible parties.

707 Wilshire Blvd., 24th Floor
Los Angeles, California 90017
tel (213) 626-2906
fax (213) 626-0215
www.meyersnave.com

Gregory J. Newmark
Attorney at Law
gnewmark@meyersnave.com

meyers | nave

October 14, 2016

Dave Kiff
City Manager
City of Newport Beach
100 Civic Center Drive, 2nd Floor, Bay E
Newport Beach, CA 92660

Re: Comments Regarding Basin Plan Amendments for Copper TMDLs and Non-Metals Action Plans for Zinc, Mercury, Arsenic and Chromium in Newport Bay, California

Dear Mr. Kiff:

This law firm has been retained by the City of Newport Beach (City) to provide comments on legal deficiencies in the Basin Plan Amendments for Copper TMDLs and Non-Metals Action Plans for Zinc, Mercury, Arsenic and Chromium in Newport Bay, California, (Copper TMDL) being considered for adoption by the California Regional Water Quality Control Board, Santa Ana Region (Regional Board). Our comments are set forth in this letter.

I. Introduction

We understand that the City appreciates the time and effort Regional Board staff has devoted to meeting with stakeholders and developing the proposed Copper TMDL. Unfortunately, notwithstanding these efforts, the Copper TMDL is subject to numerous legal defects such that it cannot be lawfully adopted in its current form. First, the Copper TMDL is based upon an implementation plan that would require the City and other local agencies to ban Copper Anti-Fouling Paint even though the Legislature has expressly forbidden regulation of registered pesticide use by any agency other than the Department of Pesticide Regulation. Second, the Copper TMDL unlawfully requires nearly all the boats in Newport Bay to convert to nontoxic anti-fouling paints even though viable alternative products are essentially unavailable. Third, the Copper TMDL's margin of safety is too large and is unsupported. Fourth, the implementation schedule unlawfully requires early investments that may prove unnecessary. Fifth, the Copper TMDL would impose unfunded state mandates on the City that the state is constitutionally required to reimburse. Sixth, even if a TMDL is

to be adopted, it is unlawful to regulate all of Newport Bay when only isolated areas even arguably exceed California Toxics Rule requirements. Finally, the Substitute Environmental Document does not comply with the California Environmental Quality Act (CEQA).

II. The Copper TMDL Unlawfully Attempts to Force Local Agencies to Solve a Conflict Caused by the Regional Board's Failure to Convince the Legislature or its Sister State Agencies to Ban Copper Anti-Fouling Paint

The Copper TMDL is unlawful because it explicitly relies on an implementation plan that requires local agencies to take actions the Legislature has prohibited and because the Regional Board purports to usurp the authority of the Department of Pesticide Regulation to govern the use of Copper Anti-Fouling Paint. This approach ignores legal impediments to implementation and fails to grapple with the conflict between public policy objectives of improving water quality on the one hand and providing effective pesticides on the other hand. Ignoring the legal impossibility of the implementation measures required by the Copper TMDL does not make the regulation attainable. It makes the TMDL unlawful, and it should not be adopted as currently drafted.

A. The Legislature Explicitly Preempted Any Attempts by Local Government Agencies Such as the City to Regulate the Use of Registered Pesticides Such as Copper Anti-Fouling Paint

In bold italics, the Copper TMDL Staff Report Proclaims that "[t]his TMDL cannot be met unless Cu loading from boats is reduced or eliminated." (Staff Report, p. 68, emphasis deleted.). In order to accomplish this objective, the Staff Report indicates that "Dischargers responsible for reducing and/or eliminating Cu discharges from AFPs to meet the TMDL load allocation (LA) include . . . the City of Newport Beach . . . .". (*Id.* at p. 69.) Given that the Legislature has declared actions by the City do so are "void and of no force or effect," it is obvious that the Copper TMDL is fatally flawed and must be revised. (Food & Agr. Code, § 11505.1, subd. (a).)

The Legislature clearly and unambiguously stated its intent to preempt any and all attempts by other government agencies to regulate the use of pesticides in Food and Agriculture Code section 11501.1, subdivision (a):

> This division and Division 7 (commencing with Section 12501) are of statewide concern and occupy the whole field of regulation regarding the registration, sale, transportation, or use of pesticides

> to the exclusion of all local regulation. Except as otherwise specifically provided in this code, no ordinance or regulation of local government, including, but not limited to, an action by a local governmental agency or department, a county board of supervisors or a city council, or a local regulation adopted by the use of an initiative measure, may prohibit or in any way attempt to regulate any matter relating to the registration, sale, transportation, or use of pesticides, and any of these ordinances, laws, or regulations are void and of no force or effect.

The statutory language establishes that the Legislature invoked the broadest doctrine of preemption, field preemption. "If the subject matter or field of the legislation has been fully occupied by the state, there is no room for supplementary or complementary local legislation, even if the subject were otherwise one properly characterized as a 'municipal affair.' [Citations.]" (*Lancaster v. Municipal Court* (1972) 6 Cal.3d 805, 808.)

In addition, the Legislature's intent to preempt local regulation is stated expressly, so there is no need to evaluate if a comprehensive regulatory scheme implies an intent to occupy the field. Indeed, in an unrelated implied preemption case, the California Supreme Court noted section 11501.1 was adopted to overturn the High Court's decision in *People v. County of Mendocino* (1984) 36 Cal.3d 476 that California's pesticide regulation program did not impliedly occupy the filed such that local regulation would be preempted. (*IT Corp. v. Solano County Bd. of Supervisors* (1991) 1 Cal.4th 81, 93, fn. 9.)

As the Staff Report acknowledges, Copper Anti-Fouling Paints are regulated as pesticides by the Department of Pesticide Regulation as "the lead state agency." (Staff Report, p. 71.) Thus, Food and Agriculture Code section 11501.1 applies, express and complete preemption is imposed, and no action by the City "may prohibit or in any way attempt to regulate any matter relating to the . . . use of pesticides." Any such actions would be "void and of no force or effect."

Further, the Regional Board's attempts to force the City to regulate the use of Copper Anti-Fouling Paints notwithstanding preemption by the Food and Agriculture Code would expose Newport Beach to lawsuits by the Department of Pesticide Regulation and potentially private entity lawsuits. In Food and Agriculture section 11501.1, subdivision (b), the Legislature imposed a mandatory duty on the Department of Pesticide Regulation to sue any local government entity that, after notification, does not repeal a preempted ordinance or regulation. (Food & Agr. Code, §

11505.1, subd. (b) ["the director *shall* maintain an action for declaratory relief to have the ordinance or regulation declared void and of no force or effect, and *shall* also bring an action to enjoin enforcement of the ordinance or regulation." (Italics added)].) Likewise, if the City is forced flout the preemptive effect of section 11505.1, it may be exposed to lawsuits by private parties affected by City actions to ban Copper Anti-Fouling Paints. In either case, the City would contend the Regional Board is a necessary party and must be joined in the action as a defendant, but it is nonetheless inappropriate to subject Newport Beach to such potential litigation.

B. The Copper TMDL Unlawfully Infringes on the Department of Pesticide Regulation's Jurisdiction By Attempting to Force the City to Undermine the Department's Quasi-Legislative Determination on How to Regulate Copper Anti-Fouling Paint

The Copper TMDL unlawfully attempts to usurp the Department of Pesticide Regulation's exclusive authority under state law to regulate the use of registered pesticides because the TMDL is designed to do just that: the Staff Report states that "boats must be converted from Cu to nontoxic AFPs to achieve the Cu TMDLs." (Staff Report, p. 59.) Indeed, the Staff Report acknowledges that "[t]he California Department of Pesticide Regulation (DPR) and USEPA have the authority to restrict the sale and use of Cu AFPs." (Staff Report, p. 69.) Even though, as the Staff Report states, the Regional Board has "the authority to regulate the discharge of Cu into waters," it is unlawful for the Regional Board to exercise that authority in a manner that effectively bans the use of Copper Anti-Fouling Paints when the Department of Pesticide Regulation, the agency with rightful authority to govern the use of such registered pesticides, declined to adopt just such a ban. "To be valid, [quasi-legislative] administrative action must be within the scope of authority conferred by the enabling statute." (*Association for Retarded Citizens v. Department of Developmental Services* (1985) 38 Cal.3d 384, 391 [citations omitted].) The Copper TMDL violates this basic principle of administrative law.

The Legislature has plainly granted exclusive authority to the Department of Pesticide Regulation to regulate the use of registered pesticides like Copper Anti-Fouling Paint. As noted, the Department's comprehensive regulatory scheme is expressly intended to "occupy the whole field of regulation regarding the . . . use of pesticides." (Food & Agr. Code, § 11505.1, subd. (a).) Further, AB 425 and its legislative history demonstrate that the Legislature entrusted the Department of Pesticide Regulation to exercise its policy judgment balancing the water quality impacts of Copper Anti-Fouling Paint use against the important

benefits provided by this effective product. Specifically, the Legislature required the Department to establish a maximum allowable leach rate and to make recommendations for mitigation measures to protect aquatic environments. The Department exercised its judgment on these matters, and issued its *Determination of Maximum Allowable Leach Rate and Mitigation Recommendations for Copper Antifouling Paints Per AB 425* on January 30, 2014. Indeed, if the Department had attempted to establish an outright ban on use of Copper Anti-Fouling Paints, instead of establishing a maximum leach rate, that action would have been overturned as inconsistent with the legislature's direction. (*Association for Retarded Citizens, supra*, 38 Cal.3d at 391 ["Thus, if the court concludes that the administrative action transgresses the agency's statutory authority, it need not proceed to review the action for abuse of discretion; in such a case, there is simply no discretion to abuse. [Citations]."].)

The Copper TMDL's requirements that boats stop using lawfully registered pesticides is inconsistent with acts of the Legislature. "Administrative action that is not authorized by, or is inconsistent with, acts of the Legislature is void." (*Association for Retarded Citizens, supra*, 38 Cal.3d at 391.)

C. It is Unlawful for the Regional Board to Attempt to Coerce the City Into Banning Copper Anti-Fouling Paints Instead of Pursuing the Established Dispute Resolution Process with the Department of Pesticide Regulation

It is inappropriate and unlawful for the Regional Board to abdicate its responsibility to resolve conflicts with the Department of Pesticide Regulation under an existing agreement and, instead, attempt to force the City to ban Copper Anti-Fouling Paints because the Regional Board failed to convince its sister state agency to do so. The Staff Report references the 1997 Management Agency Agreement between the two state agencies, but it fails to mention that the agreement includes a dispute resolution provision:

> It is the desire of both agencies to establish as speedy, efficient, and informal method for resolving interagency conflicts. Conflicts among staff of the State and Regional Boards, DPR, and the Commissioners, which cannot otherwise be informally resolved, will be referred to the Executive Director of the State Board and the Director of DPR. Conflicts which cannot be resolved at this level may be referred to the Secretary for Environmental Protection. [¶] The Executive Director of the State Board and the Director of DPR will each appoint one staff member to assist in resolving conflicts.

(Management Agency Agreement, p. 14.) Thus, the Regional Board has a procedure available to resolve its conflict with the Department of Pesticide Regulations. It would be arbitrary and capricious, and contrary to law, to end-run that process by compelling local governments to regulate the use of registered pesticides in a manner contrary to the Department of Pesticide Regulation's legislative judgment.

III. The Copper TMDL is Unlawful Because Alternatives to Copper Anti-Fouling Paint are Not Effective or Available

The Copper TMDL is unlawful because it depends upon an illusory compliance strategy. In order to implement the TMDL, according to the Staff Report, almost all of the boats in Newport Bay will have to be converted from Copper Anti-Fouling Paints to nontoxic alternatives. The Staff Report admits that "This conversion depends on the availability, efficacy and cost of nontoxic AFPs/coatings." (Staff Report, p. 80.) While the Staff Report discusses studies that purportedly found these alternative paints are "available and cost-effective, it does not directly state that alternative products are actually commercially available so that the paint conversion required by the Copper TMDL could actually happen.

Even if the Staff Report did make such a finding, it could not be supported by evidence. In fact, the record will show that alternative paints are not commercially available, are not effective and are not affordable. Moreover, as explained in Section VIII, below, the only alternative paints with any degree of effectiveness are not recommended by US EPA's technical contractor because they present serious environmental hazards.

IV. The Margin of Safety is Too Large and is Unsupported

The Copper TMDL is improperly and artificially lowered because the Regional Board proposes a margin of safety that is unreasonably large and unsupported. Under Clean Water Act section 303(d)(1)(C), TMDLs must include "a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality." The same requirement is repeated without elaboration in the applicable regulation. (40 C.F.R. § 130.7(c)(1).) The Copper TMDL Staff Report incorrectly summarizes this specific federal requirement by stating that the margin of safety is more generally "to address uncertainty in the analysis." (Staff Report, p. 10.)

The Staff Report does not include any explanation of why such a large margin of safety is appropriate, and none is apparent. The Copper TMDL calculations and analysis rely on multiple layers of "conservative" assumptions, and the

California Toxics Rule is further based upon extremely conservative assumptions. There is no justification to add a margin of safety amounting to one fifth of the TMDL on top of all the other conservative assumptions, especially when the observed "impairment" are alleged and isolated technical exceedances of the chronic water quality criterion with little to no actual observed toxicity. Moreover, and importantly, there is no explanation of how the 20% proposed margin of safety "takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality," as required by the Clean Water Act. (33 U.S.C. § 303(d)(1)(C).) As a result, the TMDL and its load allocations are unlawfully and unreasonably low.

V. The Phased Implementation Schedule is Unreasonable, Unsupported and Would Force Substantial Early Investments That May Be Unnecessary

The Copper TMDL requires phased reductions in copper loading from boats beginning almost immediately, with a 20% reduction by the end of year 3, 50% by the end of year seven and so on to an 83% reduction by the end of year 15. (Staff Report, pp. 91-92.) This phased reduction schedule is unreasonable, unsupported and unlawful because it is too short and fails to allow time at the beginning of the schedule to address the many problems with the TMDL and its implementation.

Given that neither the Regional Board nor any of the entities regulated by the TMDL may legally restrict the use of Copper Anti-Fouling Paint, the Regional Board's acknowledgment that the Copper TMDL cannot be achieved without such a restriction, and the Regional Board's further conclusion that "voluntary compliance in Newport Bay is difficult," (Staff Report, p. 82) there is no justification for the failure to provide a reasonable period of time of at least five years when no reductions are required. This time period is necessary since there is currently no mechanism in place to require the conversion of boats to nontoxic anti-fouling paints or coatings. The current plan to develop a program to "restrict the sale and use of Cu antifouling paints" is for "Regional Board staff and dischargers to *work with* DPR . . . ." (Staff Report, p. 102 [italics added].) The City submits that it will likely take considerable time for this vague plan to work, and the Regional Board's failure to allow for such time in its implementation schedule is improper.

Similarly, though the Staff Report asserts that the phased implementation schedule allows for the development of site-specific objectives for copper that would supercede the California Toxics Rule criteria, it would wastefully and unnecessarily require costly and controversial efforts to achieve early reductions in copper loading while these efforts are ongoing. Given that water quality

trends already show improvement and there is little evidence of actual toxicity notwithstanding isolated exceedances, there is no justification for forcing these early efforts.

The lack of available, effective and affordable Copper Anti-Fouling Paint alternatives also demands that a reasonable time period be provided at the beginning of the implementation period. The Regional Board apparently intends to force development of new technologies and to create a new market for alternative products. Even so, it is irrational to adopt a schedule that does not allow the proposed new market time to respond and develop.

VI. The Copper TMDL Imposes Unfunded State Mandates the State Must Reimburse under the California Constitution

The Copper TMDL, if adopted, will impose unfunded state mandates that the state will be constitutionally obligated to reimburse. Article XIII B, Section 6, of the California Constitution, provides that "[w]henever . . . any state agency mandates a new program or higher level of service on any local government, the State shall provide a subvention of funds to reimburse that local government for the costs of the program or increased level of service . . . ." The Copper TMDL will trigger this subvention obligation.

Though the regional boards and State Water Resources Control Board commonly argue that their programs are exempt from the reimbursement requirement under Government Code section 17513, that argument would not be well taken in this case. Federal law does not require the Regional Board to ban the use of Copper Anti-Fouling Paints. Indeed, the Staff Report acknowledges, as it must, that Congress chose to exempt discharges from recreational boats from any permitting requirement under the Clean Water Act. (Staff Report, p. 75, citing 33 U.S.C. 1342(r).) While US EPA is developing a best management practices program under the Clean Boating Act, implementation "is considered to be a 'long term action'" with no time schedule. (Staff Report, p. 91.) Thus, there currently is no federal requirement to ban Copper Anti-Fouling Paints and US EPA permits regulating commercial vessels actually allow the use of Copper Anti-Fouling Paints subject to some conditions. (See Staff Report, p. 76.)

The Copper TMDL would represent a discretionary decision by the state to impose requirements beyond those mandated by federal law. This would be a "true choice" by the state to impose the mandate (*Hayes v. Comm'n on State Mandates* (1992) 11 Cal.App.4th 1593) and subvention will be required.

VII. It is Improper to Promulgate a TMDL for Entire Bay When Only Certain Water Bodies Within the Bay May Be Even Arguably Elevated Above California Toxics Rule Levels

The Copper TMDL improperly proposes to establish TMDLs for all of Newport Bay notwithstanding the fact that only small areas of the Bay even arguably exceed the California Toxics Rule Criterion Continuous Concentration for copper. Federal regulations governing TMDLs require states to identify "water quality limited segments." (40 C.F.R §§ 130.1(j), 130.7(c)(1) ["Each State shall establish TMDLs for the water quality limited segments identified" on its 303(d) list].) The Clean Water Act does not require the development of a TMDL regulating an entire group of water segments when only a few arguably exceed water quality standards, nor is it proper to do so. Indeed, California's 303(d) list contains numerous examples of water quality limited segments within larger geographic water bodies. To use an example frequently cited in the Staff Report, the San Diego Regional Board developed a Total Maximum Daily Load for Dissolved Copper in the Shelter Island Yacht Basin, not all of San Diego Bay.

Evidence before the Regional Board on the Copper TMDL shows that only small and unique water segments within Newport Bay even arguably exceed the Criterion Continuous Concentration for copper. As demonstrated in technical memoranda submitted with the City's comments (*Newport Bay Copper Study: Winter 2016* (Anchor QEA, March 25, 2016); *Random Sample Points Methodology* (Anchor QEA, July 10, 2015), areas of Newport Bay that were observed to exceed 3.1 µg/L of copper were limited to restricted, closed and often dead end channels like West Newport, the Rhine Channel and Linda Isle. Though it would be improper for the Regional Board to adopted the Copper TMDL for the many reasons explained throughout the City's comments, if a TMDL is to be adopted, there is no basis to develop and implement a TMDL for the entire Newport Bay under these circumstances.

VIII. The Substitute Environmental Document Fails to Comply with CEQA

As a preliminary matter, the Substitute Environmental Document (SED) is inadequate since its analysis of impacts uses an invalid "baseline."

Environmental analysis under Certified Regulatory Programs such as that applicable to the Regional Board are subject to general principles applicable to CEQA review. One such general principle is that significance of environmental impacts is determined in comparison with a "baseline" that generally consists of the environmental conditions that exist at the time of environmental review. It

is legal error to determine significance of impacts in comparison with a non-existent hypothetically "permitted" condition.

The Regional Board's SED violates this principle throughout the document, repeatedly concluding that the proposed project will have "no" or less than significant impacts in comparison to a baseline that assumes implementation of the US EPA TMDL. (see, e.g., SED at pps. 44, 45, 49, 56, 57.) Since the US EPA's TMDL is not currently being implemented, the SED must be revised to determine impact significance in comparison to a baseline that does not assume the US EPA's TMDL is (or will be) enforced.

More particularly, the SED's impact analysis is flawed because it fails to properly account for or analyze the foreseeable significant impacts of a key part of its recommended compliance program: the conversion of boats from Copper Anti-Fouling Paint to allegedly "non-toxic" alternative paints. The SED does not identify any such "non-toxic" non-Cu AFPs. In fact, the Washington State Department of Ecology has concluded that there are no currently available non-toxic alternatives to Cu AFPs:

> "Although the assessors were able to select preferred alternatives, results indicated that none of them was a good alternative to copper antifouling paint. Some appeared to be slightly preferable to the copper antifouling paint in terms of hazard, but they all contained chemicals that posed human health and environmental concerns."

(Washington State Department of Ecology, Assessing Alternatives to Copper Antifouling Paint: Piloting the Interstate Chemicals Clearinghouse (IC2) Alternatives Assessment Guide (2014), page i.)

The Washington State Department of Ecology concluded that all non-Copper Anti-Fouling Paints analyzed should be categorized as "Benchmark 1" chemicals, i.e., chemicals that have a combination of either high persistence in the environment, high bioaccumulation potential, or high human toxicity or ecotoxicity, and avoidance of all of those products should be recommended.

In the absence of currently available non-toxic non-Copper Anti-Fouling Paints, the SED's assumption that foreseeable implementation will include use of "non-toxic" anti-fouling paint is erroneous and unsupported, which fatally undercuts all analysis in the SED based on that assumption. The SED must be revised to address the likelihood that reasonably foreseeable implementation of the Copper TMDL will involve application of toxic anti-fouling paints, and to analyze the environmental impacts of application of those toxic paints. These revisions must include analysis of potential impacts to both humans and the environment,

including but not necessarily limited to impacts in the areas of Biological Resources and Hazards and Hazardous Materials.

Additionally, the SED is invalid for failing to analyze a reasonable range of alternatives, as it is required to do under CEQA's provisions for Regulatory Programs. Apart from the No Project alternative, the SED analyzes only one "action" alternative – a purported "Modified TMDLs and Action Plans, Modified Regulatory Approach" alternative. The SED's discussion of this alternative is completely without value, however, as it does not actually describe an alternative to the proposed project. Rather, the discussion of that alternative consists entirely of conclusory and unsupported statements that the proposed project is the "most scientifically and technically defensible approach."

Since the SED does not actually describe any "action" alternative to the proposed project, it also fails to disclose the potential environmental impacts and benefits of such an alternative. The failure of the SED to identify or analyze any actual "action" alternative to the proposed project fatally undercuts the requirement that the document adequately inform decision makers and the public of a reasonable range of alternatives to the project.

In particular, the SED should describe and analyze an alternative under which reduction in copper loading would be achieved on a statewide basis, by the state of California, pursuant to the exclusive authority of the California Department of Pesticide Regulation (DPR) to regulate pesticides, including Copper Anti-Fouling Paints. The SED additionally should describe and analyze an alternative under which implementation methods would be targeted at the limited areas of Newport Bay that are arguably exceed California Toxics Rule requirements for copper, rather than regulating the entire Bay. Such focused implementation must be discussed as an alternative, as it is likely to result in fewer environmental impacts than the project as proposed.

The SED also fails to comply with CEQA because it does not include an economic factors analysis. In fact, the SED is misleading at best when it states:

> The Regional Board has analyzed the costs of implementing reasonably foreseeable BMPs to comply with the TMDLs and Action Plans. These economic factors have been considered in this environmental analysis and are summarized in the Staff Report (Section 8.3).

(SED, p. 28.) There is no such summary in Section 8.3 of the Staff Report. In fact, the only information to be gleaned from Section 8.3 is that there will be

costs but the Board will make no attempt to quantify those costs. Such short shrift of its obligations under CEQA is unprecedented and contrary to law.

IX. Conclusion

Because of the many legal deficiencies described in this letter, the Copper TMDL cannot be lawfully adopted in its current form.

Sincerely,

/s/ Gregory J. Newmark

Gregory J. Newmark
Attorney at Law

c: Leonie Mulvihill, Esq.

GJN:GJN
2719136.1

DECLARATION OF CHRIS MILLER

I, Chris Miller, declare as follows:

1. I have personal knowledge of the following facts and matters.

2. I have been continuously employed by the City of Newport Beach (hereafter "City") since 2003 and have been the Harbor Resources Manager for the City since 2008.

3. My essential duties as the City's Harbor Resources Manager include, but are not limited to, the following:

    a. Act for and assist the City Manager in administering the provisions of the City's Harbor Code.

    b. Administer the harbor-related policies adopted by the City Council and the Harbor Commission, and maintaining files and records of all pier permits issued.

    c. Conduct regular inspections of both public and private facilities and structures located upon or over the waters of Newport Harbor or the Pacific Ocean or any other water where the tide ebbs and flows within the City.

    d. Issue approvals in concept for development located on tidelands or submerged lands pursuant to the City's Municipal Code.

4. As part of my job duties, I am responsible for all docking, anchorage, berthing and mooring of boats in Newport Harbor, which means that I am responsible for designating areas where such activities are permitted and for issuing permits for such activities.

5. I have reviewed an aerial survey which documents the vessels berthed or moored in Newport Harbor in February 2014 ("Aerial Survey").

6. Based on my review of the Aerial Survey and the City's permit records, there are 800 off-shore moorings in Newport Harbor. The average length of a vessel in an off-shore mooring is between 35' and 40'.

7. Based on my review of the Aerial Survey and the City's permit records, there are 400 on-shore moorings in Newport Harbor. The maximum length for any vessel in an on-shore mooring is 18 feet. Based on the aerial survey, I estimate that half of the City's on-shore moorings, or 200, are occupied by small recreational vessels with bottom paint and 18 feet or less in length.

8. Based on my review of the Aerial Survey and the City's permit records, there are 1,925 slips in commercial marinas. Included in this figure are the 172 slips located in the Balboa Yacht Basin, which is a commercial marina owned and operated by the City.

9. Based on my review of the Aerial Survey and the City's permit records, there are 1,600 vessels at residential slips.

10. The City maintains four boats for use by its Lifeguard and Harbor Resources Department. The County maintains nine boats for use by its Harbor Patrol.

11. My review and analysis indicates that there are 4,470 vessels in Newport Harbor that have bottom paint. Of these, an overwhelming majority use copper antifouling paint.

Executed on October 12, 2016, at Newport Beach, California.

Chris Miller

EXHIBIT A

Exhibit A

Newport Beach GIS

0 2,000 4,000

Feet

Disclaimer: Every reasonable effort has been made to assure the accuracy of the data provided, however, The City of Newport Beach and its employees and agents disclaim any and all responsibility from or relating to any results obtained in its use.

Imagery: 2009-2013 photos provided by Eagle Imaging www.eagleaerial.com

10/12/2016

CITY OF NEWPORT BEACH
100 Civic Center Drive
Newport Beach, California 92660
949 644-3311 | 949 644-3308 FAX
newportbeachca.gov/HarborResources

September 16, 2016

DELIVERED Via WEBSITE UPLOAD: http://www.regulations.gov/docket?D=EPA-HQ-OW-2016-0332 ***and EMAIL:*** Elias.mike@epa.gov

U.S. Environmental Protection Agency
Ecological Risk Assessment Branch | Health and Ecological Criteria Division
Office of Science and Technology | Office of Water
Attn: Mike Elias | Biologist
1200 Pennsylvania Avenue, NW, Washington, DC 20460

Mr. Elias,

The City of Newport Beach respectfully submits the following comments on the Revised Federal Standards Proposed for Copper in Marine Waters.

Thank you,

Chris Miller
Harbor Manager
City of Newport Beach
cmiller@newportbeachca.gov
(949) 644-3043

CC: Shelly Anghera, Anchor QEA

Revised Federal Standard Proposed for Copper in Marine Waters Technical Comments

Comment 1: Uncertainty resulting from a single abalone test used to derive the Draft Criteria results in an overly conservative criteria for copper.

The proposed Draft Criteria are ultimately driven[1] by results from a single red abalone toxicity test published in 1989[2], although data from numerous other saltwater toxicity tests (including 171 saltwater mussel toxicity tests) were compiled and summarized. Using one value to derive criteria does not account for the variability in this abalone species' sensitivity to copper and the influence of water chemistry variability known to affect toxicity test results. Further, this species is only present in cool West Coast waters in or near kelp forest habitats and is not relevant to enclosed-shallow water bays and harbors of California or the Gulf and East Coasts of the United States.

Recommendations:

- Additional abalone data should be collected prior to adoption of the Draft Criteria to provide a more robust and defensible data set, which is needed to provide the scientific basis for the Draft Criteria development. This is a reasonable request as the red abalone is a species approved by EPA for use in marine/estuarine toxicity tests and is commonly used for such purposes[3].
- The saltwater BLM should include flexibility for considering different habitat types and regions (e.g., the Gulf, enclosed bays, harbors, saltmarshes, etc.).

Comment 2: Uncertainty associated with normalizing the laboratory-derived toxicity test results to an assumed and un-validated DOC value results in an overly conservative criteria for waters with naturally low DOC.

EPA assumed a DOC concentration of 2 mg/L for all unknown natural seawater test conditions. More than 33% of the mussel toxicity test data were assumed to be tested in water with 2 mg/L DOC, and the single abalone test findings (reported EC_{50} of 8.8 µg/L) were also assumed to be tested in water with 2 mg/L DOC, even though there were no DOC measurements recorded. The result of the normalization procedure on the toxicity test results is that the actual effects concentrations (i.e., EC_{50} and LC_{50} values) are reduced by approximately one half (on average).

For example, the single abalone effects concentration (EC_{50} = 8.8 µg/L) was reduced to a normalized EC_{50} of 3.94 µg/L, from which the Draft Criteria were derived. This normalization

[1] Because the criteria seek to protect a representation of the entire population of marine organisms, they can be affected by one or more very sensitive species. In this case, a single test conducted with red abalone resulted in the criteria being "driven" downward.

[2] Hunt, J.W., B.S. Anderson, S.L. Turpen, A.R. Coulon, M. Martin, F.H. Palmer, and J.J. Janik, 1989. *Experimental evaluation of effluent toxicity testing protocols with giant kelp, mysids, red abalone, and topsmelt*. Division of Water Quality Report No. 89-5WQ.

[3] Chapman, G., D. Denton, and J. Lazorchak, 1995. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms. U.S. Environmental Protection Agency, Washington, D.C., EPA/600/R-95/136 (NTIS PB96261665). Available from: https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=46584.

procedure is not scientifically justified due to lack of supporting DOC data for many saltwater toxicity tests used in the derivation, and is particularly not appropriate for the single abalone test on which the Draft Criteria are most affected. In California, where the mussels and abalone are native, it is common to have DOC values below 1 mg/L in natural seawater rather than over 2 mg/L. The low DOC is typically measured in dry, summer conditions in temperate regions like Southern California. Consequently, it is likely that toxicity tests with actual, and likely lower, DOC than that assumed by EPA would result in higher normalized effects concentrations and consequently higher Draft Criteria. The effects of this normalization on the resulting adjusted effects concentration is most obvious in the 50 most sensitive species tests.

Recommendations:

- All Granite Canyon and Scripps Pier water quality data inputs should be modified to represent accurate conditions for all tests conducted with these natural seawater sources.
- However, it is preferable that only toxicity tests paired with the actual water quality measurements (including DOC) should be included in the data set that is normalized to DOC to define the acute and chronic criteria using the saltwater BLM.
- The toxicity test data set that is modified by the BLM should only include species and test conditions known to occur in U.S. waters. Currently, the data set includes seawater samples from all over the world, many of which have very high DOC levels; these data are not relevant and further skew the normalization of the effects concentrations.

Comment 3: Uncertainty in calculation of the ACR value results in an overly conservative chronic criterion for copper.

The ACR of 3.022 was calculated as the geometric mean of the genus mean ACRs for five sensitive freshwater genera, *Ceriodaphnia* (3.268), *Daphnia* (4.057), *Oncorhynchus* (3.630), *Acipenser* (5.757), and *Cottus* (2.075), along with the two estuarine/marine genus mean ACRs for *Cyprinodon* (1.475) and *Brachionus* (1.229). Eliminating the freshwater species and using the two marine species to calculate the mean ACR changes the ACR from 3.02 to 1.35. When applied to the current abalone-based FAV of 3.94, it results in a final chronic criterion of 2.92 µg/L. This is a significant difference from the 1.3 µg/L that is currently proposed. This alternate chronic criterion (CCC) is predicted to be higher than the acute criterion (CMC) from the model, further illustrating the overly conservative model-predicted criteria.

Recommendations:

- Chronic criterion derivation should exclude freshwater species ACR data and only the actual values for the two estuarine/marine species should be used.
- Additional paired acute and chronic marine/estuarine toxicity tests should be conducted to support the development of a new, scientifically-based saltwater FACR.

Comment 4: Confirmation that site specific objectives for copper derived through approved USEPA guidance will still be upheld.

It is recognized by USEPA that the national criteria for dissolved metals including those for copper, lead, and zinc may be more or less protective than anticipated, depending on the site specific characteristics including diversity of aquatic life and water quality measurements (i.e., hardness, pH, dissolved organic matter, total suspended particulates, and concentrations of contaminants of concern) (USEPA, 1994). As a consequence, USEPA has developed the Water Effects Ratio (WER) as one of several procedures for deriving a site specific objectives.

Recommendations:

- Please confirm that studies conducted using EPA guidance[4] will still be supported by the EPA even if the results are not consistent with the revised national copper criteria.

Summary:

If all uncertainties indicated above are removed (i.e., remove single abalone test currently driving the Draft Criteria, normalizing based on more accurate DOC data—or not normalizing at all, and revising the saltwater FACR to a number based only on saltwater species), this would likely result in a lowered FAV similar to that used in 2003 of approximately 6.2 µg/L to protect the commercial Blue Mussel (*Mytilus edulis*), and an acute criterion of 3.1 µg/L (no change from 2003). Additional data would be needed to set and estimate an accurate saltwater FACR and a chronic criterion. Further support that the resulting criteria are overly conservative can be found in that the proposed standard is less than what the State of California considers to be background seawater concentrations for copper (California Ocean Plan[5]), where many of the species being protected thrive. In particular, we believe the Draft Criteria will be most difficult for enclosed bays and harbors, where circulation with ocean water is limited, and in arid regions where naturally low DOC occurs, like Southern California.

[4] United States Environmental Protection Agency (USEPA). 1994. Interim Guidance on Determination and Use of Water-Effect Ratios for Metals. EPA-823-B-94-001. February.

[5] State Water Resources Control Board, 2012. *California Ocean Plan. Water Quality Control Plan. Ocean Waters of California*. Effective August 19, 2013. Adopted October 16, 2012. Resolution No. 2012-0056. Available from: http://www.waterboards.ca.gov/water_issues/programs/ocean/docs/cop2012.pdf.

Department of Pesticide Regulation

Brian Leahy
Director

Edmund G. Brown Jr.
Governor

MEMORANDUM

TO: Ann M. Prichard, Chief
Pesticide Registration Branch

FROM: Carlos Gutierrez *[Original signed by C.Gutierrez]*
Environmental Scientist
Reevaluation Group

DATE: September 12, 2016 (Updated)

SUBJECT: LIST OF COPPER-BASED ANTIFOULANT PAINTS BY LEACH RATE CATEGORY

The Department of Pesticide Regulation (DPR) placed copper-based antifouling paint (AFP) products, containing the active ingredients copper oxide, copper hydroxide, and cuprous thiocyanate into reevaluation in June 2010. DPR initiated this reevaluation based on elevated copper concentrations in salt water marinas that are primarily a result of extensive use of copper AFPs on boat hulls.

In October 2013, the Governor signed Assembly Bill (AB) 425 (Atkins) into law which states, "No later than February 1, 2014, the Department of Pesticide Regulation shall determine a leach rate for copper-based antifouling paint used on recreational vessels and make recommendations for appropriate mitigation measures that may be implemented to address the protection of aquatic environments from the effects of exposure to that paint if it is registered as a pesticide."

DPR determined the leach rate of each copper AFP product listed below based on the International Organization for Standardization (ISO) 10890:2010 method entitled, "Paints and Varnishes – Modeling of Biocides Release Rate from Antifouling Paints by Mass Balance Calculation." DPR calculates a final daily mean copper release rate using this data and an established adjustment factor for comparison to actual environmental leach rates. Previously, the products were divided into three categories. However, after discussions with stakeholders and accounting for enforcement challenges, DPR determined establishing a single maximum allowable leach rate would be the most effective way to reduce copper in California waters. Copper AFP products are categorized based on the following criteria:

Category I: Products with a leach rate below or equal to (≤) 9.5 $\mu g/cm^2/day$
Category II: Products with a leach rate above (>) 9.5 $\mu g/cm^2/day$ or no leach rate data on file with DPR

Products are listed alphabetically by brand name within each leach rate category. Changes to the August 12, 2015 version of the list are highlighted in orange. If a product was only recently registered or the product is not currently registered, it may not appear on the list below.

Category I: Actively registered copper AFP products with leach rates below or equal to 9.5 µg/cm^2/day. Product count = 88

Product Name	Registration Number	Registrant
4054 VINYL ANTIFOULING PAINT, BLACK MIL-P-15931F,TYPE II, CLASS 2 FORMULA 129A	2693- 56-ZA	INTERNATIONAL PAINT LLC
ABC 4 MARINE ANTIFOULING PAINT	7313- 12-AA	PPG ARCHITECTURAL FINISHES INC.
ACT WITH SLIME FIGHTER	2693- 227-AA	INTERNATIONAL PAINT LLC
ANTIFOULING SEAFORCE 200 AV BLACK 3GE099	2568- 93-ZF	JOTUN PAINTS INC.
ANTIFOULING SEAFORCE 200 AV BLUE 3GEBLU	2568- 93-ZG	JOTUN PAINTS INC.
ANTIFOULING SEAFORCE 200 AV DARK RED 3GEDRD	2568- 93-ZE	JOTUN PAINTS INC.
AQUAGARD WATERBASE ANTIFOULING BOTTOM BOAT PAINT	9339- 19-AA-70383	FLEXDEL CORPORATION
CALIFORNIA BOTTOMKOTE	2693- 18-ZA	INTERNATIONAL PAINT LLC
EPOXYCOP	2693- 70-ZA	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE ACT WITH IRGAROL	2693- 183-ZC	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE CLASSIC	2693- 18-ZB	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE NT	2693- 228-AA	INTERNATIONAL PAINT LLC
HEMPEL'S GLOBIC 81920	10250- 56-AA	HEMPEL COATINGS (USA) INC.
HEMPEL'S GLOBIC 81950	10250- 55-AA	HEMPEL COATINGS (USA) INC.
INTERCLENE 140 MODIFIED VINYL ANTIFOULING BWA360 RED	2693- 178-ZA	INTERNATIONAL PAINT LLC
INTERCLENE 229 BCA449 A/F RED	2693- 60-ZA	INTERNATIONAL PAINT LLC
INTERCLENE 229 BCA779 A/F BLACK	2693- 60-ZB	INTERNATIONAL PAINT LLC
INTERCLENE 245 NA BRA570 RED	2693- 132-ZX	INTERNATIONAL PAINT LLC
INTERCLENE 245 NA BRA572 BLACK	2693- 132-ZW	INTERNATIONAL PAINT LLC
INTERCLENE 5170 ANTIFOULING BLACK BCA 172/5	2693- 176-ZA	INTERNATIONAL PAINT LLC
INTERCLENE 5170 ANTIFOULING RED BCA 170/5	2693- 176-AA	INTERNATIONAL PAINT LLC
INTERSPEED 6200NA ANTIFOULING BLACK BQA659/5GL	2693- 176-ZB	INTERNATIONAL PAINT LLC
INTERSPEED 6200NA ANTIFOULING RED BQA654/5GL	2693- 176-ZC	INTERNATIONAL PAINT LLC
INTERSPEED 640 POLISHING ANTIFOULING BRA640 RED	2693- 142-ZL	INTERNATIONAL PAINT LLC
INTERSPEED 640 POLISHING ANTIFOULING BRA641 BLUE	2693- 142-ZO	INTERNATIONAL PAINT LLC
INTERSPEED 640 POLISHING ANTIFOULING BRA642 BLACK	2693- 142-ZM	INTERNATIONAL PAINT LLC

Product Name	Registration Number	Registrant
INTERSPEED 640 POLISHING ANTIFOULING BRA643 GREEN	2693- 142-ZN	INTERNATIONAL PAINT LLC
INTERSPEED 640 POLISHING ANTIFOULING BRA644 OCEAN GRAY	2693- 142-ZK	INTERNATIONAL PAINT LLC
INTERSPEED 6400NA BLACK BQA679/5GL	2693- 132-ZY	INTERNATIONAL PAINT LLC
INTERSPEED 6400NA RED BQA674/5GL	2693- 132-ZZ	INTERNATIONAL PAINT LLC
MICRON 66 YBA470 BLUE	2693- 187-ZD	INTERNATIONAL PAINT LLC
MICRON 66 YBA471 GREEN	2693- 187-ZF	INTERNATIONAL PAINT LLC
MICRON 66 YBA472 RED	2693- 187-ZE	INTERNATIONAL PAINT LLC
MICRON 66 YBA473 BLACK	2693- 187-ZG	INTERNATIONAL PAINT LLC
MICRON CSC HS	2693- 225-AA	INTERNATIONAL PAINT LLC
MICRON EXTRA VOC 5790 BLUE	2693- 190-ZI	INTERNATIONAL PAINT LLC
MICRON EXTRA VOC 5791 GREEN	2693- 190-ZH	INTERNATIONAL PAINT LLC
MICRON EXTRA VOC 5792 RED	2693- 190-ZG	INTERNATIONAL PAINT LLC
MICRON EXTRA VOC 5793 BLACK	2693- 190-ZJ	INTERNATIONAL PAINT LLC
MICRON EXTRA VOC 5794 SHARK WHITE	2693- 190-ZK	INTERNATIONAL PAINT LLC
PETTIT HYDROCOAT SR DUAL-BIOCIDE ABLATIVE ANTIFOULING	60061- 136-AA	KOP-COAT, INC.
PETTIT MARINE PAINT ANTIFOULING PAINT FOR INFLATABLE BOATS	60061- 87-ZM	KOP-COAT, INC.
PETTIT MARINE PAINT HORIZONS ABLATIVE ANTIFOULING BOTTOM PAINT	60061- 101-AA	KOP-COAT, INC.
PETTIT MARINE PAINT HYDROCOAT ABLATIVE ANTIFOULING PAINT 1240 BLUE	60061- 87-ZH	KOP-COAT, INC.
PETTIT MARINE PAINT HYDROCOAT ABLATIVE ANTIFOULING PAINT 1340 GREEN	60061- 87-ZJ	KOP-COAT, INC.
PETTIT MARINE PAINT HYDROCOAT ABLATIVE ANTIFOULING PAINT 1640 RED	60061- 87-ZL	KOP-COAT, INC.
PETTIT MARINE PAINT HYDROCOAT ABLATIVE ANTIFOULING PAINT 1840 BLACK	60061- 87-ZI	KOP-COAT, INC.
PETTIT MARINE PAINT TRINIDAD PRO ANTIFOULING BOTTOM PAINT	60061- 94-ZB	KOP-COAT, INC.
PETTIT MARINE PAINT TRINIDAD SR ANTIFOULING BOTTOM PAINT	60061- 94-ZD	KOP-COAT, INC.
PETTIT MARINE PAINT ULTIMA SR 40 ANTIFOULING BOTTOM PAINT	60061- 117-ZB	KOP-COAT, INC.
PETTIT MARINE PAINT ULTIMA SSA ANTIFOULING PAINT	60061- 71-ZB	KOP-COAT, INC.
PETTIT MARINE PAINT VIVID ANTIFOULING PAINT	60061- 116-AA	KOP-COAT, INC.
PETTIT NEPTUNE 5 HARD HYBRID ABLATIVE	60061- 142-AA	KOP-COAT, INC.

Product Name	Registration Number	Registrant
ANTIFOULING PAINT		
PETTIT ULTIMA SR-40 ANTIFOULING PAINT	60061- 101-ZC	KOP-COAT, INC.
RUST-OLEUM MARINE COATINGS BOAT BOTTOM ANTIFOULING PAINT	60061- 63-AA-69587	RUST-OLEUM CORPORATION
RUST-OLEUM MARINE COATINGS BOAT BOTTOM ANTIFOULING PAINT	60061- 63-AA-7033	RUST-OLEUM CORPORATION
SEA HAWK AF33	44891- 12-AA	NEW NAUTICAL COATINGS, INC.
SEA HAWK SHARKSKIN ANTIFOULING PAINT	44891- 11-AA	NEW NAUTICAL COATINGS, INC.
SIGMA ECOFLEET 238	7313- 12-ZA	PPG ARCHITECTURAL FINISHES INC.
SIGMA ECOFLEET 530	7313- 24-AA	PPG ARCHITECTURAL FINISHES INC.
SUPER PROGUARD BLACK NAU773	23566- 20-ZT	INTERNATIONAL PAINT, LLC
SUPER PROGUARD BLUE NAU770	23566- 20-ZR	INTERNATIONAL PAINT, LLC
SUPER PROGUARD RED NAU772	23566- 20-ZS	INTERNATIONAL PAINT, LLC
TRILUX 33 ANTIFOULING	2693- 226-AA	INTERNATIONAL PAINT LLC
TRILUX 33 YBA060 BLUE	2693- 203-AA	INTERNATIONAL PAINT LLC
TRILUX 33 YBA061 GREEN	2693- 203-ZD	INTERNATIONAL PAINT LLC
TRILUX 33 YBA062 RED	2693- 203-ZA	INTERNATIONAL PAINT LLC
TRILUX 33 YBA063 BLACK	2693- 203-ZB	INTERNATIONAL PAINT LLC
TRILUX 33 YBA068 WHITE	2693- 203-ZC	INTERNATIONAL PAINT LLC
TRI-LUX II AEROSOL 493A BLACK	2693- 174-ZC	INTERNATIONAL PAINT LLC
TRI-LUX II AEROSOL 498A WHITE	2693- 174-ZA	INTERNATIONAL PAINT LLC
TRI-LUX III WITH BIO-LUX 5490 BLUE	2693- 181-AA	INTERNATIONAL PAINT LLC
TRILUX PROP & DRIVE 5493A BLACK	2693- 199-AA	INTERNATIONAL PAINT LLC
TRILUX PROP & DRIVE 5494A GRAY	2693- 199-ZB	INTERNATIONAL PAINT LLC
TRILUX PROP & DRIVE 5498A WHITE	2693- 199-ZA	INTERNATIONAL PAINT LLC
TRILUX PROP & DRIVE 5499A CLEAR	2693- 199-ZC	INTERNATIONAL PAINT LLC
ULTRA	2693- 212-AA	INTERNATIONAL PAINT LLC
WEST MARINE ANTIFOULING OUTDRIVE SPRAY PAINT 5566252 BLACK	2693- 174-ZD	INTERNATIONAL PAINT LLC
WEST MARINE BOTTOM SHIELD ANTIFOULING PAINT EASY APPLICATION & CLEAN-UP TECHNOLOGY	60061- 135-AA	KOP-COAT, INC.
WEST MARINE BOTTOMPRO GOLD! PROFESSIONAL ANTIFOULING BOTTOM PAINT	60061- 117-ZE	KOP-COAT, INC.
WEST MARINE BOTTOMSHIELD ANTIFOULING PAINT	60061- 129-AA	KOP-COAT, INC.

Product Name	Registration Number	Registrant
COMPOSITE COPPER TECHNOLOGY		
WEST MARINE CPP ABLATIVE ANTIFOULING PAINT COMPOSITE COPPER TECHNOLOGY	60061- 132-AA	KOP-COAT, INC.
WEST MARINE CPP PLUS! ABLATIVE ANTIFOULING PAINT	60061- 71-ZD	KOP-COAT, INC.
WEST MARINE PCA GOLD! ABLATIVE ANTIFOULING PAINT	60061- 101-ZB	KOP-COAT, INC.
WEST MARINE PCA GOLD! PREMIUM ABLATIVE ANTIFOULING PAINT	60061- 117-ZD	KOP-COAT, INC.
WOOLSEY YACHT SHIELD ABLATIVE ANTIFOULING BOTTOM PAINT	60061- 101-ZA	KOP-COAT, INC.
WOOLSEY YACHT SHIELD SF ABLATIVE ANTIFOULING BOTTOM PAINT	60061- 117-ZA	KOP-COAT, INC.
Z*SPAR BOTTOM PRO GOLD ANTIFOULING BOTTOM PAINT	60061- 94-ZE	KOP-COAT, INC.

Category II: Actively registered copper AFP products with a leach rate above (>) 9.5 µg/cm^2/day or no leach rate data on file with DPR. Product count = 117

Product Name	Registration Number	Registrant
4050 VINYL ANTIFOULING PAINT, RED MIL-P-15931F,TYPE I, CLASS 2 FORMULA 121A	2693- 46-ZA	INTERNATIONAL PAINT LLC
ABC 3 MARINE ANTIFOULING PAINT	7313- 18-ZB	PPG ARCHITECTURAL FINISHES INC.
ABC MARINE ANTIFOULING PAINT	7313- 18-AA	PPG ARCHITECTURAL FINISHES INC.
AMERCOAT 214 MARINE ANTIFOULING PAINT	7313- 13-AA	PPG ARCHITECTURAL FINISHES INC.
AWLGRIP AWLSTAR GOLD LABEL ANTIFOULING BP201 CHARCOAL BLACK	41750- 1-ZE	INTERNATIONAL PAINT, LLC
AWLGRIP AWLSTAR GOLD LABEL ANTIFOULING BP401 MEDIUM GREEN	41750- 1-ZA	INTERNATIONAL PAINT, LLC
AWLGRIP AWLSTAR GOLD LABEL ANTIFOULING BP501 LIGHT BLUE	41750- 1-ZB	INTERNATIONAL PAINT, LLC
AWLGRIP AWLSTAR GOLD LABEL ANTIFOULING BP502 DEEP BLUE	41750- 1-ZD	INTERNATIONAL PAINT, LLC
AWLGRIP AWLSTAR GOLD LABEL ANTIFOULING BP701 RED	41750- 1-ZC	INTERNATIONAL PAINT, LLC
AWLGRIP AWLSTAR HS GOLD LABEL ANTIFOULING	2693- 70-ZB	INTERNATIONAL PAINT LLC
BIOCOP TF	44891- 15-AA	NEW NAUTICAL COATINGS, INC.
BOTTOMKOTE	2693- 12-ZA	INTERNATIONAL PAINT LLC
BOTTOMKOTE PRO	23566- 6-AA	INTERNATIONAL PAINT, LLC
EPOXYCOP ABLATIVE K70 RED	23566- 19-ZY	INTERNATIONAL PAINT, LLC
EPOXYCOP ABLATIVE K75 BLUE	23566- 19-ZW	INTERNATIONAL PAINT, LLC
EPOXYCOP ABLATIVE K76 BLACK	23566- 19-ZX	INTERNATIONAL PAINT, LLC
EPOXYCOP K50 RED	2693- 62-ZP	INTERNATIONAL PAINT LLC
EPOXYCOP K51 BLUE	2693- 62-ZQ	INTERNATIONAL PAINT LLC
EPOXYCOP K52 BLACK	2693- 62-ZR	INTERNATIONAL PAINT LLC
EPOXYCOP K53 GREEN	2693- 62-ZS	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE	2693- 62-ZO	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE ACT WITH IRGAROL-4490B RED	2693- 209-ZA	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE ACT WITH IRGAROL-5590B GREEN	2693- 209-ZF	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE ACT WITH IRGAROL-6690B BLUE	2693- 209-AA	INTERNATIONAL PAINT LLC

Product Name	Registration Number	Registrant
FIBERGLASS BOTTOMKOTE ACT WITH IRGAROL-6696B DARK BLUE	2693- 209-ZB	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE ACT WITH IRGAROL-7740B GRAY WHITE	2693- 209-ZC	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE ACT WITH IRGAROL-7790B BLACK	2693- 209-ZD	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE ACT WITH IRGAROL-8890B BROWN	2693- 209-ZE	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE AQUA YBA549 RED	2693- 172-AA	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE AQUA YBA559 GREEN	2693- 172-ZC	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE AQUA YBA579 BLACK	2693- 172-ZB	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE WITH IRGAROL-449B RED	2693- 208-ZC	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE WITH IRGAROL-559B GREEN	2693- 208-ZA	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE WITH IRGAROL-669B BLUE	2693- 208-AA	INTERNATIONAL PAINT LLC
FIBERGLASS BOTTOMKOTE WITH IRGAROL-779B BLACK	2693- 208-ZB	INTERNATIONAL PAINT LLC
FIGERGLASS BOTTOMKOTE AQUA YBA569 BLUE	2693- 172-ZA	INTERNATIONAL PAINT LLC
FLEXGARD XI WATERBASE PRESERVATIVE COPPER PAINT	9339- 19-ZA	FLEXABAR CORPORATION
HEMPEL'S ANTIFOULING OLYMPIC HI 76600-19990 BLACK	10250- 54-ZA	HEMPEL COATINGS (USA) INC.
HEMPEL'S ANTIFOULING OLYMPIC HI 76600-30240 BRIGHT BLUE	10250- 54-ZC	HEMPEL COATINGS (USA) INC.
HEMPEL'S ANTIFOULING OLYMPIC HI 76600-50300 LIGHT RED	10250- 54-ZB	HEMPEL COATINGS (USA) INC.
HEMPEL'S ANTIFOULING OLYMPIC HI 76600-51110 RED	10250- 54-AA	HEMPEL COATINGS (USA) INC.
INTERSMOOTH 360 ANTIFOULING DARK BROWN BEA368/5	2693- 187-ZH	INTERNATIONAL PAINT LLC
INTERSMOOTH 360 ANTIFOULING DARK RED BEA369/5	2693- 187-ZI	INTERNATIONAL PAINT LLC
INTERSMOOTH 460 ANTIFOULING BLACK BEA461/5	2693- 187-ZL	INTERNATIONAL PAINT LLC
INTERSMOOTH 460 ANTIFOULING BLUE BEA462/5	2693- 187-ZM	INTERNATIONAL PAINT LLC
INTERSMOOTH 460 ANTIFOULING DARK BROWN BEA468/5	2693- 187-ZJ	INTERNATIONAL PAINT LLC
INTERSMOOTH 460 ANTIFOULING DARK RED BEA469/5	2693- 187-ZK	INTERNATIONAL PAINT LLC
MICRON CSC	2693- 132-ZV	INTERNATIONAL PAINT LLC
MICRON EXTRA 5690 BLUE	2693- 190-ZF	INTERNATIONAL PAINT LLC
MICRON EXTRA 5691 GREEN	2693- 190-ZB	INTERNATIONAL PAINT LLC
MICRON EXTRA 5692 RED	2693- 190-ZD	INTERNATIONAL PAINT LLC
MICRON EXTRA 5693 BLACK	2693- 190-ZC	INTERNATIONAL PAINT LLC
MICRON EXTRA 5694 SHARK WHITE	2693- 190-ZE	INTERNATIONAL PAINT LLC

Product Name	Registration Number	Registrant
MICRON EXTRA 5695 BROWN	2693- 190-AA	INTERNATIONAL PAINT LLC
MICRON EXTRA 5696 DARK BLUE	2693- 190-ZA	INTERNATIONAL PAINT LLC
MICRON OPTIMA BASE PART A OF A TWO PART ANTIFOULING PAINT SYSTEM	2693- 193-AA	INTERNATIONAL PAINT LLC
PETTIT MARINE PAINT TRINIDAD ANTI-FOULING 1275 BLUE	60061- 49-ZA	KOP-COAT, INC.
PETTIT MARINE PAINT TRINIDAD ANTI-FOULING 1675 RED	60061- 50-ZA	KOP-COAT, INC.
PETTIT MARINE PAINT TRINIDAD ANTIFOULING 1875 BLACK	60061- 49-ZJ	KOP-COAT, INC.
PETTIT MARINE PAINT TRINIDAD VOC ANTIFOULING BOTTOM PAINT (1678 RED)	60061- 50-ZD	KOP-COAT, INC.
PETTIT MARINE PAINT TRINIDAD VOC ANTIFOULING BOTTOM PAINT 1278 BLUE	60061- 49-ZD	KOP-COAT, INC.
PETTIT MARINE PAINT TRINIDAD VOC ANTIFOULING BOTTOM PAINT 1378 GREEN	60061- 49-ZE	KOP-COAT, INC.
PETTIT MARINE PAINT TRINIDAD VOC ANTIFOULING BOTTOM PAINT 1878 BLACK	60061- 49-ZF	KOP-COAT, INC.
PETTIT MARINE PAINT UNEPOXY TIN-FREE ANTIFOULING 1628 RED	60061- 64-AA	KOP-COAT, INC.
PETTIT TRINIDAD PRO ANTIFOULING PAINT	60061- 49-ZM	KOP-COAT, INC.
PETTIT TRINIDAD SR ANTIFOULING PAINT	60061- 49-ZN	KOP-COAT, INC.
PETTIT ULTIMA SR 60	60061- 94-ZC	KOP-COAT, INC.
PETTIT ULTIMA SR-60 ANTIFOULING PAINT	60061- 49-ZK	KOP-COAT, INC.
PROGUARD ABLATIVE BLACK NAU993	2693- 142-ZR	INTERNATIONAL PAINT LLC
PROGUARD ABLATIVE BLUE NAU990	2693- 142-ZP	INTERNATIONAL PAINT LLC
PROGUARD ABLATIVE RED NAU992	2693- 142-ZQ	INTERNATIONAL PAINT LLC
PROGUARD BLACK NAU883	23566- 19-AC	INTERNATIONAL PAINT, LLC
PROGUARD BLUE NAU880	23566- 19-ZZ	INTERNATIONAL PAINT, LLC
PROGUARD RED NAU882	23566- 19-AB	INTERNATIONAL PAINT, LLC
PRO-LINE COMMERCIAL MARINE FINISHES VINYL COPPER ANTIFOULING PAINT 1088C-01 BLUE	577- 550-ZJ	SHERWIN-WILLIAMS COMPANY, THE/ THE CUPRINOL GROUP/
PRO-LINE COMMERCIAL MARINE FINISHES VINYL COPPER ANTIFOULING PAINT 1088C-02 BLACK	577- 551-ZC	SHERWIN-WILLIAMS COMPANY, THE/ THE CUPRINOL GROUP/
PRO-LINE COMMERCIAL MARINE FINISHES VINYL COPPER ANTIFOULING PAINT 1088C-03 RED	577- 550-ZM	SHERWIN-WILLIAMS COMPANY, THE/CUPRINOL GROUP/

Product Name	Registration Number	Registrant
PRO-LINE COMMERCIAL MARINE FINISHES VINYL COPPER ANTIFOULING PAINT 1088C-07 LIGHT BLUE	577- 550-ZN	SHERWIN-WILLIAMS COMPANY, THE/CUPRINOL GROUP/
PRO-LINE MARINE FINISHES VINYL COPPER ANTIFOULING PAINT Y1088C-01 BLUE	577- 550-ZE	SHERWIN-WILLIAMS COMPANY, THE/ THE CUPRINOL GROUP/
PRO-LINE MARINE FINISHES VINYL COPPER ANTIFOULING PAINT Y1088C-02 BLACK	577- 551-ZB	SHERWIN-WILLIAMS COMPANY, THE/ THE CUPRINOL GROUP/
REGATTA BALTOPLATE RACING FINISH R3950 GRAY METALLIC	2693- 148-ZE	INTERNATIONAL PAINT LLC
SEA HAWK CUKOTE ANTI-FOULING COATING	44891- 7-AA	NEW NAUTICAL COATINGS, INC.
SEA HAWK MONTEREY WATER BORNE ANTIFOULING COATING	44891- 9-AA	NEW NAUTICAL COATINGS, INC.
SEA HAWK SINGLE SEASON PROTECTION TALON	44891- 12-ZA	NEW NAUTICAL COATINGS, INC.
SEA HAWK TROPIKOTE ANTI-FOULING BOTTOM PAINT	44891- 10-AA	NEW NAUTICAL COATINGS, INC.
SEAGUARD ABLATIVE ANTI-FOULANT COATING	10250- 54-AA-577	SHERWIN-WILLIAMS COMPANY, THE/ THE CUPRINOL GROUP/
SUPER ABLATIVE WITH SLIME FIGHTER - K64B GREEN	2693- 209-ZY	INTERNATIONAL PAINT LLC
SUPER ABLATIVE WITH SLIME FIGHTER-K60B RED	2693- 209-ZG	INTERNATIONAL PAINT LLC
SUPER ABLATIVE WITH SLIME FIGHTER-K61B BLUE	2693- 209-ZH	INTERNATIONAL PAINT LLC
SUPER ABLATIVE WITH SLIME FIGHTER-K62B BLACK	2693- 209-ZI	INTERNATIONAL PAINT LLC
SUPER EPOXYCOP ABLATIVE K60 RED	23566- 20-ZO	INTERNATIONAL PAINT, LLC
SUPER EPOXYCOP ABLATIVE K61 BLUE	23566- 20-ZQ	INTERNATIONAL PAINT, LLC
SUPER EPOXYCOP ABLATIVE K62 BLACK	23566- 20-ZP	INTERNATIONAL PAINT, LLC
SUPER EPOXYCOP ABLATIVE K64 GREEN	23566- 20-ZN	INTERNATIONAL PAINT, LLC
SUPER KL K90 RED	67543- 7-ZI	INTERNATIONAL PAINT, LLC
SUPER KL K91 BLUE	67543- 7-ZJ	INTERNATIONAL PAINT, LLC
SUPER KL K93 BLACK	67543- 7-ZK	INTERNATIONAL PAINT, LLC
SUPER KL K94 GREEN	67543- 7-ZH	INTERNATIONAL PAINT, LLC
SUPER KL WITH SLIME FIGHTER - K94B GREEN	2693- 213-ZC	INTERNATIONAL PAINT LLC
SUPER KL WITH SLIME FIGHTER-K90B RED	2693- 213-AA	INTERNATIONAL PAINT LLC
SUPER KL WITH SLIME FIGHTER-K91B BLUE	2693- 213-ZA	INTERNATIONAL PAINT LLC
SUPER KL WITH SLIME FIGHTER-K93B BLACK	2693- 213-ZB	INTERNATIONAL PAINT LLC
ULTRA 3449 RED	2693- 192-ZA	INTERNATIONAL PAINT LLC

Product Name	Registration Number	Registrant
ULTRA 3559 GREEN	2693- 192-ZC	INTERNATIONAL PAINT LLC
ULTRA 3669 BLUE	2693- 192-ZB	INTERNATIONAL PAINT LLC
ULTRA 3779 BLACK	2693- 192-AA	INTERNATIONAL PAINT LLC
ULTRA-KOTE	2693- 119-ZD	INTERNATIONAL PAINT LLC
ULTRA-KOTE 2449H RED	2693- 144-AA	INTERNATIONAL PAINT LLC
ULTRA-KOTE 2669N BLUE	2693- 135-ZF	INTERNATIONAL PAINT LLC
ULTRA-KOTE 2779N BLACK	2693- 135-ZH	INTERNATIONAL PAINT LLC
VC-OFFSHORE TEFLON ANTIFOULING SALTWATER FORMULA	2693- 148-ZD	INTERNATIONAL PAINT LLC
WOOLSEY DEFENSE CA	60061- 49-ZO	KOP-COAT, INC.
Z*SPAR THE PROTECTOR VOC HARD TYPE ANTIFOULING PAINT B-90 RED	60061- 50-ZE	KOP-COAT, INC.
Z*SPAR THE PROTECTOR VOC HARD TYPE ANTIFOULING PAINT B-91 BLUE	60061- 49-ZG	KOP-COAT, INC.
Z*SPAR THE PROTECTOR VOC HARD TYPE ANTIFOULING PAINT B-93 GREEN	60061- 49-ZI	KOP-COAT, INC.
Z*SPAR THE PROTECTOR VOC HARD TYPE ANTIFOULING PAINT B-94 BLACK	60061- 49-ZH	KOP-COAT, INC.
Z-SPAR BOTTOM PRO GOLD! ANTIFOULING PAINT	60061- 49-ZL	KOP-COAT, INC.