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**REVISED APPLICATION FOR
INCIDENTAL HARASSMENT AUTHORIZATION
PURSUANT TO THE
MARINE MAMMAL PROTECTION ACT**

Submitted to:

**Jolie Harrison, Division Chief
Permits and Conservation Division
National Oceanic and Atmospheric Administration Fisheries,
Office of Protected Resources
1315 East-West Hwy
Silver Spring, Maryland 20910**

For:

**City of San Diego, Transportation & Storm Water Department
Storm Water Division**

Submitted by:

**Amec Foster Wheeler Environment & Infrastructure, Inc.
9177 Sky Park Court
San Diego, California**

February 2016

Amec Foster Wheeler Project No. 502515C027

25 February 2015



Jolie Harrison
Division Chief Permits and Conservation Division, Office of Protected Resources
1315 East–West Highway, F/PR1 Room 13805
Silver Spring, Maryland 20910

**Re: Application for Incidental Harassment Authorization
Pursuant to the Marine Mammal Protection Act**

Dear Ms. Harrison:

On behalf of the City of San Diego (City), please find the attached revised request for an Incidental Harassment Authorization (IHA) under section 101(a)(5) of the Marine Mammal Protection Act of 1972, as amended, for the take of marine mammals incidental to conducting a sand quality study at Children’s Pool Beach in La Jolla, California. This final application submittal was revised based on discussion with National Marine Fisheries Service (NMFS) staff.

To fulfill a special condition under a California Coastal Commission Permit, the City plans to collect sand samples for fecal indicator bacteria (FIB) and mercury testing at Children’s Pool Beach, where several pinniped species regularly reside. Because the City’s sand sampling activities have the potential to cause Level B Harassment of marine mammals, we are requesting an IHA for the 2016 post-pupping season beginning June 1, 2016, and ending December 14, 2016.

This study is designed to collect representative sand samples to assess the magnitude and extent of FIB pollution occurring at the Children’s Pool Beach. To maximize sample representativeness and to minimize co-occurrence of public disturbance with the proposed sampling activities, the timing of initial sampling rounds is biased for the weeks immediately following the end of pupping season, including an additional two weeks to accommodate lactation and weaning of late season pups. These initial sampling rounds will occur approximately June 1, 2016 through June 15, 2016). These early test results can then be compared with sample test results collected during the warmer, high-public-use summer and fall months.

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We understand and appreciate that the typical review and approval process for issuance of a Level B IHA may take 6 to 12 months. As such, in addition to this IHA request, we are asking for your assistance in expediting this IHA request to the extent possible so that we can meet our June 2016 sampling objectives. Coincidentally, there is a current IHA in place at the Children's Pool Beach because of ongoing construction and much of the site-specific information is applicable to and is included in this request. Therefore, we are hopeful that this request is both comprehensive and complete to help facilitate the approval process. We have also received excellent feedback from your staff to our initial request that was provided in December 2015. These recommendations have made this revised request more comprehensive, have expanded the mitigation measures and as a result shall be more protective of marine mammals at the Children's Pool, while fully serving the project needs for the collection of the proposed samples.

We appreciate your assistance with this important study and look forward to working with you and your staff to answer any additional questions you may have about this application. Please feel free to contact Rolf Schottle via email at rolf.schottle@amecfw.com or 858-300-4323 with additional questions.

Respectfully submitted,

Amec Foster Wheeler Environment & Infrastructure, Inc.



Rolf Schottle
Project Manager/Associate Scientist

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SUMMARY OF THE REQUEST

In accordance with the Marine Mammal Protection Act of 1972 (MMPA) as amended, the City of San Diego (City) requests that National Oceanic and Atmospheric Administration (NOAA) Fisheries, Office of Protected Resources, issue an Incidental Harassment Authorization (IHA) for incidental take of three pinniped species found at the La Jolla Children's Pool Beach at 850 Coast Boulevard, La Jolla, CA 92037. The three species are as follows:

- Pacific harbor seal (*Phoca vitulina*)
- California sea lion (*Zalophus californianus*)
- Northern elephant seal (*Mirounga angustirostris*)

The requested IHA is for the purposes of conducting a sand quality study at the Children's Pool Beach. The California Coastal Commission issued a Notice of Intent to Issue Permit on November 7, 2014, which granted a revised Coastal Development Permit (CDP) to the City, subject to certain special conditions, including a feasibility study. One of the required objectives of the feasibility study is to analyze the sand quality and methods for improving sand quality at Children's Pool Beach. Children's Pool Beach is currently listed on the Clean Water Act Section 303(d) list as impaired for FIB. Additionally, researchers have identified pinniped molting and excrement as a potential source of mercury to the environment (McHuron et. al. 2014, Cossaboon et. al. 2015). The sand quality study will analyze the current extent and magnitude of FIB and mercury contamination in the beach sand at Children's Pool Beach.

Children's Pool Beach was established in 1931 with the construction of a seawall on the western side of the point, which created a protected pool area for swimmers. Over the years, sand has partially filled in Children's Pool Beach. Additionally, Pacific harbor seals have taken up residence on the beach. The seal population has been increasing since 1979. The harbor seals haul out, birth pups, molt, forage, and mate in and around Children's Pool Beach. Seal pupping occurs from approximately January through May (Hanan 2004; Hanan & Associates 2011; Hanan and Hanan 2014). Several studies have identified seal behavior and estimated seal numbers, including patterns of daily and seasonal area use (Yochem and Stewart 1998; Hanan 2004; Hanan & Associates 2011; Linder 2011; Hanan and Hanan 2014). Per Dr. Doyle Hanan, Children's Pool Beach is one of three mainland harbor seal hauling sites in San Diego County.

California sea lions (*Z. californianus*) and northern elephant seals (*M. angustirostris*) are observed occasionally on this beach and in nearby areas (Yochem and Stewart 1998; Hanan 2004; Hanan & Associates 2011; Hanan and Hanan 2014) in small numbers (less than five). Although sightings of these species are infrequent at Children's Pool Beach, the City is requesting that these two additional species be included in the IHA because of potential for Level B incidental harassment.

It should also be noted that northern (*C. ursinus*) and Guadalupe (*A. townsendi*) fur seals have been observed at nearby beaches and once at Children's Pool Beach in 2015 (personal communication with Dr. Doyle Hanan, December 3, 2015). However, because of the unlikelihood of observing fur seals in the study area, the City is not requesting incidental harassment of fur seals with this IHA application. Sand sampling activities would not be conducted if fur seals were present, as their presence would typically indicate a sick or injured individual.

The City has designated Children's Pool Beach as a shared use beach. Many activities currently take place at Children's Pool Beach and the surrounding shoreline areas, including swimming, surfing, kayaking, diving, tide pooling, and nature watching. The Pacific harbor seal colony that has taken up residence at Children's Pool Beach, in particular, draws many nature watchers. During the Pacific harbor seal pupping season (December 15 through May 15, annually), the beach is closed to the public per the revised City CDP issued by the California Coastal Commission. Outside of the pupping season, beach access and recreational uses are permitted, provided that there is no direct harassment of the seals.

This IHA requested by the City would allow the incidental take of harbor seals, sea lions, and elephant seals under MMPA authority. Incidental take will not be lethal and will not have any population effects or subsistence harvest effects. Humans currently visit Children's Pool Beach at all hours of the day and night, and during all seasons and weather conditions, so human scent and visual presence is generally not an issue (Hanan 2004; Hanan & Associates 2011; Hanan and Hanan 2014). Ongoing construction activities for a lifeguard station at Children's Pool Beach, also under an IHA permit, have provided additional observational data regarding pinniped responses to human visitors and activities. Per Dr. Doyle Hanan, harbor seals are disturbed when people get very close to them on the beach, generally less than 2 to 3 meters.

The sand quality study to be conducted under this IHA would have the potential to alert and flush harbor seals into the water during sample collection events. Sample collection events would involve teams of two to three individuals performing sand sampling for approximately four hours along transects parallel to the shoreline, between the water line and the seawall/bluff railing. Figure 1 presents the sand quality study area. Up to sixteen sampling events are proposed for the sand quality study. Assuming that all seals potentially hauled out at Children's Pool Beach would be exposed to Level B harassment during sampling events, there could be a maximum of 3,040 incidental harbor seal takes. The City requests the Incidental Harassment Authority for 3,040 harbor seals, 100 sea lions, and 10 elephant seals for June 2016 through December 2016 during the non-pupping season.

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ACRONYMS AND ABBREVIATIONS

cm	centimeter(s)
City	City of San Diego
IHA	Incidental Harassment Authorization
FIB	fecal indicator bacteria
MMPA	Marine Mammal Protection Act of 1972
NOAA	National Oceanic and Atmospheric Administration
CDP	Coastal Development Permit
ESA	U.S. Endangered Species Act
PSO	Protected Species Observer
FMF	field monitoring form
NMFS	National Marine Fisheries Service

1.0 RESPONSES TO INCIDENTAL HARASSMENT AUTHORIZATION REQUIREMENTS MANDATED BY SECTION 7 OF THE ENDANGERED SPECIES ACT AND THE NATIONAL ENVIRONMENTAL POLICY ACT

1. A detailed description of the specific activity or class of activities that can be expected to result in incidental taking of marine mammals

The sand quality study will produce stimuli that may result in incidental take as follows: during each event, two to three samplers will access the beach and conduct transect sand sampling between the water line and the seawall/bluff railing. Sampling will be conducted such that humans remain at least 3 meters from hauled out pinnipeds at all times. Visual stimuli will derive from samplers accessing the beach area and collecting sand grab samples. A small subset of samples will be collected from the subsurface via narrow plastic cores (approximately 5 centimeters [cm] by 60 cm) driven into the sand with a small rubber mallet. Subsurface sand sampling is anticipated to provide negligible additional stimuli to pinnipeds than surface sand sampling.

Children's Pool Beach is a highly disturbed hauling site; seals at this location do not respond to stimuli as readily as seals in other areas (Hanan 2004; Hanan & Associates 2011; Hanan and Hanan 2014; Hahn 2010). Ongoing lifeguard tower construction activities at this location, which produce equipment noise and visual cues, have at some times caused seals to alert/flush, while at other times, the same stimuli produced no reaction (City of San Diego [City], 2015).

2. The date(s) and duration of such activity and the specific geographical region where it will occur

All sampling events will be conducted during daylight hours (07:00 – 19:00); each event will be approximately 4 hours in duration. To the maximum extent practicable, sampling events will coincide with periods of lowest haul out occurrence (08:30 – 15:30). Up to 16 sampling events will be conducted. The City already closes Children's Pool Beach during harbor seal pupping (December 15 through May 15). Work on this project is anticipated to be performed between June 1, 2016, and December 14, 2016, in order to accommodate lactation and weaning of late-season pups. The City is requesting that the sand quality study begin June 1, 2016, and end December 14, 2016. All sampling activities will be performed at 850 Coast Boulevard, La Jolla CA 92037: Children's Pool Beach (32.847557°, -117.278485°). A map showing the study area is presented in Figure 1.

3. The species and numbers of marine mammals likely to be found within the activity area

The City commissioned two studies for harbor seal abundance trends at this site (Yochem and Stewart 1998; Hanan & Associates 2004 and 2011). The rocks and beaches at or near Children's Pool Beach, La Jolla, are almost exclusively harbor seal hauling sites. Both studies and observations for the previous two years of lifeguard tower construction have reported rare appearances of other pinniped species. On rare occasions, one or two California sea lions, *Z. californianus*, or juvenile elephant seals, *M. angustirostris*, have been observed on the sand or

rocks at/near Children's Pool Beach. Additionally, Guadalupe and northern fur seals (*A. townsendi* and *C. ursinus*, respectively) have been recently observed at nearby coves and beaches, including one observation at Children's Pool Beach (personal communication with Dr. Doyle Hanan, December 3, 2015). However, these sites are not currently typical haul-out locations for any of these four species.

During observation activities associated with the ongoing lifeguard construction project at Children's Pool Beach (City of San Diego 2015), the following abundance data were collected:

- During 2013, one juvenile sea lion and no elephant seals were observed.
- During 2014, 22 sea lions were observed out of the water during 19 days. A total of 30 juvenile elephant seals on 29 separate days (2 on one day) were observed. Additionally, adult sea lions were also observed hauling out on rocks and cliffs near Children's Pool Beach. There were many instances when Sea World captured harbor seals with wounds or line wrapped around them and a few abandoned pups. National Oceanic and Atmospheric Administration (NOAA) Fisheries collected stillborn and dead pups a few times. One dead adult sea lion was observed during February 2015 (well after construction stopped for the pupping closure) and six still/premature births were observed from November 2014 through January 2015.
- 2015 observations are currently underway.

Harbor seals haul out on the sand, rocks, and seawall in and around Children's Pool Beach, in numbers ranging from 0 to 250, depending on time of day, season, and weather conditions. A study conducted by Linder (2011) predicted that it was unlikely that harbor seal numbers would exceed 250 individuals because of limited space behind the seawall. During the 2014-2015 construction monitoring, 12 counts totaling more than 200, with a maximum of 238 seals, occurred. As stated in the Incidental Harassment Authorization (IHA) application for ongoing lifeguard tower construction at Children's Pool Beach, "At low tide, additional hauling space is available on the rocky reef areas outside the retaining wall and on beaches immediately southward. Radio tagging and photographic studies have revealed that only a portion of seals utilizing a hauling site are present at any specific moment or day (Hanan 1996; Hanan 2005; Gilbert et al. 2005; Harvey and Goley 2011; Linder 2011). These studies further indicate that seals are constantly moving along the coast including to/from the offshore islands and that there may be as many as 600 harbor seals using Children's Pool Beach during a year, but certainly not all at one time" (City of San Diego 2015).

As part of the IHA application for the ongoing lifeguard tower construction at Children's Pool Beach, Dr. Doyle Hanan fitted a polynomial curve to show potential seals hauling out at Children's Pool Beach by month (Figure 2) based on counts by monitors (Hanan 2004; Hanan & Associates 2011; Yochem and Stewart 1998), and the Children's Pool Beach docents (Hanan 2004). A 3 percent annual growth rate was applied to the Yochem and Stewart counts to normalize them to Hanan & Associates and docent counts during 2003–2004 (City of San Diego 2015). Based on personal observations and monitoring during 2013 and 2014 by Dr. Hanan, similar numbers are expected for 2016.

4. A description of the status, distribution, and seasonal distribution (when applicable) of the affected species or stocks of marine mammals likely to be affected by such activities

A table of the habitat, occurrence, range, abundance, and conservation status of marine mammals inhabiting the general region of the action area in the Pacific Ocean off the southern coast of California is presented below. Because of the nature of the sand sampling activities, whales and dolphins were not considered to be affected species. Additionally, because of their range, Steller sea lions are not considered to be an affected pinniped species.

Species	Habitat	Occurrence	Range	Best Population Estimate (minimum ¹)	ESA ²	MMPA ³
Mysticetes						
Gray whale (<i>Eschrichus robustus</i>)	Coastal and shelf	Transient during season migrations	North Pacific Ocean, Gulf of California to Arctic – Eastern North Pacific stock	20,990 (20,125)	DL— Eastern Pacific stock EN— Western Pacific stock	NC—Eastern North Pacific stock D—Western North Pacific stock.
Odontocetes						
Killer whale (<i>Orcinus orca</i>)	Widely distributed	Varies on inter-annual basis	Cosmopolitan	354 (354)— West Coast Transient stock	NL EN— Southern resident population	NC D— Southern Resident and AT1 Transient populations
Bottlenose dolphin (<i>Tursiops truncatus</i>)	Offshore, inshore, coastal, estuaries	Limited, small population within 1 km of shore	Tropical and temperate waters between 45° North and South	323 (290)— California Coastal stock	NL	NC
Long-beaked common dolphin (<i>Delphinus capensis</i>)	Inshore	Common, more inshore distribution, year-round presence	Nearshore and tropical waters	107,016 (76,224)— California stock	NL	NC
Pinnipeds						
Pacific harbor seal (<i>Phoca vitulina richardii</i>)	Coastal	Common	Coastal temperate to polar regions in Northern Hemisphere	30,968 (27,348)— California stock	NL	NC

Species	Habitat	Occurrence	Range	Best Population Estimate (minimum ¹)	ESA ²	MMPA ³
Northern elephant seal (<i>Mirounga angustirostris</i>)	Coastal, pelagic when not migrating	Common	Eastern and Central North Pacific—Alaska to Mexico	179,000 (81,368)—California breeding stock	NL	NC
California sea lion (<i>Zalophus californianus</i>)	Coastal, shelf	Common	Eastern North Pacific Ocean—Alaska to Mexico	296,750 (153,337)—United States stock	NL	NC
Steller sea lion (<i>Eumetopias jubatus</i>)	Coastal, shelf	Rare	North Pacific Ocean—Central California to Korea	72,223 (52,847)—Eastern United States stock	DL—Eastern United States stock EN—Western United States stock	D
Northern fur seal (<i>Callorhinus ursinus</i>)	Pelagic, offshore	Rare	North Pacific Ocean—Mexico to Japan	12,844 (6,722)—California stock	NL	NC – California Stock
Guadalupe fur seal (<i>Arctocephalus townsendi</i>)	Coastal, shelf	Rare	California to Baja California, Mexico	7,408 (3,028)—Mexico to California	T.	D

Notes:

MMPA = Marine Mammal Protection Act of 1972; NA = Not available or not assessed.

1. National Marine Fisheries Service Marine Mammal Stock Assessment Reports.

2. United States Endangered Species Act (ESA): EN = Endangered, T = Threatened, DL = Delisted, and NL = Not listed.

3. United States Marine Mammal Protection Act: D = Depleted, S = Strategic, and NC = Not classified.

Source:

<https://www.federalregister.gov/articles/2015/07/13/2015-16965/takes-of-marine-mammals-incident-to-specified-activities-construction-activities-at-the-childrens>

The seasonal distribution of the affected species is as follows:

- Per the City Children’s Pool Beach Lifeguard Tower Construction IHA:
 - Pacific harbor seals (*P. vitulina*): Harbor seal presence at hauling sites is seasonal with peaks in abundance during their pupping and molting periods. Pupping and molting periods are first observed to the south and progress northward up the coast with time (e.g., January–May near San Diego, Hanan 2004; Hanan & Associates 2011; April–June in Oregon and Washington; Jeffries 1984; Jeffries 1985; Huber et al. 2001).

- California sea lions (*Z. californianus*): There are no sea lion rookeries at or near Children's Pool Beach, although in the previous two years, sea lion births have been reported at La Jolla Cove (about 0.75 kilometers east of Children's Pool Beach).
- Northern elephant seals (*M. angustirostris*): There are no rookeries at or near Children's Pool Beach.
- Per Carretta et al. 2014:
 - Northern fur seals (*A. townsendi*): There are no rookeries at or near Children's Pool Beach.
 - Guadalupe fur seals (*M. angustirostris*): There are no rookeries at or near Children's Pool Beach.

5. The type of incidental taking authorization that is being requested (i.e., takes by harassment only; takes by harassment, injury and/or death) and the method of incidental taking

All takes of pinnipeds during this project will be Level B harassment only. There will be no intrusive, injurious, or lethal takes. There is a high likelihood that many of the harbor seals when present during project activity will not be flushed off the beach, as seals at this site are conditioned to human presence and loud noises (Hanan 2004; Hanan & Associates 2011; Hahn 2010).

6. By age, sex, and reproductive condition (if possible), the number of marine mammals (by species) that may be taken by each type of taking identified in paragraph (a)(5) of this section, and the number of times such takings by each type of taking are likely to occur

With sampling beginning June 1, 2016, we would expect up to 190 harbor seals present daily, with a seasonal decline through November 2016 to an approximate maximum of 50 seals present daily (Figure 2). If all sampling events were to take place during peak abundance in June 2016 and all estimated seals present are incidentally harassed each day, there could be a maximum of 3,040 harbor seal incidental takes (approximately 896 adult males and 672 juvenile males; 864 adult females and 608 juvenile females, based on age and sex ratios presented in Härkönen et al., 1999). About 90 percent of the adult females are expected to be pregnant after June/July 2016 (Greig 2002). An unknown proportion of the incidental takes would be from repeated exposures as seals return to Children's Pool Beach. A polynomial curve fit to counts by month, prepared by Hanan & Associates, was used to estimate harbor seals expected to be hauled out by day (Figure 2).

Because so few sea lions, elephant seals, or fur seals are observed at Children's Pool Beach, the City requests a maximum incidental take of 100 sea lions and 10 elephant seals

No incidental take is requested for northern or Guadalupe fur seals: if fur seals are observed to be hauled out on the beach, or in the water/rocks at Children’s Pool Beach prior to initiation of sand collection activities, the sampling activities will not commence and the stranding network will be alerted. Recommendations of the stranding coordinator will be followed, which may include a 24-48 hours waiting and observations period, and sampling would not commence until the animal had vacated on its own or was collected by the stranding network.

Estimated take is presented in tabular form below.

Species	Level B Take Authorization (Number of Exposures)	Estimated Number of Individuals Taken	Abundance of Stock	Estimated Stock Taken (Individuals)
Pacific harbor seal	3,040	600	30,968—California stock	1.93
Northern elephant seal	10	2	179,000—California breeding stock	<0.01
California sea lion	100	20	296,750— United States stock	<0.01

7. The anticipated impact of the activity upon the species or stock

Pinnipeds utilizing Children’s Pool Beach are a small portion of their respective stocks, and any impacts would have little effect on the population as a whole. Additionally, this Level B taking as part of the City’s sand sampling activities is not expected to affect nor impact pinnipeds at the population or stock level. Because sampling activity will be prohibited during the pupping season (December 15 through May 15) as well as an additional period to accommodate late season weaning (May 15 through May 30) there will be no impacts on birthing rates or pup survivorship at Children’s Pool Beach. There will be no in-water activities, so pinniped activities in the water (such as feeding or mating) should not be affected. Sand sampling on the beach in proximity to the water’s edge may affect seals entering and exiting the beach, but is not anticipated to impact population or stock levels. Additionally, sampling activities will be restricted to daylight hours (07:00 – 19:00), and to periods of lowest haul out occurrence (08:30 – 15:30) to the maximum extent practicable.

Per the City of San Diego (2015), “At the individual level, a newly arrived seal (which swam in from another area) may not have habituated to humans and noise, as have seals that have been onsite for a while. These recent arrivals may alert to visual stimuli, perhaps flushing to the water. But after a few days using this beach during the non-pupping season (when humans are also present on the beach), we would expect them to habituate and generally not react to humans unless very close to them (Hanan 2004, Hanan & Associates 2011, Hanan and Hanan 2014).”

8. The anticipated impact of the activity on the availability of the species or stocks of marine mammals for subsistence uses

No impact on subsistence uses is expected, because there are no anticipated effects on natality or mortality of pinniped stocks because of this project. There are also no subsistence uses of pinnipeds in the vicinity of Children's Pool Beach.

9. The anticipated impact of the activity upon the habitat of the marine mammal populations, and the likelihood of restoration of the affected habitat

All sampling activities will take place on the sandy beach area normally occupied by hauled out seals. Although sand will be collected from the beach, the total volume removed over the course of the study is estimated to be less than 1 cubic foot. Additionally, a subset of samples will be collected approximately 25 to 50 centimeters (cm) below the sand surface. Because of the mechanism of collection (use of a hollow tube and mallet with minimal digging), only transient sand displacement is anticipated. Therefore, we do not anticipate impacts to habitat.

10. The anticipated impact of the loss or modification of the habitat on the marine mammal populations involved

No projected loss or modification of habitat is predicted for these species, because there are no significant changes to the beach utilized by the pinnipeds.

11. The availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat, and on their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance

No takes or impacts on rookeries will occur, as all sampling activities will take place during the non-pupping season. There will be no activities in the ocean and because harbor seals mate underwater, there will be no takes or impacts affecting mating activities.

Other affected pinniped species (elephant seals, sea lions, and fur seals) are infrequent users of this area and their rookeries are more than 65 miles away at offshore islands; there will be no adverse impact on these species' mating activities.

12. Where the proposed activity would take place in or near a traditional Arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for Arctic subsistence uses, the applicant must submit either a "plan of cooperation" or information that identifies what measures have been taken and/or will be taken to minimize any adverse effects on the availability of marine mammals for subsistence uses

There will be no activities in Arctic areas, and there are no subsistence uses of pinnipeds in the vicinity of Children's Pool Beach.

13. The suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species, the level of taking or impacts on

populations of marine mammals that are expected to be present while conducting activities, and suggested means of minimizing burdens by coordinating such reporting requirements with other schemes already applicable to persons conducting such activity. Monitoring plans should include a description of the survey techniques that would be used to determine the movement and activity of marine mammals near the activity site(s), including migration and other habitat uses such as feeding. Guidelines for developing a site-specific monitoring plan may be obtained by writing to the Director, Office of Protected Resources

During all sampling events, a NOAA Fisheries – approved Protected Species Observer (PSO) will make observations. PSOs will follow NOAA fisheries suggested reporting criteria for seal responses to stimuli: flushing into the water; moving more than 1 meter, but not into the water; becoming alert and moving, but not more than 1 meter; and changing direction of current movement. PSOs will also estimate the number of seals that were observed to exhibit the behavior, as well as the apparent source of the stimulus. Because the beach is open for public use during sampling activities, harassment may be caused by members of the public and/or sampling activities.

The City has developed a monitoring plan (see Appendix A. Children’s Pool Beach Sand Quality Study Mitigation Monitoring) on the basis of discussions between the project management team at Amec Foster Wheeler Environment & Infrastructure, Inc., City staff, and Dr. Doyle Hanan, as well as review of granted IHAs. The plan will be utilized during all Children’s Pool Beach sand quality study sampling activities. An example field monitoring form (FMF) is also presented in Appendix B.

All observations and associated data will be entered into and maintained on City computers. Field observations will be documented on an FMF. A report summarizing mitigation monitoring for the duration of the Children’s Pool Beach sand quality study IHA will be prepared and submitted by the City to NOAA Fisheries following completion of sand sampling activities for the 2016 non-pupping season. Daily monitoring reports will be maintained at the City for periodic summary reports to NOAA Fisheries.

14. Suggested means of learning of, encouraging, and coordinating research opportunities, plans, and activities relating to reducing such incidental taking and evaluating its effects

Each sampling event will be observed for any seal reaction by type of stimulus. Any flushing due to sampling activities will be documented. These data will provide instructional information for IHA permitting in future projects. Any potential additional mitigation will be discussed and suggested in the final report. The requested IHA monitoring for 2016 will provide information of particular value since recent local observations of pinniped mortality and malnutrition have increased in concert with record temperature El Nino conditions. The causes of these impacts to pinnipeds are of high interest and may linked to food chain impact, or possibly longer term environmental effects. Linkage to observed sightings, behaviors and marine mammal health relative to other regions such as known island rookeries would provide important data for gauging the overall health of the monitored species.

Figure 1. Sand Quality Study Area (outlined in red) Within Children's Pool Beach (32.847557°, -117.278485°)

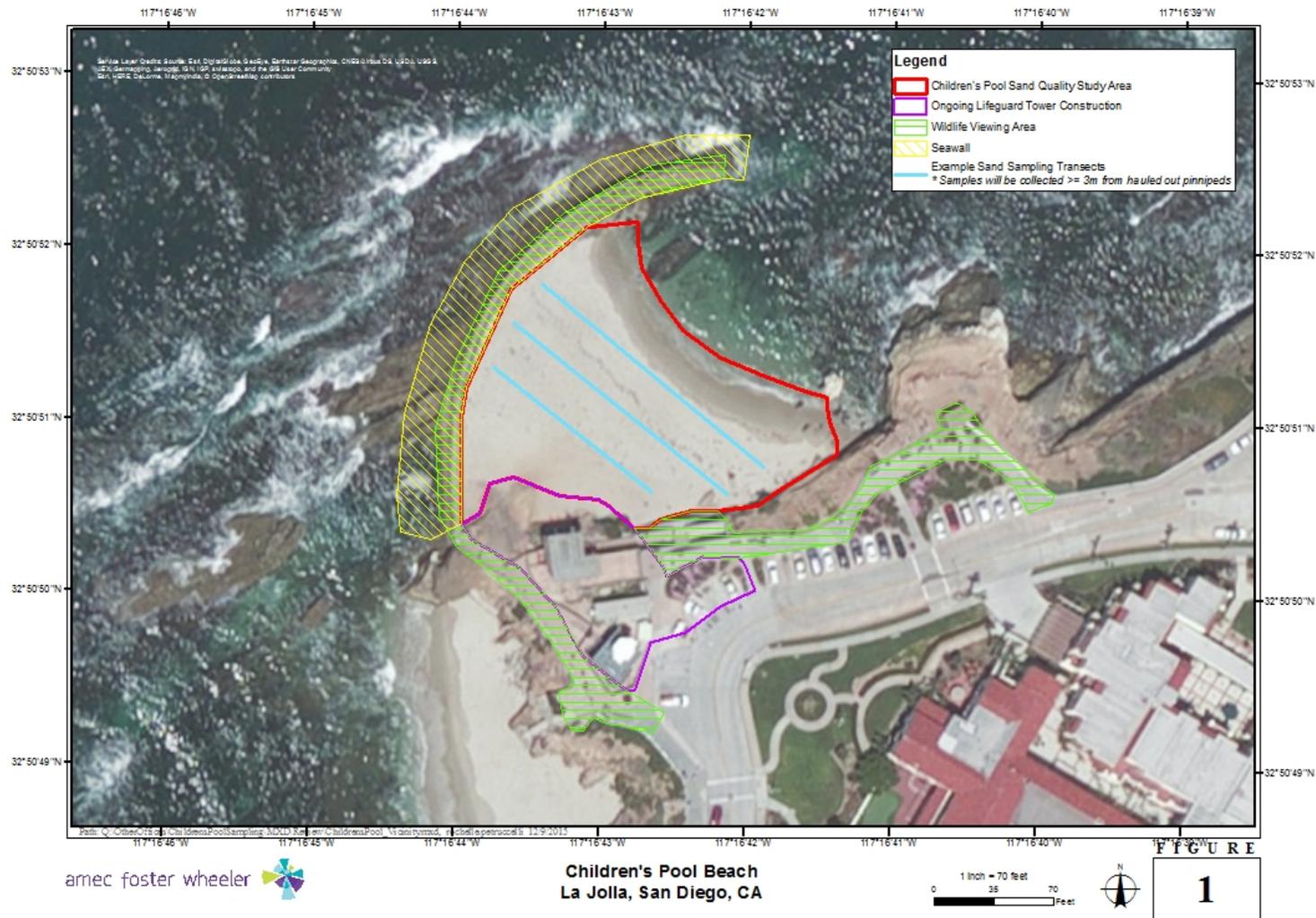
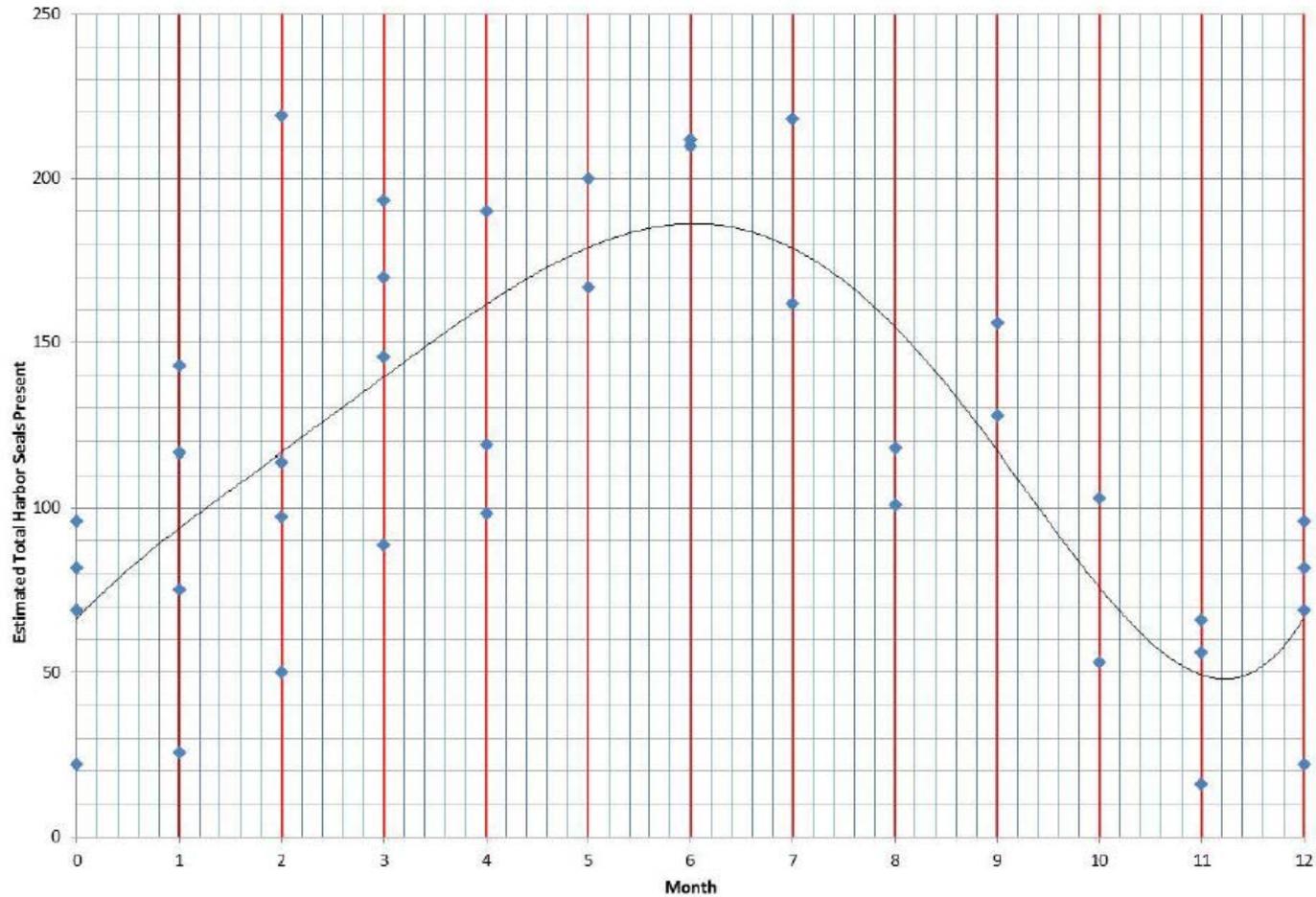


Figure 2. Estimated Total Seals
Children's Pool, La Jolla California



Notes:

Estimated Total Seals by Month Based on Counts at the Site by Hanan & Associates, Yochem and Stewart, and Children's Pool Docents. Blue diamonds represent counts. Polynomial curve fit to counts by month was used to estimate harbor seals potentially hauled out all day.

Source: City of San Diego, 2015.



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APPENDIX A

PROPOSED CHILDREN'S POOL BEACH SAND QUALITY STUDY MITIGATION MONITORING PLAN

DRAFT
MONITORING PLAN FOR THE CHILDREN'S POOL
FECAL INDICATOR BACTERIA AND MERCURY SAND STUDY

Submitted to:
City of San Diego
Transportation & Storm Water Department
9370 Chesapeake Drive, Suite 100
San Diego, California 92123



Submitted by:
Amec Foster Wheeler Environment & Infrastructure, Inc.
San Diego, California

February 2016

Amec Foster Wheeler Project No. 502515C027

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
µS/cm	microsiemens per centimeter
%	percent
303(d) List	Clean Water Act (CWA) Section 303(d) List of Water Quality Limited Segments
AB	Assembly Bill
Amec Foster Wheeler	Amec Foster Wheeler Environment & Infrastructure, Inc.
AQUA	Aquaculture
Bacteria TMDL	<i>A Resolution Amending the Water Quality Control Plan for the San Diego Basin (9) to Incorporate Revised Total Maximum Daily Loads for Indicator Bacteria Project I-Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)</i>
Basin Plan	San Diego Region Basin Plan
BIOL	Preservation of Biological Habitats of Special Significance
CDP	Coastal Development Permit
City	City of San Diego
COC	chain of custody
COMM	Commercial and Sportfishing
CWA	Clean Water Act
EDD	Electronic Data Deliverable
EM&TS	City of San Diego Environmental Monitoring & Technical Services
EPA	United States Environmental Protection Agency
EST	Estuarine Habitat
FIB	fecal indicator bacteria
IHA	Incidental Harassment Authorization
IND	Industrial Supply
MAR	Marine Habitat
MIGR	Fish Migration
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mL	milliliter
MMPA	Marine Mammal Protection Act
MPN	most probable number

ACRONYMS AND ABBREVIATIONS (Cont.)

NAV	Navigation
NOAA	National Oceanic and Atmospheric Administration
NTU	nephelometric turbidity unit
*.pdf	Portable Document Format
PSO	Protected Species Observer
QA	quality assurance
QAPP	Quality Assurance Project Plan
RARE	Preservation of Rare and Endangered Species
REC1	Water Contact Recreation
REC2	Non-Contact Water Recreation
SbS	subsurface sand
SCCWRP	Southern California Coastal Water Research Project
SDRWQCB	California Regional Water Quality Control Board, San Diego Region
SHELL	Shellfish Harvesting
SM	Standard Method
SPWN	Fish Spawning
SS	surface sand
State Board	State Water Resources Control Board
TMDL	Total Maximum Daily Load
WARM	Warm Water Habitat
WILD	Wildlife Habitat

1.0 PROJECT DESCRIPTION

1.1 Introduction

The California Coastal Commission issued a Notice of Intent to Issue Permit on November 7, 2014, which granted a revised Coastal Development Permit (CDP) to the City of San Diego (City), subject to certain special conditions, including a feasibility study. One of the required objectives of the feasibility study is to analyze the sand quality and methods for improving sand quality, including dredging, at Children's Pool Beach in La Jolla, California. Children's Pool is currently listed on the Clean Water Act (CWA) Section 303(d) List (303(d) List) as impaired for fecal indicator bacteria (FIB). Additionally, researchers have identified pinniped molting and excrement as a potential source of mercury to the environment (McHuron et al. 2014, Cossaboon et al. 2015). To partially fulfill the requirements of feasibility study, the sand study will analyze the current extent and magnitude of FIB and mercury contamination in the beach sand at Children's Pool.

1.2 Purpose

The purpose of this Monitoring Plan is to outline the program designed to determine sand quality at Children's Pool. The data generated will be used to address the following questions:

- What is the spatial and vertical distribution and magnitude of FIB in beach sand?
- What is the spatial and vertical distribution and magnitude of mercury in beach sand?

1.3 Site Background

Children's Pool Beach was established in 1931 with the construction of a seawall on the western side of the point in La Jolla, which created a protected pool area for swimmers. Over the years, sand has partially filled in Children's Pool Beach. Additionally, Pacific harbor seals have taken up residence on the beach. The harbor seal population has been increasing since 1979. Harbor seals haul out on the sand, rocks, and seawall in and around Children's Pool Beach, in numbers ranging from 0 to 250, depending on time of day, season, and weather conditions. A study conducted by Linder (2011) predicted that it was unlikely that harbor seal numbers would exceed 250 individuals because of limited space behind the seawall. During counts of Pacific harbor seals conducted during monitoring of lifeguard tower construction in the area in 2014-2015, 12 counts totaling more than 200 individuals, with a maximum of 238 individuals, occurred. As stated in the Marine Mammal Protection Act (MMPA) Incidental Harassment Authorization (IHA) application for the ongoing lifeguard tower construction at Children's Pool Beach, "At low tide, additional hauling space is available on the rocky reef areas outside the retaining wall and on beaches immediately southward. Radio tagging and photographic studies have revealed that only a portion of the harbor seals utilizing a hauling site are present at any specific moment or day (Hanan 1996; Hanan 2005; Gilbert et al. 2005; Harvey and Goley 2011; Linder 2011). These studies further indicate that the harbor seals are constantly moving along the coast, including to and from the offshore islands, and that there may be as many as 600 harbor seals using Children's Pool Beach during a year, but certainly not all at one time" (City of San Diego 2015). The harbor seals haul out, birth pups, molt, forage,

and mate in and around Children's Pool Beach. Seal pupping occurs from approximately January through May (Hanan 2004; Hanan & Associates 2011; Hanan and Hanan 2014). Per Dr. Doyle Hanan, Children's Pool Beach is one of three mainland harbor seal hauling sites in San Diego County.

California sea lions (*Z. californianus*) and northern elephant seals (*M. angustirostris*) are observed occasionally on this beach and in nearby areas (Yochem and Stewart 1998; Hanan 2004; Hanan & Associates 2011; Hanan and Hanan 2014) in small numbers (less than five). Additionally, northern (*C. ursinus*) and Guadalupe (*A. townsendi*) fur seals have been observed at nearby beaches and once at Children's Pool Beach this year (personal communication with Dr. Doyle Hanan, December 3, 2015), although sightings of these species are rare.

The City has designated Children's Pool Beach as a shared use beach. Many activities currently take place at Children's Pool Beach and the surrounding shoreline areas, including swimming, surfing, kayaking, diving, tide pooling, and nature watching. The Pacific harbor seal colony that has taken up residence at Children's Pool Beach, in particular, draws many nature watchers. During the Pacific harbor seal pupping season (December 15 through May 15, annually), the beach is closed to the public per the revised City CDP issued by the California Coastal Commission. Outside of the pupping season, beach access and recreational uses are permitted, provided that there is no direct harassment of the harbor seals.

Beneficial uses within the Scripps subwatershed (which includes Children's Pool), as designated by the State Water Resources Control Board (State Board) San Diego Region Basin Plan (Basin Plan) for surface waters, are provided in Table 1-1 (SDRWQCB 2007). Currently, Children's Pool is identified in both the Scripps subwatershed Bacteria Total Maximum Daily Load (TMDL) and the 2010 CWA 303(d) List as impaired for indicator bacteria (SDRWQCB 2010a, SDRWQCB 2010b, USEPA 2011).

**Table 1-1.
 Beneficial Uses for the 303(d) Listed Waterbody**

Hydrologic Unit	Waterbody Type	Beneficial Use														
		IND	NAV	REC1	REC2	COMM	BIOL	EST	WILD	RARE	MAR	AQUA	MIGR	SPWN	WARM	SHELL
Shoreline																
Scripps (906.30)	Pacific Ocean	•	•	•	•	•	•		•	•	•	•	•	•		•

Notes:
 AQUA = Aquaculture, BIOL = Preservation of Biological Habitats of Special Significance, COMM = Commercial and Sportfishing, EST = Estuarine Habitat, IND = Industrial Supply, MAR = Marine Habitat, MIGR = Fish Migration, NAV = Navigation, RARE = Preservation of Rare and Endangered Species, REC1 = Water Contact Recreation, REC2 = Non-Contact Water Recreation, SHELL = Shellfish Harvesting, SPWN = Fish Spawning, WARM = Warm Water Habitat, WILD = Wildlife Habitat
 • Existing Beneficial Use
 Source: Water Quality Control Plan for the San Diego Basin (9) (Basin Plan) (California Regional Water Quality Control Board, San Diego Region [SDRWQCB] 2007).



Figure 1-1. Study Site

1.4 Project Organization and Responsibilities

For sampling efforts and reporting, the City, Consultants, and Laboratory staff will have the following roles and responsibilities:

- **Contract Manager:** The Contract Manager contracts with the selected consultants and laboratories to implement the monitoring plan and act as the liaison between the City and Contractors. Andre Sonksen is the Contract Manager.
- **Project Manager:** The Project Manager is responsible for overseeing the day-to-day activities of sample collection and ensuring that samples reach the laboratory within stated holding times. Rolf Schottle is the Project Manager.
- **Project Quality Assurance (QA) Officer:** The Project QA Officer conducts quality assurance oversight for the project independently from project management and from the project's monitoring program. Jay Shrake is the Project QA Officer.
- **Laboratory QA Officer/Project Manager:** Each participating laboratory must identify a QA Officer or Project Manager for this monitoring program. The Laboratory Project Manager is responsible for performing sample analyses and implementing quality control procedures in accordance with this Monitoring Plan. Laila Othman (City Environmental Monitoring and Technical Services [EM&TS] Laboratory) and Carla Hollowell (Eurofins-Calscience) are the Laboratory Project Managers.
- **Lead Protected Species Observer:** The National Oceanic and Atmospheric Administration (NOAA)-Fisheries-approved Lead Protected Species Observer (PSO) is responsible for detecting, documenting, and minimizing the number of marine mammal harassment events in accordance with the IHA Permit. Heather Krish is the Lead PSO.

1.5 Sampling Schedule

Tasks and deliverables can be found in Table 1-2. All sampling events will be conducted during daylight hours (7:00 – 19:00); sand sampling activities shall be scheduled during the period of lowest haul-out occurrence (approximately 8:30 – 15:30) to the maximum extent practicable. Up to 16 sampling events, approximately 4 hours in duration, will be conducted. The City closes Children's Pool Beach during harbor seal pupping season (December 15 through May 15). In addition, the anticipated MMPA IHA Permit, which is required to perform the monitoring work for the Children's Pool FIB and Mercury Sand Study, stipulates that monitoring is to be performed between June 1, 2016, and December 14, 2016, as to accommodate late weaning seals. All sampling activities will be performed at 850 Coast Boulevard, La Jolla, California 92037: Children's Pool Beach (32.847557°, -117.278485°). A map showing the study area is presented in Figure 1-1.

**Table 1-2.
 Project Schedule**

Children's Pool Fecal Indicator Bacteria and Mercury Sand Study		
Activity	Date	Deliverable
Project Management and Meetings	10 business days after meeting	Meeting Notes
Incidental Harassment Authorization (IHA) Permit Procurement	Submitted December 2015	Draft Permit Application to City for Review
	Submitted December 2015	Permit Application to NOAA
Monitoring Plan and Quality Assurance Project Plan (QAPP) Development	January 29, 2016	Draft Monitoring Plan and QAPP (to City)
	March 18, 2016	Final Monitoring Plan and QAPP (to City)
	February 2016	Draft Monitoring Plan and QAPP (to NMSF)
Field Monitoring	June 1, 2016 through December 14, 2016	Laboratory Electronic Data Deliverable (EDD) (FY2017)
Reporting	TBD	Draft Technical Memorandum (FY2017)
	Before March 15, 2017, ≤90 days post sampling	Draft Monitoring Report (to Office of Protected Resources, NMFS)
	TBD, 30 days after comments from NMFS	Final Monitoring Report (to Office of Protected Resources, NMFS)

2.0 MONITORING APPROACH

This section describes the purpose, scope, and type of sampling to be conducted. Additional details of the sampling and analytical methodology and data quality objectives are described in the Quality Assurance Project Plan (QAPP), provided as Appendix A.

2.1 Incidental Harassment Authority Permit

Before sampling of beach sand can take place, the City must obtain an IHA permit that allows for Level B harassment of marine mammals that use the area. An application for an IHA pursuant to the MMPA was submitted to the NOAA Fisheries Office of Protected Resources for review in December 2015.

Based on preliminary investigation, it was determined that an IHA permit under the Marine Mammal Protection Act is necessary to perform this study, due to the likelihood for IHA Level B harassment of harbor seals during sample collection. Level B harassment has the potential to disturb a marine mammal by causing disruption of behavioral patterns such as nursing, breeding, feeding, or sheltering, but does not have the potential to cause injury or direct contact, considered as Level A harassment. The IHA permit is effective for up to one year: it is assumed that the monitoring portion of this study will be completed within this timeframe, and an IHA permit renewal is required for additional work outside of this time frame. The sand study will have the potential to alert and flush harbor seals into the water during sampling events. Assuming that all harbor seals potentially hauled out at Children's Pool Beach would be exposed to Level B harassment during sampling events, there could be a maximum of 3,040 incidental harbor seal takes. The City requested the Incidental Harassment Authority for 3,040 Pacific harbor seals, 100 California sea lion and 10 northern elephant seal take authorizations for June 2016 through December 2016 during the non-pupping season.

Once the IHA permit is approved, it is valid for up to one year. The permit, once issued, may have special provisions that will require the amendment of the current monitoring plan and QAPP for the sand study sampling events.

2.1.1 Sampling Schedule and Procedures

Up to 16 sampling events may take place under this Monitoring Plan, with 6 primary events currently planned. The first monitoring event will be conducted following the formal end of harbor seal pupping season beach access restriction, inclusive of a two week extension to accommodate late weaning harbor seals beginning on June 1, 2016 and completed prior to December 15, 2016.

Per anticipated requirements of the IHA Permit, sand sampling activities will not be conducted if Guadalupe fur or Northern fur seals are present on the beach. Sighting of these species are rare and may be associated with well documented pinniped malnutrition and die-off observed during the current El Nino conditions. If either of these two species is observed, it will be presumed that these seal(s) are stranded and the Sea World stranded animal hotline (1-800-541-7235) as well as the NOAA regional marine stranded mammal coordinator will be

immediately notified (<http://www.nmfs.noaa.gov/pr/health/report.htm>). Sampling will be rescheduled to a time after either of these depleted species have been removed by rescuers or return to the offshore. Scheduling sand sampling activities, to the maximum extent practicable, will be performed during the daily period of lowest haul-out occurrence (08:30-15:30), and sampling locations will be offset to accommodate hauled out pinnipeds during each monitoring event. However, sand sampling activities may be extended from 7:00 to 19:00. (*i.e.*, daylight hours) to help assure that the project is completed during the 2016 sand sampling window and to assure that activities are conducted during lowest numbers of hauled out pinnipeds. During sand sampling, field teams will maintain a distance of at least 3 meters from any hauled-out pinniped. A PSO will conduct monitoring concurrent to all sampling activities to document pinniped behaviors and responses as required by the IHA Permit. PSO observations will be recorded using a customized log sheet in accordance to the IHA and corresponding amendment. A draft field monitoring form is provided in Appendix B.

2.1.2 Field Teams – Composition and Training

A NMFS-qualified, trained Protected Species Observer (PSO) shall be used to detect, document, and minimize potential impacts from sand sampling activities. The PSO shall attend the project site 30 minutes prior until 30 minutes after sand sampling activities cease each day throughout the sand quality study window. The PSO shall be approved by NMFS prior to commencement of activities.

The PSO will be a trained biologist with the following minimum requirements:

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of target species with ability to estimate required reporting parameters (*i.e.*, species; size; life stage; sex; etc.); use of binoculars may be necessary to correctly identify the target;
- Advanced education in biological science or related field (undergraduate degree or higher required);
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience);
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Sufficient training, orientation, or experience with the study activities and area to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when study activities were conducted; all relevant information regarding disturbance of marine mammals due to study activities; and marine mammal behavior in relation to study activities; and
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.

- Advanced education may not be necessary in this case. The point is to have some assurance that at minimum the head observer has demonstrated competency. Training should include:
 - The MMPA and conditions of the IHA
 - Required monitoring protocols
 - Relevant species identification
 - Age class identification
 - Recording of count and disturbance observations (including completion of data sheets)
 - Use of equipment

Prior to sampling events, all field staff will take part in marine mammal training conducted by a qualified biologist. It is assumed that two or three City staff will participate in each monitoring event, in both field sampling (one or two staff members) and PSO (one staff member) roles. It is assumed that up to two Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) staff members will participate in each monitoring event, in both field support and technical lead roles, subject to any restrictions in the approved IHA.

The PSO shall search for marine mammals using binoculars and/or the naked eye within the study area. The PSO will observe (weather permitting) from the base of the cliff, on the sidewalk above the site, the staircase platform just above the beach, or the seawall catwalk, depending on where the best vantage is to observe where pinnipeds are present. The Project Manager will be available to assist on the beach as needed, but the Project Manager's primary role is to interact with and inform the public and any special interest groups on the sidewalk, oversee the sample collections, and function as a secondary PSO to confirm observations. Both the PSO and Project Manager will be in direct contact with the field team members on the beach via walkie-talkie or cell phone.

2.2 Beach Sand Sampling

2.2.1 Fecal Indicator Bacteria

The first three sampling events (herein referred to as Phase 1a) are designed to maximize sampling area and to capture critical conditions when FIB may be at their highest concentrations. During each Phase 1a event, three transects parallel to the shoreline at the swash zone, the high-tide line, and the supralittoral zone will be established relative to the seawall railing and three surface sand (SS) FIB samples (top 2 centimeters) will be collected across each of the transects at approximately left, middle, and right beach (Figure 2-1). GPS coordinates for each sample will be recorded along each transect. In addition, subsurface sand (SbS) FIB samples will also be collected at three of the nine SS sampling location during each event at approximately 25–50 centimeters below the surface. Additional adaptive FIB samples may be collected to document event-specific conditions, such as areas recently occupied by pinnipeds, areas of wrack deposits, or additional depths at existing sampling locations. A

maximum of 21 FIB samples, including field replicates, will be collected for each Phase 1a monitoring event, for an approximate maximum Phase 1a total of 63 FIB samples. The remaining three sampling events (herein referred to as Phase 1b) will consist of biased sampling based on Phase 1a preliminary findings. The study design for Phase 1b will be finalized in consultation with the City. A maximum of 21 FIB samples, including field replicates, will be collected for each Phase 1b monitoring event, for an approximate maximum Phase 1b total of 63 FIB samples.

Because of the known heterogeneity of sediment bacteria populations, field replicates will be collected at a rate of approximately 10 percent (%) of the total sample count. All sand samples will be collected in sterile containers and transported on ice to the laboratory within six hours of collection. The City of San Diego EM&TS laboratory will perform analysis of sand samples.

2.2.2 Total Mercury

Additionally, because of the potential for mercury deposition to the beach through pinniped molt and feces, total mercury may be added as an analytical constituent for up to 5 SS samples per event. A maximum of 32 mercury samples, including field replicates, may be collected during Phase 1a and 1b monitoring. The study design will be finalized in consultation with the City. Eurofins-Calscience Laboratories will perform analysis of mercury samples.

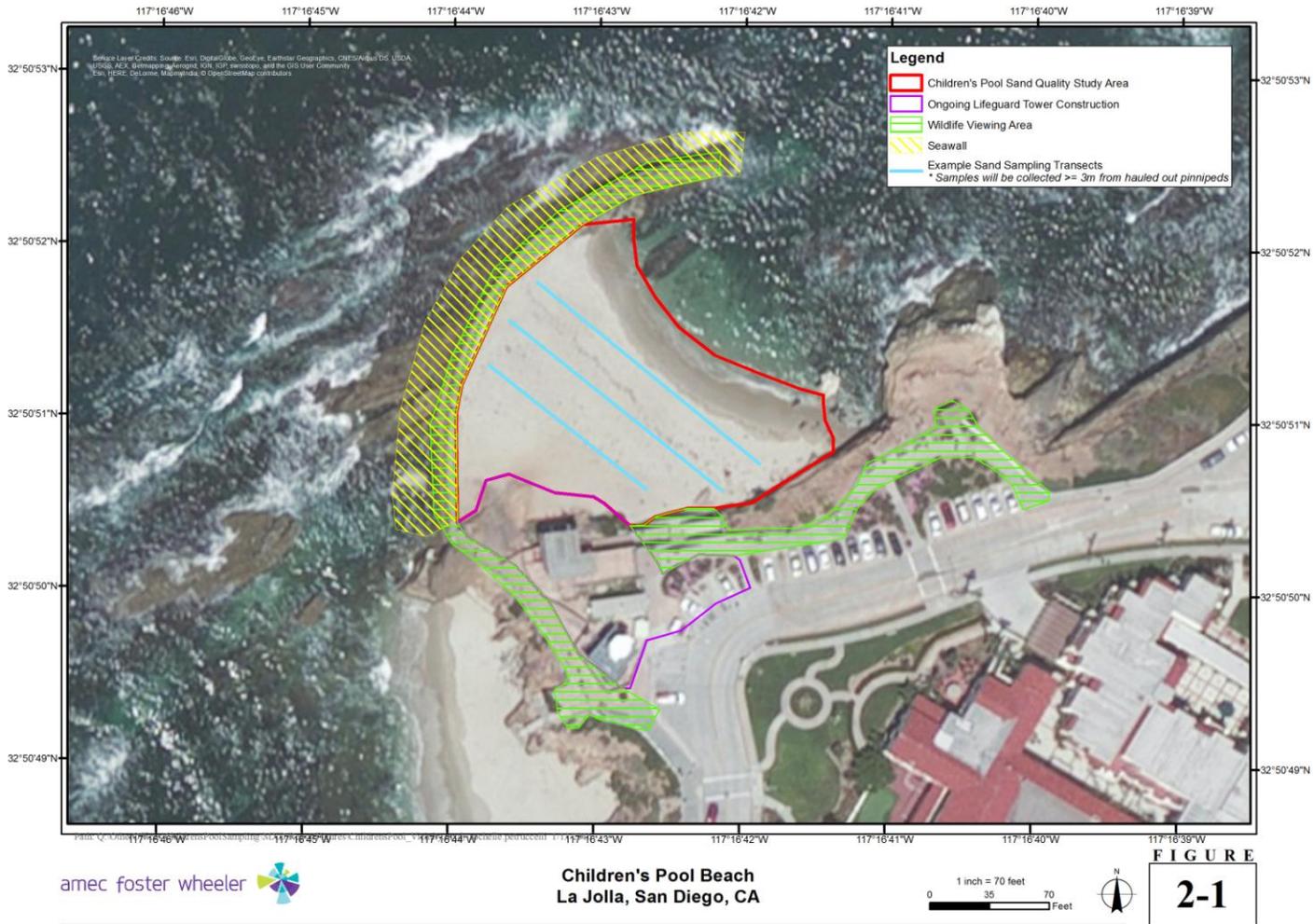


Figure 2-1. Map of Beach Sampling Locations

2.2.3 Constituents

FIB and total mercury are the target constituents for the sand study. Grab samples will be collected aseptically and analyzed for target FIB in accordance with the Southern California Coastal Water Research Project (SCCWRP) sand protocol (SCCWRP, 2009). Because bacteria levels are being measured from sand samples, the values reported are not directly comparable with existing water quality reporting limits or water quality objectives. The results will provide a relative magnitude of FIB concentrations in beach sand from which appropriate recommendations may be made. Table 2-1 presents the constituents, reporting limits, and analytical methods.

**Table 2-1.
Analyses for FIB and Mercury Sand Study**

Parameter	Analytical Methods
<i>Enterococcus</i>	EPA 1600
Fecal Coliform	SM 9222D
Total Coliform	SM 9222B
Total Mercury	EPA 7471A

2.3 Optional Reference Beach Monitoring

Marine mammal molting and excrement on the sand have been linked to elevated mercury concentrations in beach sand (McHuron et al. 2014, Cossaboon et al. 2015). Therefore, a beach in close proximity to Children's Pool, where marine mammals are not typically observed, may be sampled as a reference site to assess pinniped-associated mercury deposition. South Boomers Beach is located directly north of Children's Pool and is easily accessible via the stepped rocky bluff south of Point La Jolla Beach sand samples may be collected at this site when sand samples at Children's Pool are designated for total mercury analysis. Reference samples may also be collected for FIB testing dependent on results from Phase 1 testing. Samples will be collected at the same depth from surface and tidal interface and paired to Children's Pool samples during the same event (e.g., same swash zone, or supralittoral zone). It is anticipated that no more than 3 reference samples will be collected per event.

2.4 Non-Direct Measurements (Bacteria TMDL Water Quality Data)

The City conducts water quality monitoring at Children's Pool as part of the Scripps HA Bacteria TMDL compliance monitoring program. From April through October, the City measures field parameters (see Table 2-2) as well as FIB during dry weather approximately weekly (minimum of five events per month). For November through March, the City samples during dry weather once per month in addition to sampling within 24 hours of the end of precipitation for three qualifying storm events. Sand quality sampling events will be coordinated with water quality monitoring events to the maximum extent practicable to improve assessment of sand quality.

**Table 2-2.
Optional Field Parameters**

Field Parameter	Method	Unit
Dissolved Oxygen	YSI Pro ODO Field Meter	mg/L
pH	YSI Professional Plus Field Meter	–
Specific Conductivity	YSI Professional Plus Field Meter	µS/cm
Temperature	YSI Professional Plus Field Meter	°C
Turbidity	YSI Professional Plus Field Meter	NTU

Notes:

°C = degrees Celsius; µS/cm = microsiemens per centimeter, mg/L = milligrams per liter, NTU= nephelometric turbidity unit

3.0 DATA MANAGEMENT AND REPORTING PROCEDURES

This section describes the management of field and analytical data and reporting procedures for the Children's Pool Fecal Indicator Bacteria and Mercury Sand Study.

3.1 Data Management

Field Data Records and Analytical Data Reports will be sent to and kept by the designated City of San Diego Project Manager.

Amec Foster Wheeler will review all Field Data Log Sheets for completeness, maintain the original hardcopies, and scan electronic copies (*.pdf) for storage in the project file. Copies of Field Data Log Sheets and photographs for each event will be submitted to the City of San Diego with each EDD submittal. The field team will retain the original Field Data Log Sheets.

The laboratories will provide data in electronic format: both *.pdf copies of lab reports and an EDD. Analytical results will be submitted to the Sampling Agency in *.pdf format and as an EDD within three weeks of submittal of samples. The Sampling Agency will review all lab reports and EDDs for accuracy and completeness. The contract laboratory will retain original chain of custody (COC) forms. The contract laboratory will retain copies of the preliminary and final data reports.

3.2 Reporting Procedures

Amec Foster Wheeler will provide a laboratory EDD, data analysis and a draft technical memorandum, all tentatively planned for fiscal year 2017. The technical memorandum will describe the methods of sample collection, present results, and address the study questions.

4.0 REFERENCES

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City of San Diego
Draft Monitoring Plan for the Children's Pool
Fecal Indicator Bacteria and Mercury Sand Study
Amec Foster Wheeler Project No. 502515C027
February 2016

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Amec Foster Wheeler Project No. 502515C027
February 2016

APPENDIX A

CHILDREN'S POOL FECAL INDICATOR BACTERIA AND MERCURY SAND STUDY DRAFT QUALITY ASSURANCE PROJECT PLAN

DRAFT
QUALITY ASSURANCE PROJECT PLAN FOR THE CHILDREN'S POOL
FECAL INDICATOR BACTERIA AND MERCURY SAND STUDY

Submitted to:
City of San Diego
Transportation & Storm Water Department
9370 Chesapeake Drive, Suite 100
San Diego, California 92123



Submitted by:
Amec Foster Wheeler Environment & Infrastructure, Inc.
San Diego, California

February 2016

Amec Foster Wheeler Project No. 502515C027
QAPP Revision No. 01

GROUP A ELEMENTS: PROJECT MANAGEMENT

1.0 TITLE AND APPROVAL SHEETS

DRAFT
QUALITY ASSURANCE PROJECT PLAN FOR THE CHILDREN'S POOL
FECAL INDICATOR BACTERIA AND MERCURY SAND STUDY

February 2016

Submitted to:
City of San Diego
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9370 Chesapeake Drive, Suite 100
San Diego, California 92123

Submitted by:
Amec Foster Wheeler Environment & Infrastructure, Inc.
San Diego, California

**Amec Foster Wheeler Project No. 502515C027
QAPP Revision No. 01**

Approval Signatures:

Title:	Name:	Signature:	Date*:
City of San Diego Contract Manager	Andre Sonksen	_____	_____
Amec Foster Wheeler Project QA Officer	Jay Shrake	_____	_____
Amec Foster Wheeler Project Manager	Rolf Schottle	_____	_____
City of San Diego EM&TS Lab Project Manager	Laila Othman	_____	_____
Eurofins-Calscience Project Manager	Carla Hollowell	_____	_____
Protected Species Observer (PSO) Lead	Heather Krish	_____	_____

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
µS/cm	microsiemens per centimeter
%	percent
303(d) List	Clean Water Act (CWA) Section 303(d) List of Water Quality Limited Segments
AB	Assembly Bill
Amec Foster Wheeler	Amec Foster Wheeler Environment & Infrastructure, Inc.
AQUA	Aquaculture
Bacteria TMDL	<i>A Resolution Amending the Water Quality Control Plan for the San Diego Basin (9) to Incorporate Revised Total Maximum Daily Loads for Indicator Bacteria Project I-Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek)</i>
Basin Plan	San Diego Region Basin Plan
BIOL	Preservation of Biological Habitats of Special Significance
CDP	Coastal Development Permit
City	City of San Diego
CLRP	Comprehensive Load Reduction Program
COC	chain of custody
COMM	Commercial and Sportfishing
CWA	Clean Water Act
DHS	California Department of Health Services
DQO	data quality objective
EDD	Electronic Data Deliverable
ELAP	Environmental Laboratory Accreditation Program
EM&TS	City of San Diego Environmental Monitoring & Technical Services
EPA	United States Environmental Protection Agency
EST	Estuarine Habitat
FIB	fecal indicator bacteria
ID	identification
IHA	Incidental Harassment Authorization
IND	Industrial Supply
JPEG	Joint Photographic Experts Group
MAR	Marine Habitat
MIGR	Fish Migration
mg/kg	milligrams per kilogram

ACRONYMS AND ABBREVIATIONS (Cont.)

mg/L	milligrams per liter
mL	milliliter
MPN	most probable number
NA	not applicable
NAV	Navigation
NOAA	National Oceanic and Atmospheric Administration
NTU	nephelometric turbidity unit
*.pdf	Portable Document Format
PSO	Protected Species Observer
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RARE	Preservation of Rare and Endangered Species
REC1	Water Contact Recreation
REC2	Non-Contact Water Recreation
RL	reporting limit
RPD	relative percent difference
SbS	subsurface sand
SDRWQCB	California Regional Water Quality Control Board, San Diego Region
SHELL	Shellfish Harvesting
SM	Standard Method
SOP	standard operating procedure
SPWN	Fish Spawning
SS	surface sand
State Board	State Water Resources Control Board
SWAMP	Surface Water Ambient Monitoring Program
TBD	to be determined
TMDL	Total Maximum Daily Load
WARM	Warm Water Habitat
WILD	Wildlife Habitat

2.0 DISTRIBUTION LIST

Title:	Name (Affiliation):	Tel. No.:	QAPP No.:
Contract Manager	Andre Sonksen (City of San Diego)	858-541-4317	1.0
Project Quality Assurance (QA) Officer	Jay Shrake (Amec Foster Wheeler)	858-514-6459	1.0
Project Manager	Rolf Schottle (Amec Foster Wheeler)	858-300-4323	1.0
City of San Diego Environmental Monitoring & Technical Services (EM&TS) Lab Project Manager	Laila Othman (City of San Diego EM&TS Laboratory)	619-758-2312	1.0
Eurofins-Calscience Project Manager	Carla Hollowell (Eurofins-Calscience)	515-280-8378	1.0
Protected Species Observer (PSO) Lead	Heather Krish (City of San Diego)	858-541-4319	1.0

Laboratory Managers will receive an electronic copy of the QAPP.

3.0 PROJECT/TASK ORGANIZATION

3.1 Involved Parties and Roles

The City of San Diego, consultants, and laboratory staff will have the following roles and responsibilities (Table 3-1):

- **Contract Manager:** Andre Sonksen is the Contract Manager for the City of San Diego (City). The Contract Manager will be responsible for establishing contracts with the selected consultants and/or laboratories to implement the Children's Pool Fecal Indicator Bacteria and Mercury Sand Study (sand study) and act as the liaison between the Responsible Party (City) and consultants.
- **Project Manager:** Rolf Schottle is the Project Manager. The Project Manager will be responsible for overseeing the day-to-day activities of implementing the sand study.
- **Project Quality Assurance (QA) Officer:** Jay Shrake is the Project QA Officer. The Project QA Officer will be responsible for overseeing the project QA activities independently from the Project Manager to ensure that project implementation is being conducted in accordance with this Quality Assurance Project Plan (QAPP).
- **Laboratory QA Officer/Project Manager:** Laila Othman is the Laboratory Project Manager with the City of San Diego EM&TS Lab. Carla Hollowell is the Laboratory Project Manager with Eurofins-Calscience.
- **Protected Species Observer Lead:** Heather Krish is the PSO lead. The National Oceanic and Atmospheric Administration (NOAA)-Fisheries-approved PSO is responsible for detecting, documenting, and minimizing the number of marine mammal harassment events in accordance with the IHA Permit.

**Table 3-1.
 Personnel Responsibilities**

Name	Organizational Affiliation	Role/Responsibility	Contact Information
Andre Sonksen	City of San Diego	Contract Manager	858-541-4317 asonksen@sandiego.gov
Rolf Schottle	Amec Foster Wheeler	Project Manager	858-514-6459 rolf.schottle@amecfw.com
Jay Shrake	Amec Foster Wheeler	Project QA Officer	858-300-4323 jay.shrake@amecfw.com
Laila Othman	City of San Diego EM&TS Lab	Laboratory QA Officer	619-758-2312 lothman@sandiego.gov
Carla Hollowell	Eurofins-Calscience	Laboratory QA Officer	515-280-8378 carlahollowell@eurofinsus.com
Heather Krish	City of San Diego	PSO Lead	858-541-4319 hkrish@sandiego.gov

3.2 Quality Assurance Officer Role

The Project QA Officer position is independent of data generation. The Project QA Officer will ensure that the QA and quality control (QC) procedures set in place in this document will be properly applied throughout the sampling activities and analysis. The Project QA Officer will coordinate with the Project Managers and QA Officers of participating laboratories to ensure that all QA and QC procedures within this QAPP are understood and followed by participating labs.

3.3 Persons Responsible for QAPP Update and Maintenance

The Project Manager and Project QA Officer are responsible for maintaining this QAPP. Changes and updates to this QAPP may be made by the Project Manager or Project QA Officer. The Project Manager will be responsible for making the changes and ensuring that these updates are provided to each of the participating agencies as listed in Table 3-1. Previous versions of the QAPP should be removed to avoid any confusion regarding the most current version of the QAPP.

4.0 PROBLEM DEFINITION/BACKGROUND

4.1 Problem Statement

Children's Pool Beach was established in 1931 with the construction of a seawall on the western side of the point in La Jolla, California, which created a protected pool area for swimmers. Over the years, sand has partially filled in Children's Pool Beach. Additionally, Pacific harbor seals have taken up residence on the beach. The harbor seal population has been increasing since 1979. The harbor seals haul out, birth pups, molt, forage, and mate in and around Children's Pool Beach. Seal pupping occurs from approximately January through May (Hanan 2004; Hanan & Associates 2011; Hanan and Hanan 2014). Several studies have identified harbor seal behavior and estimated harbor seal numbers, including patterns of daily and seasonal area use (Yochem and Stewart 1998; Hanan 2004; Hanan & Associates 2011; Linder 2011; Hanan and Hanan 2014). Per Dr. Doyle Hanan, Children's Pool Beach is one of three mainland harbor seal hauling sites in San Diego County.

Children's Pool is currently listed on the Clean Water Act (CWA) Section 303(d) List (303(d) List) as impaired for fecal indicator bacteria (FIB). Additionally, researchers have identified pinniped molting and excrement as a potential source of mercury to the environment (McHuron et al. 2014, Cossaboon et al. 2015).

The California Coastal Commission issued a Notice of Intent to Issue Permit on November 7, 2014, which granted a revised Coastal Development Permit (CDP) to the City, subject to certain special conditions, including a feasibility study. One of the required objectives of the feasibility study is to analyze the sand quality and methods for improving sand quality, including dredging, at Children's Pool Beach.

This sand study will analyze the current extent and magnitude of FIB and mercury contamination in the beach sand at Children's Pool Beach. The purpose of this QAPP is to outline the methodology and data quality requirements to meet the goals of the feasibility study.

4.2 Decisions or Outcomes

The data generated by this project will be used to determine the quality of beach sand at Children's Pool using bacteria counts and mercury concentrations as indicators.

The general approach and specific design elements of the project are driven by the following monitoring questions:

- What is the spatial and vertical distribution and magnitude of FIB in beach sand?
- What is the spatial and vertical distribution and magnitude of mercury in beach sand?

5.0 PROJECT/TASK DESCRIPTION

This QAPP reflects the beach sand sampling and reporting components of the Children's Pool Sand Fecal Indicator Bacteria and Mercury Sand Study.

5.1 Field Teams, Procedures and Sampling Schedule

Up to 16 sampling events may take place under this Monitoring Plan, with 6 primary events currently planned. The first monitoring event will be conducted two weeks following the end of the formal harbor seal pupping season (June 1, 2016) and completed prior to December 15, 2016. Although May 15 is the end of pupping season according to the City CDP, the National Oceanic and Atmospheric Administration (NOAA) is requesting a start date of June 1 as a provision of the IHA permit to accommodate late weaning pups that may still be present on the beach. Reporting will continue through the City of San Diego 2016-2017 fiscal year (before June 1, 2017).

Sand sampling activities will not be conducted if Guadalupe or Northern fur seals are present on the beach. Scheduling sand sampling activities will be performed during daylight hours (07:00-19:00) and, to the maximum extent practicable, will be performed during the daily period of lowest haul-out occurrence (08:00-15:30). Sampling locations will be offset to accommodate hauled out pinnipeds during each monitoring event. During sand sampling, field teams will maintain a distance of at least 3 meters from any hauled-out pinniped. A PSO will conduct monitoring concurrent to all sampling activities to document pinniped behaviors and responses as required by the IHA Permit.

5.1.1 Field Teams – Composition and Training

A NMFS-qualified, trained Protected Species Observer (PSO) shall be used to detect, document, and minimize potential impacts from sand sampling activities. The PSO shall attend the project site 30 minutes prior until 30 minutes after sand sampling activities cease each day throughout the sand quality study window. The PSO shall be approved by NMFS prior to commencement of activities.

The PSO will be a trained biologist with the following minimum requirements:

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of target species with ability to estimate required reporting parameters (i.e., species; size; life stage; sex; etc.); use of binoculars may be necessary to correctly identify the target;
- Advanced education in biological science or related field (undergraduate degree or higher required);
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience);
- Experience or training in the field identification of marine mammals, including the identification of behaviors;

- Sufficient training, orientation, or experience with the study activities and area to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when study activities were conducted; all relevant information regarding disturbance of marine mammals due to study activities; and marine mammal behavior in relation to study activities; and
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.
- Advanced education may not be necessary in this case. The point is to have some assurance that at minimum the head observer has demonstrated competency. Training should include:
 - The MMPA and conditions of the IHA
 - Required monitoring protocols
 - Relevant species identification
 - Age class identification
 - Recording of count and disturbance observations (including completion of data sheets)
 - Use of equipment

Prior to sampling events, all field staff will take part in marine mammal training conducted by a qualified biologist. It is assumed that two or three City staff will participate in each monitoring event, in both field support (one or two staff members) and PSO (one staff member) roles. It is assumed that up to two Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) staff members will participate in each monitoring event, in both field support and technical lead roles, subject to any restrictions in the approved Incidental Harassment Authorization (IHA).

The PSO shall search for marine mammals using binoculars and/or the naked eye within the study area. The PSO will observe (weather permitting) from the base of the cliff, on the sidewalk above the site, the staircase platform just above the beach, or the seawall catwalk, depending on where the best vantage is to observe where pinnipeds are present. The Project Manager will be available to assist on the beach as needed, but the Project Manager's primary role is to interact with and inform the public and any special interest groups on the sidewalk, oversee the sample collections, and function as a secondary PSO to confirm observations. Both the PSO and Project Manager will be in direct contact with the field team members on the beach via walkie-talkie or cell phone.

5.1.2 Fecal Indicator Bacteria Sampling

The first three sampling events (herein referred to as Phase 1a) are designed to maximize sampling area and to capture critical conditions when FIB may be at their highest concentrations. During each Phase 1a event, three transects parallel to the shoreline at the swash zone, the high-tide line, and the supralittoral zone will be established relative to the seawall railing and three surface sand (SS) FIB samples (top 2 centimeters) will be collected across each of the transects at approximately left, middle, and right beach. GPS coordinates for each sample collected along the transects will be recorded. In addition, subsurface sand (SbS) FIB samples will also be collected at three of the nine SS sampling locations during each event at approximately 25–50 centimeters below the surface. Additional adaptive FIB samples will be collected to document event-specific conditions, such as areas recently occupied by pinnipeds, areas of wrack deposits, or additional depths at existing sampling locations. A maximum of 21 FIB samples, including field replicates, will be collected for each Phase 1a monitoring event, for an approximate maximum Phase 1a total of 63 FIB samples. The remaining three sampling events (herein referred to as Phase 1b) will consist of biased sampling based on Phase 1a preliminary findings. The study design for Phase 1b will be finalized in consultation with the City. A maximum of 21 FIB samples, including field replicates, will be collected for each Phase 1b monitoring event, for an approximate maximum Phase 1b total of 63 FIB samples. Based on the combined Phase 1a and Phase 1b results up to an additional 10 sample collection events will be performed.

Because of the known heterogeneity of sediment bacteria populations, field replicates will be collected at a rate of approximately 10 percent (%) of the total sample count. All sand samples will be collected in sterile containers and transported on ice to the laboratory within six hours of collection. The City of San Diego Environmental Monitoring & Technical Services (EM&TS) laboratory will perform analysis of sand samples.

5.1.3 Total Mercury Sampling

Additionally, because of the potential for mercury deposition to the beach through pinniped feces, total mercury may be added as an analytical constituent for up to 5 SS samples per event. A maximum of 32 mercury samples, including field replicates, may be collected during Phase 1a and 1b monitoring. The study design will be finalized in consultation with the City. Eurofins-Calscience Laboratories will perform analysis of mercury samples.

5.1.4 Optional/Non-Direct Monitoring

5.1.4.1 Reference Beach Monitoring

Marine mammal molting and excrement on the sand have been linked to elevated mercury concentrations in beach sand (McHuron et al. 2014, Cossaboon et al. 2015). Therefore, a beach in close proximity to Children's Pool, where marine mammals are not typically observed, may be sampled as a reference site to assess pinniped-associated mercury deposition. South Boomers Beach is located directly north of Children's Pool and is easily accessible via the stepped rocky bluff south of Point La Jolla. Beach sand samples may be collected at this site

when sand samples at Children's Pool are designated for total mercury analysis. Reference samples may also be collected for FIB testing dependent on results from Phase 1 testing, although this beach is known to harbor significant numbers of seagulls (known sources of FIB) which may complicate reference comparisons for FIB. Samples will be collected at the same depth from surface and tidal interface and paired to Children's Pool samples during the same event (e.g., same swash zone, or supralittoral zone). It is anticipated that no more than 3 reference samples will be collected per event.

5.1.4.2 Bacteria TMDL Monitoring

The City conducts water quality monitoring at Children's Pool as part of the Scripps HA Bacteria TMDL compliance monitoring program. From April through October, the City measures field parameters (see Table 5-1) as well as FIB during dry weather approximately weekly (minimum of five events per month). For November through March, the City samples during dry weather once per month in addition to sampling within 24 hours of the end of precipitation for three qualifying storm events. Sand sampling events will be coordinated with water quality monitoring events to the maximum extent practicable to improve assessment of sand quality.

**Table 5-1.
 Optional Field Parameters**

Field Parameter	Method	Unit
Dissolved Oxygen	YSI Pro ODO Field Meter	mg/L
pH	YSI Professional Plus Field Meter	-
Specific Conductivity	YSI Professional Plus Field Meter	µS/cm
Temperature	YSI Professional Plus Field Meter	°C
Turbidity	YSI Professional Plus Field Meter	NTU

Notes:
 °C = degrees Celsius; µS/cm = microsiemens per centimeter, mg/L = milligrams per liter, NTU= nephelometric turbidity unit

5.1.5 Reporting

Amec Foster Wheeler will provide a laboratory EDD, data analysis and a draft technical memorandum, all tentatively planned for fiscal year 2017. The technical memorandum will describe the methods of sample collection, present results, and address the study questions.

5.2 Monitored Constituents and Measurement Techniques

Samples will be analyzed for FIB and total mercury. Table 5-2 provides a master list of analytical constituents as well as applicable Surface Water Ambient Monitoring Program (SWAMP) requirements.

**Table 5-2.
 Master List of Analytical Constituents**

Constituents	Method	Target Reporting Limit	Analytical Laboratory
<i>Enterococcus</i>	EPA 1600	NA	City EM&TS
Fecal coliform	SM 9222D	NA	
Total coliform	SM 9222B	NA	
Total Mercury	EPA 7471A	0.00587 mg/kg	Eurofins-Calscience

Notes:
 EPA = United States Environmental Protection Agency; mg/kg = milligrams per kilogram; mL = milliliters; MPN = most probable number; NA = not applicable; SM = Standard Method

5.3 Project Schedule and Sample Timing

Tasks and deliverables are presented in Table 5-3. All sampling events will be conducted during daylight hours; each event will be approximately 4 hours in duration. To the maximum extent practicable, sand sampling activities shall be conducted from approximately 8:30 to 15:30., during the daily period of lowest haul-out occurrence; however, sand sampling activities may be extended from 7:00 to 19:00 (*i.e.*, daylight hours) to help assure that the project is completed during the 2016 sand sampling window and to assure that activities are conducted during lowest numbers of hauled out pinnipeds. The PSO shall attend the project site 30 minutes prior until 30 minutes after sand sampling activities cease each day throughout the sand quality study window. Up to 16 sampling events will be conducted, with Phase 1 consisting of the first 6 events. Pending the results of the Phase 1 study, up to 10 subsequent sampling events will be conducted. The City closes Children's Pool Beach during harbor seal pupping season (December 15 through May 15). In addition, the IHA Permit, which is required to perform the monitoring work for the Children's Pool FIB and Mercury Sand Study, stipulates that monitoring is to be performed between June 1, 2016, as to accommodate late weaning seals, and December 14, 2016. All permitted sampling activities will be performed at 850 Coast Boulevard, La Jolla, California 92037: Children's Pool Beach (32.847557°, -117.278485°). Optional monitoring for mercury testing only may be conducted as described in Section 5.1.4.1. A map showing the study area is presented in Figure 5-1.

**Table 5-3.
 Project Schedule**

Children's Pool Fecal Indicator Bacteria and Mercury Sand Study		
Activity	Date	Deliverable
Project Management and Meetings	10 business days after meeting	Meeting Notes
IHA Permit Procurement	Submitted December 2015	Draft Permit Application to City for Review
	Submitted December 2015	Permit Application to NOAA
Monitoring Plan and QAPP Development	January 29, 2016	Draft Monitoring Plan and QAPP (to City)
	March 18, 2016	Final Monitoring Plan and QAPP (to City)
	February 2016	Draft Monitoring Plan and QAPP (to NMSF)
Field Monitoring	June 1, 2016 through December 14, 2016	Laboratory Electronic Data Deliverable (EDD) (FY 2017)
Reporting	TBD (FY2017)	Draft Technical Memorandum (to City)
	Before March 15, 2017, ≤90 days post sampling	Draft Monitoring Report (to Office of Protected Resources, NMFS)
	TBD, 30 days after comments from NMFS	Final Monitoring Report (to Office of Protected Resources, NMFS)

5.4 Geographical Setting

The City has designated Children's Pool Beach as a shared use beach. Many activities currently take place at Children's Pool Beach and the surrounding shoreline areas, including swimming, surfing, kayaking, diving, tide pooling, and nature watching. The Pacific harbor seal colony that has taken up residence at Children's Pool Beach, in particular, draws many nature watchers. During the Pacific harbor seal pupping season (December 15 through May 15, annually), the beach is closed to the public per the revised City CDP issued by the California Coastal Commission. Outside of the pupping season, beach access and recreational uses are permitted, provided that there is no direct harassment of the harbor seals.

Beneficial uses within the Scripps subwatershed (which includes Children's Pool), as designated by the State Water Resources Control Board (State Board) San Diego Region Basin Plan (Basin Plan) for surface waters, are provided in Table 5-4 (SDRWQCB 2007). Currently, Children's Pool is identified in both the Scripps subwatershed Bacteria Total Maximum Daily Load (TMDL) and the 2010 CWA 303(d) List as impaired for indicator bacteria (SDRWQCB 2010a, SDRWQCB 2010b, USEPA 2011).

**Table 5-4.
 Beneficial Uses for the 303(d) Listed Waterbody**

Hydrologic Unit	Waterbody Type	Beneficial Use													
		I N D	N A V	R E C 1	R E C 2	C O M M	B I O L	E S T	W I L D	R A R E	M A R	A Q U A	M I G R	S P W N	W A R M
Shoreline															
Scripps (906.30)	Pacific Ocean	•	•	•	•	•	•		•	•	•	•	•	•	•

Notes:
 AQUA = Aquaculture, BIOL = Preservation of Biological Habitats of Special Significance, COMM = Commercial and Sportfishing,
 EST = Estuarine Habitat, IND = Industrial Supply, MAR = Marine Habitat, MIGR = Fish Migration, NAV = Navigation,
 RARE = Preservation of Rare and Endangered Species, REC1 = Water Contact Recreation, REC2 = Non-Contact Water
 Recreation, SHELL = Shellfish Harvesting, SPWN = Fish Spawning, WARM = Warm Water Habitat, WILD = Wildlife Habitat
 • Existing Beneficial Use
 Source: Water Quality Control Plan for the San Diego Basin (9) (Basin Plan) (California Regional Water Quality Control Board, San
 Diego Region [SDRWQCB] 2007).

5.5 Constraints

This program has the following procedural and logistical constraints:

- A current IHA Permit is required to perform monitoring at Children's Pool Beach. The IHA Permit may include additional constraints not explicitly listed herein.
- Field teams will not be mobilized during or near certain holidays if the mobilization or laboratory analyses should continue through that holiday. This includes the following holidays:
 - Independence Day
 - Labor Day
 - Thanksgiving

All other typical statutory holidays occur during the prescribed pupping season and are not applicable.

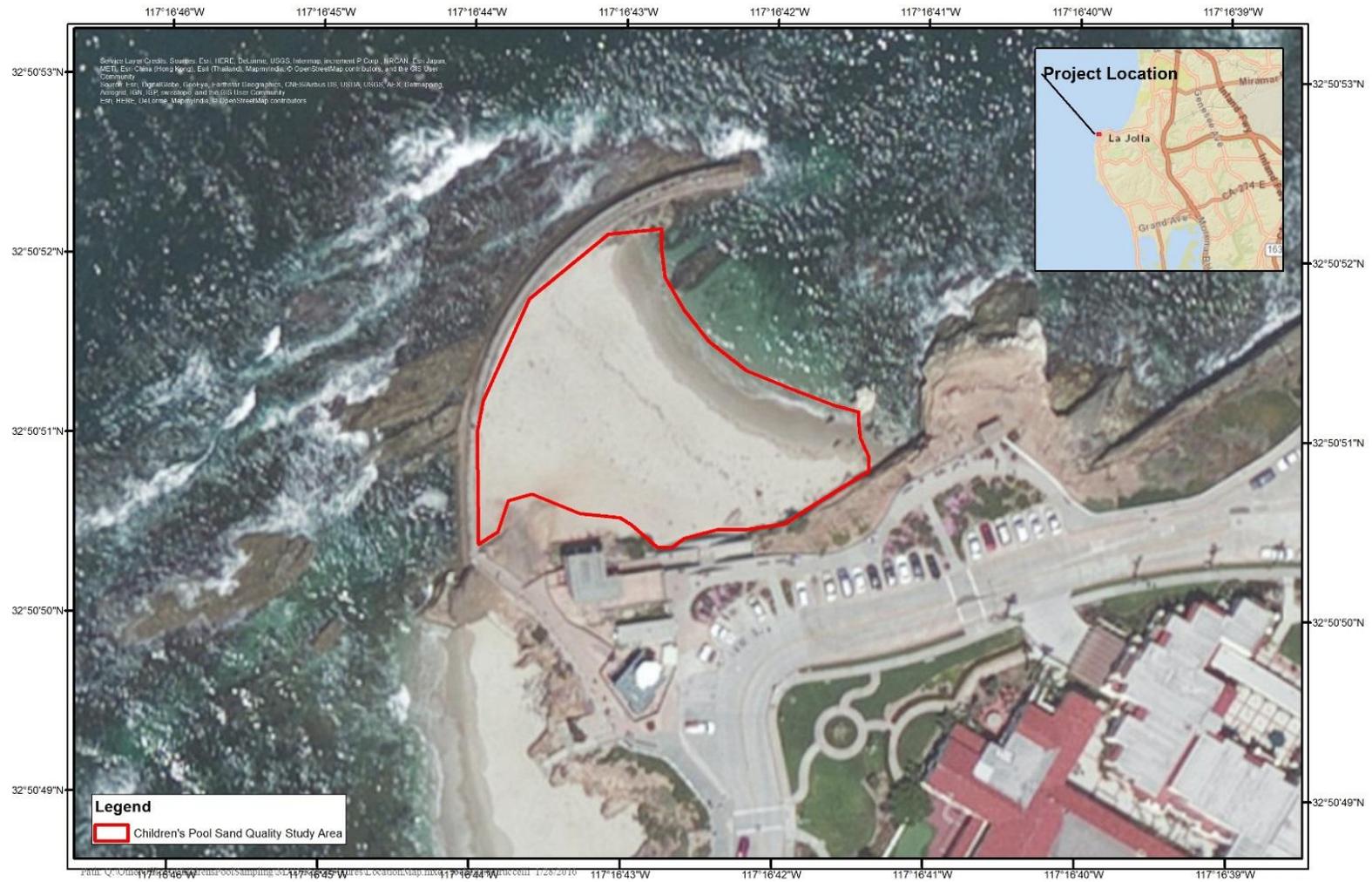


Figure 5-1. Children's Pool

6.0 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

Data quality will be assessed using measurement quality objectives (MQOs) such as accuracy, precision, and completeness. The applicable MQOs are provided for each analysis type in Table 6-1. Measurement quality objectives for laboratory analyses are provided in Table 6-2. Measurement quality objectives for field samples are provided in Table 6-3. Details on DQOs and how they are measured are provided below.

**Table 6-1.
 Measurement Quality Objectives**

Measurement or Analysis Type	Applicable Data Quality Indicators
Laboratory – Bacteria	Accuracy, Precision, Completeness
Laboratory – Total Mercury	Accuracy, Precision, Completeness

Accuracy is a measurement of the closeness of a test value to the true or reference value. Accuracy can be measured in the laboratory using positive and negative controls.

Precision is a measurement of the repeatability of test measurements. Precision can be measured in the laboratory using laboratory replicates. Precision can be measured in the field using field duplicates. Relative percent differences (RPDs) will be calculated to determine the precision between duplicate samples. This calculation is shown below:

$$RPD = \frac{abs[x_1 - x_2]}{0.5 \times (x_1 + x_2)} \times 100$$

where:

x_1 is the primary sample concentration; x_2 is the duplicate sample concentration.

Completeness is a measurement of the percentage of project-specific data that are valid. Percent completeness will be calculated by dividing the number of useable sample results by total number of sample results planned. This calculation is:

$$Completeness = \frac{\text{Actual Number of Samples Collected (Valid Results)}}{\text{Project Required Total Samples Planned (Number of Sample Results Planned)}} \times 100$$

**Table 6-2.
 Measurement Quality Objectives for Laboratory Data**

Group	Parameter	Accuracy	Precision ^(a)	Completeness
Bacteria	<i>Enterococcus</i>	Positive control and reference material = 80-120% recovery. Negative control = no growth on filter.	Lab Replicate RPD<25%	90%
	Fecal coliform			
	Total coliform			
Metal	Total Mercury	Matrix Spike (75-125% recovery) Reference Material (75-125% recovery)	Lab Replicate RPD<25%	90%

Notes:

mL = milliliters; MPN = most probable number; RPD = Relative Percent Difference

a. Not applicable, if native concentration of either sample is less than Reporting Limit (RL).

b. The target reporting limits are consistent with methodology of the Assembly Bill (AB) 411 program to facilitate overlap with that program. However, reporting limits may be lower depending on the lab used to conduct the analysis.

**Table 6-3.
 Measurement Quality Objectives for Field Samples**

Group	Parameter	Precision ^(a)	Completeness
Bacteria	<i>Enterococcus</i>	Lab Replicate RPD<25%	90%
	Fecal coliform		
	Total coliform		
Metal	Total Mercury	Lab Replicate RPD<25%	90%

Notes:

RPD = Relative Percent Difference

a. Not applicable, if native concentration of either sample is less than Reporting Limit (RL).

7.0 SPECIAL TRAINING NEEDS/CERTIFICATION

7.1 Specialized Training or Certifications

All project field staff members are required to receive training on sampling standard operation procedures (SOPs) and safety procedures prior to engaging in any field activities. Field staff will also be required to receive marine mammal training from a NOAA Fisheries scientist before conducting field activities. Field staff will annually review the following:

- Sampling procedures in accordance with the QAPP
- Safety procedures, site hazards, and safety awareness in accordance with the Sampling Agency's Health and Safety Plan.
- NOAA marine mammal PSO training

7.2 Training and Certification Documentation

Amec Foster Wheeler will maintain records of training as detailed in Table 7-1. Documentation includes the date of training, the topic, the instructor name, and list of trainees.

**Table 7-1.
 Specialized Personnel Training or Certification**

Specialized Training Course Title or Description	Training Provider	Personnel Receiving Training/Organizational Affiliation	Location of Records and Certification ^(a)
Sampling SOPs and Health and Safety Training	Amec Foster Wheeler	Field Staff (Amec Foster Wheeler)	9210 Sky Park Ct, San Diego, CA 92123
NOAA Marine Mammal PSO Training	Qualified Biologist (TBD)	Field Staff (Amec Foster Wheeler and City Storm Water)	

Notes:

a. If training records and/or certification are on file elsewhere, then document their location.

7.3 Training Personnel

Field staff will be trained on proper procedures for sampling, post-sampling processing, and sample handling in accordance with the QAPP and Monitoring Plan. The Amec Foster Wheeler Project Manager is responsible for training employees prior to the start of sampling, and to conduct any training sessions as needed throughout the course of the program.

Trained laboratory analysts will perform sample analysis for this program.

8.0 DOCUMENTS AND RECORDS

Documentation and recordkeeping are essential for project organization, consistency, and data verification. There are many types of documents and records required by this project. Table 8-1 identifies the document and record types, the locations where they will be retained and archived, and their respective dispositions. Final and revised versions of the QAPP will be distributed to the Responsible Party (Section 3.0), analytical laboratory, and sampling agency.

**Table 8-1.
 Documents and Record Retention, Archival, and Disposition Information**

Documentation Category	Identify Type Needed	Retention	Archival	Disposition
Project Plans	QAPP	Project Manager	Document/Portable Document Format (*.pdf)	Minimum 5 years
	Monitoring Plan	Project Manager	Document/*.pdf	Minimum 5 years
Sampling Records	Water Sampling Field Data Sheets/ Electronic Data Deliverable (EDD)	Amec Foster Wheeler	Field Notebook/ *.pdf/ Excel Spreadsheet	Minimum 5 years
	Training Records	Amec Foster Wheeler	Field Notebook/ *.pdf	Minimum 5 years
	Photographs	Amec Foster Wheeler	Field Notebook/ Joint Photographic Experts Group (JPEG)	Minimum 5 years
Analytical Records	Chain-of-Custody	Analytical Laboratory	Field Notebook/ *.pdf	Minimum 5 years
	Laboratory Reports	Analytical Laboratory	*.pdf /Microsoft Excel spreadsheet	Minimum 5 years
	EDD	Analytical Laboratory	Excel spreadsheet or Database	Minimum 5 years
Data Records	Corrective Action Forms	Amec Foster Wheeler / Analytical Laboratory	*.pdf	Minimum 5 years

GROUP B: DATA GENERATION AND ACQUISITION

9.0 SAMPLING DESIGN

This section provides an overview of the sampling design. The Monitoring Plan provided details of the sampling design.

9.1 Project Description and General Design

During a sampling event, three transects parallel to the shoreline at the swash zone, the high-tide line, and the supralittoral zone will be established relative to the seawall railing and three surface sand (SS) FIB samples (top 2 centimeters) will be collected across each of the transects at approximately left, middle, and right beach. GPS coordinates will be recorded for each sample collected along the transects. In addition, subsurface sand (SbS) FIB samples will also be collected at three of the nine SS sampling locations during each event at approximately 25–50 centimeters below the surface. Additional adaptive FIB samples will be collected to document event-specific conditions, such as areas recently occupied by pinnipeds, areas of wrack deposits, or additional depths at existing sampling locations.

9.2 Sampling Locations

Beach sand samples will be taken from the beach at Children's Pool as well as from a reference beach, South Boomers Beach (32.847557°, -117.278485°). Boomers Beach lies directly north of Children's Pool at the southern end of Ellen Browning Scripps Park and is rarely used as a haul out location by marine mammals. Number of samples and events are detailed in Section 5.1.2 and 5.1.3.

Figure 9-1 presents the sampling locations for the sand study.

9.3 Laboratory Distribution

Laboratories will be ready to receive, preserve, and analyze bacteria and metal samples as necessary according to this QAPP. Sample collection may be timed so that sample collection will occur during daylight hours and delivery will occur during business hours Monday through Friday (holidays excluded). Additional details regarding sampling handling and distribution are provided in Section 11.0.

10.0 SAMPLING METHODS

Samples will be collected and analyzed for the analyses listed in Table 5-1. The collection of samples for FIB analyses will follow sampling protocols outlined in "Standard Operating Procedures (SOP) for the Collection of Bacteria Samples from Storm Drains and Receiving Waters (Creeks, Lagoons, Bays, and Ocean)" used by the San Diego Copermittees for the Coastal Storm Drain and Lagoon Monitoring (County of San Diego, 2007).

10.1 Field Observations and Documentation

Field observations will be recorded during each sampling event to record site conditions and actions taken during sampling. Field data sheets will be used to record general observations and potential sources of bacteria located within the vicinity of the site. General observations include weather, debris/trash observed, color and clarity of the water, odor, and any other conditions of interest. Potential sources of bacteria will be identified, including human-related sources, activities, and natural sources.

The following general information should be recorded on a field data sheet during each site visit:

- Site identification (ID)
- Monitoring project name
- Field team personnel
- Weather conditions
- Runoff characteristics
- Water quality observations
- Grab sample IDs
- Grab sample date/time
- Miscellaneous comments
-

10.2 Sand Sampling

During the first three sampling events (Phase 1a), three transects parallel to the shoreline at the swash zone, the high-tide line, and the supralittoral zone will be established relative to the seawall railing and three surface sand (SS) FIB samples (top 2 centimeters) will be collected across each of the transects at approximately left, middle, and right beach (Figure 2-1). In addition, subsurface sand (SbS) FIB samples will also be collected at three of the nine SS sampling location during each event at approximately 25–50 centimeters below the surface. Additional adaptive FIB samples will be collected to document event-specific conditions, such as areas recently occupied by pinnipeds, areas of wrack deposits, or additional depths at existing sampling locations.

10.2.1 Sample Handling

The following sample handling protocols will be followed when collecting samples to minimize the possibility of contamination. Further information regarding sample handling and custody is provided in Table 11-1:

- Field personnel will be thoroughly trained in the proper use of sample collection gear.

- Unused (new), clean, powder-free nitrile gloves will be worn while collecting samples and will be replaced with new, clean gloves between samples and sites.
- New, sterile 50-milliliter polypropylene (Falcon) tubes and sterile spatulas will be used to collect sand samples aseptically for analysis of FIB. Sand samples for analysis of mercury will be collected directly into laboratory-provided containers. Tubes, spatulas and caps will be protected from contact with solvents, dust, or other contaminants during storage and handling.
- The inside of the sampling container and lids will not be touched during preparation and sampling activities.
- New bags of previously unopened ice will be used to cool samples following sample collection.

Once sample containers are filled, containers destined for FIB analysis will be promptly placed on ice, in a clean cooler (maximum temperature of 10 degrees Celsius) in the dark and transported to the City of San Diego EM&TS laboratory for processing to meet holding times.

11.0 SAMPLE HANDLING AND CUSTODY

All bottles will be pre-labeled with the following information:

- Project name
- Date
- Time
- Sampling location name and number
- Sample matrix
- Collector's initials
- Sample ID number
- Analysis name

Samples will be marked with a unique sample ID that will be used to track the sample throughout its analyses. These sample IDs are also entered directly on to field and laboratory data sheets. All field observations and processed sample information will be recorded and transcribed to Microsoft Excel spreadsheets. Hard copies of these field and laboratory data sheets will be maintained by the responsible agency.

Once sample containers for FIB analyses are filled, they will be placed on ice, in a cooler, in the dark and transported to City of San Diego EM&TS laboratory for processing. Sand samples for analysis of mercury will be held at room temperature and shipped to Eurofins-Calscience. The chain-of-custody (COC) form will accompany the collected samples. Sand samples for FIB analyses will be kept below 10 degrees Celsius and transferred to an analytical laboratory within holding times. COC forms for the samples will be completed and transported with the samples to the analytical laboratory. Transportation will be coordinated to ensure that all samples are handled and analyzed within the proper holding time. Sample holding times are in Table 11-1. Custody of all samples will be transferred from the field personnel to laboratories.

**Table 11-1.
 Sample Handling and Custody**

Analysis	Container	Minimum Sample Volume	Initial Preservation	Holding Time
<i>Enterococcus</i>	New, sterile 50-mL polypropylene centrifuge tubes	50 mL	< 10°C in the dark ^(b)	8 hours
Fecal coliform				
Total coliform				
Total Mercury	To be provided by the laboratory (Eurofins-Calscience)	TBD	None	48 hours before acidification; 90 days following acidification

12.0 ANALYTICAL METHODS

The laboratory analyses and the analytical methods are provided in Table 12-1.

**Table 12-1.
 Laboratory Analytical Methods**

Analyte	Laboratory	Project Reporting Limit	Analytical Method	
			Analytical Method/SOP	Modified for Method (yes/no)
Enterococcus	EM&TS	NA ^a	EPA 1600	Yes ^b
Fecal Coliform	EM&TS	NA ^a	SM 9222D	Yes ^b
Total Coliform	EM&TS	NA ^a	SM 9222B	Yes ^b
Total Mercury	Eurofins-Calscience	0.00587 mg/kg	EPA 7471A	No

Notes:

MDL = method detection limit; TBD = to be determined

- a. Because bacteria levels are being measured from sand samples, the values reported are not directly comparable with existing water quality reporting limits or water quality objectives. The results will provide a relative magnitude of FIB concentrations in beach sand from which appropriate recommendations may be made.
- b. Sand samples will be analyzed for FIB in accordance with the Southern California Coastal Water Research Project (SCCWRP) sand protocol (SCCWRP, 2009).

13.0 QUALITY CONTROL

This section addresses QA/QC activities associated with both field sampling and laboratory analyses. The field QC samples are used to evaluate potential contamination and sampling error introduced prior to submittal of samples to the analytical laboratory. Laboratory QA/QC activities provide information needed to assess laboratory contamination, analytical precision, and analytical accuracy. If any QA/QC standards are not met, the appropriate corrective actions will be taken in accordance with Section 22.0 of this document and the laboratories' QA Manuals. The Project Manager is responsible for making decisions on corrective actions pertaining to laboratory analysis. If issues are identified by Amec Foster Wheeler staff, the Laboratory Project Manager or Project Manager will be notified immediately and documentation of the issue and the corrective action will be made.

13.1 Quality Control Types

A set of QC samples will be submitted to the laboratory on the basis of the frequencies noted in Section 5.1.1.2. The analytical laboratory may also require more QC samples if one type of analysis is to be run in more than one batch. The main types of QC samples that will be utilized for this study include field duplicates, laboratory replicates, and positive and negative controls.

The duplicate samples and laboratory replicates may be collected from different sites during a particular sampling event. The number and frequency of field QC samples to be collected are presented in Table 13-1. Field QC samples will be submitted blind to the analytical laboratory. For laboratory replicates, additional sample volumes will be collected and it will be clearly identified on the COC form.

13.2 Field Quality Control Samples

Field Duplicates

Duplicate samples consist of two distinct samples (an original and a duplicate) of the same matrix collected at the same time and location using the same sampling technique. Field duplicate samples will be collected by filling two grab sample containers at the same time, or in rapid sequence. The purpose of field duplicates is to measure the consistency of field sampling. The project frequency for field duplicates is 10 percent of samples. The result for each field duplicate will be compared to the sample result to estimate a RPD between the two sample results. The RPD between the two results will be calculated using the RPD equation provided in Section 6.0.

Table 13-1 presents summary of field quality control criteria.

**Table 13-1.
Field QC**

Field QC	Frequency	Acceptance Limit
Field Duplicate	10% of all project samples	RPD range of 0-25% ^{(a), (b)}

Notes:

a. For coliforms: within 95% confidence interval as defined by IDEXX Laboratories.

b. Not applicable (NA) if native concentration of either sample is less than the RL.

13.3 Laboratory Quality Control

Laboratory QC samples include laboratory replicates, matrix spikes, positive and negative controls as described below. Laboratory QC sample results will be provided in a laboratory report and electronic data deliverable (EDD) with a batch ID number to correlate with the corresponding environmental sample data set. Table 13-2 describes the frequencies quality control samples for each constituent category. Quality control objectives are presented in Section 6.0

- **Laboratory Replicate** – For a laboratory replicate, a sample is prepared and analyzed twice to assess the repeatability (precision). The results are evaluated by calculating the RPD between the two sets of results. This serves as a measure of the reproducibility, or precision, of the sample analysis.
- **Matrix Spike and Matrix Spike Duplicates (Metals Only)** – Matrix spikes and matrix spike duplicates involve adding a known amount of the analyte(s) of interest to one of the actual samples being analyzed. One sample is split into three separate portions. One portion is analyzed to determine the concentration of the analyte in question in an unspiked state. The other two portions are spiked with a known concentration of the analytes of interest. The recovery of the spike, after accounting for the concentration of the analyte in the original sample, is a measure of the accuracy of the analysis. An additional precision measure is made by calculating the RPD of the duplicate spike recoveries. Both the RPD values and spike recoveries are compared against accepted and known method dependent acceptance limits. Results outside these limits are subject to corrective action.
- **Positive and Negative Controls (Bacteria Only)** – A negative control is created as a separate plate count after the buffered rinse water is filtered and incubated the same way as a sample. There should be no bacteria growth on the filter after incubation. It is used to detect laboratory bacterial contamination of the sample. A positive control is created as a separate plate count after a water sample known to contain bacteria (such as wastewater treatment plant influent) is filtered and incubated the same way as a sample. There should be bacteria growth on the filter after incubation. It is used to detect procedural errors or the presence of contaminants in the laboratory analysis that might inhibit bacteria growth (United States Environmental Protection Agency [USEPA] 2012).
- **Laboratory Control Sample (Metals Only)** – The laboratory control sample procedure involves spiking known amounts of the analyte of interest into a known, clean, sample matrix to assess the possible matrix effects on spike recoveries. High or low recoveries of the analytes in the matrix spikes may be caused by interferences in the sample. Laboratory control samples assess these possible matrix effects since the LCS is known to be free from interferences.

- **Method Blank**– A method blank is an analysis of a known clean sample matrix that has been subjected to the same complete analytical procedure as the field sample to determine if potential contamination has been introduced during processing. Blank analysis results are evaluated by checking against reporting limits for that analyte. Results obtained should be less than the reporting limit for each analyte.

**Table 13-2.
 Laboratory Quality Control Frequencies**

Group	Parameter	Laboratory Replicate	Matrix Spike	Positive Control/ Laboratory Control Sample	Negative Control/ Method Blank
Bacteria	<i>Enterococcus</i>	Per 10 samples or per analytical batch, whichever is more frequent	NA	Per 10 samples or per analytical batch, whichever is more frequent	
	Fecal coliform				
	Total coliform				
Metal	Total Mercury	Per 20 samples or per analytical batch, whichever is more frequent			

Notes:

- a. Not applicable, if native concentration of either sample is less than Reporting Limit (RL).
 RPD = Relative Percent Difference

14.0 INSPECTION/ACCEPTANCE OF CONSUMABLES AND SUPPLIES

All glassware, sample bottles, and collection equipment will be inspected prior to use. All ordered supplies will be examined for damage as they are received. Bottles and caps will be inspected for damage prior to sampling, and only sound containers will be used. The container caps will be tested for tightness prior to transport of samples.

Amec Foster Wheeler will ensure sufficient field supplies are on hand prior to the start of sampling for each period. Field supplies will be stored at Amec Foster Wheeler's offices. Laboratory supplies will be stored at the laboratories conducting the work. Table 14-1 presents the acceptance criteria for consumables and supplies that will be used for this study.

**Table 14-1.
 Inspection/Acceptance Testing Requirements for Consumables and Supplies**

Project-Related Supplies/Consumable	Inspection/Testing Specification	Acceptance Criteria	Frequency	Responsible Individual
Precleaned sample containers	Open container	Lids screwed on bottles/tubes	100%	Sampling Agency
Laboratory glassware	Dirty	Clean	100%	Laboratories

15.0 INSTRUMENT CALIBRATION

There are no field measurements included in the Children's Pool Fecal Indicator Bacteria and Mercury Sand Study at this time. This section is included as a place holder for future optional monitoring.

16.0 NON-DIRECT MEASUREMENTS

The City conducts water quality monitoring at Children's Pool as part of the Scripps HA Bacteria TMDL compliance monitoring program. Data collected under this program may be leveraged for the assessment of sand quality at Children's Pool Beach. This program is described in depth in the Scripps Bacteria TMDL Monitoring Program and QAPP documents (City of San Diego, 2012a,b).

17.0 DATA MANAGEMENT

Data will be submitted in a standardized SWAMP-compatible format. Amec Foster Wheeler will compile the monitoring data and the laboratory will compile analytical data. A final data will be provided to the Responsible Party.

17.1 Field Observations

Amec Foster Wheeler will review all field data sheets for completeness, maintain the original hardcopies, and scan electronic copies to *.pdf format for storage in the project file. Field data sheets will be transcribed into an electronic spreadsheet. Photographs of the monitoring sites taken by field personnel will be uploaded into the project file within three business days of field visits. Field team members will name the photographs using the site ID and the date the photo was taken. Copies of field data sheets and photographs for each event will be submitted to the Project Manager with the quarterly sampling summary.

17.2 Analytical Data

Laboratories will provide data in *.pdf, hardcopy, and SWAMP-compatible EDD. A SWAMP-compatible EDD will ensure that the data files can be uploaded to the SWAMP regional database. The Project Manager will review all lab reports and EDDs for accuracy, completeness, and SWAMP compatibility. Analytical results will be submitted to the Project Manager within three weeks of submittal of samples.

Within two weeks of receipt, the Project Manager will screen preliminary data deliverables for the following major items:

- A 100-percent check between electronic data provided by the laboratory and the hard copy reports
- Conformity check between the COC forms and laboratory reports
- A check for laboratory data report completeness
- A check for typographical errors on the laboratory reports
- A check for suspect values, data qualifiers, and review of laboratory QC data

GROUP C: ASSESSMENT AND OVERSIGHT

18.0 ASSESSMENT AND RESPONSE ACTIONS

The Project Manager will be responsible for the day-to-day oversight of monitoring activities, laboratory analyses, and/or data reporting. Any failures (e.g., instrument failures) that occur during data collection and/or laboratory analyses will be the responsibility of the field crew or laboratory conducting the work, respectively. It is the responsibility of the Laboratory's QA Officer and Sampling Agency's Project Manager to report any assessments and proposed corrective actions to the Lead Agency's Project Manager. The Project Manager will relay deviations to the Project's QA Officer. The Project's QA Officer has the authority to stop all sampling and analytical work if the deviations noted are considered detrimental to data quality. The following section describes how deviations from the QAPP will be identified.

Three types of assessments will be performed as part of this project to ensure that the sampling and analysis activities are in accordance with the approved QAPP. Assessment activities and results will be documented in writing first by field or laboratory reports, then in final reporting. They are as follows:

- **Surveillance of Sample Collection Activities:** The Project Manager will be responsible for oversight of sampling activities and will review field datasheets to verify that the samples were collected in accordance with QAPP requirements. If the Sampling Agency identifies any of the field activities to be in violation of QAPP requirements, the Project Manager will be contacted immediately. The Project Manager has the authority to stop field activities until corrective actions are successfully implemented. Corrective actions may include additional training to improve field team performance and QAPP compliance, or appropriate resampling of sites, as needed. Any corrective actions will be documented. Any actions necessary will be communicated to the Project Manager.
- **Data Quality Assessment:** Each Laboratory Manager will be responsible for providing a summary of QC data to the Sampling Agency's Project Manager. If it is determined that the precision and accuracy objectives were not met, the Sampling Agency's Project Manager will notify the Laboratory Manager. Laboratory techniques will be reviewed to minimize errors, and samples will be reanalyzed, if possible.
- **Assessment of Data Entry:** Once the performance criteria are met, the Sampling Agency's Project Manager will review data files to ensure that errors are detected and corrected. The Project Manager will retain original data files; qualified data will be retained by the Contract Manager in a database. Data are qualified in the database according to SWAMP protocols.

19.0 REPORTS TO MANAGEMENT

Amec Foster Wheeler will provide sampling summaries to the Contract Manager as a status of monitoring activities upon request. Additionally, a draft technical memorandum will be prepared following completion of sampling and analysis. Table 18-1 presents the required management reports.

**Table 19-1.
 Management Reports**

Type of Report	Frequency (Daily, weekly, monthly, quarterly, annually, etc.)	Projected Delivery Dates	Person(s) Responsible for Report Preparation	Report Recipients
Sampling Summary	Upon Request	Upon Request	Project Manager	City of San Diego
Draft Technical Memorandum	Upon Completion of Sampling and Analysis	FY2017	Project Manager	City of San Diego

GROUP D: DATA VALIDATION AND USABILITY

20.0 DATA REVIEW, VERIFICATION, AND VALIDATION

All analytical data will be reviewed and compared to the DQOs described in Section 6.0 of this QAPP, along with the applicable QA/QC practices. If results fail to meet any DQO, the Sampling Agency's Project Manager will flag them for further review. Batch QC samples will be reviewed to determine the potential cause of failure to meet the DQO. Data will be separated into three categories: data meeting all DQOs (acceptable data), data failing precision or recovery criteria (further investigation warranted), and data failing to meet accuracy criteria (further investigation warranted).

If further investigation is warranted based on data failing precision or recovery criteria, all aspects of the data will be assessed for data quality by the Project Manager. At that point, the data will either be accepted or rejected. If accepted, the data will be flagged with a "J" qualifier per the EPA specifications (USEPA 2002). If data fail to meet accuracy criteria, or the cause of the failure cannot be identified and rectified, the data will be excluded from the results. All rejected data will be retained in the Project database, and qualified as "rejected." The ultimate decision of whether to accept or reject a data point will be made by the Project Manager in consultation with the Project QA Officer.

If the analysis for more than ten percent of data fails to meet the DQO, the Project Manager and Project QA Officer will meet to discuss the appropriateness of the DQO and any potential modifications. All proposed modifications of DQOs will require a reissuance of the QAPP.

21.0 VERIFICATION AND VALIDATION METHODS

Data verification is the process of evaluating the completeness, correctness, and conformance of the dataset against the method, procedural, or contractual requirements. The goal of data validation is to evaluate whether the data quality goals established during the planning phase have been achieved. Data quality indicators will be continuously monitored by the analyst producing the data (i.e., field and lab personnel), as well as the Laboratory or Sampling Agency's Project Manager throughout the project to ensure that corrective actions are taken in a timely manner. Data validation is an analyte-specific and sample-specific process that extends verification to determine the analytical quality of the dataset. Laboratory and field personnel responsible for conducting QC analysis will be responsible for documenting when data do not meet measurement quality objectives as determined by data quality indicators.

21.1 Data Verification and Validation Responsibilities

Data collected in the field will be verified by the Project Manager. The laboratories will maintain COC records and sample manifests.

Verification and validation of laboratory data is the responsibility of the laboratory section supervisor and Project Manager. Laboratories will maintain analytical reports including QC documentation. The Laboratory QA Officer will perform checks of all of its records.

The Project QA Officer and Project Manager are responsible for oversight of field data and laboratory data obtained from the contracted laboratory and sampling agency. All data records will be checked visually and recorded as checked by initials and dates.

Reconciliation and correction of any data that fails to meet the DQOs will be done by the Project Manager in consultation with the Laboratory QA Officer and/or Sampling Agency's Project Manager. Any corrections require a unanimous agreement that the correction is appropriate.

21.2 Process for Data Verification and Validation

Data verification and validation for sample collection and handling activities will consist of the following tasks:

- Verification that the sampling activities, sample locations, number of samples collected, and type of analysis performed is in accordance with QAPP requirements
- Documentation of any field changes or discrepancies
- Verification that the field activities and field data (including sample location, sample type, sample date and time, name of field personnel, etc.) were properly documented
- Verification of proper completion of sample labels and COC forms, and secure storage of samples
- Verification that all samples recorded on COC forms were received by the laboratory

Data verification and validation for the sample analysis activities will include all of the following:

- Verification that appropriate methodology has been followed
- Verification that instrument calibrations have been adequately conducted
- Verification that QC samples meet performance criteria
- Verification that analytical results are complete
- Verification that documentation is complete

Verification and validation of data entry includes:

- Sorting data to identify missing or mistyped (too large or too small) values
- Double-checking all typed values
- Verifying that correct data types correspond to database fields (i.e., text for text, integers for integers, number for numbers, dates for dates, times for times, etc.)

22.0 RECONCILIATION WITH USER REQUIREMENTS

The data will be qualified if QA issues are identified. Statistics and reporting of standard deviation and relative error will be used to quantify the uncertainty associated with the data. Uncertainty and limitations on data use will be described in the draft technical memorandum.

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City of San Diego
Draft Monitoring Plan for the Children's Pool
Fecal Indicator Bacteria and Mercury Sand Study
Amec Foster Wheeler Project No. 502515C027
February 2016

APPENDIX B

CHILDREN'S POOL PROTECTED SPECIES OBSERVER FIELD MONITORING FORM (DRAFT)

Field Monitoring Form (FMF)

PSO	<input style="width: 90%;" type="text"/>	Date	<input style="width: 90%;" type="text"/>	Time Mitigation Monitoring Start/End	<input style="width: 90%;" type="text"/> / <input style="width: 90%;" type="text"/>
Samplers	<input style="width: 100%;" type="text"/>	Time Sample Collection Start/End		<input style="width: 90%;" type="text"/> / <input style="width: 90%;" type="text"/>	

First Count (Pre-Sample Collection)				Time:										
Beaufort Sea State	1	2	3	4	5	6	7	8	9	10	11	12	Air Temp	°C
Tide Status	Rising	Falling	High	Low	Tide Height	ft			Water Temp	°C				
Weather	Sunny	Partly Cloudy		Overcast	Fog	Raining	Drizzle							
Last Rain	> 72 Hours		< 72 Hours		Rainfall	None	< 0.1"	> 0.1"						
Study Area Visibility	Low (≤ 30 meters)		Medium (31-99 meters)			Full (≥ 100 meters)			Photos Taken?	Y	N			
Number of Public Visitor:	Total _____		= On the Beach _____		+ On the Seawall _____		+ Other _____							
Comments														

Last Count (Post-Sample Collection)				Time:										
Beaufort Sea State	1	2	3	4	5	6	7	8	9	10	11	12	Air Temp	°C
Tide Status	Rising	Falling	High	Low	Tide Height	ft			Water Temp	°C				
Weather	Sunny	Partly Cloudy		Overcast	Fog	Raining	Drizzle							
Last Rain	> 72 Hours		< 72 Hours		Rainfall	None	< 0.1"	> 0.1"						
Study Area Visibility	Low (≤ 30 meters)		Medium (31-99 meters)			Full (≥ 100 meters)			Photos Taken?	Y	N			
Number of Public Visitor:	Total _____		= On the Beach _____		+ On the Seawall _____		+ Other _____							
Comments														

PINNIPED COUNTS

Date	Time	Species	Distance (m)	Total #	# Juv.	# Male	# Female	Comments
		Pacific Harbor Seal						
		California Sea Lion						
		N. Elephant Seal						
		Pacific Harbor Seal						
		California Sea Lion						
		N. Elephant Seal						
		Pacific Harbor Seal						
		California Sea Lion						
		N. Elephant Seal						
		Pacific Harbor Seal						
		California Sea Lion						
		N. Elephant Seal						
		Pacific Harbor Seal						
		California Sea Lion						
		N. Elephant Seal						
		Pacific Harbor Seal						
		California Sea Lion						
		N. Elephant Seal						

Distance = Distance from PSO
 Note additional findings when feasible (i.e. age estimates, health status, evidence of malnutrition or injury)

