# FINAL SAND COMPATIBILITY AND OPPORTUNISTIC USE PROGRAM PLAN


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March, 2006

# FINAL SAND COMPATIBILITY AND OPPORTUNISTIC USE PROGRAM PLAN

Prepared for:

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And the

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# EXECUTIVE SUMMARY

California's Coastal Sediment Management Workgroup (CSMW) and San Diego Association of Governments present a process crafted to streamline regulatory approval of small (less than 150,000 cubic yards) beach nourishment projects using opportunistic materials. Identifying technical and regulatory concerns associated with beach nourishment and addressing those concerns in a systematic and consistent manner is part of CSMW's thrust to streamline sediment management activities across California. Regional management of sediment is the goal of the State of California Resources Agency and U.S. Army Corps of Engineers (USACE), the founding partners of the CSMW.

This report presents a Sand Compatibility and Opportunistic Use Program (SCOUP) Plan for implementing opportunistic beach replenishment on a regional basis. Developed with significant input from appropriate staff at permitting and resource agencies, this SCOUP Plan also presents a pilot project in the Oceanside littoral cell (northern San Diego County) as an example of implementation, and provides guidance for similar programs that could occur elsewhere in coastal California. The user (local or regional agency) is guided through the beach fill processes of receiver site selection, material identification, testing protocols, implementation, and monitoring. Use of this SCOUP Plan will not guarantee that the user will obtain all necessary permits to construct projects. However, most issues of concern common to resource agencies for permitting are addressed, thereby minimizing requests for further information, clarifications or studies.

CSMW objectives for the statewide regional opportunistic use program are to:

- Improve protection to coastal structures, and enhance beach recreation opportunities and environmental habitats throughout the State;
- Provide for renourishment within appropriate littoral cells of California, and explicitly the Oceanside littoral cell in this pilot effort;
- Establish a process approved by regulatory agencies for environmentally-responsible use of opportunistic materials to nourish a pre-established receiver site(s) when those materials become available;
- Present guidance on how best to establish a regional opportunistic use program and select appropriate receiver sites;
- Promote a clear vision of the type of testing and monitoring needed before, during and after construction of opportunistic programs; and
- Develop standardized methodologies for establishing compatibility between potential sources and receiver sites and the use of optimum and less-than-optimum source sands;

This SCOUP Plan meets these objectives by identifying relevant and appropriate:

- Jurisdictional regulatory agencies, required permits and informational needs;
- Specific considerations needed to establish and rank potential receiver sites within the littoral cell or other regional area;

- Types of anthropogenic activities that could produce viable potential sources of sediment if located within an economic distance of the receiver site;
- Testing protocols, criteria and checklists required to assess potential physical, chemical and biological impacts associated with the use of opportunistic materials, as well as establish compatibility between potential sediment sources and the approved receiver site(s);
- Project design considerations including maximum volume, placement techniques, placement rates and location (typically based on biological or recreational concerns), and transportation methods/impacts (often associated with disturbance of nearby residents and economic considerations).
- Biological and physical monitoring concerns and testing needed before, during and after project construction, as well as reporting requirements;
- Description of user steps required to successfully implement a regional opportunistic program, including additional informational needs and project design considerations when using less-than-optimum source sands; and
- Specific examples of ways to increase public education and awareness.

Criteria establishing appropriateness and compatibility of potential sources with the receiver site include:

- A Sampling and Analysis Plan, including a Tier 1 assessment to be approved by the U.S. Army Corps of Engineers and U.S. Environmental Protection Agency prior to any further characterization;
- Source materials must be free of harmful chemical or biological contaminants;
- The grain size distribution of the potential source must lie within the "composite grain size envelope" developed to characterize the receiver site, with some small exceedance allowed for cobbles and fine-grained materials;
- Optimum beach fill ($\leq$ 15% fines) is appropriate for placement on the dry beach. Less-than-optimum beach fill (15-45% fines) are to be placed in the surf zone or nearshore, dependant on conditions and fines content;
- The color must reasonably match the color of the receiver site after natural color changes occur. Material not initially matching the receiver site's color must be placed in the surf zone;
- Particles must not be substantially angular or jagged shaped. The use of manufactured sand is discouraged;
- The material must be free of trash and debris; and
- The potential source material must not form a hardpan crust if placed above the reach of tides and waves. Empirical tests are proposed to evaluate this potential under appropriate conditions.

Checklists provided as attachments to this SCOUP Plan provide for:

- Determining the suitability of the candidate material for beach fill;
- Evaluating the physical properties of the receiver site;
- Assessing the presence of biologic receptors potentially impacted by the nourishment project at the beach and in the nearshore;
- Evaluation and ranking results for the Oceanside littoral cell, demonstrating how South Oceanside was determined to be the most optimum receiver;
- An example preliminary list of potential source areas throughout San Diego County; and
- Directions for preparing a Project Monitoring Report for the permitting agencies.

The pilot SCOUP study identified the most appropriate receiver site within the Oceanside littoral cell to be South Oceanside Beach. The pilot SCOUP program proposes:

- Renourishment activities at South Oceanside Beach. The maximum quantity of sediment to be placed at the receiver site over any calendar year is 150,000 cubic yards (limited during the first two years).
- Nourishment activities will be restricted during grunion runs, and particularly high beach-use times, such as major holidays. Minimal impacts to natural resources are expected at South Oceanside Beach.
- Up to 100% of the total sand volume can be placed during the fall/winter seasons, but no more than one-third of the total volume should be placed during the spring/summer seasons (to reduce impacts to recreational beach use and biology from construction and turbidity);
- Project design includes direct placement of optimum materials in a surface layer (berm) on the beach, and placement at the surfzone for less-than-optimum sands (with 15-45% fines content);
- Monitoring of nourishment activities to identify turbidity and potential effects to biological resources, beach profiles, and recreation; and
- That permits be pursued by City of Oceanside that has jurisdiction over the selected receiver site.

The SCOUP pilot study program is currently being used to prepare the documents for environmental review, which will eventually accompany the SCOUP Plan and pilot study document. When completed, all documents will be posted on CSMWs website (www.dbw.ca.gov/csmw/csmw.htm) at the "Sediment Master Plan" page. Several other cities with receiver sites that ranked similar to South Oceanside beach are jointly pursuing separate but very similar programs, and preparing necessary documentation, indicating that regional sediment

Funding was provided by the California Resources Agency as part of a Coastal Impact Assistance Program grant for the California Sediment Master Plan being developed by the CSMW. The document was prepared with significant input from CSMW, Permitting and Resource Agency personnel, but does not necessarily represent the official position of those Agencies.

# 1. INTRODUCTION

This report presents a generic Sand Compatibility and Opportunistic Use Program (SCOUP) Plan for implementing opportunistic beach replenishment for California that has been developed with input from appropriate staff at permitting and resource agencies and applied to the Oceanside littoral cell in northern San Diego county as a pilot project. The user (e.g., local or regional agency) is guided through receiver site selection, testing protocols, design, and preparation of the environmental document. While use of the SCOUP Plan will not guarantee that the user will obtain all necessary permits, most issues of concern common to the permitting agencies should be addressed, thereby streamlining the permitting process.

## 1.1. BACKGROUND AND PROGRAM PURPOSE

The State of California Resources Agency and the U.S. Army Corps of Engineers (USACE) are heading a joint state/federal initiative to develop a California Coastal Sediment Management Master Plan (Sediment Master Plan or SMP). The Coastal Sediment Management Workgroup (CSMW), composed of a number of state and federal agencies with coastal management responsibilities is guiding the work. The CSMW is chaired by the State Resources Agency and the USACE. This document was produced for CSMW with significant input from staff of member agencies, but the document does not necessarily represent the official position of the member agencies.

SCOUP, one of SMP projects, develops a process to manage opportunistic sand on a regional (i.e., littoral cell) basis by identifying:

1) Acceptable methods of characterizing beach and source sands;
2) Environmentally-responsible use of both optimum and less-than-optimum materials;
3) Potential economically-feasible source areas;
4) Locations of appropriate receiver sites and, if appropriate, storage sites;
5) Appropriate placement techniques; and
6) Permitting needs of local governments and permitting agencies.

Development of this program required compiling existing information from related Opportunistic Beach Fill programs being carried out by the Beach Erosion Authority for Clean Oceans and Nourishment (BEACON), the City of Carlsbad, and the City of San Clemente, and information and data on the San Diego region coastal zone from a number of sources.

## 1.2. REPORT OBJECTIVES

This report presents:

1) Jurisdictional regulatory agencies, required permits and informational needs;
2) A methodology to establish and rank potential receiver sites;
3) A review of various placement techniques for land, inland aquatic, and marine sources of sediment at receiver sites;

4) Guidance for establishing potential sources of sediment within a reasonable distance of the littoral cell;
5) Testing protocols and criteria for physical and chemical compatibility of sediment sources and receiver sites;
6) Informational needs for use of less-than-optimum source sands;
7) Project design considerations;
8) Biological monitoring requirements; and
9) Preparation needs for environmental review documents (consistent with the California Environmental Quality Act and the National Environmental Policy Act).

The SCOUP Plan was applied in the Oceanside littoral cell in San Diego County as a pilot program for refinement purposes. Permits are to be pursued by City of Oceanside, which owns the selected receiver site.

### 1.3. DEFINITIONS

- Backshore: (1) The upper part of the active beach above the normal reach of the tides and wave run-up (high water), but episodically affected by high waves occurring during a spring high tide.
- Beach: That portion of land and seabed above Mean Lower Low Water (MLLW). Includes the foreshore and backshore areas.
- Beach Profile: A cross-section through the beach perpendicular to the beach slope; it may include a dune face or sea wall, extend across the beach, and seaward into the nearshore zone to the closure depth (see below).
- Closure Depth – The maximum depth of average seasonal cross-shore sand movement. This depth represents the seaward end of the beach profile, and essentially remains unchanged on average over the long term. Sand that moves beyond the depth of closure in a seaward direction is typically lost to the littoral cell and not available for natural seasonal beach recovery. The actual closure depth is typically approximately -30 feet MLLW in Southern California and -40 feet MLLW or deeper in Northern California.
- Compatibility: When the range of grain sizes of a potential sand material source lies within the range (envelope) of natural grain sizes existing at the receiver site, with certain allowances for exceedances of coarse and fine-grained sediments.
- Fine-grained Materials (or Fines): Clays and silts, passing the #200 soil grain size sieve, or less than 0.074 millimeters in diameter.
- Foreshore: In general terms, the beach between approximately Mean Higher High Water and Mean Lower Low Water.
- Less-than-Optimum Beach Fill Material: Material that is not compatible in grain size with sand at the dry beach, but is compatible with material within the nearshore portion (between MLLW and the closure depth) of the receiver site. The fines fraction should be within 10% of that of the existing nearshore sediments that exist along a profile.

Typically, the percent fines of the nearshore portion of a beach profile in California can range from 5% to 35% fines. Therefore, Less-than-Optimum Beach Fill Material may contain between 15% and 45% fines.

- Littoral Cell: A reach, or compartment, of the shoreline in which all sediment transport is bounded. In theory, it has zero longshore sediment transport beyond its updrift and downdrift boundaries. It will likely contain sand sources (rivers), storage areas (beaches), and sinks (canyons).
- Nearshore: The seafloor along a coast between the closure depth (typically near -30 feet MLLW) and Mean Lower Low Water (MLLW).
- Offshore: That part of the seabed below the depth of closure.
- Opportunistic Sand - Surplus sand from various source materials, including inland construction, development projects, and public works in the region, dredging of harbors or wetlands, etc.
- Optimum Beach Fill Material: Material compatible with the dry beach portion of the beach profile. The fines fraction of the grain size of this material can be within 10% of that of the existing dry beach sediments, which typically range from 0% to 5% fines. Therefore, Optimum Beach Fill Material may contain up to 15% fines.
- Receiver Site: The entire related system of coastal environments that would receive opportunistic materials, including the beach, nearshore and offshore regions.

Acronyms used in the report include:

- CCC – California Coastal Commission
- CDFG – California Department of Fish and Game
- CEQA – California Environmental Quality Act
- CSLC – California State Lands Commission
- CSMW – Coastal Sediment Management Workgroup
- DBW - Department of Boating & Waterways
- NEPA – National Environmental Policy Act
- NMFS – NOAA National Marine Fisheries Service
- RWQCB – Regional Water Quality Control Board
- SANDAG- San Diego Association of Governments
- SCOUP- Sand Compatibility and Opportunistic Use Program
- USACE – U.S. Army Corps of Engineers
- USEPA – U.S. Environmental Protection Agency
- User – Public Agency (City, County, etc.) implementing an Opportunistic Beach Nourishment Program
- USFWS – U.S. Fish and Wildlife Service

# 2. REGULATORY REQUIREMENTS

***Tasks pertaining to regulatory requirements appropriate for users to perform include:***

1. ***Identify agency concerns applicable to the coastal region;***
2. ***Identify permitting agencies;***
3. ***Identify lead agency for the CEQA/NEPA document;***
4. ***Prepare project description;***
5. ***Prepare a draft CEQA/NEPA document, and finalize after public review; and***
6. *Secure necessary permits. This is not part of the SCOUP Plan scope of work.*

## 2.1. AGENCY CONCERNS

State and Federal agencies with permit authority for beach nourishment projects are concerned with public health and welfare, and the effects of potentially toxic components, sedimentation, and turbidity on the environment that may occur from beach nourishment activities. Agency responsibilities and technical concerns pertaining to beach replenishment projects are summarized below.

### 2.1.1 Permit Agencies

USACE – Primary federal permitting agency. Primarily responsible for navigation and protection of aquatic resources under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act, and thus issues Sections 10 and 404 permits.

USEPA – Advises the USACE on compliance with 404(b)(1) guidelines and on sediment/water quality and impacts to habitat/biological resources, concurs on Marine Protection Reserve Santuary Act (MPRSA) issues, and has joint enforcement authority for the Clean Water Act.

NOAA National Marine Fisheries Service – Advises the USACE regarding habitat/biological resources, specifically fisheries protected under the MPRSA and some endangered species protected under the Endangered Species Act (ESA).

USFWS – Advises the USACE regarding habitat/biological resources, specifically wildlife and fisheries protected by the ESA

California Coastal Commission – Enforces consistency with the Coastal Act, specifically public access and recreation, habitat/biological resources, sediment transport, impacts to water quality, traffic, air quality, and noise. Issues a Coastal Development Permit for projects within State jurisdiction.

California Department of Fish and Game – Protects and manages the public's fish and wildlife resources of the State. Advises state agencies regarding habitat/biological resources, specifically wildlife and fisheries, and issues Streambed Alteration Agreements and incidental take permits for state listed species.

California State Lands Commission – Maintains jurisdiction of lands waterward of the mean high tide line including habitat/biological resources, public access and recreation, sediment transport, water quality, and related issues with traffic, air quality, and noise. Issues a Lease of State Lands for projects within State jurisdiction not already possessing a lease.

California State Department of Parks and Recreation - Manages State beach parks including habitat/biological resources, access and recreation, sediment transport, and water quality. Issues Encroachment Permits for projects within Park jurisdiction.

State Water Resources Control Board – Enforces protection of water and sediment quality, and habitat/biological resources within waters of the State.

Regional Water Quality Control Board – Enforces protection of water, sediment quality, and beneficial uses, habitat/biological resources, and evaluating beneficial reuses of sediment within the regional jurisdiction. Issues Waste Discharge Requirements (WDRs) and Clean Water Act Section 401 Water Quality Certifications.

Local Agencies – Manage issues within their jurisdictional boundaries including sediment transport, access/recreation, traffic and air quality, and noise. Issues Coastal Development Permit (if they possess an approved Coastal Development Program) and Use Permits; this level of permit is the first to be considered and the most likely to generate public input).

***Chemical and Biological Contamination***

Potential beach fill material is required to be substantially free of chemical and biological contamination, determined through background research and testing. Material may be considered substantially free of contaminants if it is composed of sand, gravel, or other inert material, and is found in areas of high current or wave energy. Isolation of the material from sources of contamination, based on previous testing and information about past and present land uses at the source location may also be considered in a decision about whether there is no "reason to believe" contaminants are present. Chemical and biological contamination of sediments is addressed in great detail in the Inland Testing Manual (ITM) (USEPA and USACE 1998). The ITM does not address terrestrial soils in as much detail as dredged materials, however material compatibility criteria specified in the document are applicable to terrestrial materials. The USACE has ultimate discretion over application of the ITM with advice from the USEPA, although the USEPA can also specify chemical and biological testing under federal regulations.

***Sediment Grain Size***

Analysis of the sediment grain size of potential beach fill material helps to determine impacts on the receiving environment. Reef habitat, bottom-dwelling organisms, and aquatic plants such as eelgrass, surfgrass, and kelp may become covered when fine-grained sediment settles from suspension. Also, contaminants tend to adhere to fine sediment grains. Acceptable grain size criteria and effects of turbidity caused when silt and clay are suspended in the water column are covered only in more general terms in the ITM (USEPA and USACE 1998). The acceptable percentage of fines (silt and clay) in beach fill is not specified.

Internal USACE guidelines (1989) to determine the acceptable fines content for Federal projects is based on matching the gradation of the native sediment within a certain percentage on the beach and out to the closure depth. The USACE method was devised internally for their dredging and beach replenishment projects and is not always applicable to other beach fill projects, but can serve as the basis of a relevant analysis approach. The permit agency approach in the past to determining the acceptable content of fines in beach fill has been to consider the matter on a case-by-case basis. While this still will be done for many projects as determined appropriate by the agencies, the USACE is also working toward establishing general guidelines in a Regional General Permit applicable to a region, which is also a goal of this SCOUP Report. The USACE and USEPA approach towards broadly applicable guidelines for acceptable fines content within potential beach fill is that the grain size distribution should generally match that within the natural grain size envelope of the receiving beach profile, and the restoration materials placed where most appropriate considering:

- The presence or lack of sensitive habitats that could be impacted;
- The possibility of contamination existing within the material;
- Probable sand dispersion;
- Volume of beach fill, timing of placement; and
- Human use of the beach.

The Los Angeles District of the USACE Regulatory Branch recently indicated in the draft Regional General Permit (RGP) (in process) for the LA District that, without additional information, the acceptable percentage of fines may be up to 20% (USACE 2004) with higher-fine materials required to be placed in the surf-zone).

To evaluate the appropriateness of the potential beach fill material's composition, the USEPA follows a process that considers whether the material for a project is excluded from certain testing requirements, or whether the project is required to perform more extensive analyses for a determination of suitability referred to as the 404(b)(1) evaluation. Both processes are summarized below.

General Exclusions to Testing

The USEPA considers certain criteria that allow for exclusions from certain types and levels of chemical testing, thereby limiting the evaluation to Tier I testing (described in section 5.1 of this document). One important criterion is that the material of concern is likely not a "carrier of contaminants" if it is composed primarily of sand, gravel, or inert materials (USEPA and USACE 1998). The USEPA has used a "rule of thumb" that if the material is approximately 80% sand and 20% fines, it most likely meets this criterion and therefore suggests that minimal chemical testing is needed. Per USEPA internal direction (USEPA 2000), this criterion is based in part on a consensus view among the USEPA Regions of what constitutes "predominantly" sand for the purpose of applying the testing exclusion criteria of the ocean dumping regulations at section 227.13(b)(1). Other exclusionary criteria include: the materials of concern are located distant from sources of contaminants; the materials were deposited in pre-industrial times; the source and placement sites are adjacent and similar in chemistry, and; if containment caps or other containment devices can be applied to isolate the contaminated material in place.

Case-By-Case Analyses

Projects and material that does not meet exclusionary criteria typically have to undergo more extensive testing and analyses at Tier II or higher. Generally, the USEPA staff have indicated their criterion for reviewing permit applications for beach fill projects is to require the percentage of fine-grained particles for a project to be that appropriate for the specific project site and objectives. For instance, internal correspondence between USEPA staff (2000) indicate that, in the absence of sufficient Tier I information, to approve a percentage of fines greater than 20%, they need to know:

- The degree of contamination carried by the fine fraction, as distinct from the bulk sediment chemistry (since the majority of contaminants are typically associated with the fine fraction);
- The specific deposition area(s) for the fines "winnowed out" from sediments placed on or near the particular beach;
- The natural resources that may be exposed or affected at the deposition site(s) or during transport to the site(s) (for example, will the fines affect surfgrass or kelp beds via reduced light penetration, will they smother hard-bottom or reef habitats even temporarily, etc.?);
- The degree to which human uses may be affected (will turbidity, odors, etc., degrade the beach? and for how long?); and
- Whether there is a legitimate need for beach nourishment - i.e., whether placement of even a high percentage of sand would be a "beneficial use" at the location proposed, or whether another alternative may be the "Less Environmental Damaging Practical Alternative, or LEDPA" for disposal of dredged material (in California it is usually, but not always, beneficial to re-use dredged sand to nourish beaches).

More information on material testing and evaluation is provided in section 5.0 of this document.

Coarser sands typically remain on the beach longer and therefore provide wider beaches than finer sand. Coarser sands are often considered better for use as beach fill because of the improved protection they provide for the cost incurred. Coarser sands will also form steeper equilibrium beach slopes at receiving beaches than finer sands. Some user groups can consider steep beach slopes less desirable than flatter beach slopes, but they generally do not create other types of adverse conditions. Steep beach slopes with coarse sediments also dissipate wave energy more effectively through increased percolation, and thus provide a higher level of protection to the backshore area than finer sand grain sizes on flatter beaches.

Fine-grained materials naturally occupy deeper portions of the beach profile, typically in water depths of between -20 and -40 feet MLLW as shown by sediment sampling off of nearly a dozen sites in the Southern California bight (Moffatt & Nichol 1994b; 2001a; 2001b; 2004; and 2005. As such, fine-grained materials are also an important component of the littoral cell as they essentially anchor the lower profile. They also provide habitat for benthic organisms and foraging areas for fish and other species.

***Turbidity***

Turbidity is of concern to agencies because it can reduce the foraging ability of species that hunt for food using primarily visual senses, such as fish and birds. Turbidity can clog the apparatuses of filter feeding invertebrates and the gills of fish. Turbidity also decreases the penetration of light into the ocean water column thus reducing the ability of kelp and other sensitive flora to photosynthesize. Such impacts to sensitive plants could decrease the quality of habitat for other sensitive species such as lobster and fish. Turbidity can also be a nuisance and deterrent to recreational use of the beach by the public. Potential impacts to the public by the aesthetic detraction caused by turbidity are most significant during high-use periods of spring and summer. These impacts are most likely when the turbid conditions are extensive in duration or area; short-lived and local turbidity conditions are not expected to cause the impacts just described.

***Burial***

Burial of marine resources from beach fill is a major concern to resource and permit agencies. Burial can cause mortality of organisms that cannot readily move (immotile) out of the footprint of impact. Such organisms include plants such as surfgrass, eelgrass, and kelp, and some invertebrates such as Pismo Clams. Also, partial burial of some plants can affect their health and condition and eventually lead to their mortality if it exists over a sufficient duration (e.g., six to twelve months). Burial can be a direct impact occurring within the footprint of initial placement during construction, or it can be an indirect impact occurring adjacent or near the initial placement site from dispersion of the sand by currents. Typically design and analyses of beach fill projects is done to consider burial as a potential impact by:

- Planning the placement to occur outside of sensitive resources that cannot tolerate burial; and
- Predicting potential sand dispersion and indirect burial of resources, and iterating project design to minimize the changes for significant impacts by reducing quantities, maximizing distance to resources, and minimizing the fines content (i.e., reducing the volume of material that will travel farthest the quickest by currents).

The goal of assessing potential indirect burial is to result in a post-project condition in the nearshore and offshore areas where depths of burial of resources are shallow enough to be below the level of significance, even with very conservative assumptions and calculations. More information on this procedure is described in section 6.0 of this report.

***Color***

Resource agencies have been less concerned about material color in the past because of more extensive use of dredged material for historic beach fill rather than upland material. Strong public reaction occurred when red-colored sand was placed over the white sand beach at Ponto Beach in Carlsbad, California in 1996. Dredged material and many upland source materials are typically darker colored than the receiving beach initially. When placed in the surf zone, the material is washed and reworked by waves resulting in sand very similar in appearance to the receiving beach. Permit agencies have informally indicated that the only criteria for color is to reasonably match the color of the receiving beach after reworking by waves for aesthetic reasons. Impacts to recreational beach use can occur during high-use periods of spring and summer.

### *Particle Shape*

Use of natural sand rather than manufactured sand is considered more appropriate for beach fill. Natural sand consists of sub-rounded to rounded particles rather than sharp or angular particles. Natural sand is carried downstream in rivers where fluvial transport and chemical weathering causes wearing and rounding of particle edges. Upland source materials have also been rounded during their exposure to fluvial action in the previous cycle of erosion. Rounded particles are considered more comfortable to recreational users that frequently walk in bare feet and sit or lie on the sand in swimsuits and are therefore susceptible to irritation from sharper shaped particles. Use of manufactured sand and its angularities may inhibit colonization of interstitial flora and fauna that live on and between the sand grains.

### *Debris*

Opportunistic sand must be generally free of trash, debris, and large fragments of organic material (tree limbs, shrubs, etc.) when placed on the beach. Debris content should be addressed considering the source location of material and past land uses on and around the site. Debris should definitely not constitute any portion of beach fill because of possible health and safety hazards posed by such materials and possible nuisance odors and visual impacts associated with their presence.

### *Compactability/Moldability of Proposed Beach Fill*

Certain types of fill may form a hardpan when allowed to consolidate or if they are compressed. The potential for beach fill to become compacted if placed above the reach of the tides and exposed to the atmosphere is important in determining material suitability. Material that does not harden or form a crust that would prevent reworking by waves is desirable. If the potential material is compactable, it must be placed in the surf zone or nearshore portions of the beach profile (USACE 2004). The USACE and USEPA are working to identify appropriate tests for this material property. Until such time as appropriate tests are identified, higher-fine content material will be required to be placed in the nearshore or surf zone.

### *Receiver Site and Timing*

The receiver site and timing of beach fill operations has been considered a significant factor by the USACE in analyses according to Section 404(B)(1) Guidelines, and by the CCC in conditioning permits for recent projects. Material placement should occur away from sensitive resources (such as least tern and snowy plover foraging activities, and spawning grounds for the Dungeoness Crab and the Pacific Herring), and not occur during:

- Grunion runs;
- Nesting of relevant threatened or endangered species;
- Runs of Pacific Salmon and Steelhead Trout; and

- Particularly high human use times, and not interrupt beach access.

### 2.1.2 Placement Rate

Beach fill placement rates have been restricted on previous beach fill projects to control turbidity levels on projects occurring near sensitive species or beach uses. Controlled or limited beach fill placement rates may also extend the sand placement period and thus the period of turbid conditions. The restriction has been applied to dredging projects and is typically expressed as a quantity of sand placed per year or month. Limiting the placement rate will also limit the number of truck or train trips per day required to transport land-based material. The number of trucks and trains must be controlled to minimize adverse impacts to air quality, traffic and circulation, public safety, and noise.

### 2.1.3 Project Monitoring

Physical and biological monitoring must be done prior to project construction to develop a baseline for comparison of potential effects, and during and after construction to quantify changes and enable analyses of project effects. Please refer to Section 7 for a detailed description of project monitoring requirements.

## 2.2. SAMPLING AND ANALYSIS PLAN

A Sampling and Analysis Plan (SAP) for tiered testing, pursuant to the Inland Testing Manual, will be required for each opportunistic placement project within a program. The user will be required to examine the source material and the receiver site sediments. The SAP shall address tiered testing requirements (including grain size and the need for other testing) and be reviewed by the USACE, USEPA, and RWQCB for concurrence prior to any sampling of the materials. See Section 5.4.2 of this document for an overview of SAP requirements. Certain coastal beachfill permit applications may not require a SAP if the material is used well above extreme high water (so it never comes into contact with ocean currents) and/or inside of a "baseline" environment such as in coastal sand dunes if the material is pure sand.

## 2.3. SENSITIVE HABITAT SURVEYS

The USACE will also require a Sensitive Habitat Survey (SHS) for each opportunistic placement project (USACE 2004). The SHS Survey shall include a pre- and post-project monitoring plan (see Section 7) and proposal for mitigation for any impacts to sensitive habitats in the vicinity of the receiver site. The survey should identify the habitat types immediately adjacent and downcoast of the proposed receiver site, and delineate any sensitive habitat areas potentially impacted by the proposed project, if any. SHS areas include eelgrass beds, high-relief reef and low-relief vegetated reefs, with indicator species including giant and feather boa kelp, large sea fans, and surf grass. The SHS would be subject to review and comment by the USACE, NOAA Fisheries, USEPA, and the appropriate RWQCB if any sensitive habitat is located within the receiver site vicinity.

The biological assessment checklist in Appendix B is the initial step needed to prepare an SHS, and helps identify locations of field investigations (reconnaissance scuba dives of sensitive habitat areas in the vicinity of the receiver sites that may be affected either directly or indirectly by nourishment) required for the full SHS. A habitat map of baseline conditions that can be compared to post-construction conditions is required. Assessments performed for nourishment projects in Southern California have included surveys of areas of kelp, surfgrass and eelgrass in nearshore waters within depths of 30 feet or less. Rocky intertidal areas are also surveyed for presence of sensitive species. Dive surveys are typically done 30 days before construction, then at 30 days, possibly 90 days (if needed), 180 days and 360 days after construction for relatively small projects (less than 100,000 cy). Surveys may be required for periods of up to five years depending on the size of the project and the sensitivity of the area, or not required, as determined on a case-by-case basis. The SANDAG Regional Beach Sand Project was monitored for five years.

### 2.4. SEDIMENT BUDGET ANALYSIS

A sediment budget analysis is also required by the USACE or RWQCBs, either for the permitting of a single project or an opportunistic program. The purpose of the study is to ultimately avoid discharge occurring as a convenience and to place the material where it is most needed. The sediment budget analysis should demonstrate the need for placement of suitable material at the receiver site based on (1) pre-project sediment budget analysis or (2) known sediment budget data for the receiver site from a reasonable recent study. The analysis needs to demonstrate a net loss of sediment deposition over the project area, and that local beach profiles show the effects of such erosion and thus are in need of replenishment. The CSMW is currently sponsoring a study designed to update all known information regarding current and historical regional (littoral cell) sand budgets, which should assist in this effort.

### 2.5. ENVIRONMENTAL REVIEW

A project description should be prepared for CEQA and NEPA analyses. Environmental review must be performed following implementation procedures of CEQA and NEPA. The project description shall provide all components needed for environmental review such as project objectives, the location and area of the receiver site (and borrow site if not an opportunistic project), amount of sand to be imported, maximum range of the sediment characteristics, location and size of any proposed stockpiles, methods of stockpiling, equipment to be used, transportation planning (e.g., flaggers and signage) and routes, placement method(s), construction timing, project duration for maximum project limits, and required agency permits and approvals.

The project description can then be used to prepare the CEQA Initial Study. Areas potentially impacted by an opportunistic beach replenishment program include biological resources, hydrology and water quality, geology and soils, land use and planning, noise, air quality, traffic and circulation, and recreation. Socioeconomic analysis may have to be included if there is a potential impact to any commercial fisheries, e.g. lobster or fisheries affected by offshore dredge operations (Marilyn Fluharty, Personal Communication, 7/14/05). It is possible that a Mitigated Negative Declaration (MND) can be prepared for most opportunistic projects. This may entail restrictions on site selection and placement criteria to minimize impacts.

San Clemente, Carlsbad, and BEACON started with an ideal opportunistic program, selected the best sites to suit that ideal program, then constrained the program (sand volumes, fines, timing, etc.) to meet the requirements of a MND. This was accomplished using analytical modeling of sand movement along a typical beach profile, combined with assessment of potential impacts to resources in an iterative process that identified the appropriate footprint and volume of beach fill that would not cause significant impacts.

The process of site selection is discussed in Section 3, appropriate sand material characteristics are outlined in Section 4, and various placement methods are described in Section 5. These elements will help the user in preparing the project description for environmental compliance.

## 2.6. PERMITTING

Permits will be required from the agencies listed below. Local agencies may require other permits not included in this list and should be investigated by the user.

- USACE – Sections 10 and 404 permits. Issuance of these permits requires the Corps to consult with NOAA NMFS and the USFWS where necessary for Essential Fish Habitat (EFH) and ESA issues. In the event a threatened or endangered species is present, an Incidental Take Statement will be required from the USFWS.
- California Coastal Commission – Coastal Development Permit and/or Consistency Determination.
- California State Lands Commission – Lease of State Lands for placement of sand below mean high tide line, which will include the requirement to perform a mean high tide line survey prior to placement.
- Regional Water Quality Control Board – Section 401 Certification for typical nourishment, and Waste Discharge Requirements (WDRs) under the State's Porter-Cologne Act and Clean Water Act if discharging fluidized contaminated dredge material (e.g., from a harbor).
- California State Department of Parks and Recreation – Potentially, an Encroachment Permit will be required if the receiver site is located within a State Park.
- Local Agencies – Potential permit required from the local agency. May include grading permit, Coastal Development Permit, special use permit, and variances to applicable ordinances.
- California Department of Fish and Game – Potentially, a Streambed Alteration Agreement may be required if the receiver site is at or adjacent to an existing rivermouth or streambed. Potentially, a CESA incidental take permit, 2081(b), if there is a likelihood of taking a state listed species.

Separate permits may be required for the acquisition of the source material. For example, a grading permit may be required for upland construction generating opportunistic beach fill or a USACE permit may be required for dredging or excavation within a riverbed, lagoon, or embayment.

## 2.7. OPPORTUNISTIC PROGRAM PERMIT TYPES

There are two methods for permitting placement of opportunistic sand on a receiver beach. These include 1) a single opportunistic project and 2) an opportunistic program. The basic steps are the same, but the order or level of detail for each step may be different.

A single project is permitted when a pre-defined source material has been located and the placement methods and receiving beach are defined for this single source material. The benefits for a single project include selecting the best receiver site for the specific project. However, permitting may take six months to a year to process. Typically, a single opportunistic project would be permitted either by the developer supplying the sand source or by the local municipality of the receiving beach.

The intent of an opportunistic program is to establish a predefined program for placement of material at a predetermined receiver site. Once the receiver site(s) has been selected, then specific criteria for volume, dimensions, placement options, seasonal timing, etc can be developed. If a source is identified in the future that fits within the accepted criteria, then the material can be placed at the permitted receiver site with minimal review required from the regulatory agencies. The benefits of permitting an opportunistic program include the availability of a site for any acceptable source material without proceeding through the lengthy permit process each time. The down-side to an opportunistic program is that the site selected may not be the best suited site for all opportunities that arise. Typically, a local municipality, county, or regional association for permitting by the appropriate agencies proposes an opportunistic program. This SCOUP document represents an attempt to establish a standardized approach as guidance statewide to these users for such opportunistic programs.

### 2.8. IMPLEMENTATION

Once the opportunistic program has been defined and permitted, the program can be implemented. Potential opportunistic sand sources can be identified from submittal of development applications to the local agency, or by notification of maintenance of flood control facilities, harbors, wetlands, etc. A general flowchart of the sequence of the steps and responsibilities for placement of opportunistic sand source material on the beach is provided in Figure 1A and Figure 1B. Once a potential sand source is identified, all existing data of the material properties and sand source site (grain size, chemistry, historic land use, proximity to potential sources of contamination, etc.) shall be researched. A Material Assessment Checklist (Appendix A) shall be completed to serve as a tool for preliminary review and assessment of potential source material, similar to a CEQA Initial Study checklist. The checklist is intended to enable the user to determine if the source material is a worthy candidate for further consideration. The checklist is meant to be lay-friendly and suitable for use by non-technical staff.

If the source material is a potential candidate, then further testing may be required. Section 5 provides protocols for determining if the source material is a suitable candidate and compatible with the receiver site sediments.

### 2.9. MEAN HIGH TIDE LINE SURVEY

The California State Lands Commission will require that a mean high tide line survey be performed prior to the first beach replenishment activity. The following is required as part of the survey:

- <u>The survey must be based on the California Coordinate System 1983 and must include a control scheme showing found monuments and coordinates referencing the epoch date;</u>

- The survey must locate a minimum of two property monuments shown on an official record map;
- The vertical datum must be shown on the map with the benchmark location and elevation;
- The mean high tide elevation and tidal epoch must be noted on the survey and California State Lands Commission staff must approve the elevation prior to the fieldwork;
- Stations used to locate the mean high tide line must be at intervals of 50'±;
- The survey must be performed by or under the supervision of a Licensed Land Surveyor; and
- The California State Lands Commission will be provided with a hardcopy map and AutoCAD drawing file within 30 days of completion of survey fieldwork.

# 3. RECEIVER SITE SELECTION

***Tasks pertaining to receiving site selection appropriate for opportunistic beach fill proponents to perform include:***

1. ***Identify all the potential receiver sites within the local jurisdiction coastal areas and complete the Receiver Site Evaluation Checklist (Appendix B) for each site.***
2. ***Identify any other criteria that need to be included in the evaluation of the receiver sites for the local areas that may not be included in the example Checklist. Assign a weighted value to these additional criteria.***
3. ***Evaluate each site against each set of criteria and calculate the weighted score for each site. Evaluate each site for Spring/Summer and Fall/Winter, if applicable to the local conditions (see Oceanside littoral cell example evaluation in Appendix C).***
4. ***Identify prime receiver sites by summing the weighted scores of each receiver site.***
5. ***Assess possible constraints to beach nourishment pertaining to turbidity and burial, such as sensitive biological habitat and other site-specific constraints, as they bear on defining the project description for a specific program.***

## 3.1. RECEIVER SITE SELECTION AND EVALUATION

Proper receiver site selection includes compiling a broad and complete list of potential beach receiver sites within the appropriate coastal region (i.e., littoral cell) for consideration. This list should be compiled before any new evaluation of the potential sites occurs. All of the sites within the area of consideration should be listed and evaluated separately.

A Receiver Site Evaluation Checklist (Appendix B) will aid in gathering and evaluating all existing data and to assess whether further site information is needed. Information including accessibility, stockpile location, need for sand, intensity of recreational use, and existing sediment characteristics are included in the evaluation checklist. The evaluation should be based on factual data assessed by a qualified technical staff person or consultant. For example, biological resources should be evaluated and any report prepared by a qualified biologist. Once all the receiver sites have been independently characterized they can be evaluated based on a set of criteria as presented below.

Certain regions should strongly consider multiple receiver sites to capitalize upon the spatial distribution of potential sources of material. Most littoral cells in the state are relatively long and their contributing watersheds are large, causing sand sources to be broadly distributed. Providing several placement site options enables a regional sediment manager to better match receiver sites with sources in relatively close proximity. In this way sediment can be delivered to the beach site that it may have been delivered to naturally if the receiver beach is within the same watershed, and transportation costs can be reduced. For example, BEACON's South Central Coastal Beach Enhancement Program in Ventura and Santa Barbara Counties identified six receiver sites for opportunistic sand that are distributed throughout a 60-mile-long section of the littoral cell.

Alternatively, coastlines with "pocket" beaches that exist through Central and Northern California are also suitable for considering multiple placement sites. Predominantly rocky coasts can be characterized by long reaches of bedrock coasts, interspersed with relatively short reaches of beach in coves referred to as pocket beaches. Pocket beaches vary in scale, and can provide the local population with a valuable opportunity to recreate. They can also serve as placement sites for opportunistic sand from the area. Their variable scale leads to a variable range of project sizes, but their multitude can provide an opportunity to accommodate potentially significant placement volumes. Thus, along rocky coasts there may be a need to specify numerous placement sites at available pocket beaches.

### 3.2. EVALUATION CRITERIA

Criteria for evaluating each potential receiver site are listed below and shown on Table 1. The list can be modified to either include additional site-specific criteria applicable to certain areas or to exclude certain items that are not. The value in parentheses next to each criterion ("Criteria weighted value" on Table 1) indicates their relative level of influence in assessing an opportunistic receiver site on a scale of 1 to 5. This scale is arbitrary and is intended to enable the analyst to sufficiently discern a relative ranking of several sites for selection of the preferred site and avoid sites that are essentially unsuitable. Subsequent chapters of this document explain how the program then calls for specific design of beachfill projects to maximize environmental sensitivity and minimize impacts.

1. Need for Sand (4) – Does the beach site or area influenced by the project need sand (i.e., is it an eroding beach or littoral zone)?
2. Proximity to Residences of Haul Route & Construction Site (4) – Are the haul route and construction site sufficiently far from local residences to present minimal disturbance?
3. Truck/Construction Equipment Accessibility (5) – Can equipment readily access the beach?
4. Minimal Impact to Intertidal/Beach Biological Resources (5) – Is the site located such that nourishment will have minimal impact on sensitive intertidal/beach biological resources (surfgrass and reef)?
5. Minimal Impact to Nearshore Biological Resources (5) – Is the site located such that nourishment will have minimal impact on sensitive nearshore biological resources (surfgrass, eelgrass and reef)?
6. Minimal Impact to Offshore Biological Resources (5) – Is the site located such that nourishment will have minimal impact on sensitive offshore biological resources (kelp and reef)?
7. Minimal Impact to Visual Feeders (Fish, Birds) (5) – Is the site located such that nourishment will have minimal impact on sensitive visual feeders (birds such as least terns and snowy plovers, and fish)?

8. Minimal Impact to Recreation and Surfing (3) – Will placement of sand at the beach have minimal impact on recreation and surfing by decreasing the quality of the experience during or shortly after completion of construction? It is assumed that beach fills will not detrimentally affect beach use and surfing after construction is complete.
9. Minimal Impact to Tidal Lagoons (4) – Is the site located such that nourishment will have minimal impact on tidal lagoons (sedimentation at the lagoon mouth causing closure and/or increased maintenance dredging)?
10. Minimal Impact to Navigational Entrances (4) – Is the site located such that nourishment will have minimal impact on existing navigational entrances (shoaling causing unsafe navigation and/or increased maintenance dredging)?
11. Minimal Impact to Creek and River Mouths (3) – Is the site located such that nourishment will have minimal impact on existing creeks and rivermouths (sedimentation causing closure of the mouths or the need for increased maintenance activities)?
12. Permittability (Previous Nourishment Receiver Site) (2) – Has previous beach nourishment occurred at the site rendering it more able to be permitted?
13. Feeder Beach for Downcoast Beaches (2) – Is the receiver site an effective feeder beach for downcoast beaches?
14. Maximum Natural Sand Retention (2) – Is the receiver site known to naturally retain sand owing to its configuration or nearshore geomorphology?
15. Proximity to Natural Sand Supply (creek or river) (2) – Is the site located relatively close to a natural sand supply, such as a creek or rivermouth that naturally exposes the site to sedimentation and turbidity?
16. Proximity to Potential Stockpile Locations (1) – Is there a potential stockpile site located relatively close to the receiver site to enable temporary material storage and equipment staging?
17. Support From the Local Community (5) – Does the local community support beach nourishment at the receiver site, or will significant opposition exist to impacts from transporting sand to the site?
18. Proximity of Receiver Site to Potential Sources (4) – Is the site located within close proximity to several potential sand source sites?
19. Local Agency Willingness to Obtain Permits (5) – Is the local agency willing to dedicate resources to prepare the environmental documentation and permitting for the program?
20. Potential Cumulative Effects (2) – Is the site a designated placement site for some other project or ongoing nourishment effort that could lead to cumulative adverse effects to the site or region?

Assuming the bulk of opportunities are transported via truck (as has been the case throughout Southern California for opportunistic beach fills), Criteria 2, 3, 17 and 19 are the most important factors in site selection from a practical standpoint. Even if the potential receiver site is ideal based on other criteria, if residents experience significant disturbance, equipment cannot readily access the site, the local public does not support the project, or the City is not willing to process the permits, then nourishment most likely will not occur.

## 3.3. RECEIVER SITE EVALUATION

Each site can be assessed at an initial level of screening to identify a "short-list" of potential receiver sites for further evaluation. The initial screening should be based on determining if the site is accessible by construction/earthmoving equipment, and if the site and the inland transportation route (assuming material primarily arrives by truck) are located far enough from residences to not cause disturbance.

The shortlist of receiver sites can then be further evaluated against the list of remaining criteria and a value (or criterion score) is assigned to each potential site. The value ranges from 1 to 5 (1=poor, 2=below average, 3=average, 4=good, 5=excellent) for beach placement to occur based on that criterion. The higher value relates to a better site candidate for placement of opportunistic beach replenishment, lower values indicate a poorer site for beach nourishment. For example, if a site has poor construction access then a value of 1 would be assigned. If a site possesses highly sensitive biological resources, then there is a greater potential for impacts associated with beach placement and a value of 1 or 2 should be assigned.

In many California areas, the evaluation of the sites may produce different values depending on the season. Therefore, it may be best to evaluate each site for Spring/Summer and Fall/Winter separately. This will identify the best potential receiver sites based on the desired or most sensitive season of emplacement. Seasonal differences may be caused by biological constraints (endangered species nesting seasons), changes in longshore sediment transport, and/or recreational beach use. Some criteria may not change significantly between seasons, like Proximity to Residences of Haul Route & Construction Site.

The score for each potential receiver site is then multiplied by its corresponding Criteria Weighted Value to obtain a weighted score for each criterion. The weighted scores for each receiver site are then summed to provide a total weighted score. The sites with the higher scores are the preferred sites for placement of opportunistic sand.

Table 1 shows an example of the evaluation form. For this example, Site B has the highest total weighted score, followed by Site A. These two sites are probably the best locations for beach replenishment compared to the other sites identified in the matrix.

## 3.4. GENERAL CONSIDERATIONS REGARDING BEACH FILL AT SELECTED SITES

Once the final receiver site(s) are identified, then further analysis is needed to define the boundaries of the beach placement. This section discusses potential issues that should be addressed prior to defining the specific placement location on the receiver beach.

### 3.4.1 Placement Rate and Timing

Beach fill placement should generally be less restricted during fall and winter months because this is the season natural sediment delivery occurs from rainfall-related runoff, and beach use is typically less-intense. Placement during spring and summer may be more restricted depending on the selected receiver site, environmental considerations, beach usage and the quality of source material (percentage of fines). As much as 100% of the proposed annual volume for a receiver site could be placed during fall/winter seasons. Less volume could be proposed during the spring/summer seasons to limit impacts to biological resources and recreation if the site has such restrictions. Spring/summer placement would take advantage of natural processes encouraging beach growth (as opposed to fall/winter offshore movement of sand). Higher fines content material is generally required to be placed in the surf zone via loaders or slurry, i.e. not pushed across the beach, or driven on, or otherwise handled in such a way as to cause compaction.

### 3.4.2 Turbidity

Beach nourishment causes turbidity, regardless of the grain size of the material. Using sand closely resembling the grain size of the existing sand at the beach causes less turbidity, and using sand with higher fines content than exists on the beach causes more turbidity. Turbidity is a concern from an aesthetic standpoint for beach users, and for biology. For beach users, turbidity is a nuisance that detracts from the water contact experience, particular during seasons of high beach use such as spring and summer. As described in Section 2, it is also a concern for biology because high levels potentially:

- Block the view of visual feeders such as sensitive birds including the California brown pelican and least tern;
- Interfere with fish gill function and can cause effects and mortality to sensitive fish, and affects to the food source for sensitive birds;
- Reduce light needed for photosynthesis of marine flora such as kelp, eelgrass and surfgrass; and
- Lead to accumulation of fine-grained particles on the seafloor (burial) that can smother reef-dwelling organisms and plants. Burial is addressed in the following section.

As such, beach nourishment efforts are scrutinized for effects of turbidity, particularly near areas of sensitive habitat such as kelp or reef. The USACE addressed turbidity concerns in their draft RGP (in process) for opportunistic beach nourishment. Their conclusions were that turbidity can be addressed by limiting the percentage of fines in beach fill and limiting the placement quantities and rates. Turbidity is generally acknowledged as a short-term condition that returns to normal relatively quickly. Impacts from turbidity would therefore be less than significant and not affect foraging activities of sensitive feeders such as the California brown pelican and least tern for the long-term condition after construction ceases. Turbidity conditions should also not affect prey populations affecting those species in the long-term, especially for projects of limited duration. The USACE will make project-specific determinations of effects or the need for conditions such as seasonal restrictions on a case-by-case basis. Also, high-relief reef or low-relief vegetated reef with kelp and other species are expected to not be permanently impacted by decreased light penetration because turbidity will only be similar to that occurring naturally during storms, provided appropriate placement rates and conditions are applied.

Turbidity can be measured in a variety of ways. The most practical method for local agencies is to employ qualitative methods of visual plume mapping using lifeguards or other qualified staff (possibly including consultants). A person observing the placement of the beach fill should monitor turbidity visually from the shore and/or a local pier or bluff top. Observations should be documented with photographs, and maps of maximum daily plumes should be made and assembled into a report submitted within a month or so after construction. Observations of swell, wind and tide conditions should also be made to correlate with turbidity conditions. As required in permits for previous opportunistic programs at San Clemente and Ventura/Santa Barbara Counties, if monitoring indicates excessive turbidity (greater than ambient beyond one-quarter mile offshore at or downcoast of the placement site) for a prolonged period, assumed to be 5 days, then placement should halted or be modified to reduce turbidity. Also, if significant levels of turbidity are generated and possibly threaten the health of swimmers or surfers, the monitor should work with the construction manager and local agency staff supervisor to either halt the project temporarily or decrease the sand placement rate.

Other more quantitative methods include measuring turbidity in the water using a secchi disk submerged from a small boat to estimate water clarity. Thresholds of water quality and duration of turbidity can be set by qualified scientists, regulatory staff, and public agency staff to use as a guideline to interpret readings and render decisions about the project. Turbidity data are both useful in improving planning of future projects and in regulating a particular project under construction.

Limiting turbidity during opportunistic beach fill projects is accomplished by:

- Limiting the total quantity of fill placed over a given time (the fill rate); and
- Limiting the percentage of fines in the beach fill material.

Incorporating these considerations into opportunistic project designs requires that projects be relatively small is total volume (no more than 150,000 cubic yards per year), and limited in the content of fines (less than 45%), and preferably 25% or less. Individual opportunistic beach fill projects with more than 25% fines should be relatively small in volume (less than the 10,000 cubic yard limit) over the first two years of the program so monitoring can occur to verify any effects.

### 3.4.3 Burial

Excess fines or suspended solids can cause burial of benthic species and habitat. Monitoring of an opportunistic beach fill project in Carlsbad by the University of Southern California and DBW indicates that the depth of burial from a 10,000 cy project with 20% fines was on the order of a small fraction of an inch (Sherman et al. 1998). The utility of this study is that it quantified the threat to habitat from suspended solids and concluded that overall the consequences of burial from short-term high levels of suspended solids are insignificant, given that projects are relatively small (less than 20,000 cy) and possess fines content near 20%. Larger projects or those with higher levels of fines may be more of a concern and monitoring should occur to ascertain their effects.

The USACE indicates that buried benthic ecosystems would be expected to recolonize rapidly (within weeks to a few years, depending on conditions) and impacts to them would be short-term and temporary. However, sensitive flora such as eelgrass is vulnerable to significant impacts if buried, and project-specific determinations will have to be made from an SHS, with possible mitigation required if significant impacts occurred.

Burial is measured in the field by divers at biological monitoring transects. For example, transects at Goleta Beach near Santa Barbara and North Beach at San Clemente were utilized to measure the depth of sediment cover, and percent of total sediment cover versus exposed rock at sensitive habitat areas (kelp, eelgrass, and surfgrass beds). Measurements are taken before project, immediately afterward, and for longer-term periods after construction to document man-induced and natural dynamics. This system works fairly well for detailed measurements of burial and is superior to bathymetric surveying to detect burial because the scale of burial affecting habitat can be very small (inches rather than feet) and difficult to resolve within the limitations of bathymetric surveys.

### 3.4.3 Determining Beach Fill Dimensions and Volume

A biological investigation (see Appendix B) and assessment should be conducted on the preferred site(s) to determine potential effects to resources from an assumed depth and prolonged duration of sand cover that could occur at the receiver site from placement of the material. The biological assessment can also outline the distance beach fill should be placed from the resources to not cause significant impacts. These data assist in determining the appropriate quantity of sand that can be placed at a particular receiver site while not causing significant impacts (maintaining maximum environmental sensitivity). A beach profile model that predicts the equilibrium profile depth of cover along the beach profile can then be used to design the beach fill cross-section, minimizing the depth of cover at the resources to prevent impacts. This information will formulate the appropriate design and quantity and dimensions of the beach fill (length, width, and volume).

# 4. POTENTIAL SAND SOURCES

***Tasks pertaining to potential sand sources appropriate for opportunistic beach fill proponents to perform include:***

1. ***Identify all the potential sand sources within the local jurisdiction. Sources within 20 miles from the beach area are most viable; however more distant sources can also be included to expand opportunities.***
2. ***Compile all known data for each potential source, including location, volume, material characteristics, and availability.***

## 4.1. IDENTIFYING POTENTIAL SOURCE MATERIAL

Potential source materials within a region should be investigated to better understand their locations and the likelihood of such material becoming available for opportunistic placement. This process also helps in evaluating potential receiver sites, as impacts to air quality and traffic from transporting these materials to the beach are reduced with increased proximity to the receiver site.

Volume estimates of the potential sources may vary from year to year because of environmental or other factors. For example, debris basins can reach capacity more than once in a season, or not reach capacity for many years, depending on the rainfall-related runoff within a given year.

Potential sand sources include the following:

- Dams and Reservoirs
- Debris/Retention Basins
- Channelized Streams
- Lagoons
- Harbors
- Road and Highway Construction or Maintenance
- Railroad Projects
- Landslides
- Local/City Development or Maintenance Projects
    - Residential Developments
    - Hotel Developments
    - Mixed Use Developments (e.g. commuter villages)
    - Road Projects

- Rail Projects
- Public Works Projects

- Other Inland Construction Projects

Dams and debris basins trap sediment and debris that may otherwise travel downstream and cause flood control problems. Flood control districts periodically clean out the debris basins, while reservoirs are much less frequently, if ever cleared. Normally, the material removed from debris basins is used for landfills or provided to brokers or contractors. The use of debris basin sediment as opportunistic fill material involves removal of incompatible material such as brush, debris and boulders at the site. Removal of this material may be accomplished through mechanical sifting and reworking of the sediment using conventional earthmoving equipment but it adds an additional cost, which is not desirable. Alternatively, the material can be visually assessed for clearance from debris, and particular areas of the source site can be selectively excavated to only remove the "clean" material, leaving less desirable sand at the basin. The beach-compatible material could then be hauled to the receiver site via trucks. As mentioned, debris basin infilling is sporadic and dependent on the precipitation that occurs during any given year.

Dams are now being considered for decommissioning and their sediment-laden reservoirs are being evaluated as sources of coastal sediment. Matilija Dam in Ventura County and Rindge Dam in Los Angeles are two examples. Studies are being done at the federal level to ascertain the suitability of impounded sediment for beach/coastal nourishment, and engineering and habitat studies are being performed to determine the appropriate methods for decommissioning.

Another potential source of sandy material comes from rivers, creeks, sloughs, and marshes. Sediment supply along many California rivers has slowed since construction of dams upstream. Some rivers are periodically excavated as flood control improvement or maintenance measures. Sediments produced by this excavation could be placed on the beach to help offset the volume of sediment that is trapped upstream behind dams and other flood control devices. An example is the Santa Ana River in Orange County, which requires clearing of up to 1.5 million cubic yards of high-quality beach sand every 10 to 15 years. Most of the sand has been brokered off to inland industrial uses over time, with a portion placed in the littoral zone.

Major transportation projects such as roadways and railways may generate surplus sediment from excavation. Excavating transportation routes through coastal terrain composed of sandy sediment can result in suitable opportunistic sand that could be considered for beach placement. An example is the Lomas Santa Fe Grade Separation Project in Solana Beach in 1998 that resulted in 55,000 cy of sand being placed at Fletcher Cove.

Landslide deposits are another potential source of sediment for the beach enhancement program. Landslides generally occur during the winter-wet season along road or railroad cuts, and other over-steepened areas. Caltrans is the California state agency responsible for planning, designing, building, operating, and maintaining California's state highway system including rail and mass transit. Therefore, when landslides occur near roadways and railroad tracks, Caltrans is responsible for removing the material and disposing of it properly.

Coastal lagoons typically act as sediment traps, particularly if the lagoon mouth is stable and remains open throughout the year. Maintenance dredging occurs at most of these sites and the sand is used for beach nourishment. Examples are Agua Hedionda Lagoon and Batiquitos Lagoon in San Diego County. Harbors offer similar sediment trap function, and are also maintenance-dredged frequently with their sand being placed on the adjacent beach. Examples are all federal harbors along the coast including harbors at Cresent City, San Francisco Bay entrance channel, Santa Cruz, Monterey, Santa Barbara, Ventura, Channel Islands, Marina Del Rey, Oceanside, and San Diego Bay entrance channel.

Certain local project actions within the coastal zone result in surplus sandy material that is often suitable and available for nourishment. Such projects include underground parking garages that penetrate deep into sandy geological formations. Examples are a hotel to be constructed along the coast in Encinitas in 2005/2006, the Solana Beach Mixed-Use Project to be constructed one-quarter mile inland in 2007, the Poinsettia Train Station Project to be constructed one mile inland in Carlsbad in 2006, and the Pierside Townhomes Project to be constructed one-half a mile inland in Oceanside in 2006/2007.

### 4.2. COMPILE DATA

The search and inventory of potential sand sources involves researching available data and categorizing it in a way that can be used to prioritize their use as beach fill. Typically the research involves significant efforts to gather information from local agency staff. The types of information to be requested include:

- Location;
- Volume;
- Material characteristics;
- Timing of availability;
- Ownership;
- Contact person; and
- Telephone number or e-mail address.

A data matrix can be prepared, similar to that provided as Appendix D. A GIS data base can be prepared to query over time and use as a planning tool. The data base and matrices are dynamic and need to be maintained as “living” files to be most effective. Maps of sources can be matched against maps of potential receiver sites to best manage sediment regionally.

# 5. SEDIMENT CHARACTERIZATION AND COMPARISON PROTOCOLS

***Tasks pertaining to sediment characterization and comparison that are appropriate for opportunistic beach fill proponents to perform include:***

1. ***Prepare a Sampling and Analysis Plan for testing of the receiver site sediments and potential source material. Research and acquire all background information for the receiver site and source materials (Tier I Analysis).***
2. ***Sample and test the receiver site for grain size. Prepare a composite grain size envelope for the receiver site.***
3. ***Sample and test the source material for grain size, chemistry, and physical properties (compactibility) (Tier II Analysis). Test for biological effects, if required.***
4. ***Make a determination if the source material is acceptable for placement at the receiver site based on grain size, chemistry, and other test results.***

## 5.1. SAMPLING AND ANALYSIS PLAN

The Clean Water Act of 1972 dictates preservation of ocean water quality and habitat conditions as implemented by the USEPA, USACE, and the appropriate RWQCBs. For beach nourishment, implementation is done by requiring analysis of beach fill materials for their physical and chemical constituents and grain size to determine environmental compatibility with the proposed placement location. A Sampling and Analysis Plan (SAP) specifies all testing requirements to determine compatibility, based on Tier 1 research of existing data.

If source material is a potential candidate for opportunistic sand, then a SAP must be submitted to the USACE, USEPA, and RWQCB for review and approval. Characterization of the receiver site sediments must be included if the beach profile grain size envelope has not been prepared or if it has been a substantial time period (three-plus years) since such analysis was conducted.

The SAP should contain the following general categories per the Inland Testing Manual (USACE and USEPA 1998) found at http://www.epa.gov/ost/itm/index.html:

1. Tier I Information - Site history, current site use, identification of potential sources of contamination, and past permitting.
2. Project Description - A plan map and cross-sections of the source site, type and volume of sediment to be removed, and methods and equipment for removing the sediments.
3. Computation of Sampling and Analysis Requirements - Development of a proposed plan for sediment removal from the source site, allocation of field samples, and development of a compositing plan.

4. Sampling Procedures - Sampling schedule, sampling technology, positioning methodology, sample collection, logging, and handling protocols, sample extrusion and compositing, sample transport and chain of custody.
5. Physical and Chemical Testing - Grain-size analysis, physical properties for compactibility, chemicals of concern, analytical methods, holding time requirements, and quality assurance requirements.
6. Biological Testing (if required based on results of previous tests) - Holding time requirements, proposed testing sequence, bioassay protocols and quality assurance requirements.
7. Personnel Responsibilities - Individual roles and responsibilities, project planning and coordination, field sampling, chemical and biological testing, QA/QC management, and final report preparation.

## 5.2. SAMPLING & TESTING REQUIREMENTS-GENERAL

This section describes the testing requirements for the receiver site and source material once an opportunistic program has been approved and when source material has been identified. Testing both the receiver site and source material is crucial in determining their compatibility for grain size and chemistry.

Receiver sites are tested primarily for grain size, and sometimes chemistry (for reference), to characterize the receiving beach sediments. Samples collected provide the grain size distribution of the receiver site, which includes the adjacent nearshore area. By plotting the coarsest and finest grain size curves, a "grain size envelope" of the sediments of the receiver site is created.

Potential source materials are tested for grain size, chemistry, and compactibility (as appropriate). If the chemistry of the source material is considered acceptable, and the composite grain size of the source material falls mainly within the limits of the receiver site grain size envelope, then the material would be appropriate for opportunistic beach placement.

### 5.2.1 Definitions of Sediment Grain Sizes

Definitions used herein are from the Unified Soils Classification (Figure 2 and Table 2), and include:

- Fine-grained sediments, or fines, consist of silt and clay particles that are smaller than 0.074 millimeters or pass through the #200 sieve.
- Sand-sized sediments consist of particles between 0.074 millimeters and 4.76 millimeters (#200 to #4 sieve); and
- Coarse-grained sediments, or anything larger than sand (such as pebbles, gravel, cobbles and boulders) are larger than 4.0 millimeters in diameter and are retained on a #4 sieve.
- Sieves to be used include those listed in Table 2.

## 5.3. SAMPLING REQUIREMENTS

### 5.3.1 Receiving Beach Site

The present USACE method for characterizing receiver sites requires that each sample's gradation be determined. Characterizing only the footprint of placement is not sufficient because the fill will disperse from natural processes to occupy appropriate nearshore and offshore locations based on its grain size distribution. It is recommended that the USACE's gradation analysis be supplemented with a "composite grain size envelope." Gradation curves of the coarsest and finest fractions create an envelope of grain sizes that effectively describes conditions at the entire receiver site. A composite envelope provides a more realistic representation of the littoral system at the receiver site and sediment dispersion based on natural processes. It "brackets" the distribution of existing materials and helps determine if a potential source material fits within the limits of this natural range of grain sizes (i.e., source material is compatible with the receiver site).

Three-dimensional testing of a receiver site is not appropriate because the main interest for the receiver site is the surficial layer of material, which is subject to waves and currents that will interact with the source material. Methods to retrieve deeper sub-bottom samples are difficult to employ and cost much more than conventional methods. Also, coastal processes that move and mix the sand result in relatively homogenous deposition conditions with depth, so stratification is not as prevalent as that which occurs in quieter or protected depositional environments. Grab samples along varying elevations of the beach profile are more useful in determining the grain size distribution of the receiver site, which includes the beach, nearshore, and offshore.

### 5.3.2 Source Material

Both systematic and random sampling over space may be applicable, depending on information about the source. Sampling of source materials using a systematic plan that focuses on potential contaminant sources is preferred for sites with possible contamination. Sampling must be done to the depth of dredging and two feet deeper to account for possible over-excavation to ensure the full volume to be removed is represented (such as shoals or thicker deposits). Systematic sampling will reflect a strategy to characterize all ranges of the material's gradation and chemistry. Target areas within the volume to be dredged or excavated can be more accurately defined and delineated. Systematic sampling may require more samples at higher costs. A SAP (see Section 5.1) should be submitted to the USACE and USEPA for review and approval prior to conducting any sampling.

Random sampling may be appropriate at sites that are clearly not contaminated and do not require strategic characterization. Random sampling for confirmation may require fewer samples and lower costs.

## 5.4. SAMPLING AND TESTING CONSISTENCY

Existing processes at receiver sites and at inland source locations require different sampling techniques to adequately characterize grain size distribution, physical properties, and chemistry. However, sample testing should be conducted using comparable tests (e.g., same sieve range for gradation analysis). Once the test data are available, analysis of sample test results shall be done consistently between receiver site and source materials to allow a direct comparison of conditions. Test and analysis recommendations are specified below.

### 5.4.1 Receiving Beach Site

***Sampling***

Receiver sites may need to be sampled mainly for purposes of grain size analyses, with certain exceptions for chemistry testing as a reference. See Section 5.6.1 for a discussion of when testing for chemistry may be appropriate.

***Testing***

Test for grain size at beaches and sources using the same sieve size range for analysis. The grain size distribution should be developed using the Number 4 sieve for the coarsest limit, the Number 200 sieve to establish the finest limit, and a minimum of 10 sieve sizes should be part of the procedure (see Table 2). Wash testing of grains finer than the Number 200 sieve is not necessary. The dry weight of materials retained on the various sieves will be subtracted from the sample's total dry weight to obtain the percentage of fines within the sample.

### 5.4.2 Source Material

***Sampling***

Potential source material must be analyzed for grain size, chemistry, and possibly other physical properties for compaction. Sampling must be to the anticipated excavation depth and two feet lower to fully characterize the source, and capture variability. Sampling of upland source sand for chemistry should be done by compositing samples from individual borings; this will limit the number of samples tested, yet isolate a specific location that may be contaminated if levels in sample results exceed thresholds of concern. Approval from the USEPA, USACE, and Water Board is needed for the SAP. Compositing is discussed in more detail in following sections.

***Testing***

Test for grain size at beaches and sources using the same sieve size range for analysis (Table 2). The grain size distribution should be developed using the Number 4 sieve for the coarsest limit, the Number 200 sieve to establish the finest limit, and a minimum of 10 sieve sizes should be part of the procedure. Wash testing of grains finer than the Number 200 sieve is not necessary.

Another test that may be appropriate to identify the tendency for the material to form a hardpan is the Atterberg, or plasticity test. Simple geotechnical tests including grain size and Atterberg tests were used for an opportunistic beach fill project at Encinitas in 2005 to judge the material behavior to compact or harden (Dave Schug, Personal Communication, 2005). Another testing option is to conduct a real-life pilot test of the behavior of the material by exposing a relatively small amount (two cubic yards) of the dry material at a coastal location to compression/tamping for a period of time and observing/measuring the result. If the material tends to form a hardpan, versus remaining unconsolidated, then it should be placed in the surf zone.

Testing sand sources for chemistry may be required for all potential source materials at some level, even if there is reason to believe contamination does not exist. If contamination may exist, samples should be tested as specified in Section 5.6 below. The requirement to test is at the discretion of the permitting agencies.

## 5.5. PHYSICAL CHARACTERIZATION OF SEDIMENT

### 5.5.1 Receiving Beach Site

A representative composite grain size envelope should be developed for each receiver site to characterize existing sediments. This envelope will "bracket" the range of grain sizes present at the receiver site, and can be updated over time to consider short- and long-term changes in conditions that may affect the sediment quality.

*Methods and Locations*

Samples should be collected along transects that are approximately perpendicular to the shoreline. At least two profiles should be sampled for a receiving beach one mile in length or less, with at least one additional profile for every ½ mile of beach affected (USACE 1989).

Samples of at least 100 grams should be collected in 1-gallon bags and consist of no less than the upper 6 inches of sediment depth (USACE 1989). As shown on Figure 3, samples should be collected at every 6-foot change in elevation from MLLW (i.e., from the backshore to the local closure depth). The highest portion of the backshore is considered the landward boundary of the beach and the seaward limit is the depth of closure (e.g., typically -30 feet in Southern California and out to -40 feet or more in Northern California). Therefore, a typical profile in Southern California would include samples at elevations +12, +6, 0, -6, -12, -18, -24, and -30 feet MLLW.

To develop the grain size envelope, each sample should be sieved (Table 2) and a gradation curve established for that sample. There should be a minimum of 16 sets of sieve results (assuming two transects with eight samples each). Next, a composite grain size gradation "envelope" should be prepared from the global set of sieve data using plots of the coarsest and finest grain sizes along the transects. Analysis of source material samples against the receiver site's composite envelope will then establish compatibility if the opportunistic sand's gradation curve lies mainly within the composite envelope. Figure 4 shows an example envelope of grain sizes based on composite grain size curves developed for a beach site in San Clemente, California.

### 5.5.2 Source Material

Appendix A presents a checklist designed to capture all known relevant information about the potential source material, including that from previous geotechnical studies (if any) and findings from Tier I research. Any additional testing should be described in detail in the Project's SAP (see Section 5.1), submitted to the USEPA, USACE, and RWQCB prior to initiation of any sampling activities. Obtaining the agencies' approval in advance will minimize requests for more information, further sampling, or other requirements that may slow down the progress of the project. The USACE and USEPA guidance on the typical minimum sampling requirements for sources in the San Francisco Bay Region (typically high in fines content) are available at <http://www.spn.usace.army.mil/conops/guidance.html>; sampling requirements for more sandy source materials may be reduced, dependant on the individual situation.

*Sampling and Compositing*

Sampling should be representative of the material, reflecting volume, homogeneity, potential for pollutants, etc., and will be approved on a case-by-case basis. The sample locations should reflect the maximum volume of material to be removed, and do not require even spacing on a plan view map of the area, as locations should be weighted according to the thickness of the deposit to be removed. At a minimum, two sampling locations should be established at each excavation area, and each non-contiguous area should have at least two sampling sites. There should be a minimum of at least three samples per acre. All samples should be taken to two feet below the proposed excavation depth. All the material from an individual boring should be collected. Sub-samples from an individual boring location should then be collected from near-surface, at mid-depth, and at the bottom of the boring to evaluate whether stratification may reflect grain size differences. Typically the entire sample is then homogenized (a slice of the entire length of the sample in the sampling tube is combined) into one bulk sample for analysis, with documentation of which samples are homogenized made before testing occurs.

If multi-boring compositing has been approved in the SAP, a proportionate subsample of the homogenized material can be composited with similar subsamples from other boring locations to analyze once for a larger area. For example, four adjacent sample locations, composited into one sample for analysis may represent adequate sampling to characterize a potential source material between 5,000 to 20,000 cubic yards. The homogenized or composited sample's gradation curve can then be compared against the composite gradation envelope of the receiver site to establish compatibility. Criteria for such compositing include contiguous nature of the deposit, homogeneity, lack of potential pollutants, etc. Please refer to the USACE guidance web page referenced above for further information.

These methods need to be considered for specific borrow site conditions, with modifications as needed. Modified sampling may be appropriate, based on evidence of possible contamination, stratification, or as a result of Tier 1 assessments (see USACE web page referenced above for guidance on Tier 1 assessments). If the borrow deposit contains distinctly different layers of recoverable thickness (typically greater than two feet thick for dredging, but one foot for land-based excavation) then those layers would be analyzed separately. Gross manipulation of any raw sample (e.g., to remove fines, organic matter, or debris) should not occur prior to sieve analysis.

## 5.6. CHEMICAL TESTING

### 5.6.1 Receiving Beach Site

Chemisty testing at receiver beaches may be needed to compare measured contaminant levels of source material with existing conditions at the proposed receiving beach. For example, certain metals exist naturally in geologic formations and could be detected in testing of sand sources. If these metals are detected at levels of concern, testing of receiving beach sediments may be appropriate to evaluate whether the same metals are present and if so, at what levels, thus providing the context needed to identify if source material compares with littoral sediment.

### 5.6.2 Source Material

Chemistry testing of the source material is a critical element of the opportunistic source sand characterization. USACE and USEPA must approve any proposed chemistry testing on a case-by-case basis. Their approval is obtained via the project SAP. A master list of analytes is provided in the USACE ITM for screening source locations (USEPA and USACE 1998). Note that upland sources may have a longer list of analytes than dredged sources, including those not normally evaluated in sediments such as Benzene, Toluene, Ethylbenzene and Xylenes (BTEX), etc. due to their proximity to sources not typical in the marine environment. The USEPA and USACE may require additional tests on a case-by-case basis if they have reason to believe these chemicals exist. Tier 1 research (see www.spn.usace.army.mil/conops/guidance.html) should occur for each source to establish a "reason to believe" the material is, or is not contaminated. From this effort, a target list of analytes has to be compiled, with an assumed minimum list for any project. A focused list of potential analytes applied to recent projects is provided in Table 3. Target analytes should be selected from, but not necessarily limited to the compounds listed in the Table, and should include contaminants that could be present based on historical research. Testing for all analytes should not necessarily occur for all sources, and not all source sands should be tested for the same constituents.

## 5.7. CAULERPA SURVEYS

### 5.7.1 Receiving Beach Site

Biological mapping and habitat assessment is needed at all receiver sites, and monitoring of biology will also be required after placement. The level of detail of the mapping and monitoring will depend on the quality of the material to be used, and on the biological sensitivity of the receiver site. The checklist for receiver site evaluation (Appendix B) includes specific information needed to assess biological sensitivity that will determine the level of analysis and monitoring needed. Receiver sites on the open coast would not need a Caulerpa taxifola (Caulerpa) survey as they are assumed to be free of the species. Invasive invertebrates should be looked for prior to and after replenishment projects as part of the monitoring program. Project monitoring considerations are discussed in detail in Section 7.2.

For purposes of conducting an SHS, pre- and post-project monitoring of specific species and habitats of concern is needed to plan the most sensitive possible project, and to document any impacts caused by beach nourishment. For more information on the SHS, see Section 2.3. The checklist in Appendix B is intended to provide the type of information required for an SHS.

### 5.7.2 Source Material

It is assumed that upland sand will be free of vegetation and other debris from site clearing and grubbing activities prior to excavation and placement at the receiver site. Source material from saltwater environments shall be surveyed for Caulerpa taxifola. The proliferation of Caulerpa is potentially devastating, as the plant can rapidly overtake existing habitat areas and is nearly impossible to eradicate on open coasts. Specific considerations for biological testing are listed below.

- Protocols for dredging and construction projects in marine waters where Caulerpa taxifolia may be found have been established by NMFS and CDFG (2003). Any bottom disturbing activity requires a Caulerpa survey before permits can be issued according to established protocol (see http://swr.nmfs.noaa.gov/hcd/CaulerpaControlProtocol.htm).

- The Caulerpa survey is applicable to marine and estuarine waters. This species does not survive in freshwater, so freshwater streams and habitats are exempt from this requirement.
- Pre-dredging and/or pre-construction surveys for Caulerpa are required because it can be propagated from small pieces of the plant. Dredging an area containing this species would result in fragmentation, dispersal, and formation of new colonies at the receiver site.
- The Caulerpa protocols referenced above provide guidelines for defining level of infections, survey criteria and requirements, survey area size, level of effort, and reporting requirements. Reporting forms and submission criteria are included.

*Additional Biological Testing Needs*

- Bacteria testing may be warranted if there is reason to believe the source material has been exposed to certain bacteria that may cause or increase bacteria levels of the receiving beach. Indicator bacteria includes, at a minimum, fecal coliforms and enterococcus.
- Invasive invertebrates may colonize protected areas such as harbors. The presence or absence of these species types should be assessed, if appropriate.

## 5.8 SEASONAL AND LONG-TERM PERSPECTIVE

### 5.8.1 Receiving Beach Site

Sediments migrate along shore and cross-shore with the change of the seasons. Some sediment can be lost, but typically the cross-shore changes occur in the shallower nearshore area in build-up or removal of sand bars. Due to this seasonal redistribution of sand, the positions of the sediment grains will change along a profile, but the range of grain sizes (from coarse to fine) within the envelope will not change significantly over the year. Also, the grain size at the depth of closure does not change appreciably with seasons as that represents the point of no net shoreward sediment movement.

However, on a beach possessing both sand and cobble where sand returns during the summer and creates a sand veneer over the cobble, the upper beach area will exhibit a more coarse material (cobble) in the winter than in the summer. Additional sampling may need to be conducted during the winter to adequately quantify the cobble-sized sediments at a cobble receiver site. Some receiver sites may be appropriate for use of opportunistic beach fill that contains some measure of cobble if approved by the agencies. Certain sources may contain an incidental fraction of cobble that is not cost-effective to remove. Thus sources of beach fill that include very small portions of cobble should also be able to be considered as candidates for opportunistic beach fill.

Sampling should occur prior to placement of material. There may be factors (large storms, other beach fills, etc.) or trends (erosion or accretion) that contribute to changes in grain size along the beach over time. Sites within close proximity to rivers and streams may be more susceptible to seasonal changes from flooding and may need to be sampled more frequently to better understand the seasonal and annual variations in grain size. Updates to the representative grain size envelope should occur over a maximum of every three (3) years as confirmation. More frequent sampling can be considered to quantify any changes that have occurred due to extreme events.

The envelope of coarsest and finest grain sizes along a receiver site profile is not expected to change seasonally. If the receiver site is a cobble beach, then the envelope should contain two coarsest curves, one for the coarse sand and one for the cobble material in case cobble is anticipated for use as nourishment.

With respect to seasonal timing of sampling, there are presently no agency restrictions on when samples must be collected. However, for comparison and consistency it may be best to sample during the later summer when the sand volume is typically greatest on the upper beach and when the biological surveys are typically conducted. Exceptions to this suggestion exist as described below.

### 5.8.2 Source Material

Some source locations may experience seasonal changes that bear on sampling and thus serve as exceptions to the sampling timing expressed above. Examples include flood control channels or debris basins where the sediment typically accumulates during the winter rainy season and deposits can vary tremendously by season.

If the source material has a tendency to vary with seasons, then sampling should be conducted within the same season that the excavation or dredging is to commence, and if possible, as close in time to excavation as possible. Alternatively, phased sampling can occur to provide a first phase of planning-level data for permitting, then additional confirmatory sampling as a second phase prior to construction to confirm data considered for the permit.

Other upland sources of opportunistic material (e.g., upland construction projects) would not be subject to seasonal variations.

## 5.9 BLENDING MATERIAL

Blending of materials is not appropriate due to the possibility that a small portion of high-quality material could offset or mask the impacts of poor-quality material. Also, difficulties may arise if unforeseen problems are discovered with material from multiple sources as it is being placed (e.g., Naval ordnance in the Homeporting sand dredged for a Navy Project) and more than one source was used. Both or all sources may become suspect at that point leading to a potential loss of all the sand rather than just the culprit source.

However, after a better understanding and knowledge of opportunistic replenishment sources, it may be beneficial to consider combining compatible sediments from two nearby locations, which may increase the economic viability of a particular nourishment project. However, the risk of losing both sources still applies if one source has unforeseen problems or issues.

# 6. CONCEPTUAL DESIGN

***Tasks pertaining to beach fill concept design appropriate for opportunistic beach fill proponents to perform include:***

1. ***Evaluate selected sites to determine which transportation and placement methods are practical at each site.***
2. ***Determine the specific beach fill quantity, design, and placement restrictions based on beach conditions of access, biology, recreation, transport methods, and, potentially, other factors.***
3. ***Identify any other transportation and placement methods that may be implemented.***

## 6.1. PLACEMENT VOLUMES

The volume of beach fill material proposed for a receiver site should be determined by designing a best-fit beach fill footprint onto the existing exposed dry beach and along the profile, considering site-specific constraints of the environment, infrastructure, beach users, surfing, and potential downcoast effects.

The maximum renourishment volume is that which will not cause significant adverse effects to biological resources after the sand disperses into the nearshore, offshore and downcoast. A biological assessment must be conducted for each site to determine the acceptable maximum depth of cover and its duration that sensitive resources at a site could experience without causing significant impacts. The project biologist will perform the assessment utilizing data from the SHS to determine the appropriate significance criteria for each particular receiver site. An analytical model is used to predict the depth of sand cover along the beach profile just offshore of the fill, and comparing that to the location of natural resources along the profile as specified by the project biologist.

The analyst "backs into" the sand quantity that would not cause adverse impacts as determined by the project biologist as described below. Based on this information, the beach fill dimensions (length, width, and volume) are determined for a site. A profile model, such as one specified by the National Research Council (1995) is used to design the beach fill cross-section, ensuring that the depth of cover at resources will be under the maximum criteria determined from the biological assessment. The biological assessment also outlines the minimum distance from sensitive resources that fill could be placed along the shoreline without causing significant impacts. This information helps the planner/engineer to design the footprint (or planform, including length and width) of the beach fill. Once the cross-section and planform are determined, the volume of material is calculated for the beach fill site.

The recommended approach is very conservative so as to overstate potential impacts and thus provide greater confidence in predictions of non-adverse impacts. This analysis typically results in estimates of sand cover at the locations of natural resources that are extremely thin (on the order of inches), which proves that significant impacts will not occur. A more realistic examination of sand movement after placement would include considering the dispersion of sand alongshore. However, such calculation requires use of a dispersion model (National Research Council 1995). Adding this component to the analysis is typically not done because it is highly technical, prone to disagreement amongst experts, and is difficult for agency staff untrained in coastal processes to understand. Thus it has not been utilized for previous opportunistic beach fill programs. However, it is appropriate for larger projects at locations of sensitive resources when greater effort is required to perform the higher level of scrutiny needed for such projects (e.g., the San Diego RBSP).

The method of calculating sand dispersion from beach fills described below is conservative in that it only considers on- and offshore sand transport and does not account for reduced volume of sand along the beach profile resulting from alongshore sand transport. Results would be much more realistic if the alongshore transport were included. The problem with factoring in alongshore transport is that several methods exist to perform this analysis and each can lead to a different answer, and they are difficult for non-technical persons untrained in coastal sciences to assimilate. Unless and until a standardized method of alongshore dispersion/transport analysis is identified, it is recommended to perform the on/offshore alone, and let empirical evidence from monitoring performance of beach fill placement guide future fill designs. One last consideration is that opportunistic beach fill programs are intended to be low cost efforts to manage coastal sediment. Performing extensive analyses of sand dispersion may require costs that are unaffordable to most local agencies and developers and may cause the process to become economically infeasible or impractical.

The following steps are used to calculate the appropriate quantity of beach fill for a receiver site in an iterative manner to fine-tune the appropriate volume. The proposed method of assessment assumes that the maximum quantity of sediment is placed at one time, and that the sand moves only on- and offshore (not alongshore). This assumption results in the maximum possible sand deposition along the beach profile at locations of resources in intertidal, nearshore and offshore areas. If resources are located downcoast, then the calculation of sand cover is done assuming the nourishment project occurs at the beach immediately shoreward of the resources for the most conservative results.

1) Calculate the depth of sand cover along the beach profile from the back of the beach to the depth of closure assuming that the entire volume of material is placed at one time using the profile model.
2) Identify the habitat and sensitive species along the profile to determine whether impacts of burial in these areas would be significant. Impacts are defined on a site-specific basis by the project biologist. Definitions of significant impacts used in other studies (Coastal Resources Management 2000, Chambers Group, Inc. 2004) consist of:
    a) Surfgrass - More than 50% of the blade length is buried for more than six months;
    b) Eelgrass – Partial burial sufficient to reduce the density of existing beds for more than six months;
    c) Kelp - Burial sufficient to reduce the habitat quality and density for more than six months; and
    d) Rocky Intertidal Habitat – Burial in excess of seasonal averages for more than one year.

3) If the profile model predicts significant impacts, reduce the sand quantity and continue the analyses in an iterative manner until less than significant impacts are predicted.

## 6.2. TRANSPORTATION METHODS

Beach fill activities will likely occur on short notice and when material becomes available. Transport of the sand would most likely be by trucks or rail. Some aquatic sources located near a receiver site could be transported via dredge and discharge line. Along many California coastal areas, train tracks run parallel to the shoreline, and could therefore provide a viable transport mode.

### 6.2.1 Trucking

Trucks could haul material from construction sites along designated routes to the placement sites. Temporary construction access routes may be created across unstable features, such as flood control channels or on the beach, to enable trucks to access and transit the beach without becoming stuck in the sand. Sand would be redistributed along the beach using earthmoving equipment such as bulldozers, loaders and scrapers.

Trucks could generate added traffic and noise along the haul route, and may cause residents a temporary inconvenience during sand delivery. Also, noise levels may be temporarily increased during construction from heavy equipment hauling and spreading material. All operations should follow the local noise ordinances and hours of operation specified in the local ordinance.

### 6.2.2 Rail

Many Southern California beach areas are located adjacent to railroad tracks, adding an optional transportation mode to receiver sites with this feature. Ideally, the receiver site should have clear access to the railroad tracks. Rock revetments or change in grade between the railroad tracks and the beach could add difficulty in implementing this transportation method. At rail-accessible sites, material can be transported by train and sidecar-dumped directly onto the beach or conveyed from the railcar by a belt system, where scrapers and/or loaders could transport the material to the placement site and create the design beach template. Approval by the railroad company would be needed prior to implementing this transportation method.

### 6.2.3 Hydraulic Transport

Several types of waterborne transport vessels exist for dredging. The primary types include cutterhead pipeline dredges, hopper dredges and clamshell dredges. Each is described below.

A cutterhead pipeline dredge consists of a stationary floating pump plant that mines material by lowering a cutter suction head to the seafloor. This technology is suitable for dredging enclosed bays or estuaries, wetlands and harbors, as well as the open ocean. Enclosed bays and harbors are likely to be sources of opportunistic sand; this technique is used for maintenance dredging at both Agua Hedionda and Batiquitos Lagoons, as well as at Oceanside Harbor. The cutterhead loosens or breaks-up the material that is then vacuumed into an intake line, and the sediment is then pumped to its destination via pipeline. This dredge can be employed offshore in depths ranging from about –0 to –90 feet below mean sea level (MSL). Maximum direct pumping distances vary from between 1 and 2 miles. Pumping distances can be increased to distances of 6 to 10 miles with the use of booster pump stations. This method has significant efficiencies in moving material; however, it is prone to shutdowns when ocean wave heights exceed approximately 3 feet. In addition, the pipeline must be maintained to prevent loss of material at other than the intended placement site. If the proposed placement sites are located far from the dredging location, there is a potential risk to the equipment in the event of storm activity.

A hopper dredge is a self-contained, mobile dredge vessel. This technology is more suitable for open-ocean dredging and less suitable for dredging of enclosed embayments, likely to be sources of opportunistic sand. The dredge is equipped with a mechanical arm and attached draghead. The mechanical arm lowers to the seafloor and the draghead collects material, which is then brought to the surface and placed on the dredge by the mechanical arm. The hopper dredge operates in waters depths ranging from –25 to –85 feet MSL. The hopper dredge physically moves from the mining location to the placement site. This dredge can transport material over greater distances than the pipeline dredge. At the shore off-loading location, the hopper must either be pumped out through a discharge line to shore or via a monitor mounted on the vessel, or it drops the material through the bottom of its hull into the nearshore region. Due to depth limitations, the hopper dredge can generally reach within about one quarter to one-half of a mile of shore (considering the slope of the nearshore is from 1:50 to 1:100 horizontal to vertical dimensions on average at most locations) to off-load unless booster stations are placed in service that can increase its pumping distance.

For both the cutterhead pipeline and hopper dredges, a horizontal distance of about 200 feet is required on the seafloor between the dredge and placement location to enable placement of the discharge pipeline in the nearshore. This is required due to the difficulty in placing an unstable object in a high wave energy environment. The pipeline is either floated in-place and then submerged, or assembled onshore and dragged seaward. In either scenario, impacts can potentially occur to bottom habitat. Proactive measures include placing oversize tires around the pipe to raise it off the seafloor thus minimizing its impact on the seabed.

Clamshell dredges are also available to perform offshore dredging. The clamshell is a large bucket suspended by a cable from a crane on a barge. The clamshell is dropped in an open-jaw position to the seafloor, closed and raised to the surface. The material grabbed in the bucket is manually dumped onto the barge and transported to the placement site. The clamshell is a relatively inefficient dredging technique for the type of operation envisioned by this project.

### 6.2.4 Other Methods

- Scrapers - Scrapers would be used in a localized sand placement area to lower a stockpile or move material from a drop site to a placement site along a beach. Scrapers can also be used to transport material short distances on blocked-off streets or lanes. Since they are not licensed for public streets, they would serve as an ancillary piece of equipment. They may be useful to perform sand back-passing for periodic project maintenance.

- Pumps (Slurrying to the Nearshore or Bypassing/Backpassing) – Less-than-optimum beach fill materials may be suitable for slurrying into nearshore water depths of less than -30 feet using a pump and discharge line. These materials are compatible with the deeper portions of the littoral zone. Pumping them from a water-filled pit on the beach to the desired depth can place them. Also, pumps are suitable for sand bypassing and backpassing. Bypassing has been attempted at Oceanside Harbor as part of an experimental system to maintain the entrance channel. The poor performance of the system for that particular application caused it to be abandoned.

- Conveyor System - Like the scraper option, conveyor belts would be ancillary equipment used to move material from a stockpile or train off-loading area to another specific placement site. Locations where this may be viable would be at a nearby inland source that could be conveyed directly over the bluff or for off-loading of rail cars and conveying material into trucks and/or scrapers.

## 6.3. PLACEMENT LOCATION AND TIMING

The placement location and timing of beach fill operations has been considered a significant factor by the USACE in Section 404(B)(1) Guidelines, and by the CCC in conditioning permits for recent projects. Agencies typically specify that placement of the material should occur away from sensitive resources (least tern, snowy plover, spawning grounds of the Pacific Herring and Pismo Clam, and California brown pelican foraging activities), should not occur during grunion runs, least tern or snowy plover nesting, and runs of Steelhead Trout and Salmon, should not occur at public beaches during particularly high-use times, and should not be constructed in a manner to interrupt beach access. These considerations were taken into account when designing the Oceanside program (Section 8.0), which was proactively designed to be as environmentally sensitive as possible with restrictions as to placement locations and timing. Typically, placement of higher fine content materials is required in the surf zone directly, and care must be taken to avoid handling it in such a way as to cause compaction of the material on the beach.

## 6.4. PLACEMENT RATE

Beach fill placement rates have been restricted by the USACE on previous beach fill projects to control turbidity levels. Controlled or limited beach fill placement rates may also extend the sand placement period and the period of turbid conditions. The restriction has been applied to dredging projects and is expressed as a quantity of sand placed per year or month. Such restrictions have been imposed on projects located at sites possessing sensitive species.

Limiting the placement rate will also limit the number of trips required to transport the material per day. The number of trucks must be controlled to minimize adverse impacts to air quality, traffic and circulation, public safety, and noise. Considerations should be made for restricting the placement rate of material to proactively address the issues of truck traffic and turbidity.

## 6.5. DESIGN SCENARIOS

The receiver site fill material may be placed 1) below the mean high tide line, 2) as a layer over the beach surface as a berm, or 3) as a dike along the back of the beach. These procedures are described below and shall only be implemented if the placement method will not adversely impact the receiver site's biological constraints.

### 6.5.1 Placement Within or Slightly Beyond the Surf Zone

Material with high fines content could be placed at an appropriate depth along the profile where sediments of a similar grain size are naturally found, or where natural transport processes will carry it to the point of natural occurrence. It is envisioned that for sites that will receive less-than-optimum sand with a fines content of between 20% and 45%, the material may be placed either in the surf zone or just beyond that point to be dispersed along the beach profile. Fines will naturally deposit at these locations under hydraulic transport. These depths typically possess a fines content of up to 30 to 35 percent based on sampling at Carlsbad, and at BEACON sites (M&N 1998 and M&N 2001). This approach will result in finest materials being deposited in relatively deep waters allowing natural winnowing of the fines from the sediment and deposition offshore in calmer waters.

### 6.5.2 Below the Mean High Tide Line

Source materials will be placed below the mean high tide line if the material is darker colored and/or finer grained than the existing beach sand. Sediment color is discussed further in Section 2. Sand will be delivered to the beach and carried by wheeled loaders to the water's edge, and pushed by bulldozers into the water during a spring tidal event (defined as when tidal ranges on a tide chart exceed six feet which occurs entering and leaving the period of either a full or new moon). Material will not be pushed over the dry beach to the water, but carried in the bucket of a piece of earthmoving equipment. Over a time period of at least six hours, including three hours prior to low tide and three hours after low tide, the material will be pushed as far seaward as possible and left in a low linear mound below the existing berm so that it can be reworked by waves during the following rising tide. The fines will be gradually winnowed out of the material by waves and currents and carried offshore and sand will be left behind. It is estimated that most of the material will be reworked within eight full tidal cycles (four days). If the material is not reworked by high tide and waves within this period, it may need to be necessary to manually break it up with earthmoving equipment. This placement design is appropriate for less-than-optimum sands with a fines content of between 20% and 45%, and for materials that have a tendency to form a hardpan if left exposed high on the beach.

### 6.5.2 Beach Berm

Source materials may be placed as a layer over the existing beach as a berm if the material is high quality; grain size is compatible with the existing dry beach and closely matches the existing beach sediment color. The berm would be a level surface extending a certain distance from the back of the beach toward the ocean, and then sloping gradually into the water. The elevation, width, length, and slope of the berm will vary for each sand placement opportunity, depending upon the quantity of material to be placed and its qualities. An example design might be a level surface at +10 feet MLLW, extending 150 feet from the back of the beach toward the ocean, then sloping gradually into the water at a ratio of 15:1 (horizontal: vertical in dimension). This design is most suitable for optimum sands, with fines content less than 20%.

### 6.5.4 Sand Dike Along the Back Beach

Sand could also be placed as a dike along the back beach, if appropriate. Materials that may be appropriate are both optimum beach sand and finer, less-than-optimum material. The optimum beach sand would be ideal for placement in the winter as added storm protection to the back of the beach, or bury an existing revetment or other shore-protection feature located at the back of the beach. Less-than-optimum material could be placed along the toe of an existing bluff if the material was compatible with this bluff material and could be placed at any time of the year providing added toe protection to the existing bluff.

The sand dike concept could be constructed if the user chose to apply the sand to the sea more gradually than would otherwise occur. The material could be piled up along the back portion of the beach, adjacent to the back cliffs, revetment, or seawall. The dike would typically be narrower and longer than the beach berm concept. A typical dike could reach up to +20 feet MLLW, and slope steeply to the beach at approximately 3:1 (Horizontal:Vertical ratio). This placement allows for gradual "feeding" of sediment to the surf zone during only high tide and/or high wave conditions. Gradual input to the surf zone will reduce turbidity while still nourishing the littoral cell. The sand dike option has a high potential to impact access and recreational uses of the beach if employed at narrow, bluff-backed beaches and will be assessed during project design and review.

### 6.6. NATURAL BEACH PROFILE ADJUSTMENT AND SCARPING

For each design concept, the post-construction receiver site profile will be steeper than the pre-construction profile, but will naturally evolve toward an equilibrium average nearshore slope, which is a function of sediment and wave characteristics. The beach fill will naturally disperse over a wider portion of the beach and nearshore zone resulting in a flatter profile. Flattening of the slope and profile adjustment causes reduction of the berm width from the post-construction profile. Figure 5 illustrates this concept.

Periodic re-grading of the post-construction beach fill may be required to minimize scarping, especially with the beach berm design scenario. Bulldozers can be used to reduce a vertical scarp, which may form as waves rework the seaward edge of the beach fill slope.

# 7. MONITORING

***Tasks pertaining to beach fill monitoring that are appropriate for opportunistic beach fill proponents to perform include:***

1. ***Identify biological and physical monitoring needs for each receiver site based on location, volume, and sediment characteristics.***

## 7.1. GENERAL

Pre-, during-, and post-construction monitoring should occur for biology, beach profiles, and impacts to recreational activities such as surfing. This monitoring is described below.

## 7.2. BIOLOGICAL MONITORING

If quantitative data exist to serve as a comparison for determining the effects of material placement operations on marine resources, these could be used for evaluating opportunistic projects. However, for most locations in California, biological monitoring must be conducted prior to, during, and following project construction. The following programs assess observed effects on intertidal and reef resources, based on experience gained from previous nourishment projects. If it is determined, based upon the results of the pre- and during-construction sampling periods that sensitive marine resources are being adversely and significantly affected, then the material placement programs can be adaptively managed and modified to prevent further degradation of marine resources.

### 7.2.1 Sandy Intertidal

The California Grunion, *Leuresthes tenuis*, is a local species known to occur predominantly along the Southern California coast. Grunion use sandy beaches for spawning, between late March and early September. If construction could overlap with grunion activity, pre-project surveys should be conducted to identify beach suitability for grunion activity. Based on the survey findings, appropriate measures should be taken, if necessary, to avoid impacts on the grunion spawn. Dependant on the type of placement, possible measures include halting construction activities until the spawning has been completed and/or placing sand berms around the spawning area, if possible, creating a buffer zone. The buffer zone should be kept in place until the next predicted grunion run (about 14 days) to allow for the eggs to hatch and surveys show that no subsequent spawning occurred in the area. Nearshore placement may not affect the grunion's ability to access and spawn on the beach.

### 7.2.2 Nearshore Reefs and Surfgrass

A sediment monitoring program and surfgrass health inventory should be conducted offshore of each receiver site that has such nearshore reefs. A series of reef monitoring transects should also be established offshore of each receiver site with points along each as located using Differential Global Positioning System (GPS). At each site, sand levels on the reef should be measured using comparable methods. Baseline measurements taken before sand placement operations are initiated shall be used as a benchmark. At each site, random surfgrass percent-cover measurements and surfgrass blade-length measurements shall be collected. If sand is covering surfgrass, then sand depth over surfgrass and surfgrass blade length shall be measured.

In addition, the presence and health of other macrophytes (i.e., Egregia and Eisenia) shall be noted and the amount of any sand deposition over these plants determined. A random point-contact assessment of the reef cover should also be conducted using a 0.25 meter square sampling quadrant. The purpose of the point-contact study is to provide an estimate of the types and amount of sand and/or marine biological cover on the nearshore reefs that may be under the influence of the beach fill sediment movement. Sediment traps could also be used for this purpose.

Biological data should be collected up to four times for each small to moderate-sized project (10,000 to 100,000 cy), for example at 30 days prior to the project, 30 days after construction, at 6 months and 1 year after construction. The actual frequency of surveys may change and have to be determined on a case-by-case basis. Projects that are large, placed in the wet (placed in water areas such as the nearshore), and/or near sensitive habitat (e.g., reefs) may need to be surveyed immediately after construction is complete. Certain projects may not require the survey at one year after project for various reasons. The necessity of the last event is to be determined based on post-project monitoring information, depending on the professional judgment of the project biologist with concurrence of the permitting agencies. For larger projects (greater than 100,000 cy), surveys may have to occur at more numerous intervals between the 30-day post-project survey and the 6-month post-project survey to capture dynamics during construction. Seasonality should be incorporated into the survey frequency. In the event it is determined that nearshore reefs and surfgrass meadows are being negatively affected by beach fill operations, remedial actions will be identified and recommended for implementation at the earliest possible time. An example of a biological survey system is shown in Figure 6 as applied to the first project of the San Clemente Opportunistic Beach Fill Program.

Specific tasks to measure surfgrass are:

a) Estimate the percent of sand cover with the same quadrants as described above;
b) Estimate the depth of sand cover;
c) Estimate the cover of surfgrass; and
d) Observe the general condition of the surfgrass, such as if it appears healthy or not.

Specific tasks to measure kelp are:

a) Observe and quantify conditions along the transect in a one meter swath to each side, and note conditions at each meter along the transect (1 meter square measurement areas, or quadrants);
b) Document the number and age of species of kelp, the percent sand cover, and the holdfast diameter of giant kelp; and
c) Observe the general condition, such as if it appears to be healthy or not.

## 7.3. PHYSICAL MONITORING

### 7.3.1 Turbidity

To prevent impacts to brown pelican, least tern, and snowy plover foraging from increased turbidity caused by fines suspended in the nearshore, turbidity monitoring should be conducted. Turbidity monitoring should be conducted during construction of the beach fills by visual observation from an elevated vantage point to ensure the turbidity plume does not increase significantly over ambient conditions for an extended duration. Turbidity should be monitored during construction by making daily qualitative observations from a vantage point (on the bluff and/or pier). Observations should be recorded with digital photography, and the daily maximum plume area should be mapped on a basemap. The record should be maintained at the local agency file and be available for inspection by regulatory agencies.

### 7.3.2 Beach Profiling

Beach profile surveys should be conducted prior to and after construction of each placement project to quantify sand accretion or loss along the beach and nearshore, and immediately downcoast. A licensed surveyor or engineer experienced with the coastal survey methods and the specific project site should survey the beach profiles. The frequency of surveys should generally be at 30 days prior to the project, immediately after construction, and at 6 months and 1 year after construction. Tasks include:

1) Establish an appropriate number of beach profile transects, typically including two within the beach fill footprint depending on its length (one located toward the downcoast end and one toward the upcoast portion of the fill), and one to two downcoast at distances of approximately 1,500 and 3,000 feet from the downcoast end of the fill, respectively.
2) Record beach and seabed elevation along the profiles from the back of the beach out to the depth of closure. Suggested survey equipment to be used includes:
    a) Standard survey equipment (level, GPS and rod) for work on land; and
    b) A survey boat with a fathometer and GPS for work on the water to tie into the land profile.
3) Reduce data and produce receiver site profiles to compare pre-project with post-project profiles for interpretation and reporting.

### 7.3.4 Surfing

If surfing occurs at or within 2,500 feet of the placement site, monitoring for surfing conditions should be performed at the receiver site using best qualitative and quantitative scientific methodology to determine effects. Surfing activities and climatic conditions should be monitored by recording conditions for 30 days prior to construction and for 30 days after construction by hand-held video camera (e.g., 15 minutes three times per week between 8 and 9 AM, or other suitable monitoring time depending on local surfing conditions). Also, observations and notes should be made and documented on data recording forms specifying the general conditions (month/day/time, wave height and direction, tide, wind, water temperature and clarity, number of surfers in the water, and qualitative observations of wave qualities). The local agency may also need to perform short interviews with surfers to ascertain effects of the project that may not be able to be determined using the forms. Finally, local staff may surf the site as needed before and after the project to identify potential effects first-hand.

### 7.3.5 Reporting

A Project Notification Report (PNR) is the first document to be submitted to the agencies. The PNR notifies all agencies of the upcoming project and solicits their formal and final approval to construct. It presents the material source information, specifies the placement site, timing, methods and any other relevant information in context with permit conditions. The PNR provides sufficient information for the agencies to justify approving construction. It will be the framework to report all project results and progress under one cover, and will provide a running total of all activities as part of the program.

The intent of the opportunistic program is to be a living program that is optimized and refined over time based on results of monitoring and analyses. The evolution of the program can also be documented in the project notification report. An example PNR is provided in Appendix E.

At a minimum, the notification report should be submitted to the following permitting agencies; USACE, California Coastal Commission, California State Lands Commission, and the appropriate California Regional Water Quality Control Board. The proposed activities shall be consistent with those contained in the approved regional opportunistic program. The notification report should include:

1. Introduction and Background: include approved program limits and permitting requirements. Discuss any previous projects constructed at the placement site.
2. Source Material Description: describe general site location and specific location of source material, volume, material testing, and debris management.
3. Receiver Site Description: description of the receiver site sampling and source material compatibility
4. Transportation and Placement Methods: describe the placement site location and timing of project, transportation methods, beach placement methods, proposed volumes placed, and any actual volumes placed previously, contractor information, access, etc.
5. Public Notification Process: include a description of all public meetings, public (Planning Commission or Council) hearings, and other public notification methods; include all public issues of concern.
6. Project Monitoring: describe all pre-construction, construction, and post-construction monitoring and reporting requirements. The level of monitoring depends on the placement site, placement timing, volume of material, and fines percentage.
7. Submittals and Other Special Requirements: describe all post-discharge reporting requirements and the timing and approval of these submittals from the resource agencies.

Results of the monitoring should be presented as a comprehensive monitoring report, issued at approximately one year after construction. The results may need to be presented in person to resource agency staff for interaction. An electronic copy of the monitoring results report should be provided to the Coastal Sediment Management Workgroup for archiving in the State's Geographic Information System database. A standardized format should be utilized so that reports throughout the State over time can be compared for effects. Developing the report format is beyond the scope of this effort, but one example of an outline could be:

1. Introduction;
2. Scope of Monitoring;
3. Monitoring Methods;
4. Monitoring Results;
5. Conclusions; and
6. References.

# 8. CASE STUDY APPLICATION OF SCOUP TO THE OCEANSIDE LITTORAL CELL

## 8.1. RECEIVER SITE SELECTION AND EVALUATION

For the Oceanside littoral cell case study, 12 potential receiver sites were considered for review. The project team identified these sites with recommendations from the local coastal Cities. Much information has been obtained on these potential sites from the recent Regional Beach Sand Project implemented by SANDAG and other recent available data. Receiver site information was compiled using the Receiver Site Checklist (Appendix B). Potential sites and stockpile locations are shown on Figure 7. Potential receiver sites include:

1) Oceanside Strand;
2) South Oceanside;
3) North Carlsbad (Buena Vista Lagoon Site);
4) South Carlsbad North;
5) South Carlsbad South (Encinas Creek);
6) Batiquitos Lagoon Beach;
7) Leucadia;
8) Moonlight Beach;
9) Cardiff (Restaurant Row);
10) Solano Beach (Fletcher Cove);
11) San Dieguito Rivermouth;
12) Del Mar (17th Street); and
13) Torrey Pines.

## 8.2. RECEIVER SITE EVALUATION

The thirteen potential receiver sites were initially evaluated on accessibility and local community support. Four potential receiver sites were eliminated as they presently do not provide either ready access to the beach or are located too close to residents and nourishment activities may disturb them. Those sites include North Carlsbad, South Carlsbad North, Leucadia, and 17th Street in Del Mar leaving nine sites for further screening and evaluation.

The remaining receiver sites were further evaluated for each of the remaining criteria. Evaluation matrices were developed for both the Spring/Summer and Fall/Winter seasons. An example of the evaluation matrices is provided in Appendix C.

Results indicate that South Oceanside is the preferred receiver site for opportunistic sand. This site is best suited for the program due to ready access, lack of sensitive biology, lack of seasonal constraints other than for recreation, will serve as a feeder beach for downcoast beaches, and other criteria. The site is located at the west end of a major arterial (Oceanside Boulevard) and is thus directly accessible to the nearest freeway. Only two residential blocks of homes are affected at the sand delivery site, thus minimizing disturbance to neighbors.

Equipment access is available off of the west end of Oceanside Boulevard using a concrete ramp to the beach as shown in Figure 8. It is assumed trucks could deliver sand to the beach in the equivalent of twin-trailer, belly dump trucks. These trucks could drop the sand from their containers onto the beach, drive south and exit the site at the Buccaneer Beach curb cut adjacent to the south bank of Loma Alta Creek (Figure 9). Limited earthwork may be required to modify the surface of the beach to enable trucks to drive from the beach to Pacific Avenue at the exit location. Trucks could then head north on Pacific Avenue to Oceanside Boulevard and return to the freeway. This exact type of operation occurred at this site in 1982 when nearly 920,000 cubic yards were successfully trucked in from the San Luis Rey River (Ray Duncan, Personal Communication, 2005).

### 8.3. POTENTIAL SAND SOURCES

A list of potential opportunistic sand sources was compiled for the Oceanside littoral cell study. It includes sources as far as Mexico and Arizona and as close as lagoon restoration projects adjacent to potential receiver sites. Source location, approximate volume, and other information is presented in Appendix D. Also, Figure 10 shows the locations of some of these potential sources relative to the potential receiver sites.

### 8.4. CONCEPT DESIGN

The Oceanside littoral cell is in need of opportunistic sand, and sand sources of all types have become more numerous over time. An example SCOUP program for South Oceanside is presented here for implementation. All proposed properties of this program may and probably should be modified over time as the result of adaptations needed for optimization at this and other locations. Projects conducted as part of the South Oceanside program will be monitored and results analyzed to understand their impacts and effectiveness. The example SCOUP program should be considered a “living program” that can be modified with agency consent over time to become more environmentally sensitive while at the same time become maximally effective at nourishing the littoral zone.

#### 8.4.1. Sand Quantity and Quality

The appropriate annual quantity of opportunistic sand proposed for placement at South Oceanside was determined to be approximately 150,000 cubic yards (cy) (See Table 5). Biology, trucking (assumed to the main delivery mode), turbidity, and effects to recreation were considered to derive this quantity. Site biology is relatively unconstrained. A volume of 380,000 cy was placed at South Oceanside by SANDAG as part of the Regional Beach Sand Project (RBSP) in 2001 with no effects to biology. The first two years should consist of small projects of up to 20,000 cy for information gathering purposes. Larger projects can occur later after evidence indicates that the operation can occur without causing significant environmental impacts.

The proposed annual quantity is limited mainly by the possible disturbance from assumed truck traffic. The calculated number of trips is shown in Table 6. Truck trips would be numerous and frequent, with project duration between 6 (summer) and 10 weeks (winter) if the total annual quantity was placed in one project. This is unlikely, as most opportunistic projects are smaller than 60,000 cy (Solana Beach received 54,000 cy in 1998; Carlsbad received 20,000 cy in 1996; Seal Beach received 30,000 cy in 1995 and 1996; and San Clemente is receiving 5,000 cy in 2005). But for definition of the most-conservative scenario, it is assumed the entire 150,000 cy is placed in one operation.

Thus the annual maximum quantity was capped at 150,000 cy determined to not result in significant, unmitigable impacts to traffic, circulation and safety (EDAW 2005). Recreational impacts will occur during the program, but should be mitigable, as project duration is limited during the high beach-use season and precluded from holidays, and the length of Oceanside beach is sufficient to provide other recreational sites.

The quality, or grain size, of the material should be primarily sand, but can include up to 45% fine-grained particles. This is considered appropriate because the fraction of fines existing in beach sediments at closure depths is between 30% and 35%. USACE guidelines that limit materials to those with less than 10% more fines than what exists at the placement point results in beach fill containing between 40% to 45% fines being acceptable at -30 feet MLLW in locations without sensitive offshore/nearshore biology. The Oceanside site does not have any nearshore or offshore biological resources that are of concern. This proportion of fines in the fill will result in turbidity plumes that must be managed, and the limit of 150,000 cy per year is also proposed to manage turbidity. Depending upon the quality of material, limiting initial projects to certain volumes less than 150,000 cy may be another way to manage turbidity.

### 8.4.2. Placement Timing and Restrictions

Sand placement should occur primarily in fall and winter (October through March), with some placement being acceptable in spring and summer (April through September). The entire annual maximum quantity can be placed during the wet season of fall and winter. Coastal watersheds yield sediment in the wet season that causes turbidity and the coastal zone is acclimated to this seasonal pattern. The wet season is also typically the lower beach-use season.

Approximately one-third of the annual maximum is can be placed in the dry season of spring and summer. Placement in the dry season is important to capitalize upon opportunities related to construction. Most construction occurs in the dry season and it is anticipated that surplus sandy material would be generated more often during that season. Not allowing any placement in the dry season may result in significant missed opportunities or the need for excessive stockpiling. Although there may be some short-term impacts to recreational beach users from nourishment activities during the summer months, there may be long-term benefits to these users if the placement of material on the beach widens the available beach space.

### 8.4.3. Sand Delivery Methods and Stockpiling

Trucking is the most common and conventional form of sand delivery from upland sources. Previous similar projects in the region have been by truck. It is likely that most material will be generated locally and trucked along freeways to the Oceanside Boulevard exit on the I-5, carried west along the Boulevard to the beach, and down the concrete ramp to the sand. Figure 11 shows the truck route.

Trucks may also reach the receiver site from a potential stockpile area several miles inland along Oceanside Boulevard (the El Corazon site). Sand stockpiling is feasible at the El Corazon site, according to the City of Oceanside (Don Hadley and Ray Duncan, Personal Communication, 2005). The stockpile location is large enough to hold the proposed annual maximum sand quantity, and used to stage trucks after-hours. The stockpile site is also shown on Figure 11.

Once material is delivered to the beach, it will then be placed more precisely using scrapers, loaders and bulldozers. Contractors will possess a variety of earthmoving equipment but these should be representative of that to be used. The sand will be spread on the beach as a berm, or placed along the low tide line as a low mound if it is less than optimum sands.

Other possible sand delivery methods may include a slurry pump and discharge line to transport less-than-optimum material to or just beyond the surf zone. The set-up might include a pit on the high beach filled with seawater. The sand would be dumped in the pit and then pumped as a hydraulic slurry to depths up to -30 feet MLLW. This placement method is less desirable than those described above due to the added costs of the additional pumping stage.

#### 8.4.4. Concept Beach Fill Designs

The most appropriate beach fill designs for South Oceanside include the beach berm for optimum sands (less than 20% fines content), the placement below the mean high tide line for less-than-optimum sands (20% to 45%), and possibly slurry placement in or beyond the surf zone for less-than-optimum sands with higher fines content (45%). Figure 12 shows the placement site plan view, while Figure 13 shows an example sand berm placement plan a project with 150,000 cy of sand. Figures 14-16 present cross-section views of the beach berm placement, placement below the MHT line, and nearshore placement, respectively. All sand placement would occur between the foot of Oceanside Boulevard and the first major street intersection south of the mouth of Loma Alta Creek mouth.

Assuming deposition of 150,000 cy, the beach berm placement would be a surface layer with the finished surface elevation of +12 feet MLLW with a width of 120 feet and a length of 1,700 feet. From the seaward edge of the berm, it would slope towards the ocean at approximately 10:1 (horizontal:vertical).

The maximum dimensions for placement below the mean high tide line would be a three- to four-foot high mound placed with the base of the mound near the +1 foot MLLW or lower, depending on conditions at the time of placement. It would likely extend along the length of the project site (1,700 feet), and need to be placed in increments if the quantity to be placed exceeded the rate of daily reworking by waves. The stockpile site may be needed for staging material to enable slower delivery and placement rates if the quantities are moderate (more than 20,000 cy) and this placement option is required due to grain size.

The slurry to or beyond the surf zone will produce a pile of sediment deposited at the end of the discharge line. It is anticipated that this pile will be located over a certain swath of the nearshore by moving the end of the line as the mound forms, or by currents naturally dispersing the material, depending on conditions. It may initially be placed in water depths of approximately between -5 and -10 MLLW, to out to -25 feet MLLW, depending on quantities and conditions, with a maximum crest elevation of near -10 feet MLLW depending on quantities. This concept is similar to that used by the USACE in placement of less-than-optimum sands off of the Santa Ana Rivermouth in 1992, and is occurring off Bolsa Chica as of this writing.

## 8.5. PROPOSED MONITORING

The following monitoring program for South Oceanside will require monitoring. The following monitoring is proposed.

### 8.5.1. Sandy Intertidal

Monitoring for grunion is required when projects occur in spring and summer, since they have been observed at South Oceanside Beach in recent years. This project will actually improve grunion spawning by adding sand to the beach. As a precaution, grunion will be monitored before construction, and if present, during construction. No post-construction monitoring is required for grunion.

Grunion spawn on the beach between March 1st to August 30$^{th}$, during middle-of-the-night spring high tides, and at or above approximately mean higher high water (MHHW). The eggs incubate then hatch after approximately two weeks, when the juvenile fish return to the sea during the subsequent spring high tides. The presence of grunion should not result in a halt to construction, due to the availability of a larger sandy area for spawning immediately up- and downcoast. The project shall be allowed to proceed with modifications as needed to accommodate spawning.

A grunion monitor will be present to observe grunion runs two to three weeks prior to construction during a predicted grunion run (according to the grunion calendar produced by the California Department of Fish and Game), and immediately prior to construction. If grunion are not present during the predicted run, no further monitoring is required until the next predicted run. If grunion are present during predicted runs, beach nourishment will only occur above the spring high tide line/kelp line or in the nearshore until the spawning season is over. Grunion monitoring should continue throughout the sand placement period, and if they do not spawn during a predicted run then sand could be placed below the spring high tide line.

### 8.5.2. Nearshore Reefs and Biological Monitoring

Monitoring of nearshore reefs or biology is not recommended for the South Oceanside pilot project because previous SHS performed for the San Diego Regional Beach Sand Project show no sensitive resources in the area. This is one significant consideration in selecting the South Oceanside site for the pilot project.

### 8.5.3. Turbidity

Turbidity will be monitored throughout construction to qualify the effect on ocean water clarity from the project. Conditions in the area are typically clear, with occasional storms causing turbidity. The project will also cause turbidity, but the condition will be short-lived and should diminish immediately when construction activities are halted. An observer will monitor turbidity from a vantage point (such as a bluff top) noting the extent of turbid conditions. The observer will map the area of turbidity each day and photograph it. The observer will create a map, and they will document all other pertinent environmental conditions such as waves, wind, and weather. If monitoring indicates excessive turbidity (greater than ambient beyond one-half mile offshore at or downcoast of the placement site) for a prolonged period, assumed to be 5 days, then placement should halted or be modified to reduce turbidity. This judgment should be made by the project engineer in consultation with the user and regulatory staff assigned to the project.

### 8.5.4. Beach Profiling

Beach profiles will be monitored to quantify sand accretion or loss at South Oceanside Beach. A licensed surveyor experienced with the survey methods and the specific project site will survey the beach profiles. There is one established profile that will be used for this study, and the surveyor will establish one new profile. Tasks for beach profiling include:

1) Establish an appropriate number of beach profile transects typically including one or two within the beach fill footprint depending on its length (one located toward the downcoast end and another located toward the upcoast portion of the fill) and one to two downcoast at distances of approximately 1,500 and 3,000 feet from the downcoast end of the fill, respectively. A minimum of two profiles and a maximum of four profiles is recommended.
2) Record beach and seabed elevation along the profiles from the back of the beach out to the depth of. Survey equipment to be used includes:
    a) Standard survey equipment (level, Global Positioning System or GPS, and rod) for work on land; and
    b) A survey boat with a fathometer and GPS for work on the water to tie into the land profile.
3) Reduce data and produce receiver site profiles to compare pre-project with post-project profiles for interpretation and reporting

### 8.5.5. Surfing

Surfing conditions should be recorded digitally on video for 30 days prior to construction and for 30 days after construction for 15 minutes three days per week between the hours of 8 and 9 AM. Also, observations and notes should be recorded on data recording forms specifying the general conditions (month/day/time, wave height and direction, tide, wind, water temperature and clarity, number of surfers in the water, and qualitative observations of wave qualities). Also, observations and notes should be made and documented on data recording forms specifying the general conditions (month/day/time, wave height and direction, tide, wind, water temperature and clarity, number of surfers in the water, and qualitative observations of wave qualities). The local agency should perform short interviews with surfers to ascertain effects of the project that may not be able to be determined using the forms. Finally, local staff may surf the site as needed before and after the project to identify potential effects first-hand.

### 8.5.6. Monitoring Frequency

Monitoring will occur over time from pre- to post-construction as described below.

1) Pre-Project Baseline Monitoring – Surveys of beach profiles and for the presence of grunion will occur within one month prior to construction to observe and document the baseline condition.

2) Construction Monitoring – Turbidity will be observed during construction to document project effects on a daily basis. Grunion monitoring will also occur if they are present.
3) Post-Construction Monitoring – Beach profile monitoring will occur immediately after construction to quantify initial project conditions. Beach profiling will occur at a minimum of three to four locations as performed before construction.
4) Longer-Term Post-Project Monitoring – Monitoring will continue after construction to quantify project effects. Beach profiles will be recorded twice for one year after construction. They are typically recorded in fall and spring seasons after construction to determine changes and account for the natural seasonality of the west coast.

#### 8.5.7. Reporting

Annual monitoring reports will be submitted to the permitting and resource agencies, including a letter indicating if no project occurs (with baseline conditions included). Project-specific monitoring reports will also be submitted to all permitting agencies, at the end of each monitoring episode (one month and six months after construction, and one year after construction) and be included in annual reports. Reports and data will also be provided to SANDAG and the CSMW for posting on their respective websites.

A Project Notification Report (PNR) must be submitted to the USACE, California Coastal Commission, California State Lands Commission, and the San Diego Regional Water Quality Control Board prior to any construction actions. The PNR presents the material source information, specifies the placement site, timing, methods and any other relevant information in context with permit conditions. Reporting requirements are specified in Section 7.3.4, and an example of a completed PNR is included in this SCOUP Plan document as Appendix E.

# 9. TEMPLATE FOR USE OF OPPORTUNISTIC SANDS

***Task pertaining to use of opportunistic sands that are appropriate for project proponents to perform include:***

***1. Develop a regulatory-approved template identifying appropriate steps for use of optimum sands, and any additional efforts required if use of less-than-optimum sands is desired, in order to streamline regulatory oversight and approval.***

## 9.1. GENERAL

This section provides a process for appropriate use of opportunistic sands (optimum and less-than-optimum) for beach nourishment as part of an opportunistic beach fill program. It is assumed that the user is a public agency and the permittee for an approved and permitted opportunistic beachfill program at a defined receiver site(s). The regional opportunistic permit would outline placement sites, timing, and material characteristics that have been accepted and approved by the regulatory agencies with jurisdictional responsibilities.

This template serves as a manual, or checklist, of steps to be followed by the user to implement a project using optimum and less-than-optimum sands. Optimum sand is classified as prime beach fill material that is compatible with the dry beach portion of the receiver beach profile, possessing between 20% and 45% fines, or that are from upland sources, and/or are aquatically-derived are considered as less-than-optimum beach fill sands because:

1) The percent fines along a beach profile typically increases with depth; where up to 35% fines can exist at the deepest point within the littoral zone (e.g., -30 feet MLLW). This is based on sediment sampling conducted at eight different beaches for other opportunistic beach fill programs (Moffatt & Nichol 1998, 2001, and 2004);
2) The USACE and USEPA have concurred that the fraction of fines in beach fill sediment may exceed the existing sediment at the beach placement site by 10%; therefore, materials with up to 45% fines could be placed within the nearshore area of the receiving beach
3) They may be incompatible with sand on the dry beach due to the amount of fine-grained sediment contained within the source material.

The USEPA has indicated in internal communications that materials with relatively high fines content (up toward 45%) can be considered for nourishment projects if it can be shown that the fines will not cause environmental degradation based on full analyses under 404(b)(1) guidelines (see section 2.3 of this report for details) (USEPA 2000)

Less-than-optimum sands are important potential sand sources to consider because they are commonly available, would benefit the littoral zone, and are often analogous to natural sediment delivery from coastal streams. Optimum sands tend to remain relatively higher on the beach profile during their movement because they are more coarse-grained. Less-than-optimum sands disperse over broader areas and fines tend to settle in deeper waters and lower portions of the beach profile. Understanding the migration of the fines and determining that they will not adversely impact natural resources is key if such materials are to be approved for nourishment of receiver sites.

The fact that the less-than-optimum materials exist naturally along the coast in certain water depths within and outside of the littoral zone indicates that they may represent an important component of the sediment budget. However, the design of beach nourishment programs must be done conservatively enough to result in very thin and/or temporary layers of fines deposition in the nearshore and/or offshore to preclude adverse impacts.

Also, designs must be done considering interpretation of monitoring data obtained from previous projects to be of maximum environmental sensitivity. For example, studies were done by DBW and the University of Southern California on the fate of fines placed at Ponto Beach in Carlsbad. The study concluded that for a 10,000 cy project with 22% fines, the ultimate dispersion of fines over a seafloor area was so great that the depth of cover was on the order of only several grain diameters thick (Sherman, et.al., 1998). Another study, performed for the Santa Cruz Port District by McLaren (2000), assessed the fate of 2,000 cy of sediment with approximately 50% fines placed just offshore from the Harbor in the nearshore and surf zone. The District wanted to place less-than-optimum sands from the north harbor onto a local beach. The report concluded that sediment transport patterns indicate that fines would be rapidly dispersed from the beach and have little deleterious affect and that the very small quantity of fines to be disposed could not significantly change the beach material to have any affect on its present dynamic behavior. Monitoring done for the project indicated that the predicted results were realistic (Brian Foss of Santa Cruz Harbor, Personal Communication, 2005 and 2006; Sea Engineering 2005; Sea Engineering 2006). These studies can serve as examples of methods to use for evaluating the fate of fines at other locations.

Local conditions will dictate the need for site-specific studies. Some programs have relied on extensive coastal studies done for other efforts to indicate typical sediment transport patterns. When considered together with site-specific SHSs and SAPs, such studies may provide enough information to start up a pilot program. Then the pilot program can be used to verify the assumptions and analyses with monitoring data, providing further evidence to optimize the program over time and possibly justify a longer-term permit. Examples are the BEACON program, in which staff used a previous regional study as the basis for general longshore transport trends, and combined this understanding with site-specific beach profile surveys and first-order (simplified) beach profile modeling, SHS's, and SAP's to formulate a program that is fully permitted and ongoing (Permit No. 200100033-AJS from the USACE, 4-02-074 from the CCC, Water Quality Certification from the State Water Resources Control Board, and General Lease PRC No. 8600.9 from the State Lands Commission, and four local agency permits from Cities and Santa Barbara County). The program established at San Clemente was done in a similar fashion, with the City utilizing data from a USACE Feasibility Study and the same type of site-specific studies to formulate a program that is permitted with the first project having occurred in late Spring of 2005 (Permit No. 200400838-DPS from the USACE, 5-02-142 from the CCC, Section 401 Water Quality Certification from the RWQCB, General Lease PRC 8567.9 from the State Lands Commission). Actual post-construction observations from opportunistic beach fills will be important to serve as data to confirm or verify the conclusions of these studies. Also, Santa Cruz Harbor secured a long-term permit for placement of 3,000 cy of fines from the inner Harbor and performed monitoring that confirmed predictions of material fate (Sea

Engineering 2005). A second pilot project proposed with monitoring is occurring to evaluate expansion of the operation to 10,000 cy of material removed (Sea Engineering 2006).

### 9.2. IMPLEMENTATION TASKS

Necessary tasks to utilize opportunistic material are listed below. Refer to Figure 1A and B, Simplified and Detailed Sequence of Events for Use of Opportunistic Material, respectively, for illustration on the sequence of steps and user responsibilities described below. Tasks required for use of opportunistic sand for beach fill include those listed below. Capital letters after the task refers to the box in the detailed sequence of tasks flowchart in Figure 1B.

1) Identify potential source materials, such as those from development applications, maintenance of flood control facilities, dredging operations, etc. (Section 4). Ensure coordination between various local departments [Boxes A].
2) Research all existing data on the material and the sand source site (grain size, chemistry, land use, proximity to potential sources of contamination, etc.) and complete the Source Material Assessment Checklist (Section 4 and Appendix A). This checklist serves as a preliminary review of source material. [B]
3) Make a preliminary assessment of whether source material is a worthy candidate for further consideration based on comparison of material characteristics with criteria specified in Appendix A, Source Material Assessment Checklist. This step identifies whether the material can be considered optimum or less-than-optimum sands. [C]
4) Prepare a Draft Sampling and Analysis Plan (SAP) for submittal to the U.S. Corps of Engineers, U.S. Environmental Protection Agency, and Water Board for review and approval (Section 5.1). [D]
5) Once the USACE, USEPA, and Water Board have approved the Draft SAP then sampling of the source sediments and receiver site (if needed) can be conducted (Sections 5.2 through 5.4). [E]
6) Review chemical results of the source material testing to ensure all detected concentrations (if any) are within acceptable limits (Section 5.6). [F]
7) If chemical analysis is acceptable, then compare source material grain size distributions with the receiver site grain size envelope to determine if source sediments are compatible with receiver site sediments. Source material should predominantly fall within the grain size envelope of the receiving beach, and the fines percentage should be within 10% of the fines of the receiver site profile (Section 5.5). [F]
8) Prepare concept design of the program and specify the monitoring plan (Sections 6 and 7.). Prepare a sediment budget analysis and perform an SAS according to guidelines herein.
9) Obtain local approval from public hearings (Section 10) [G]
10) Prepare a Notification Report for the permitting/resource agencies (Section 7 and Appendix F). Coordinate with the appropriate local departments. [H]
11) Address any questions the permitting/resource agencies may have regarding the Notification Report and obtain written approvals from the permitting agencies (Notice to

Proceed from the USACE and letters or notices of approval from the CCC, CLSC, and RWQCB) (Section 10). [I] Agency approvals may take less than 30-days if the Notification Report adequately describes the proposed project and the proposed activities are consistent with an existing regional opportunistic program (e.g., RGP). Permits may take up to 135 days, or longer, if no regional program exists and/or endangered species consultations are required.

12) Conduct Pre-Construction Monitoring that may include monitoring of the receiver site for biology, beach profiles, and surfing as a baseline for post-project monitoring (Section 7). [J]

13) Transport and place the source material at the beach site and conduct construction monitoring for turbidity, surfing, etc. [K], as described in the approved notification report and regional opportunistic program (example program described in Section 8).

14) Conduct Post-Construction Monitoring for biology, beach profiles, and surfing [L], as described in the approved notification report and regional opportunistic program (Section 7).

15) Prepare and submit a Final Project Report to the permitting agencies and the CSMW. This report shall include all of the pre-construction, construction, and post-construction monitoring and all other related activities of the project. All of the project activities and monitoring results should be reviewed and all concerns should be addressed in the report. The Final Project Report should also include any recommendations for future projects on how the opportunistic beach fill program can be improved (Section 7). [M]

16) If public agency or resource agencies request changes to the opportunistic beach fill program, document these changes for the next opportunistic project (Section 10). [N]

### 9.3. ADDITIONAL REQUIREMENTS FOR LESS-THAN-OPTIMUM MATERIALS

If less-than-optimum (LTO) sands are proposed for use as beach fill, analyses for preparation of the concept design provided to the permitting agencies need to include information on sediment transport patterns and offshore resources (if any), and an assessment of whether adverse impacts on such offshore resources are likely to occur. It would be best to choose sites that naturally possess the range of grain sizes in the LTO sand.

The suggested approaches to quantify predicted impacts and thus minimize potential effects associated with less-than-optimum materials include the same steps as presented above, but with additional tasks to more closely scrutinize LTO sands. The concerns for LTO sands are: 1) their potential for sequestering of harmful chemicals; 2) potential for direct burial of habitat; and 3) excess turbidity causing problems for visual feeders and photosynthesis by plants. The steps below apply to LTO sands with these concerns highlighted.

1. Same as step one in preceding section. [A]

2. Same as step two in preceding section. [B]

3. Same as step three in preceding section, with this being the point at which LTO sands are identified. (Section 4). [C]

4. Prepare a Draft Sampling and Analysis Plan (SAP) for submittal to USACE, USEPA, and Water Board for their review and approval (Section 5.). [D]

    a) Specify more information required for chemistry, including testing more samples for chemicals to characterize the source in more detail than for optimum sands.

5. Once the Draft SAP has been approved, sample the source sediments and receiver site (Sections 5.4 and 5.5). [E]

6. Review chemical results of the source material testing to ensure all detected concentrations (if any) are within acceptable limits (Section 5.6). [F]

7. If chemical analysis is acceptable, then compare source material grain size distributions with the receiver site grain size envelope to determine if source sediments are compatible with receiver site sediments. (Section 5.5). [F]

8. Prepare concept design of the program after the material has been approved as being free of contaminants. Two approaches to the design are available for planning.

    a) Approach A: Perform more detailed modeling of the fate of fines to discern where they may deposit and to what extent they may bury habitat, and monitor the project to verify the predictions. This also requires sufficient SHS work to map habitat and determine impacts.

        1. Perform settling test materials for percentages of silts and clays;

        2. Utilize an accepted numerical model (satisfactory to the U.S. Army Corps of Engineers and U.S. EPA) to predict their fate;

        3. Perform detailed SHS of downcoast areas to be potentially affected;

        4. Overlay the predictions of the model with a map of resource areas to identify potential impacts;

        5. Assess and quantify potential impacts of fines deposition;

        6. Establish a monitoring plan for projects to verify predictions that should include estimates of the locations and depths of sedimentation, and impacts on resources.

b) Approach B: Design the project so that no impacts from fines deposition or from turbidity will occur based on information without the modeling. Some options include:

   1. Identify a receiver site with no sensitive resources;

   2. Identify a receiver site that is in proximity to a river mouth that is adapted to high turbidity;

   3. Identify a receiver site that is not a popular or accessible recreational or surfing beach;

   4. Propose relatively small quantities (e.g., conservatively less than 10,000 cy when minimal information is available about potential impacts) so that turbidity is controlled simply by limited volume;

   5. Limit placement to only below the mean low tide line or surf zone;

   6. Limit placement to only the wet season when turbidity is highest; and/or

   7. Conduct extensive public outreach and notification to alert citizens of a pending project and temporary water discoloration.

9. Develop a monitoring plan to specifically determine the potential impacts of burial of habitat, and effects of turbidity caused by the fines (Sections 6 and 7).

10 – 17. All subsequent steps are the same as those in the preceding section. [G-N]

# 10. PUBLIC EDUCATION AND AWARENESS

In addition, the user may choose to implement a public information program to increase public awareness of the program (e.g., sediment color, beach fill equilibrium processes, and beach fill construction). Proposed public noticing methods are listed below:

1) Public coastal committee meetings and workshops - As part of a public workshop, the local coastal committee can discuss the Beach Replenishment Program as an active beach nourishment activity and explain the effects of placing inland sources of material on the beaches.
2) City or Agency Council Meetings - As part of a presentation to the City Council approving a beach nourishment activity, explain the benefits and expected inconveniences of placing inland sources of material on the beaches.
3) Chamber of Commerce/Downtown Business Association - Prepare an article to be placed in regular publication of local business groups.
4) Local Publications - Place an information article in local publications.
5) Newspaper Article - Place a description of the beach nourishment activity in the local papers with an explanation of the benefits of the program.
6) Signage - Place an information sign at the beach and disposal site informing the public of the program.
7) Public Television - Work with local cable television companies with a program on the Public Access Station.
8) Water Billing - Place a notice on the monthly water billing form.

Conducting public noticing can increase public awareness of long-term project benefits to the coast in comparison to possible short-term inconveniences during construction.

# 11. FIGURES

This section contains all of the figures referenced throughout the report.

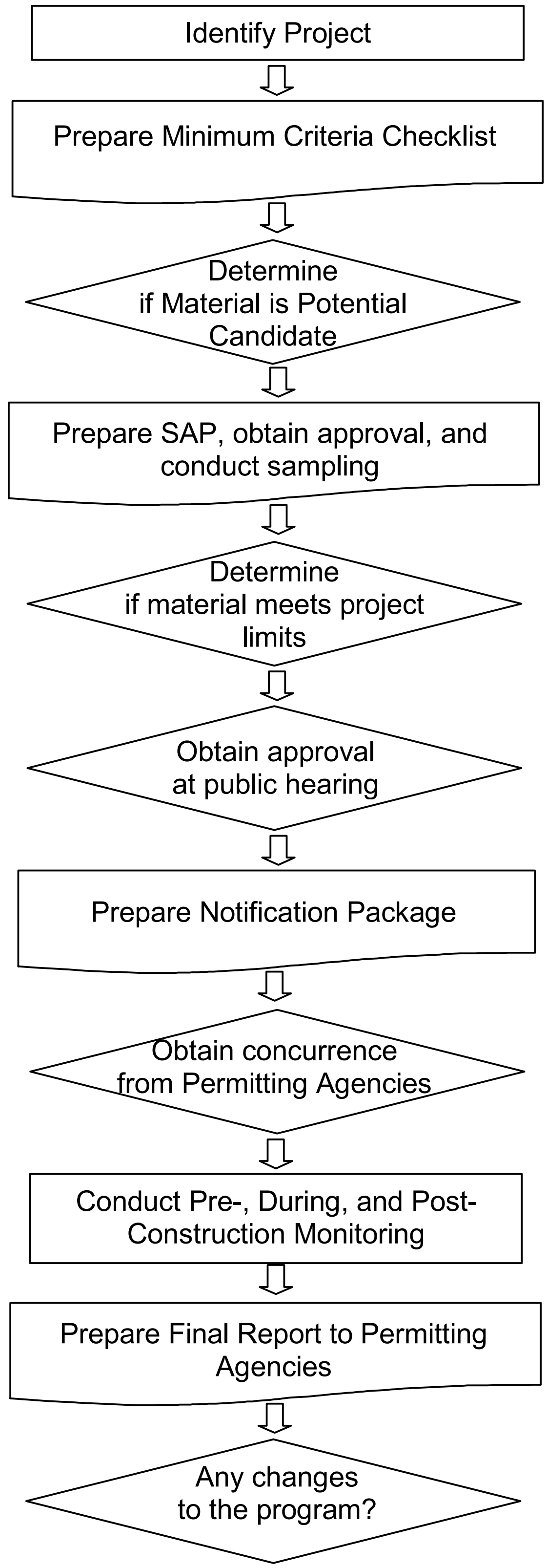
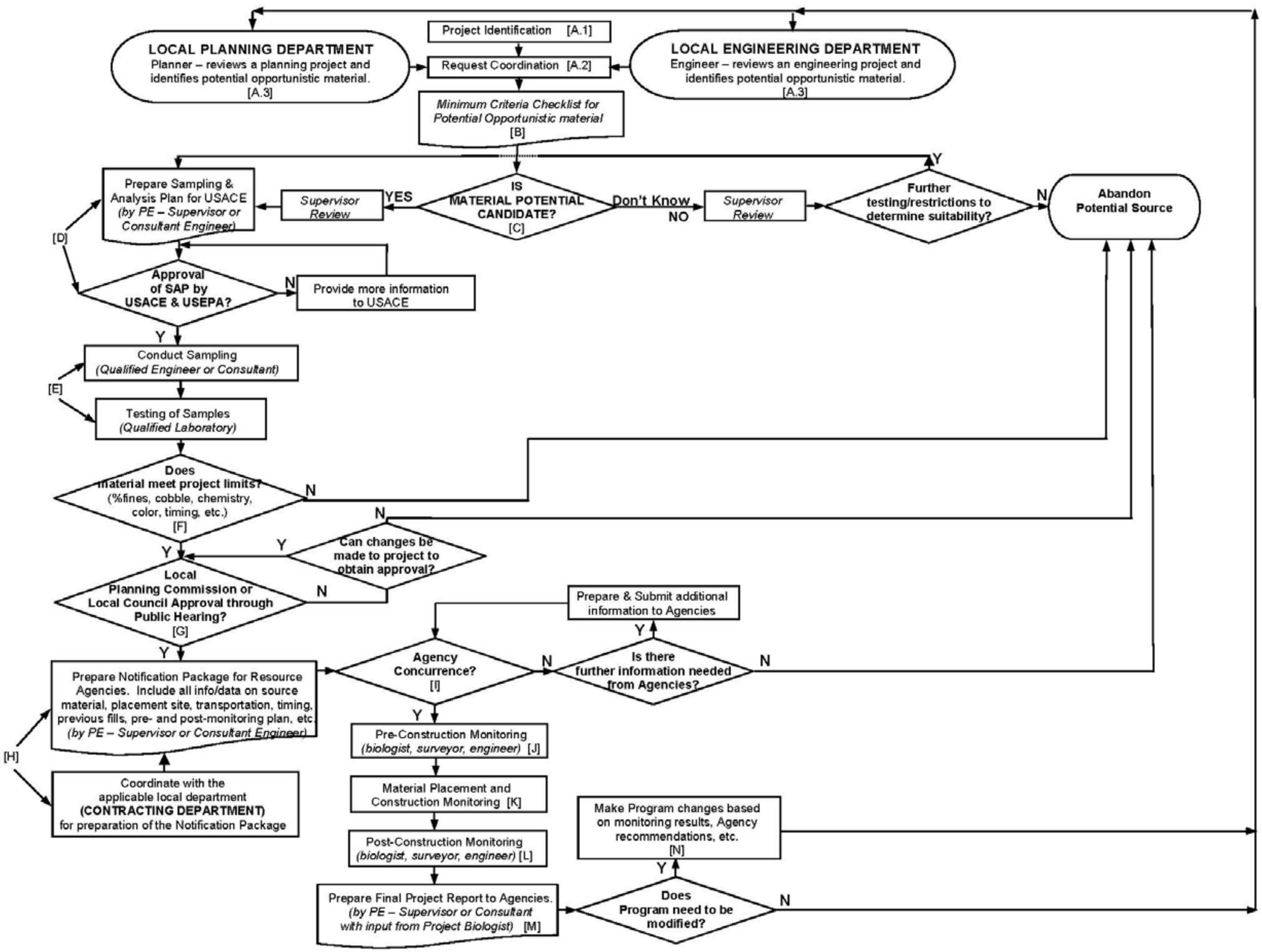



**Figure 1A. Simplified Sequence of Events Flowchart for Use of Opportunistic Source Material**




Note: Section 9.2 provides detailed task descriptions

**Figure 1B. Detailed Sequence of Events Flowchart for Use of Opportunistic Source Material**

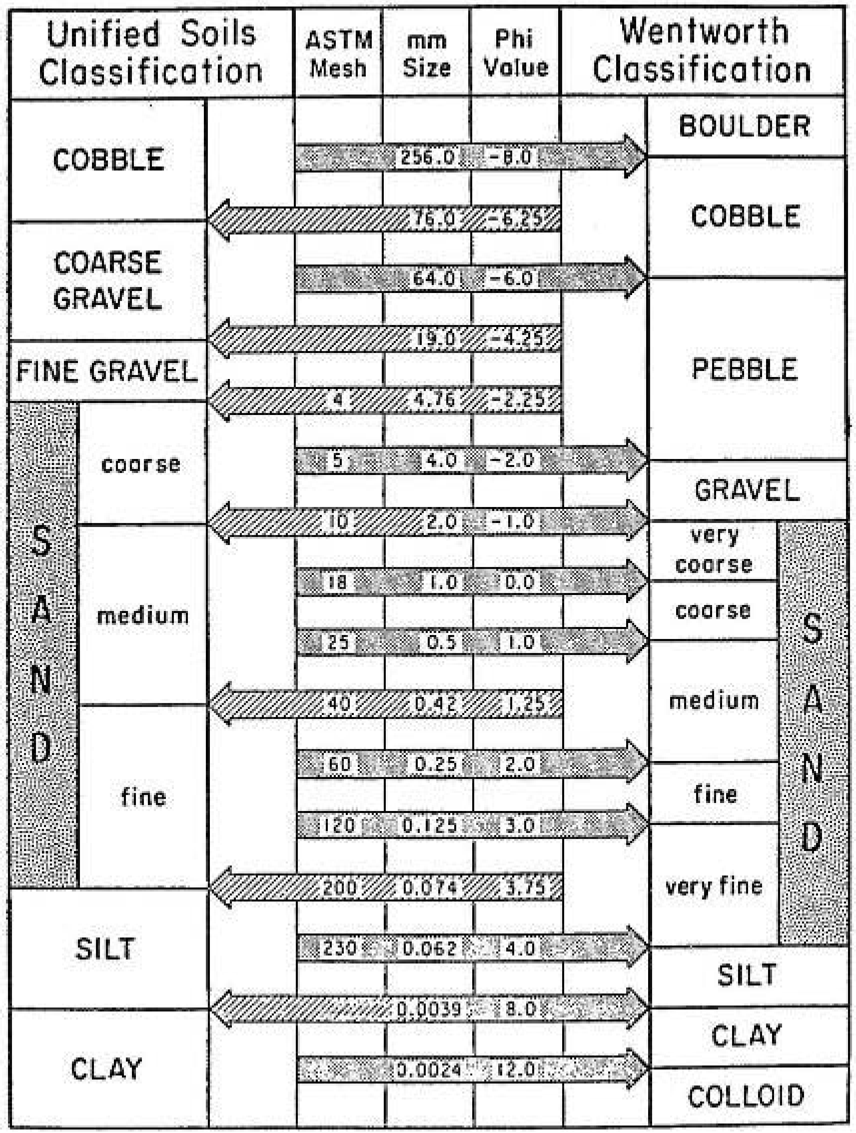



**Figure 2. Unified Soils Classification**

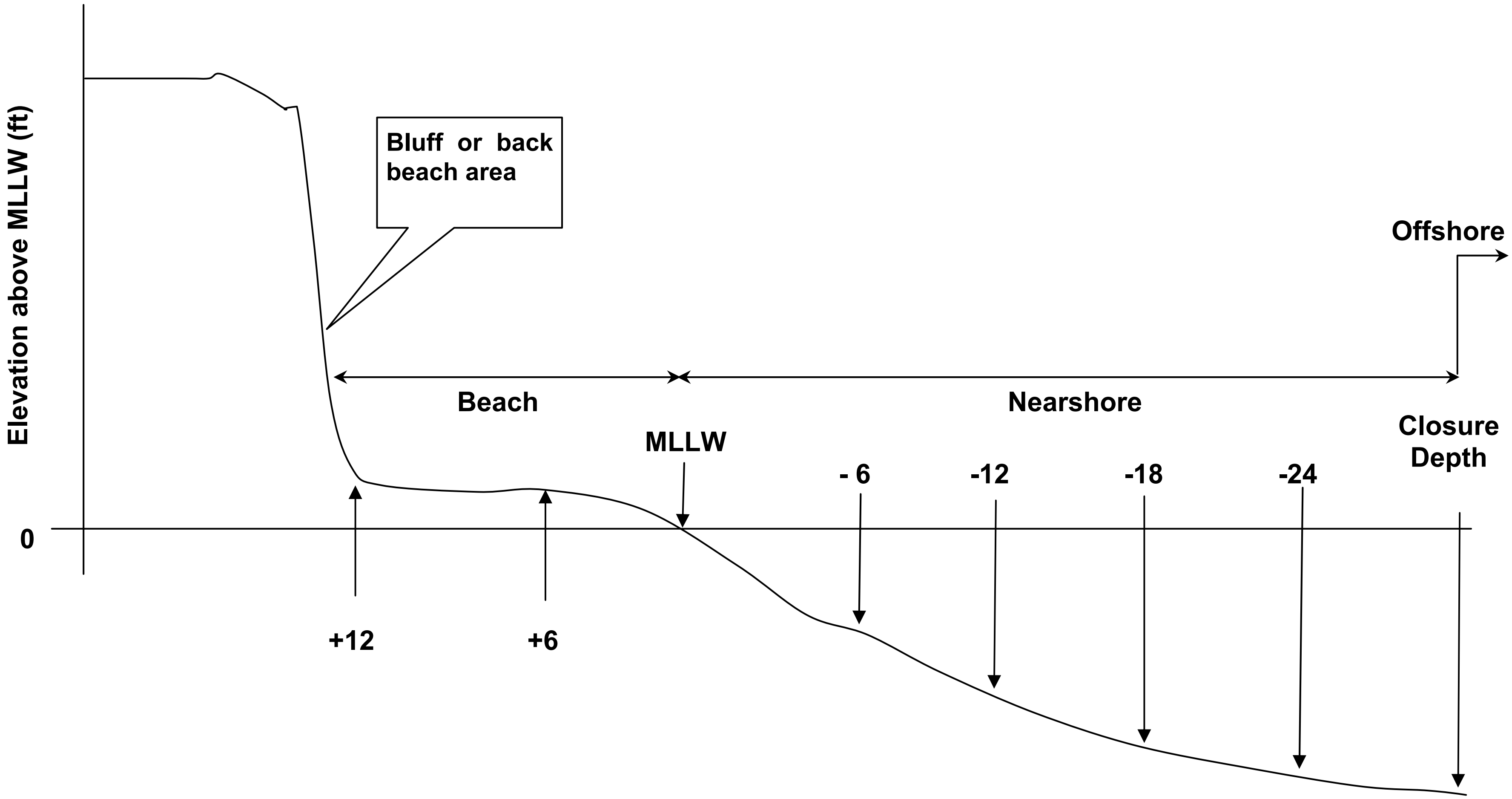



**Figure 3. Example Receiver Site Sediment Sampling Profile Showing Appropriate Sampling Locations**

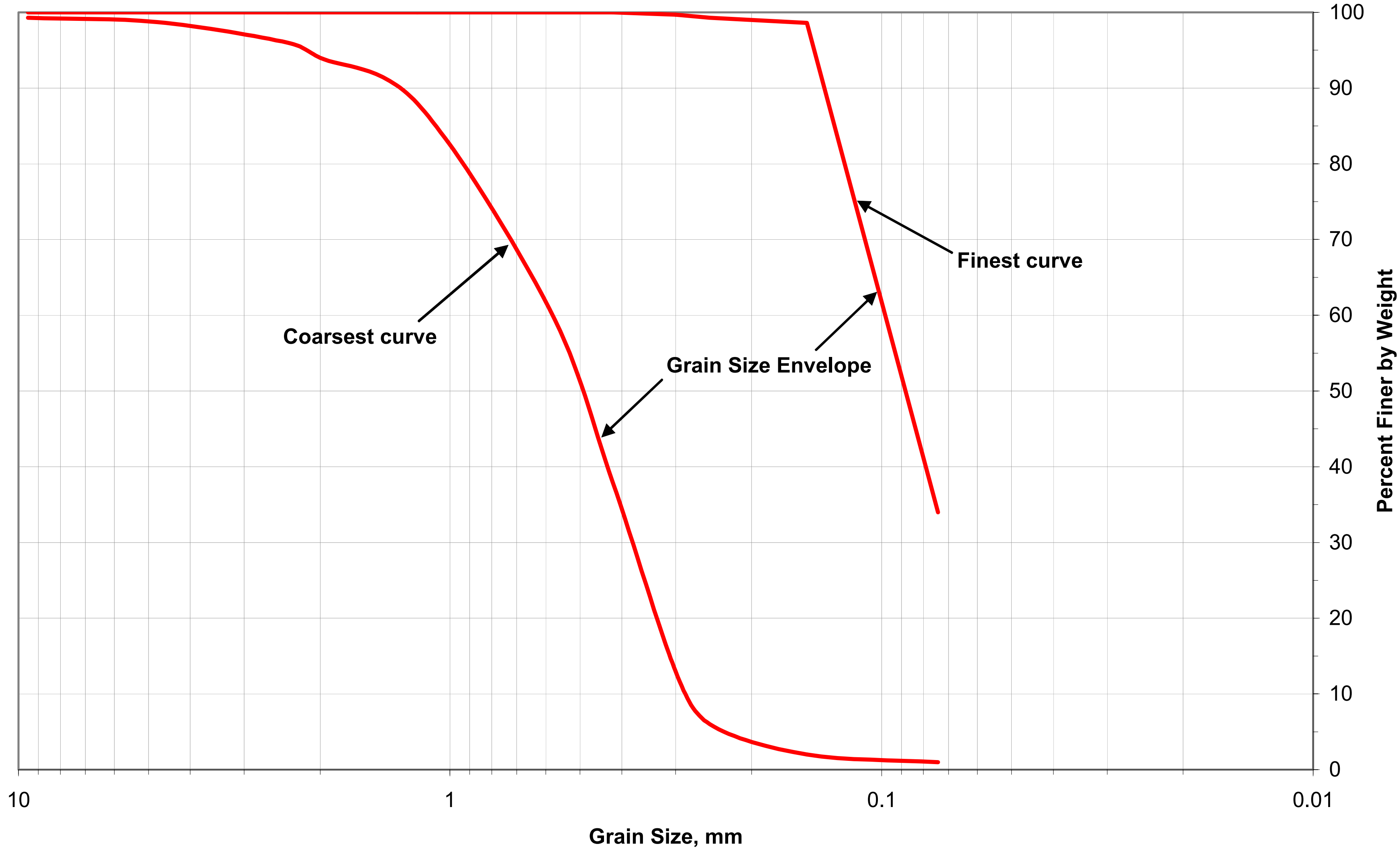



**Figure 4. Example Grain Size Envelope Based On Composite Gradation Curves Of The Existing Beach At San Clemente**

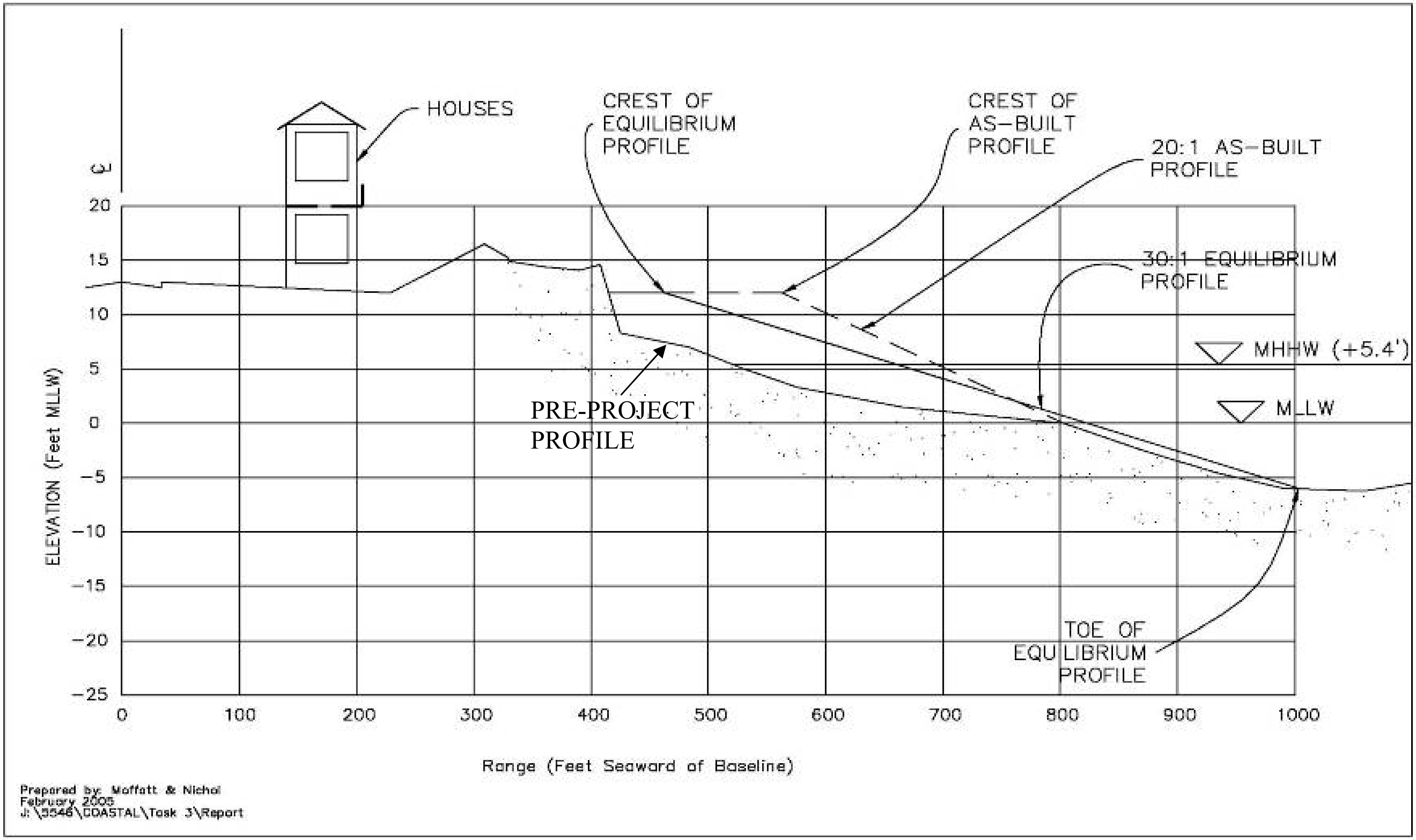



**Figure 5. Example of Profile Adjustment**

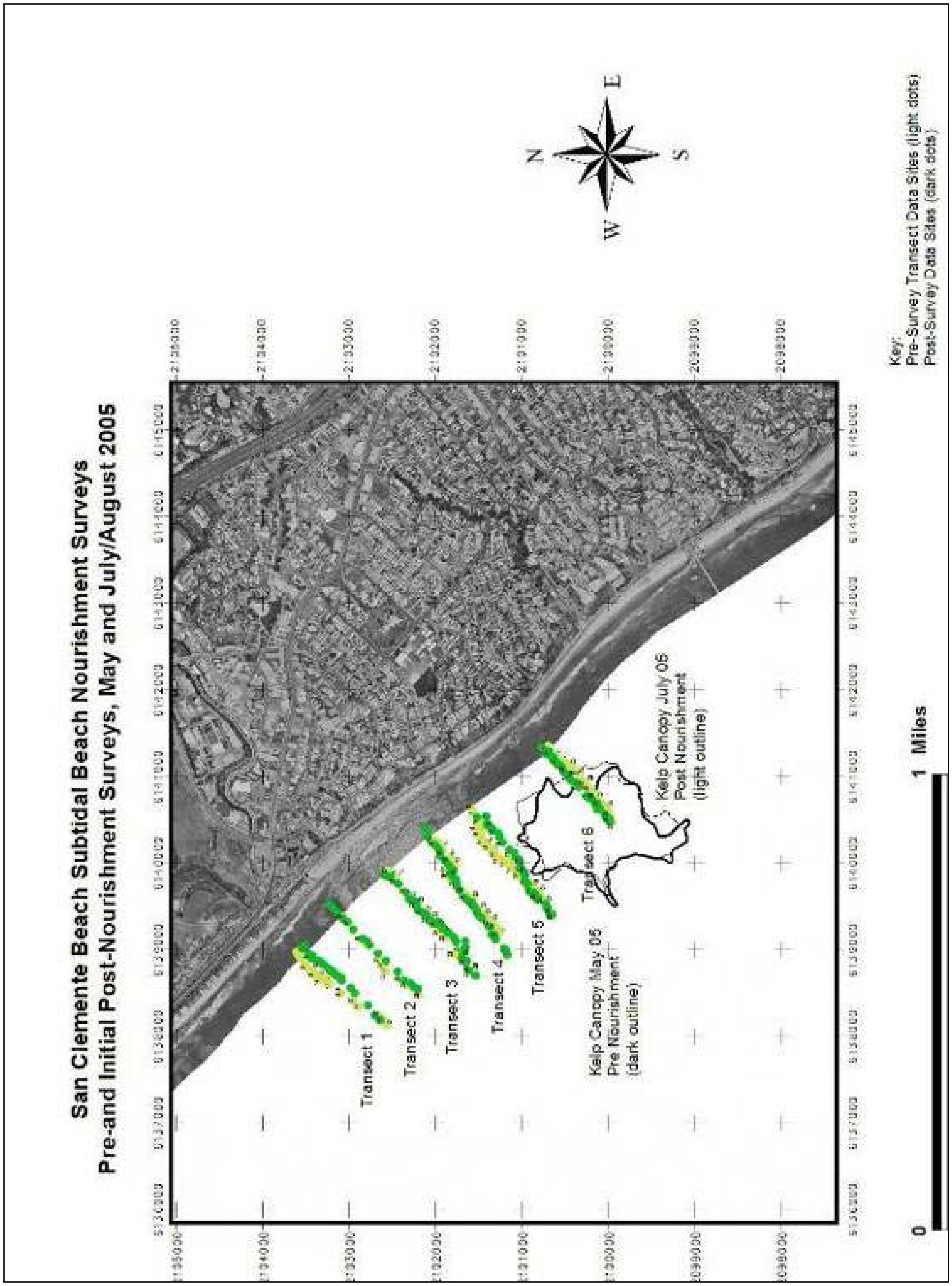



**Figure 6. Example Biological Transect Locations**

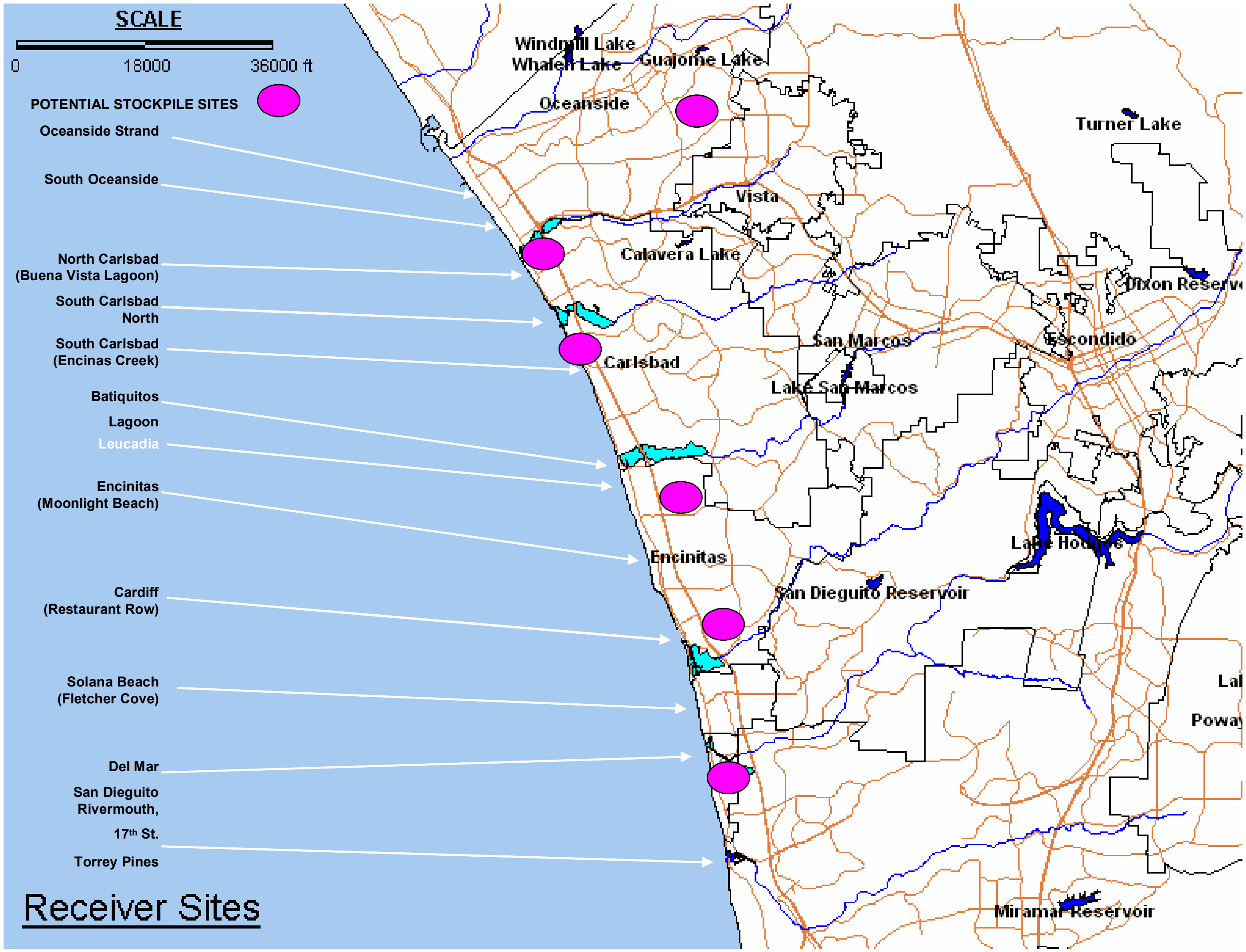



Figure 7.   Potential Receiver Sites for the Oceanside Littoral Cell


**Figure 8. Access to the South Oceanside Receiver Site (North is to the left)**

Photo. © K. Adelman 2002 California Coastal Records Project


**Figure 9. Egress from the South Oceanside Receiver Site (North is to the left)**

Photo. © K. Adelman 2002 California Coastal Records Project

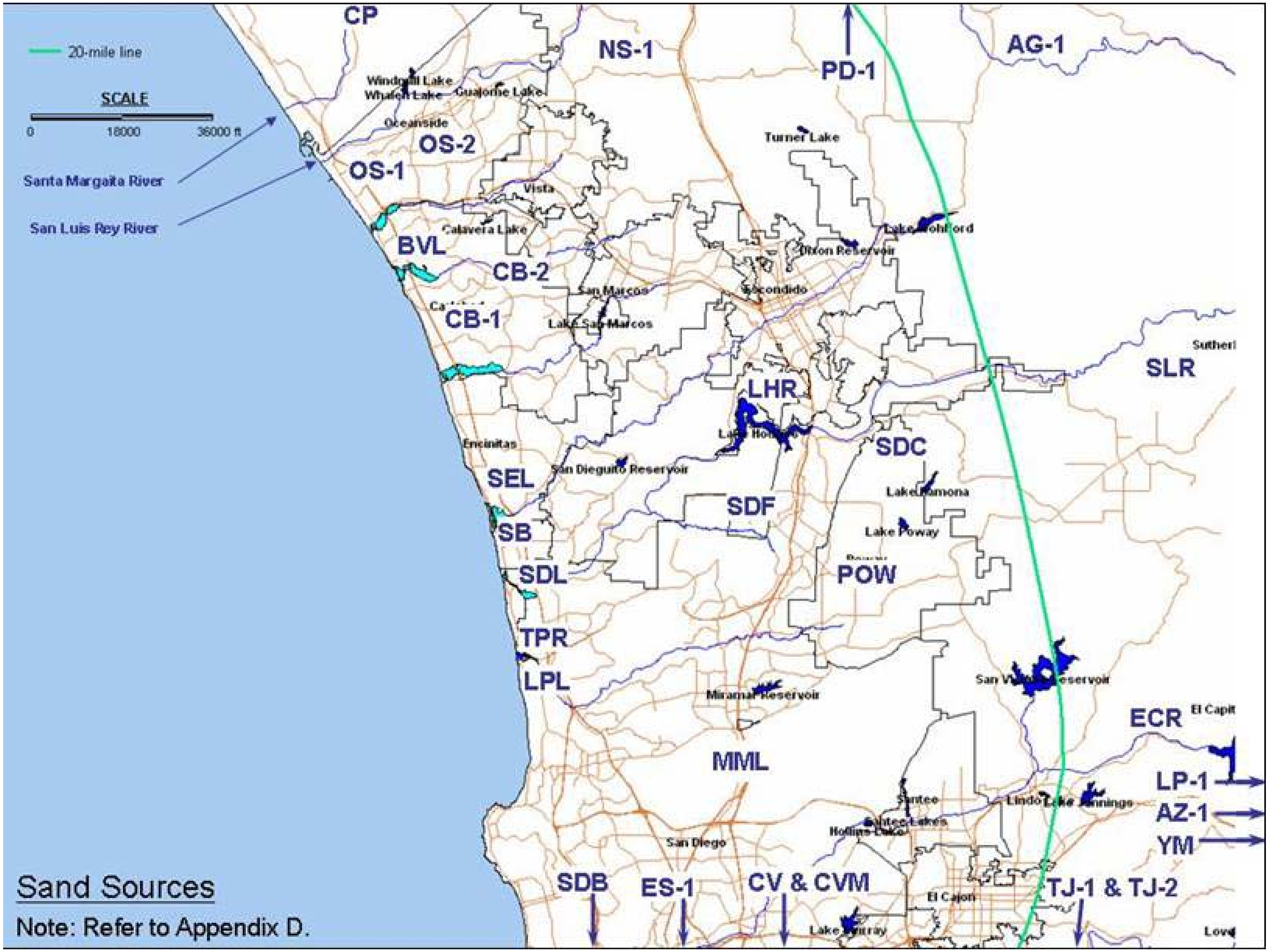



**Figure 10. Potential Sand Sources for the Oceanside Littoral Cell OBRP**

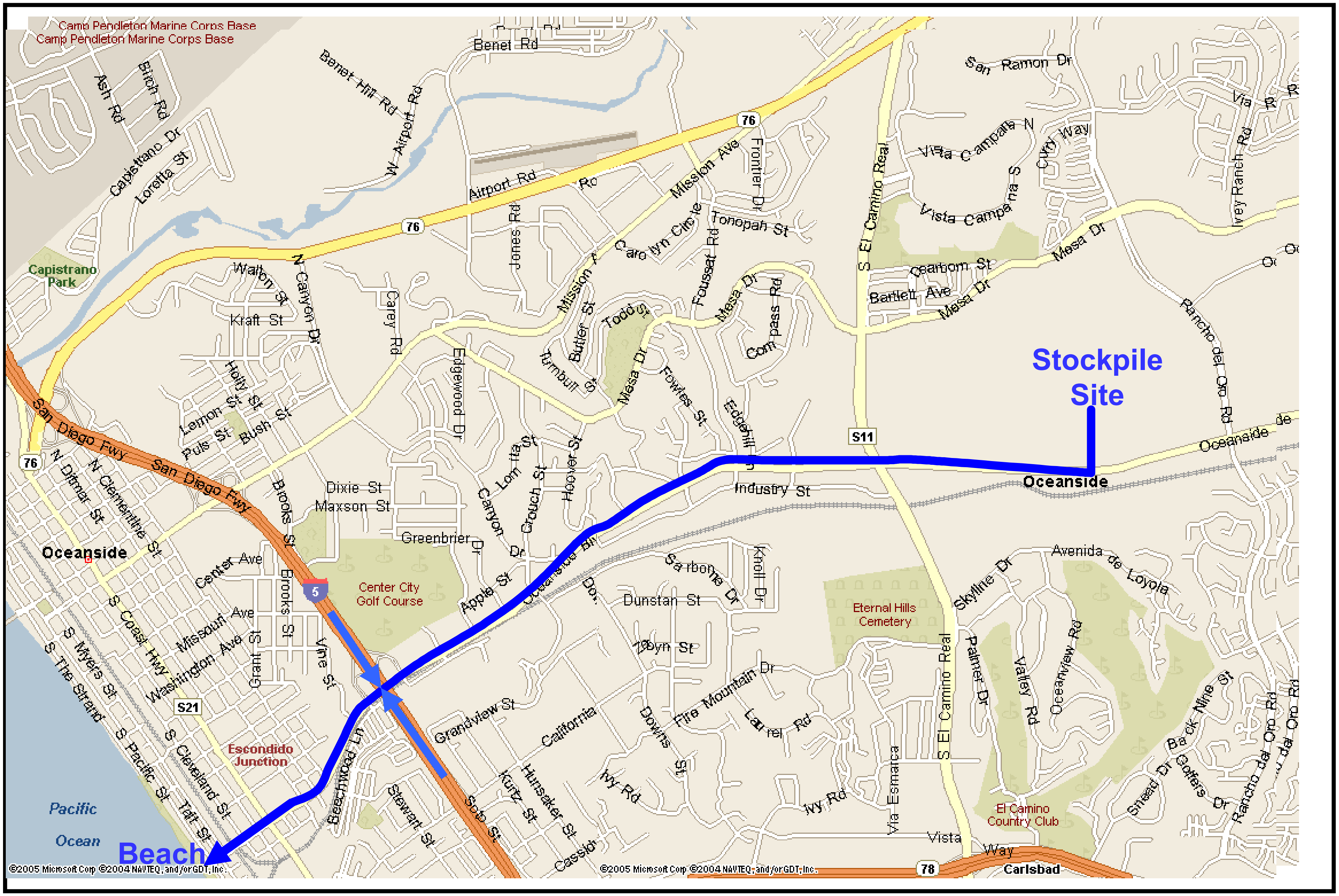



**Figure 11. South Oceanside Truck Route and Stockpile Location**

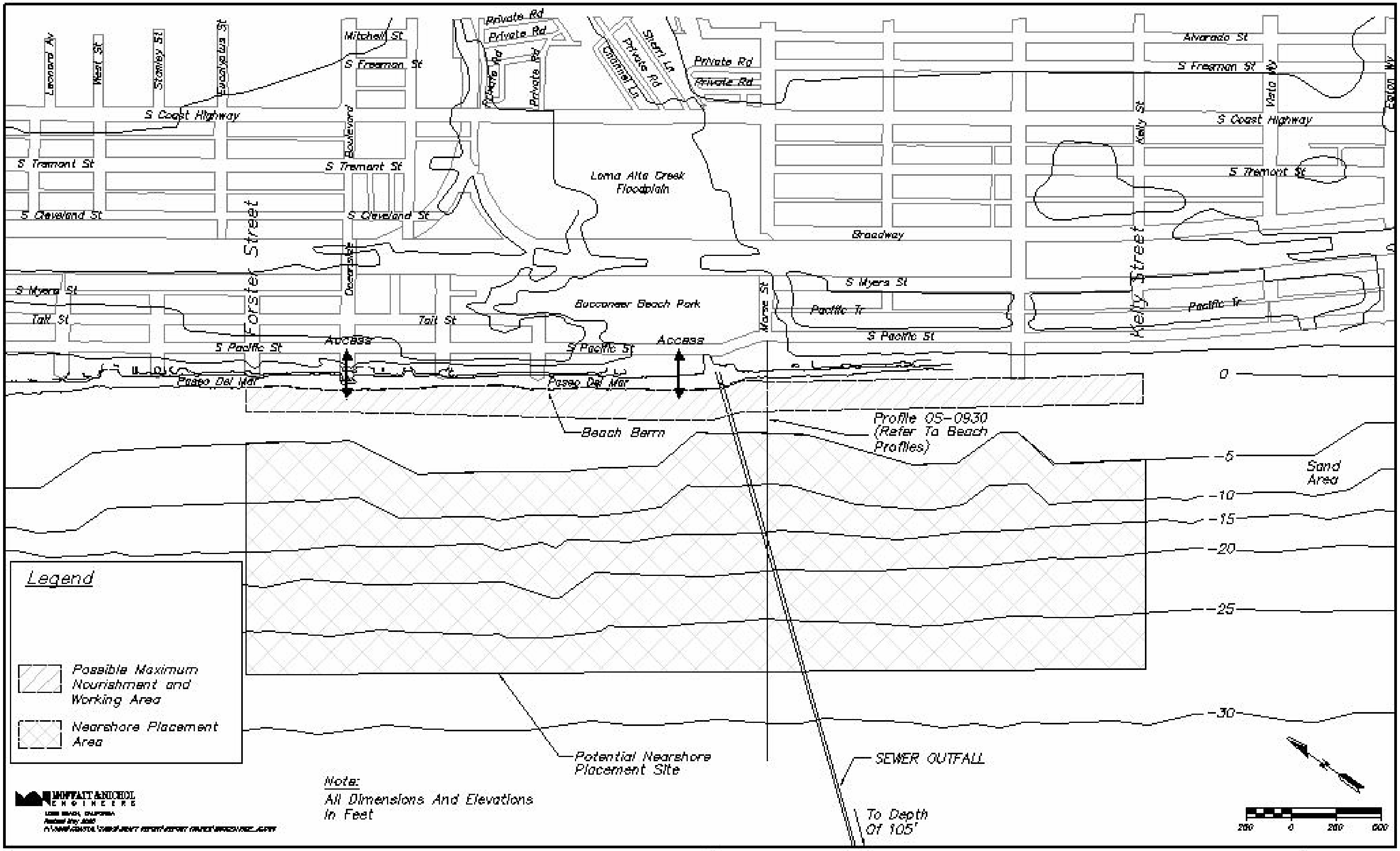



**Figure 12. Site Plan for the South Oceanside Site**

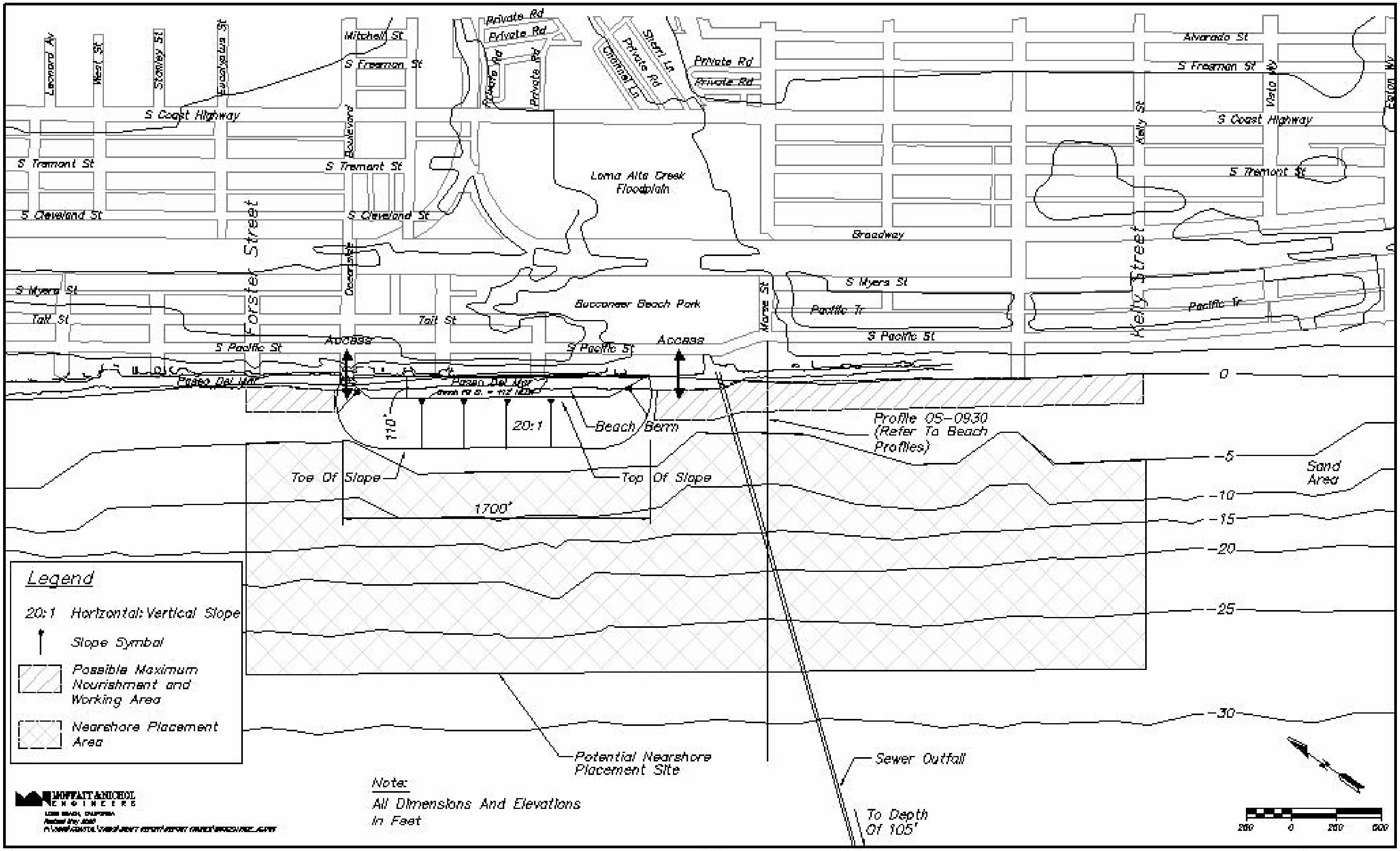



**Figure 13. Example Beach Fill Berm Plan for the South Oceanside Site**

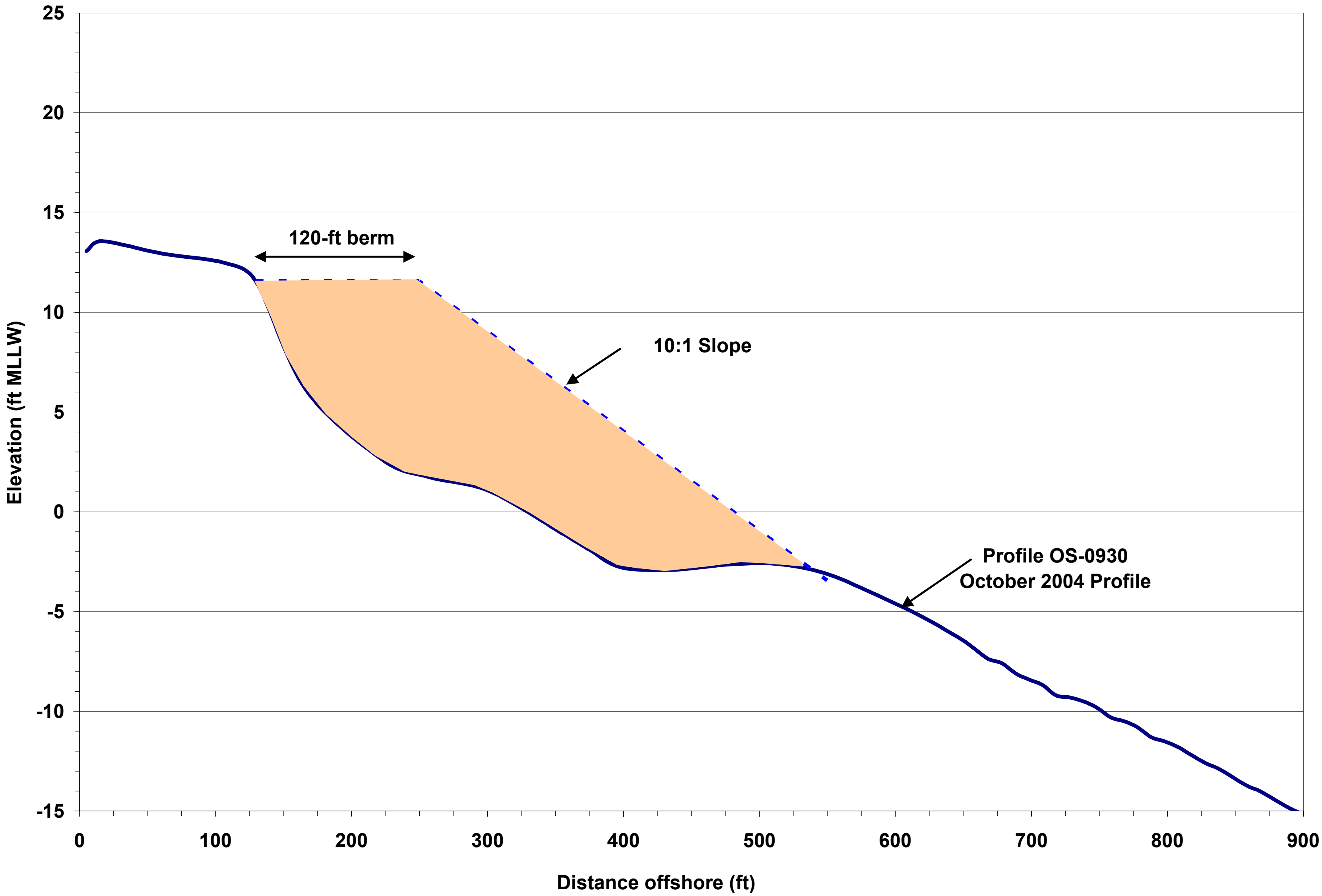



**Figure 14. Cross-Section of the Beach Berm Placement Method at the South Oceanside Site**

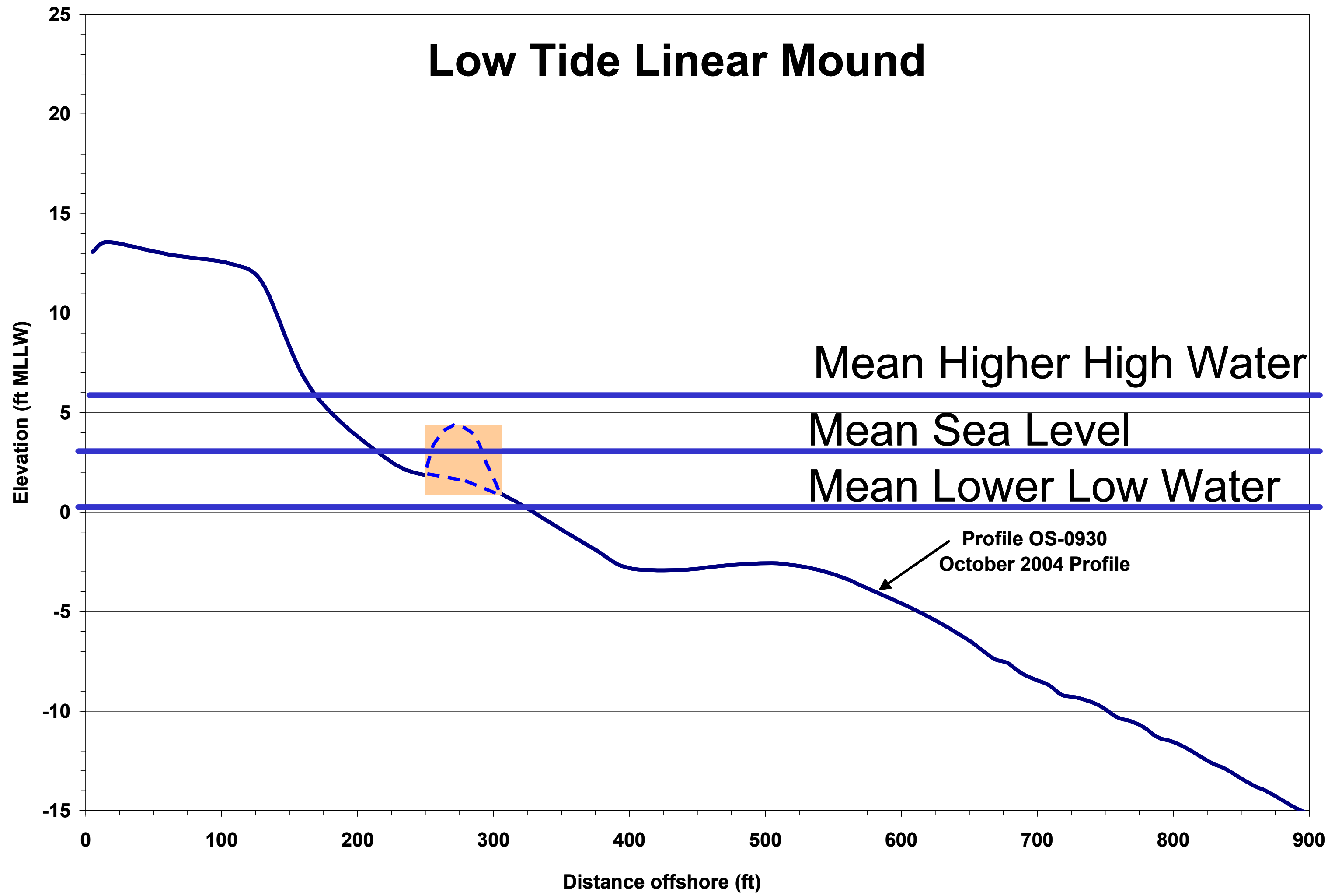



**Figure 15. Cross-Section of Placement Below the MHT line at the South Oceanside Site**

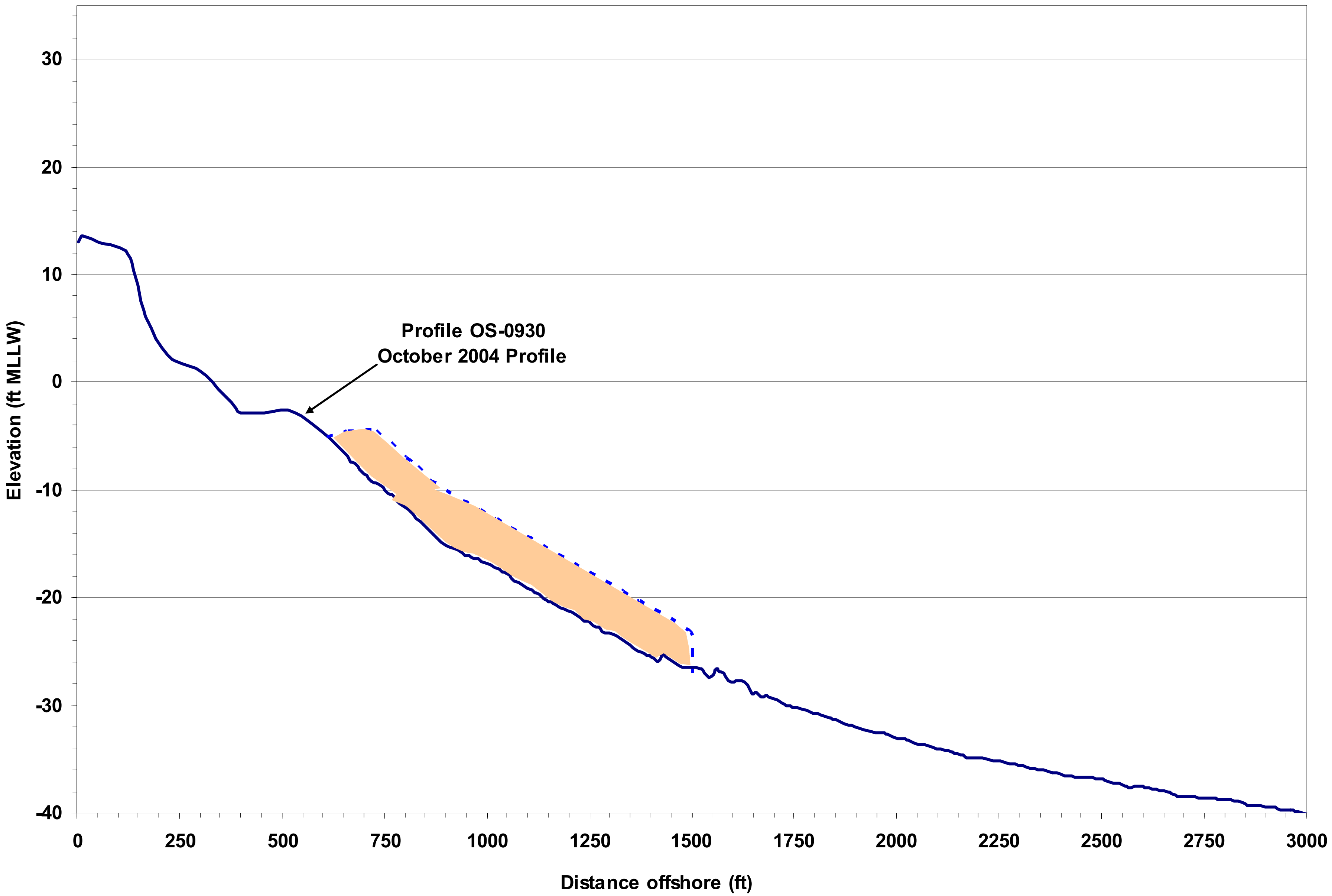



**Figure 16. Cross-Section of the Nearshore Placement at the South Oceanside Site**

# 12. TABLES

This section contains all of the tables referenced throughout the report.

# Table 1. Example of Receiver Site Evaluation Matrix

| | Need for Sand | | Proximity to Residences of Haul Route & Construction Site | | Truck/Construction Equipment Accessibility | | Minimal Impact to Intertidal/Beach Biological Resources | | Minimal Impact to Nearshore Biological Resources | | Minimal Impact to Offshore Biological Resources | | Minimal Impact to Visual Feeders (Fish, Birds) | | Minimal Impact to Recreation and Surfing | | Minimal Impact to Tidal Lagoons | | Minimal Impact to Navigational Entrances | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Criteria Weighted Value* → | *4* | | *4* | | *5* | | *5* | | *5* | | *5* | | *5* | | *3* | | *4* | | *4* | |
| **SITE** ↓ | Value* | **Score**** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** |
| **Site A** | 2 | **8** | 4 | **16** | 5 | **25** | 5 | **25** | 5 | **25** | 5 | **25** | 4 | **20** | 2 | **6** | 5 | **20** | 5 | **20** |
| **Site B** | 3 | **12** | 3 | **12** | 5 | **25** | 5 | **25** | 5 | **25** | 5 | **25** | 5 | **25** | 1 | **3** | 5 | **20** | 5 | **20** |
| **Site C** | 4 | **16** | 1 | **4** | 3 | **15** | 4 | **20** | 4 | **20** | 3 | **15** | 5 | **25** | 2 | **6** | 5 | **20** | 5 | **20** |
| **Site D** | 4 | **16** | 1 | **4** | 1 | **5** | 3 | **15** | 2 | **10** | 1 | **5** | 5 | **25** | 2 | **6** | 2 | **8** | 5 | **20** |
| **Site E** | 3 | **12** | 4 | **16** | 2 | **10** | 3 | **15** | 1 | **5** | 3 | **15** | 5 | **25** | 4 | **12** | 3 | **12** | 5 | **20** |

***Continued below***

* See Section 3.2 for the definition of value.

** Score = Value X Weighted Value

| | Minimal Impact to Creek and River Mouths | | Previous Receiver Site (Permittability) | | Feeder Beach for Downcoast Beaches | | Maximum Natural Sand Retention | | Proximity to Natural Sand Supply (creek or river) | | Proximity to Potential Stockpile Locations | | Support from Local Community | | Proximity to Potential Sources | | Local Agency Willingness to Permit Site | | **TOTAL SCORE** | **RANK** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Criteria Weighted Value* → | *3* | | *2* | | *2* | | *2* | | *2* | | *1* | | *5* | | *4* | | *5* | | | |
| **SITE** ↓ | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | | |
| **Site A** | 3 | **9** | 1 | **2** | 5 | **10** | 2 | **4** | 5 | **10** | 5 | **5** | 4 | **20** | 5 | **20** | 4 | **20** | **290** | **2** |
| **Site B** | 5 | **15** | 5 | **10** | 5 | **10** | 2 | **4** | 4 | **8** | 4 | **4** | 4 | **20** | 4 | **16** | 5 | **25** | **304** | **1** |
| **Site C** | 2 | **6** | 3 | **6** | 5 | **10** | 3 | **6** | 1 | **2** | 3 | **3** | 5 | **25** | 3 | **12** | 4 | **20** | **251** | **3** |
| **Site D** | 5 | **15** | 1 | **2** | 5 | **10** | 3 | **6** | 1 | **2** | 2 | **2** | 5 | **25** | 4 | **16** | 3 | **15** | **207** | **5** |
| **Site E** | 5 | **15** | 5 | **10** | 2 | **4** | 2 | **4** | 1 | **2** | 2 | **2** | 3 | **15** | 5 | **20** | 5 | **25** | **239** | **4** |

**Table 2. Sand Sieve Sizes and Designations for Sand Compatibility Analyses (Unified Soils Classification)**

| SOIL TYPE | SIEVE | SIZE (mm) |
|---|---|---|
| GRAVEL (Optional) | SIEVE3/8" | 9.5 |
| COARSE SAND | SIEVE4 | 4.76 |
| | SIEVE8 | 2.38 |
| | SIEVE10 | 2 |
| MEDIUM SAND | SIEVE16 | 1.19 |
| | SIEVE30 | 0.59 |
| | SIEVE40 | 0.42 |
| FINE SAND | SIEVE50 | 0.3 |
| | SIEVE60 | 0.25 |
| | SIEVE100 | 0.149 |
| | SIEVE200 | 0.074 |
| SILT | -- | <0.074 |

**Table 3. Chemical And Physical Parameters, Analytical Methods, and Target Detection Limits**

| Parameter | Method | Procedure | Sediment Target Detection Limit (dry weight) | Tissue Target Detection Limit (wet weight) |
|---|---|---|---|---|
| **Physical / Conventional Tests** | | | | |
| Grain Size | Plumb (1981) | Sieve/Pipette | 1.0% | n/a |
| Percent Solids | SM 2540G | Gravimetric | 0.1% | n/a |
| Percent Volatile Solids | Plumb (1981) | Gravimetric | 0.1% | n/a |
| Specific Gravity | Plumb (1981) | Gravimetric | 0.001 g/cc | n/a |
| TOC | Lloyd Kahn or equivalent | Combustion IR | 0.1% | n/a |
| Total Sulfides | Plumb (1981) | Titrametric | 0.1 mg/kg | n/a |
| Dissolved Sulfides | SM 45000 S2D | Titrametric | 0.1 mg/kg | n/a |
| Oil and Grease | USEPA 413.2 | Gravimetric | 100 mg/kg | n/a |
| TRPH | USEPA 418.1 | IR Spectroscopy | 20.0 mg/kg | n/a |
| **Metals** | | | | |
| Arsenic (As) | USEPA 6020 | ICP-MS | 0.1 mg/kg | 0.02 mg/kg |
| Cadmium (Cd) | USEPA 6020 | ICP-MS | 0.1 mg/kg | 0.002 mg/kg |
| Chromium (Cr) | USEPA 6020 | ICP-MS | 0.1 mg/kg | 0.01 mg/kg |
| Copper (Cu) | USEPA 6020 | ICP-MS | 0.1 mg/kg | 0.005 mg/kg |
| Lead (Pb) | USEPA 6020 | ICP-MS | 0.1 mg/kg | 0.002 mg/kg |
| Mercury (Hg) | USEPA 7471 | GFAAS | 0.02 mg/kg | 0.005 mg/kg |
| Nickel (Ni) | USEPA 6020 | ICP-MS | 0.1 mg/kg | 0.02 mg/kg |
| Zinc (Zn) | USEPA 6020 | ICP-MS | 1.0 mg/kg | 0.2 mg/kg |
| **Pesticides** | | | | |
| 4-4′ DDD | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| 4-4′-DDE | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| 4-4′-DDT | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| Aldrin | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| α-BHC | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| β-BHC | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| Chlordane | USEPA 8081 | GC/ECD | 10 µg/kg | 10 µg/kg |
| δ-BHC | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| Dieldrin | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| Endosulfan I | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| Endosulfan II | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| Endosulfan Sulfate | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| Endrin | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| Endrin Aldehyde | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| Heptachlor | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| Endrin Ketone | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| Heptachlor Epoxide | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| γ-BHC | USEPA 8081 | GC/ECD | 2 µg/kg | 2 µg/kg |
| Methoxychlor | USEPA 8081 | GC/ECD | 4 µg/kg | 20 µg/kg |

| Parameter | Method | Procedure | Sediment Target Detection Limit (dry weight) | Tissue Target Detection Limit (wet weight) |
|---|---|---|---|---|
| Toxaphene | USEPA 8081 | GC/ECD | 20 µg/kg | 20 µg/kg |
| **PCBs** | | | | |
| Aroclor 1016 | USEPA 8082 | GC/ECD | 10 µg/kg | 10 µg/kg |
| Aroclor 1221 | USEPA 8082 | GC/ECD | 10 µg/kg | 10 µg/kg |
| Aroclor 1232 | USEPA 8082 | GC/ECD | 10 µg/kg | 10 µg/kg |
| Aroclor 1242 | USEPA 8082 | GC/ECD | 10 µg/kg | 10 µg/kg |
| Aroclor 1248 | USEPA 8082 | GC/ECD | 10 µg/kg | 10 µg/kg |
| Aroclor 1254 | USEPA 8082 | GC/ECD | 10 µg/kg | 10 µg/kg |
| Aroclor 1260 | USEPA 8082 | GC/ECD | 10 µg/kg | 10 µg/kg |
| **Dioxin/furan Screening** | | | | |
| Dioxin/furan | USEPA 4425 | Detection of total TEQ | 20 ng/kg TEQ | 20 ng/kg TEQ |
| **Dioxin/furan Confirmation** | | | | |
| 2,3,7,8-TCDD | USEPA 8290 | GC/MS | 1.0 ng/kg | 1.0 ng/kg |
| 1,2,3,7,8-PeCDD | USEPA 8290 | GC/MS | 2.5 ng/kg | 2.5 ng/kg |
| 1,2,3,6,7,8-HxCDD | USEPA 8290 | GC/MS | 2.5 ng/kg | 2.5 ng/kg |
| 1,2,3,7,8,9-HxCDD | USEPA 8290 | GC/MS | 2.5 ng/kg | 2.5 ng/kg |
| 1,2,3,4,6,7,8,9-HpCDD | USEPA 8290 | GC/MS | 2.5 ng/kg | 2.5 ng/kg |
| 1,2,3,4,6,7,8,9-OCDD | USEPA 8290 | GC/MS | 5.0 ng/kg | 5.0 ng/kg |
| 2,3,7,8-TCDF | USEPA 8290 | GC/MS | 1.0 ng/kg | 1.0 ng/kg |
| 1,2,3,7,8-PeCDF | USEPA 8290 | GC/MS | 2.5 ng/kg | 2.5 ng/kg |
| 2,3,4,7,8-PeCDF | USEPA 8290 | GC/MS | 2.5 ng/kg | 2.5 ng/kg |
| 1,2,3,6,7,8-HxCDF | USEPA 8290 | GC/MS | 2.5 ng/kg | 2.5 ng/kg |
| 1,2,3,7,8,9-HxCDF | USEPA 8290 | GC/MS | 2.5 ng/kg | 2.5 ng/kg |
| 1,2,3,4,7,8-HxCDF | USEPA 8290 | GC/MS | 2.5 ng/kg | 2.5 ng/kg |
| 2,3,4,6,7,8- HxCDF | USEPA 8290 | GC/MS | 2.5 ng/kg | 2.5 ng/kg |
| 1,2,3,4,7,8-HxCDF | USEPA 8290 | GC/MS | 2.5 ng/kg | 2.5 ng/kg |
| 1,2,3,4,6,7,8-HpCDF | USEPA 8290 | GC/MS | 2.5 ng/kg | 2.5 ng/kg |
| 1,2,3,4,7,8,9-HpCDF | USEPA 8290 | GC/MS | 2.5 ng/kg | 2.5 ng/kg |
| 1,2,3,4,6,7,8,9-OCDF | USEPA 8290 | GC/MS | 5.0 ng/kg | 5.0 ng/kg |
| **Semivolatile Organics** | | | | |
| 2,4-dimethylphenol | USEPA 8270M | GC/MS SIM | 20 µg/kg | 80 µg/kg |
| 2,4,6-trichlorophenol | USEPA 8270M | GC/MS SIM | 20 µg/kg | 30 µg/kg |
| 2-chlorophenol | USEPA 8270M | GC/MS SIM | 20 µg/kg | 25 µg/kg |
| 2,4-dichlorophenol | USEPA 8270M | GC/MS SIM | 20 µg/kg | 20 µg/kg |
| 2-nitrophenol | USEPA 8270M | GC/MS SIM | 20 µg/kg | 20 µg/kg |
| 4-nitrophenol | USEPA 8270M | GC/MS SIM | 20 µg/kg | 40 µg/kg |
| 4-methylphenol | USEPA 8270M | GC/MS SIM | 20 µg/kg | 40 µg/kg |
| 4,6-dinitro-2-methylphenol | USEPA 8270M | GC/MS SIM | 20 µg/kg | 100 µg/kg |
| 2,4-dinitrophenol | USEPA 8270M | GC/MS SIM | 20 µg/kg | 100 µg/kg |
| Pentachlorophenol | USEPA 8270M | GC/MS SIM | 20 µg/kg | 40 µg/kg |
| Naphthalene | USEPA 8270M | GC/MS SIM | 10 µg/kg | 20 µg/kg |
| Acenaphthylene | USEPA 8270M | GC/MS SIM | 10 µg/kg | 20 µg/kg |
| Acenaphthene | USEPA 8270M | GC/MS SIM | 10 µg/kg | 20 µg/kg |

| Parameter | Method | Procedure | Sediment Target Detection Limit (dry weight) | Tissue Target Detection Limit (wet weight) |
|---|---|---|---|---|
| Fluorene | USEPA 8270M | GC/MS SIM | 10 µg/kg | 20 µg/kg |
| Phenanthrene | USEPA 8270M | GC/MS SIM | 10 µg/kg | 20 µg/kg |
| Anthracene | USEPA 8270M | GC/MS SIM | 10 µg/kg | 20 µg/kg |
| Fluoranthene | USEPA 8270M | GC/MS SIM | 10 µg/kg | 20 µg/kg |
| Pyrene | USEPA 8270M | GC/MS SIM | 10 µg/kg | 20 µg/kg |
| Chrysene | USEPA 8270M | GC/MS SIM | 10 µg/kg | 20 µg/kg |
| Benzo(a)anthracene | USEPA 8270M | GC/MS SIM | 10 µg/kg | 20 µg/kg |
| Benzo(b)fluoranthene | USEPA 8270M | GC/MS SIM | 10 µg/kg | 20 µg/kg |
| Benzo(a)pyrene | USEPA 8270M | GC/MS SIM | 10 µg/kg | 20 µg/kg |
| Indeno(1,2,3-cd)pyrene | USEPA 8270M | GC/MS SIM | 10 µg/kg | 20 µg/kg |
| Dibenzo(a,h)anthracene | USEPA 8270M | GC/MS SIM | 10 µg/kg | 20 µg/kg |
| Benzo(g,h,i)perylene | USEPA 8270M | GC/MS SIM | 10 µg/kg | 20 µg/kg |
| **Organotins** | | | | |
| Monobutyltin | Rice et al. (1987) | GC/FPD | 1 µg/kg | 2 µg/kg |
| Dibutyltin | Rice et al. (1987) | GC/FPD | 1 µg/kg | 2 µg/kg |
| Tributyltin | Rice et al. (1987) | GC/FPD | 1 µg/kg | 1 µg/kg |

| | |
|---|---|
| % | percent |
| ng/kg | nanogram per kilogram |
| µg/kg | microgram per kilogram |
| g/cc | gram per cubic centimeter |
| n/a | not applicable |
| GC/ECD | gas chromatography with electron capture detection |
| GC/FPD | gas chromatography/flame photometric detector |
| GC/MS | gas chromatography/mass spectrometry |
| GFAAS | graphite furnace atomic absorption spectrophotometry |
| SIM | selected ion monitoring |
| TEQ | toxicity equivalent |

## Table 4. Potential Sand Sources for the Oceanside Littoral Cell

| SOURCE DESIGNATION | LOCATION | | QUANTITY (Cubic Yards) |
|---|---|---|---|
| | Area | Project/Source | |
| **MEXICO** | | | |
| TC | Tecate | Tecate River | 3 Million |
| TJ | Tijuana | Alluvial borrow east of TJ | Potential large quantity |
| ES | Ensenada | Ensenada-Area Rivers | Potential large quantity |
| **ARIZONA** | | | |
| YM | Yuma | Yuma | 10 Million |
| LP | La Paz County | La Paz County Landfill | Potential large quantity |
| **GREATER CALIFORNIA** | | | |
| PD | LA County | Palmdale Quarry | 25 million |
| AG | Riverside Co. | Aguanga | 23 Million |
| **SAN DIEGO COUNTY** | | | |
| **North County Coastal** | | | |
| CP | Oceanside | Camp Pendleton | Undefined |
| SB | Solana Beach | Train Station | 100,000 |
| OS1 | Oceanside | Hotel Construction | Undefined (likely 50,000) |
| OS2 | Oceanside | Hotel Construction 5 miles inland | |
| CB1 | Carlsbad | Poinsettia Train St/Multi-Use | 30,000 - 40,000 |
| BVL | Carlsbad | Buena Vista Lagoon Restoration | 300,000 - 600,000 |
| CB2 | Carlsbad | City Detention Basins | <12,000 |
| SEL | Cardiff | San Elijo Lagoon Restoration | 800,000 |
| SDL | Del Mar | San Dieguito Lagoon Restoration | 78,000 |
| TPR | N. San Diego | Torrey Pines Retention Basin | 50,000 |
| LPL | N. San Diego | Los Penasquitos Lagn Restoration | 10,000 - 20,000 |
| **North County Inland** | | | |
| POW | Poway | Flood Control Channels | 20,000 cy/yr |
| NS-1 | Bonsal | San Luis Rey River | 250,000 - 500,000 |
| LHR | Lake Hodges | Dam Maintenance | 2,132,000 |
| **Central County Coastal** | | | |
| SDB | North Island | Navy Construction Projects | 30,000 |
| MML | Miramar | Miramar Landfill | Less than 100,000 |
| SDF | County-wide | Flood Control Channels | 500,000 |
| **Central County Inland** | | | |
| SDC | Ramona/Sp Vly | Flood Control Channels | 100,000 |
| ECR | Alpine (near) | El Capitan Dam Maintenance | 2,112,000 |
| SVR | Blossom Vly | San Vicente Dam Maintenance | 456,000 |
| SLR | Ramona/Julia n | Sutherland Dam Maintenance | 92,000 |
| **South County** | | | |
| TJ | Tijuana River | Debris/Sedimentation Basins | 100,000 |
| CV | Chula Vista | Open Space erosion | Undefined |
| CVM | Chula Vista | Chula Vista Marina | 300,000 |

**Notes**

Coastal area is defined as WEST of I-15 in San Diego County; inland area is defined as EAST of I-15 in San Diego County

North is defined as areas NORTH of City of San Diego limits; south County areas are defined as south of City of San Diego limits

## Table 5. Proposed Project Limits

| Placement Site | Maximum Annual Quantity (CY) | Maximum Project Length (ft) | Placement Scenarios (1) | Season | Maximum Percent Fines Allowed | Trucking (Volumes and Timing) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | CY Per Season | CY Per Week (2) | No. of Weeks | No. Days per Week (3) |
| South Oceanside Beach | 150,000 | 1,700 | a) Berm<br>b) MHT<br>c) Nearshore | Fall/Winter<br>(Sept 21 – Mar 21) | 45% | 150,000 | 15,000 | 10 | 6 |
| | | | | Spring/Summer<br>(Mar 21 – Sept 21) | 45% | 50,000 | 8,333 | 6 | 5 |

Notes:

(1) (a) Berm = beach berm on upper beach; (b) MHT = placement below the high tide line; (c) Nearshore = nearshore placement

(2) Assumes a 10-week winter placement period and a 6-week placement period during summer

(3) Assumes a 6-day workweek (Monday through Saturday only) during the winter and a 5-day workweek (Monday through Friday) during the summer. No work will occur on holidays.

(4) No work can occur on the holiday weekends of Memorial Day and Labor Day, and weekends adjacent to Independence Day, when Independence Day falls on a Friday or Monday.

### Table 6. Proposed Trucking for Maximum Project Limits

| Placement Site | Season | Maximum volume of sand placed weekly (cy) (1) | Maximum weekly number of truck trips Projected (2) | Maximum daily number of truck trips Projected (3) | Maximum hourly number of truck trips Projected (4) | Time between trips, on Average (minutes) |
|---|---|---|---|---|---|---|
| South Oceanside Beach | Fall/Winter (Sept 21 – Mar 21) | 15,000 | 1,071 | 179 | 18 | 3 |
| | Spring/Summer (Mar 21 – Sept 21) | 8,333 | 595 | 119 | 12 | 5 |

Notes:

(1) Assumes a 10-week winter placement period and a 6-week placement period during summer

(2) Assumes a twin trailer belly-dump truck holding 14 cy total.

(3) Assumes a 6-day workweek during the winter and a 5-day workweek during the summer.

(4) Assumes a 10-hour workday.

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# APPENDIX A

# SOURCE MATERIAL CHECKLIST

# SOURCE SAND MINIMUM CRITERIA ACCEPTABILITY CHECKLIST

## REVIEWING AGENCY NAME:

| | |
|---|---|
| Name: | |
| Job Title: | |
| Date: | |

## SOURCE SITE AND MATERIAL

| | | | | |
|---|---|---|---|---|
| 1) Location of Potential Source Material: | | | | |
| 2) Indicate Quantity of Material (Total at site/Net available for possible beach placement) | | | Do Not Know | N/A |
| 3) Has any **Grain size** Testing of Material been done? If *yes*, describe results below. **If *no*, see GRAINSIZE ASSESSMENT.** | Yes | No | Do Not Know | N/A |
| a) Locations/depths of borings or samples: | | | | |
| b) Grain size (median, D50, D85, D15, %fines): | | | | |
| c) Grain size envelope prepared and attached? | | | | |
| d) Existence and provision of soils data report? | | | | |
| 4) Has any **Chemistry** Testing of Material been done? If *yes*, describe results below. **If *no*, see CHEMISTRY ASSESSMENT.** | Yes | No | Do Not Know | N/A |
| a) Locations/depths of borings or samples: | | | | |
| b) Chemical constituents present: | | | | |
| c) Existence and provision of chemistry testing report? | | | | |
| d) List date tested in space to the right. | | | | |
| 5) Any Previous or Available **Geotechnical** Data | Yes | No | Do Not Know | N/A |
| If yes, provide details and source | | | | |

| | | | | |
|---|---|---|---|---|
| 7) Physical Inspection of Site: | Yes | No | Do Not Know | N/A |
| Date: | | | | |
| Observations: | | | | |
| 8) Physical Inspection of all Available Sediment Samples? | Yes | No | Do Not Know | N/A |
| Date: | | | | |
| Observations: | | | | |
| 9) Does Material Contain Debris? | Yes | No | Do Not Know | N/A |
| 10) Does Material Contain Large Rocks or Boulders? | Yes | No | Do Not Know | N/A |
| 11) Timing of Source Availability: | Yes | No | Do Not Know | N/A |
| 12) Where Will Other Excess Material at Site be Distributed? | | | Do Not Know | N/A |
| 13) Does the Site Possess Sensitive Habitat (Upland or Wetland?) | Yes | No | Do Not Know | N/A |
| 14) List all Available Technical Information About the Source Location and Material: | | | | |

| | Agree | Dis-Agree | Do Not Know | N/A | Basis for Decision |
|---|---|---|---|---|---|
| **GENERAL MATERIAL CHARACTERIZATION** | | | | | |
| 1) material is primarily sand, gravel and/or inert material, | | | | | |
| 2) sediments are from locations far removed from sources of contaminants (based on agency judgment), | | | | | |
| 3) sediments were deposited in pre-industrial times, | | | | | |
| 4) sediments were NOT exposed to modern sources of pollution. | | | | | |
| 5) sediments are NOT from agricultural areas. | | | | | |

| | Yes | No | Do Not Know | N/A | Basis for Decision |
|---|---|---|---|---|---|
| **POSSIBLE POLLUTANTS MAY BE PRESENT IF:** | | | | | |
| **The material was known to be exposed to:** | | | | | |
| 1) urban and agricultural runoff, | | | | | |
| 2) sewer overflows/bypassing, | | | | | |
| 3) industrial and municipal wastewater discharges, | | | | | |
| 4) previous dredged or fill discharges, | | | | | |
| 5) landfill leachate/groundwater discharges, | | | | | |
| 6) spills of oil or chemicals, | | | | | |
| 7) releases from Superfund and other hazardous waste site | | | | | |
| 8) illegal discharges, | | | | | |
| 9) air deposition, | | | | | |
| 10) biological production (detritus), | | | | | |
| 11) mineral deposits. | | | | | |

| DESCRIBE SITE FACTORS TO ASSESS POTENTIAL CONTAMINANTS |
|---|
| 1) bathymetry: |
| 2) water current patterns: |
| 3) tributary flows: |
| 4) watershed hydrology and land uses: |
| 5) sediment and soil types: |
| 6) sediment deposition rates: |

| GRAIN SIZE ASSESSMENT | | | | | Basis for Decision |
|---|---|---|---|---|---|
| Based on the checklist and assessment of factors listed above, does the local agency determine that the material requires further **GRAIN SIZE** testing? | Yes | No | Do Not Know | N/A | |

## CHEMISTRY ASSESSMENT

| PROJECT LIMITS AND TESTING CRITERIA | | Chemistry Testing Requirements |
|---|---|---|
| LARGE PROJECTS | | |
| OPTIMUM SAND | | |
| > 50,000 cy with a max of 15% fines | | ***LIMITED CHEMISTRY TESTING REQUIRED (may only need Tier I analysis if adequate data exist)*** |
| LESS THAN OPTIMUM SAND | | |
| > 50,000 cy with a max of 45% fines | | ***CHEMISTRY TESTING REQUIRED*** |
| | | |
| SMALL PROJECTS | | |
| OPTIMUM SAND | | |
| < 50,000 cy with a max of 15% fines | | ***LIMITED CHEMISTRY TESTING REQUIRED (may only need Tier I analysis if adequate data exist)*** |
| LESS THAN OPTIMUM SAND | | |
| < 50,000 cy with a max of 35% fines | | ***CHEMISTRY TESTING REQUIRED*** |
| < 10,000 cy with a max of 45% fines | | ***MOST EXTENSIVE CHEMISTRY TESTING REQUIRED*** |

| | | | | | |
|---|---|---|---|---|---|
| Based on the checklist and assessment of factors listed above, does the City determine that the material requires further **CHEMICAL** testing? | **Yes** | **No** | **Do Not Know** | **N/A** | |

*A Sampling & Analysis Plan (SAP) is REQUIRED for approval from the Corps of Engineers to determine compatibility. The SAP can include previous data, if available. BEFORE any further testing is conducted, a SAP shall be prepared and submitted to the Corps for approval.*

*The total volume and fines content of the source sediment will directly impact the placement technique and level of monitoring proposed at the receiver site. Each receiver site will have independent criteria for project size and fines content. This information should be carefully considered when selecting the placement site.*

| | Yes | No | Do Not Know | N/A | Basis for Decision |
|---|---|---|---|---|---|
| **GRAIN SIZE AND QUANTITY** | | | | | |
| Does the material fall within the Level I review requirement, as specified in the Technical Report for Beach Replenishment Program Criteria and Concept Design? | | | | | |
| **AESTHETICS: COLOR** | | | | | |
| Is the material similar in color to existing beach sand after exposure to the marine environment? | | | | | |
| **AESTHETICS: POTENTIAL TO FORM A HARDPAN IF SUBAERIAL** | | | | | |
| Based on visual inspection and material gradation, would this material form a hardpan if placed above the mean high tide line? | | | | | |
| **ANGULARITY** | | | | | |
| Does the material mainly consist of natural sand rather than manufactured sand, and appear rounded in shape? | | | | | |
| **CONCLUSION** | | | | | |
| **BASED ON RESULTS OF THIS CHECKLIST ASSESSMENT, DOES THIS MATERIAL QUALIFY TO BE CONSIDERED AS OPPORTUNISTIC BEACH FILL? IF YES, CONTACT THE PLANNING AND ENGINEERING DIRECTORS AND PROVIDE ALL SUPPORTING TECHNICAL INFORMATION.** | | | | | |

# APPENDIX B

# RECEIVER SITE EVALUATION CHECKLIST

# RECEIVER SITE EVALUATION TEMPLATE

| | |
|---|---|
| Name: | |
| Job Title: | |
| Date: | |

**RECEIVER SITE NAME:**

| | | | | |
|---|---|---|---|---|
| 1) Location of Potential Receiver Site: | | | | |
| | | | | |
| 2) Indicate Maximum Quantity of Material Site can hold | | | Do Not Know | N/A |
| Basis of calculation (length available, width, etc.) | | | | |
| | | | | |
| | | | | |
| 3) Has any Sediment Testing been conducted at site? If yes, describe results below. **If no, see ASSESSMENT.** | Yes | No | Do Not Know | N/A |
| a) Date of Sampling: | | | | |
| b) Types of analysis (grain size, etc.): | | | | |
| | | | | |
| c) Locations/depths of borings or samples: | | | | |
| | | | | |
| d) Report prepared?: | | | | |
| | | | | |
| 4) Physical Inspection of Site | Yes | No | Do Not Know | N/A |
| Date: | | | | |
| Observations: | | | | |
| | | | | |
| 5) General Site Characteristics: | | | | |
| a) Previous beach fills at or near site? | Yes | No | Do Not Know | N/A |
| Explanation: | | | | |
| | | | | |
| b) Accessible by Truck and Earthmoving Equipment? | Yes | No | Do Not Know | N/A |
| Explanation: | | | | |
| | | | | |
| c) Stockpile Site available? | Yes | No | Do Not Know | N/A |
| Explanation: | | | | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| 5) d) Is site an Eroding Beach (i.e., Needs Sand)? | Yes | No | Do Not Know | N/A |
| Explanation: | | | | |
| | | | | |
| e) Is the receiver site close to existing residences? | Yes | No | Do Not Know | N/A |
| Explanation: | | | | |
| | | | | |
| f) Intensity of public use? | High | Med | Low | Do Not Know |
| Explanation: | | | | |
| | | | | |
| g) Is the site a popular surfing spot? | Yes | No | Do Not Know | N/A |
| Explanation: | | | | |
| | | | | |
| h) Potential impacts to access and use by public? | High | Med | Low | Do Not Know |
| Explanation: | | | | |
| | | | | |
| 6) Is site in close proximity to sensitive resources? ***See Biological Characteristics below.*** | Yes | No | Do Not Know | N/A |
| | | | | |
| 7) Describe Coastal Characteristics of Site | | | | |
| Bathymetry: | | | | |
| | | | | |
| Sediment Transport Patterns: | | | | |
| | | | | |
| Proximity of Natural Sediment Sources at Site | | | | |
| | | | | |
| Sand deficit (need for Sand) | | | | |
| | | | | |
| 8) Is Site a Potential Feeder Beach to Down Coast Beaches? | Yes | No | Do Not Know | N/A |
| Explanation: | | | | |

## BIOLOGICAL ASSESSMENT CHECKLIST - BEACH RECEIVER SITE

Name:
Job Title:
Date:

Receiver Site Location:

Site Name, if appropriate:

### RECEIVER SITE

| 1) Habitat Characteristics: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Is sand the only habitat ? | | | |
| b) Are a combination of sand and/or hard substrate present ? If known, fill in under "yes" column approximate percentage by appropriate substrate types, as listed below. | | | |
| Sand | | | |
| Cobble | | | |
| Boulder Rip Rap | | | |
| Isolated Rocks | | | |
| Bedrock | | | |
| Rocky Reef | | | |

| 2) If isolated rocks, bedrock, and/or reefs occur, check next to yes all ranges of rock heights that apply. | < 2 feet | 2-3 feet | > 3 feet |
|---|---|---|---|
| Yes | | | |

| 3) Biological Resources: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Does any vegetation occur on sand and/or hard substrate within site ? | | | |
| b) Are marine animals attached to any hard substrate within site? | | | |
| c) Does site potentially support grunion spawning? | | | |
| d) Is site used by sensitive wildlife and/or marine mammals? | | | |
| e) Does site support other known local sensitive resources? If yes, list under comments. | | | |
| f) If yes or don't know to any above question, has site been inspected by qualified biologist? | | | |

List Date of Inspection and/or Report Reference:

### ACCESS ROUTE

| 1) Habitat Characteristics: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Are urban land and/or sand the only habitats within access route? | | | |
| b) If no to "a", check yes next to all appropriate habitat types listed below that will be crossed by access route. | | | |
| Nearshore Sands | | | |
| Nearshore Reefs | | | |
| Intertidal Sands | | | |
| Rocky Intertidal | | | |
| Dune | | | |
| Wetlands | | | |

| 2) If isolated rocks, bedrock, and/or reefs occur, check next to yes all ranges of rock heights that apply. | < 2 feet | 2-3 feet | > 3 feet |
|---|---|---|---|
| Yes | | | |

| 3) Biological Resources: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Does vegetation occur within access route? | | | |
| b) Are marine animals attached to any hard substrate within access route? | | | |
| c) Does access route potentially support grunion spawning? | | | |
| d) Does access route potentially support sensitive wildlife and/or marine mammals? | | | |
| e) Does site support other known local sensitive resources? If yes, list under comments. | | | |
| f) If yes or don't know to any above question, has access route been inspected by qualified biologist? | | | |
| g) Has California Natural Diversity Data Base (CNDDB) search been conducted for vicinity ? | | | |

List Date of Inspection, CNDDB Search, and/or Report References:

### OFFSHORE OF RECEIVER SITE

Project Vicinity

| 1) Habitat Characteristics: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Is sand the only habitat ? | | | |
| b) Are a combination of sand and/or hard substrate present ? | | | |

| 2) If isolated rocks, bedrock, and/or reefs occur, check next to yes all ranges of rock heights that apply. | < 2 feet | 2-3 feet | > 3 feet |
|---|---|---|---|
| Yes | | | |

| 3) Biological Resources: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Does surfgrass occur directly offshore? | | | |
| b) Do other vegetated reefs occur directly offshore ? | | | |

### OTHER SENSITIVE RESOURCES

| Proximity to Sensitive Resources | Within 1,000 feet | Within 2,000 feet | Within 1 mile | Within 2 miles | > 2 miles |
|---|---|---|---|---|---|
| Rocky Intertidal | | | | | |
| Kelp Beds | | | | | |
| Nearshore Reefs | | | | | |
| Surfgrass Beds | | | | | |
| Eelgrass Beds | | | | | |
| Creeks/River Mouths | | | | | |
| Lagoons/Wetlands | | | | | |
| Endangered and/or Threatened Species Nesting Habitats | | | | | |

| **Potential Impacts:** Would the project have the potential to cause any of the following impacts? Answer impact questions according to location, as appropriate, where R = receiver site, A = access route, O = offshore, V = vicinity. | Significant Impact | Less than Significant Impact With Mitigation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| Conflict with any local policies or ordinances protecting biological resources ? | | | | |
| Impact, either directly or through habitat modification, any threatened and/or endangered species? | | | | |
| Impact, either directly or through habitat modification, essential fish habitat ? | | | | |
| Impact, either directly or through habitat modification, wetlands and/or creek/river mouths? | | | | |
| Impact indirectly from increased turbidity sensitive habitats and/or biological resources? | | | | |
| Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | | | | |
| Substantially contribute to lagoon and/or creek/river mouth sedimentation? | | | | |

**Comments:**

**References:**

## BIOLOGICAL ASSESSMENT CHECKLIST - NEARSHORE RECEIVER SITE

Name:

Job Title:

Date:

Receiver Site Location:

Site Name, if appropriate:

### RECEIVER SITE

| 1) Habitat Characteristics: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Is sand the only habitat ? | | | |
| b) Are a combination of sand and/or hard substrate present ? If known, fill in under "yes" column approximate percentage by appropriate substrate types, as listed below. | | | |
| Sand | | | |
| Cobble | | | |
| Isolated Rocks | | | |
| Bedrock | | | |

| 2) If isolated rocks, bedrock, and/or reefs occur, check Yes next to all ranges of rock heights that apply. | < 2 feet | 2-3 feet | > 3 feet |
|---|---|---|---|
| Yes | | | |

| 3) Biological Resources: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Does surfgrass occur within site? | | | |
| b) Does kelp occur within site? | | | |
| c) Does site support other known local sensitive resources? If yes, list under comments. | | | |
| d) If yes or don't know to any above question, has site been surveyed by qualified biologist? | | | |

List Date of Survey and/or Report Reference:

### ACCESS ROUTE

| 1) Habitat Characteristics: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Are urban land and/or sand the only habitats within access route? | | | |
| b) Check yes next to all appropriate habitat types listed below that will be crossed by access route: | | | |
| Rocky Intertidal | | | |
| Nearshore Reefs | | | |
| Kelp Beds | | | |
| Surfgrass Beds | | | |

| 2) If isolated rocks, bedrock, and/or reefs occur, check yes next to all ranges of rock heights that apply | < 2 feet | 2-3 feet | > 3 feet |
|---|---|---|---|
| Yes | | | |

| 3) Biological Resources: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Does access route potentially support grunion spawning? | | | |
| b) Does access route potentially support sensitive wildlife and/or marine mammals? | | | |
| c) Does site support other known local sensitive resources? If yes, list under comments. | | | |
| d) If yes or don't know to any above question, has access route been inspected by qualified biologist? | | | |
| d) Has California Natural Diversity Data Base (CNDDB) search been conducted for vicinity? | | | |

List Date of Inspection, CNDDB Search, and/or Report References:

### OTHER SENSITIVE RESOURCES

| Proximity to Sensitive Resources | Project Vicinity: Within 1,000 feet | Within 2,000 feet | Within 1 mile | Within 2 miles | >2 miles |
|---|---|---|---|---|---|
| Rocky Intertidal | | | | | |
| Kelp Beds | | | | | |
| Nearshore Reefs | | | | | |
| Surfgrass Beds | | | | | |
| Eelgrass Beds | | | | | |
| Creeks/River Mouths | | | | | |
| Lagoons/ Wetlands | | | | | |
| Endangered and/or Threatened Species Nesting Habitats | | | | | |

| **Potential Impacts:** Would the project have the potential to cause any of the following impacts? Answer impact questions according to location, as appropriate, where R = receiver site, A = access route, V = vicinity | Significant Impact | Less than Significant Impact With Mitigation | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| Conflict with any local policies or ordinances protecting biological resources? | | | | |
| Impact, either directly or through habitat modification, any threatened and/or endangered species? | | | | |
| Impact, either directly or through habitat modification, essential fish habitat? | | | | |
| Impact, either directly or through habitat modification, wetlands and/or creek/river mouths? | | | | |
| Impact indirectly from increased turbidity sensitive habitats and/or biological resources? | | | | |
| Intefere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | | | | |
| Substantially contribute to lagoon and/or creek/river mouth sedimentation? | | | | |

**Comments:**

**References:**

## SENSITIVE HABITAT SURVEY - BEACH AREA

Name:

Job Title:

Date:

Receiver Site Location:

Site Name, if appropriate:

### RECEIVER SITE

| 1) Habitat Characteristics: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Is sediment the only habitat? | | | |
| b) Are a combination of sand and/or hard substrate present ? If known, fill in under "yes" column approximate percentage by appropriate substrate types, as listed below. | | | |
| Sand | | | |
| Cobble | | | |
| Boulder Rip Rap | | | |
| Isolated Rocks | | | |
| Bedrock | | | |
| Rocky Reef | | | |

| 2) If isolated rocks, bedrock, and/or reefs occur, check next to yes all ranges of rock heights that apply. | < 2 feet | 2-3 feet | > 3 feet |
|---|---|---|---|
| Yes | | | |

| 3) Biological Resources: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Does any vegetation occur on sand and/or hard substrate within site ? | | | |
| b) Are marine animals attached to any hard substrate within site? | | | |
| c) Does site potentially support grunion spawning? | | | |
| d) Is site used by sensitive wildlife and/or marine mammals? | | | |
| e) Does site support other known local sensitive resources? If yes, list under comments. | | | |
| f) If yes or don't know to any above question, has site been inspected by qualified biologist? | | | |

List Date of Inspection and/or Report Reference:

### ACCESS ROUTE

| 1) Habitat Characteristics: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Are urban land and/or sand the only habitats within access route? | | | |
| b) If no to "a", check yes next to all appropriate habitat types listed below that will be crossed by access route: | | | |
| Nearshore Sands | | | |
| Nearshore Reefs | | | |
| Intertidal Sands | | | |
| Rocky Intertidal | | | |
| Dune | | | |
| Wetlands | | | |

| 2) If isolated rocks, bedrock, and/or reefs occur, check next to yes all ranges of rock heights that apply. | < 2 feet | 2-3 feet | > 3 feet |
|---|---|---|---|
| Yes | | | |

| 3) Biological Resources: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Does vegetation occur within access route? | | | |
| b) Are marine animals attached to any hard substrate within access route? | | | |
| c) Does access route potentially support grunion spawning? | | | |
| d) Does access route potentially support sensitive wildlife and/or marine mammals? | | | |
| e) Does site support other known local sensitive resources? If yes, list under comments. | | | |
| f) If yes or don't know to any above question, has access route been inspected by qualified biologist? | | | |
| g) Has California Natural Diversity Data Base (CNDDB) search been conducted for vicinity ? | | | |

List Date of Inspection, CNDDB Search, and/or Report References:

### SEAWARD OF RECEIVER SITE

| | Project Vicinity | | |
|---|---|---|---|
| 1) Habitat Characteristics: | Yes | No | Do Not Know |
| a) Is sand the only habitat ? | | | |
| b) Are a combination of sand and/or hard substrate present ? | | | |

| 2) If isolated rocks, bedrock, and/or reefs occur, check next to yes to all ranges of rock heights that apply. | < 2 feet | 2-3 feet | > 3 feet |
|---|---|---|---|
| | | | |

| 3) Biological Resources: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Does surfgrass occur directly offshore? | | | |
| b) Do other vegetated reefs occur directly offshore ? | | | |

### OTHER SENSITIVE RESOURCES

| Proximity to Sensitive Resoures | Within 1,000 feet | Within 2,000 feet | Within 1 mile | Within 2 miles |
|---|---|---|---|---|
| Kelp Beds | | | | |
| Nearshore Reefs | | | | |
| Surfgrass Beds | | | | |
| Eelgrass Beds | | | | |
| Sea Fans, Sea Palms | | | | |
| Creeks/River Mouths | | | | |
| Lagoons/ Wetlands | | | | |
| Endangered and/or Threatened Species Nesting Habitats | | | | |

| **Potential Impacts:** Would the project have the potential to cause any of the following impacts? Answer impact questions according to location, as appropriate, where R = receiver site, A = access route, O = offshore, V = vicinity. | Significant Impact | Less than Significant Impact With Mitigation | Less Than Significant Impact | No Impact | Don't Know |
|---|---|---|---|---|---|
| Conflict with any local policies or ordinances protecting biological resources ? | | | | | |
| Impact, either directly or through habitat modification, any threatened and/or endangered species? | | | | | |
| Significant impact, either directly or through habitat modification, essential fish habitat ? | | | | | |
| Impact, either directly or through habitat modification, wetlands and/or creek/river mouths? | | | | | |
| Impact indirectly from increased turbidity sensitive habitats and/or biological resources? | | | | | |
| Intefere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | | | | | |
| Substantially contribute to lagoon and/or creek/river mouth sedimentation? | | | | | |

Comments:

## SENSITIVE HABITAT SURVEY - NEARSHORE AREA

| | |
|---|---|
| Name: | |
| Job Title: | |
| Date: | |

Receiver Site Location:

Site Name, if appropriate:

### RECEIVER SITE

| 1) Habitat Characteristics: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Is sand the only habitat ? | | | |
| b) Are a combination of sand and/or hard substrate present ? If known, fill in under "yes" column approximate percentage by appropriate substrate types, as listed below. | | | |
| Sand | | | |
| Cobble | | | |
| Isolated Rocks | | | |
| Bedrock | | | |
| 2) If isolated rocks, bedrock, and/or reefs occur, check Yes next to all ranges of rock heights that apply. | < 2 feet | 2-3 feet | > 3 feet |
| Yes | | | |
| 3) Biological Resources: | Yes | No | Do Not Know |
| a) Does surfgrass occur within site? | | | |
| b) Does kelp occur within site? | | | |
| c) Does site support other known local sensitive resources? If yes, list under comments. | | | |
| d) If yes or don't know to any above question, has site been surveyed by qualified biologist? | | | |

List Date of Survey and/or Report Reference:

### ACCESS ROUTE

| 1) Habitat Characteristics: | Yes | No | Do Not Know |
|---|---|---|---|
| a) Are urban land and/or sand the only habitats within access route? | | | |
| b) Check yes next to all appropriate habitat types listed below that will be crossed by access route: | | | |
| Rocky Intertidal | | | |
| Nearshore Reefs | | | |
| Kelp Beds | | | |
| Surfgrass Beds | | | |
| 2) If isolated rocks, bedrock, and/or reefs occur, check yes next to all ranges of rock heights that apply. | < 2 feet | 2-3 feet | > 3 feet |
| Yes | | | |
| 3) Biological Resources: | Yes | No | Do Not Know |
| a) Does access route potentially support grunion spawning? | | | |
| b) Does access route potentially support sensitive wildlife and/or marine mammals? | | | |
| c) Does site support other known local sensitive resources? If yes, list under comments. | | | |
| d) If yes or don't know to any above question, has access route been inspected by qualified biologist? | | | |
| d) Has California Natural Diversity Data Base (CNDDB) search been conducted for vicinity? | | | |

List Date of Inspection, CNDDB Search, and/or Report References:

### OTHER SENSITIVE RESOURCES

| Proximity to Sensitive Resources | Project Vicinity: Within 1,000 feet | Within 2,000 feet | Within 1 mile | Within 2 miles |
|---|---|---|---|---|
| Kelp Beds | | | | |
| Nearshore Reefs | | | | |
| Surfgrass Beds | | | | |
| Eelgrass Beds | | | | |
| Sea Fans, Sea Palms | | | | |
| Creeks/River Mouths | | | | |
| Lagoons/ Wetlands | | | | |
| Endangered and/or Threatened Species Nesting Habitats | | | | |

| Potential Impacts: Would the project have the potential to cause any of the following impacts? Answer impact questions according to location, as appropriate, where R = receiver site, A = access route, V = vicinity. | Significant Impact | Less than Significant Impact With Mitigation | Less Than Significant Impact | No Impact | Don't Know |
|---|---|---|---|---|---|
| Conflict with any local policies or ordinances protecting biological resources? | | | | | |
| Impact, either directly or through habitat modification, any threatened and/or endangered species? | | | | | |
| Impact, either directly or through habitat modification, commercially viable resources? | | | | | |
| Significant Impact, either directly or through habitat modification, essential fish habitat? | | | | | |
| Impact, either directly or through habitat modification, wetlands and/or creek/river mouths? | | | | | |
| Impact indirectly or directly from increased turbidity or sedimentation sensitive habitats and/or biological resources? | | | | | |
| Intefere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | | | | | |
| Substantially contribute to lagoon and/or creek/river mouth sedimentation? | | | | | |

Comments:

# RECEIVER SITE EVALUATION TEMPLATE

| | Yes | No | Do Not Know | N/A | Basis for Decision |
|---|---|---|---|---|---|
| **ASSESSMENT** | | | | | |
| Based on the checklist and assessment of factors listed above, does the site require further analysis or inspection? | | | | | |
| Based on the checklist and assessment of factors listed above, does the receiver site sediments need to be tested? | | | | | |
| *A Sampling & Analysis Plan (SAP) is REQUIRED for approval from the Corps of Engineers to determine compatibility. The SAP can include previous data, if available. BEFORE any further testing is conducted, a SAP shall be prepared and submitted to the Corps for approval.* | | | | | |

| | Yes | No | Do Not Know | N/A | Basis for Decision |
|---|---|---|---|---|---|
| **GRAIN SIZE AND QUANTITY** | | | | | |
| Has a grain size envelope been created for this site? | | | | | |
| **BIOLOGICAL RESOURCES** | | | | | |
| Is the site sensitive in protecting biological resources? | | | | | |
| **SITE RESTRICTIONS** | | | | | |
| Are there any timing or placement restrictions associated with this site? If so, please list below | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| **CONCLUSION** | | | | | |
| **BASED ON RESULTS OF THIS CHECKLIST ASSESSMENT, DOES THIS SITE QUALIFY TO BE CONSIDERED FOR OPPORTUNISTIC BEACH FILL?** | Yes | No | Do Not Know | N/A | |

# APPENDIX C

# RECEIVER SITE EVALUATION FOR THE OCEANSIDE LITORAL CELL

**Site Evaluation Matrix**

| | Need for Sand | | Proximity to Residences of Haul Route & Construction Site | | Truck/Construction Equipment Accessibility | | Minimal Impact to Intertidal/Beach Biological Resources | | Minimal Impact to Nearshore Biological Resources | | Minimal Impact to Offshore Biological Resources | | Minimal Impact to Visual Feeders (Fish, Birds) | | Minimal Impact to Recreation and Surfing | | Minimal Impact to Tidal Lagoons | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Criteria Weighted Value* → | *4* | | *4* | | *5* | | *5* | | *5* | | *5* | | *5* | | *3* | | *4* | |
| **SITE** ↓ | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** |
| **Oceanside Strand** | 3 | **12** | 3 | **12** | 3 | **15** | 5 | **25** | 5 | **25** | 5 | **25** | 5 | **25** | 4 | **12** | 5 | **20** |
| **South Oceanside** | 4 | **16** | 4 | **16** | 5 | **25** | 4 | **20** | 4 | **20** | 3 | **15** | 5 | **25** | 4 | **12** | 5 | **20** |
| **North Carlsbad (Buena Vista Lagoon)** | 4 | **16** | 1 | **4** | 1 | **5** | 3 | **15** | 2 | **10** | 1 | **5** | 5 | **25** | 4 | **12** | 2 | **8** |
| **South Carlsbad North** | 3 | **12** | 4 | **16** | 2 | **10** | 3 | **15** | 1 | **5** | 3 | **15** | 5 | **25** | 5 | **15** | 3 | **12** |
| **South Carlsbad South (Encinas Creek)** | 3 | **12** | 4 | **16** | 2 | **10** | 4 | **20** | 2 | **10** | 2 | **10** | 4 | **20** | 4 | **12** | 5 | **20** |
| **Batiquitos Lagoon** | 3 | **12** | 4 | **16** | 5 | **25** | 3 | **15** | 2 | **10** | 2 | **10** | 1 | **5** | 5 | **15** | 2 | **8** |
| **Leucadia** | 5 | **20** | 1 | **4** | 1 | **5** | 4 | **20** | 1 | **5** | 1 | **5** | 2 | **10** | 2 | **6** | 3 | **12** |
| **Moonlight Beach** | 3 | **12** | 4 | **16** | 5 | **25** | 3 | **15** | 2 | **10** | 2 | **10** | 5 | **25** | 3 | **9** | 5 | **20** |
| **Cardiff (Restaurant Row)** | 5 | **20** | 3 | **12** | 4 | **20** | 2 | **10** | 2 | **10** | 2 | **10** | 1 | **5** | 4 | **12** | 3 | **12** |
| **Solana Beach (Fletcher Cove)** | 5 | **20** | 4 | **16** | 5 | **25** | 2 | **10** | 2 | **10** | 2 | **10** | 4 | **20** | 4 | **12** | 3 | **12** |
| **San Dieguito River Mouth** | 4 | **16** | 4 | **16** | 5 | **25** | 3 | **15** | 3 | **15** | 3 | **15** | 5 | **25** | 4 | **12** | 2 | **8** |
| **Del Mar (17th Street)** | 4 | **16** | 1 | **4** | 5 | **25** | 1 | **5** | 1 | **5** | 2 | **10** | 5 | **25** | 2 | **6** | 2 | **8** |
| **Torrey Pines** | 3 | **12** | 4 | **16** | 2 | **10** | 3 | **15** | 2 | **10** | 3 | **15** | 5 | **25** | 2 | **6** | 2 | **8** |

## Site Evaluation Matrix Continued

| | Minimal Impact to Navigational Entrances | | Minimal Impact to Creek and River Mouths | | Previous RBSP Receiver Site (Permittability) | | Feeder Beach for Downcoast Beaches | | Maximum Natural Sand Retention | | Proximity to Natural Sand Supply (creek or river) | | Proximity to Potential Stockpile Locations | | Support from Local Community | | Proximity to Potential Sources | | Local Agency Willingness to Permit Site | | TOTAL SCORE | RANK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Criteria Weighted Value* → | *4* | | *3* | | *2* | | *2* | | *2* | | *2* | | *1* | | *5* | | *4* | | *5* | | | |
| **SITE** ↓ | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | Value | **Score** | | |
| **Oceanside Strand** | 5 | **20** | 5 | **15** | 1 | **2** | 5 | **10** | 2 | **4** | 3 | **6** | 4 | **4** | 4 | **20** | 5 | **20** | 4 | **20** | **292** | 2 |
| **South Oceanside** | 5 | **20** | 4 | **12** | 5 | **10** | 5 | **10** | 3 | **6** | 3 | **6** | 4 | **4** | 5 | **25** | 5 | **20** | 4 | **20** | **302** | 1 |
| **North Carlsbad (Buena Vista Lagoon)** | 5 | **20** | 5 | **15** | 5 | **10** | 5 | **10** | 3 | **6** | 1 | **2** | 2 | **2** | 5 | **25** | 5 | **20** | 4 | **20** | **230** | 10 |
| **South Carlsbad North** | 5 | **20** | 5 | **15** | 5 | **10** | 2 | **4** | 2 | **4** | 1 | **2** | 2 | **2** | 3 | **15** | 5 | **20** | 4 | **20** | **237** | 8 |
| **South Carlsbad South (Encinas Creek)** | 5 | **20** | 3 | **9** | 5 | **10** | 4 | **8** | 2 | **4** | 1 | **2** | 2 | **2** | 3 | **15** | 5 | **20** | 5 | **25** | **245** | 6 |
| **Batiquitos Lagoon** | 5 | **20** | 5 | **15** | 5 | **10** | 5 | **10** | 3 | **6** | 2 | **4** | 4 | **4** | 4 | **20** | 2 | **8** | 5 | **25** | **238** | 7 |
| **Leucadia** | 5 | **20** | 5 | **15** | 5 | **10** | 5 | **10** | 3 | **6** | 1 | **2** | 2 | **2** | 5 | **25** | 1 | **4** | 3 | **15** | **196** | 13 |
| **Moonlight Beach** | 5 | **20** | 5 | **15** | 5 | **10** | 2 | **4** | 2 | **4** | 1 | **2** | 4 | **4** | 5 | **25** | 2 | **8** | 4 | **20** | **254** | 4 |
| **Cardiff (Restaurant Row)** | 5 | **20** | 5 | **15** | 5 | **10** | 2 | **4** | 4 | **8** | 2 | **4** | 3 | **3** | 5 | **25** | 4 | **16** | 4 | **20** | **236** | 9 |
| **Solana Beach (Fletcher Cove)** | 5 | **20** | 5 | **15** | 5 | **10** | 3 | **6** | 1 | **2** | 1 | **2** | 3 | **3** | 5 | **25** | 4 | **16** | 3 | **15** | **249** | 5 |
| **San Dieguito River Mouth** | 5 | **20** | 5 | **15** | 1 | **2** | 4 | **8** | 2 | **4** | 2 | **4** | 4 | **4** | 4 | **20** | 4 | **16** | 3 | **15** | **255** | 3 |
| **Del Mar (17th Street)** | 5 | **20** | 5 | **15** | 5 | **10** | 4 | **8** | 3 | **6** | 1 | **2** | 3 | **3** | 4 | **20** | 3 | **12** | 2 | **10** | **210** | 11 |
| **Torrey Pines** | 5 | **20** | 5 | **15** | 5 | **10** | 2 | **4** | 2 | **4** | 2 | **4** | 3 | **3** | 2 | **10** | 3 | **12** | 2 | **10** | **209** | 12 |

# APPENDIX D

# POTENTIAL SOURCE MATERIAL FOR THE OCEANSIDE LITTORAL CELL

| SOURCE DESIGNATION | LOCATION | | QUANTITY* (Cubic Yards) | OWNERSHIP | DATE AVAILABLE | CONTACT | PHONE |
|---|---|---|---|---|---|---|---|
| | Area | Project/Source | | | | | |
| **Mexico** | | | | | | | |
| M-TJ-1 | Tecate | Tecate River | 3 Million | Ocean Restoration | Now | Ray Files | (760) 757-1226 |
| M-TJ-2 | Tijuana | Alluvial borrow east of TJ | Potential large quantity | W.S. Produccion | Now | Walter Pufflis | (619) 668-9729 / (61 |
| M-ES-1 | Ensenada | Ensenada-Area Rivers | Potential large quantity | Nelson & Sloan | Now | Fred Colin | (760) 744-7130 |
| **Arizona** | | | | | | | |
| AZ-YM-1 | Yuma | Yuma | 10 Million | American Waste Transport, Inc | Now | Fred Alexander | (760) 744-7130 |
| AZ-LP-1 | La Paz County | La Paz County Landfill | Potential large quantity | La Paz County Landfill | Now | Kelly Sarber | (760) 942-8400 |
| **Greater California** | | | | | | | |
| CA-PD-1 | LA County | Palmdale Quarry | 25 million | Coast Rail Services | Now | George Engelage | (714) 570-7314 |
| CA-AG-1 | Riverside Co. | Aguanga | 23 Million | Private Ownership | Now | Tom Lively | (619) 589-9455 |
| **SAN DIEGO COUNTY** | | | | | | | |
| **North County Coastal** | | | | | | | |
| NC-CP | Oceanside | Camp Pendleton | -- | U.S. Marine Corps | NA | Viola Innis | (760) 725-7245 |
| NC-SB | Solana Beach | Train Station | 100,000 | | mid-2006 to 2008 | Bob Scott (Del Mar) | |
| NC-OS1 | Oceanside | Hotel Construction | | | | Steve Apple (Solana Beach) | |
| NC-OS2 | Oceanside | Hotel Construction 5 miles inland | | | | | |
| NC-CB1 | Carlsbad | Poinsettia Train St/Multi-Use | 30,000 - 40,000 | | | Steve Jantz (Carlsbad) | |
| NC-BVL | Carlsbad | Buena Vista Lagoon Restoration | 300,000 - 600,000 | City of Carlsbad/Oceanside | 2008-2009 | Dave Cannon (Everest Int'l) | (562) 435-9309 |
| NC-CB2 | Carlsbad | City Detention Basins | <12,000 | City of Carlsbad | | Steve Jantz (Carlsbad) | |
| NC-SEL | Cardiff | San Elijo Lagoon Restoration | 800,000 | | | Bruce Williams (USACE ) | |
| NC-SDL | Del Mar | San Dieguito Lagoon Restoration | 78,000 | SoCal Edison Project | Oct-05 | Hany Elwany | (858) 459-0008 |
| NC-TPR | N. San Diego | Torrey Pines Retention Basin | | | | Denny Stoffer | (760) 720-6375 |
| NC-LPL | N. San Diego | Los Penasquitos Lagoon Restoration | 10,000 - 20,000 | | | Hany Elwany | (858) 459-0008 |
| **North County Inland** | | | | | | | |
| NI-POW | Poway | Flood Control Channels | 20,000 cy/yr | | over next 3-5 years | Kevin Quinn (City San Diego) | |
| NI-NS-1 | Bonsal | San Luis Rey River | 250,000 - 500,000 | Nelson & Sloan | Now | Fred Colin | (760) 744-7130 |
| NI-LHR | Lake Hodges | Dam Maintenance | 2,132,000 | City of San Diego Water Dist. | | Rosalva Morales (SDWD) | |
| **Central County Coastal** | | | | | | | |
| CC-SDB | North Island | Navy Constructin Projects | 30,000 | Navy | | Ed Kleeman (Coronado) | |
| CC-MML | Miramar | Miramar Landfill | Less than 100,000 | City of San Diego | Not known now | Joseph Corones | (619) 492-5034 |
| CC-SDF | County-wide | Flood Control Channels | 500,000 | County of San Diego | | Marianne Green (City San Diego) | |
| **Central County Inland** | | | | | | | |
| CI-SDC | Ramona/Sp Vly | Flood Control Channels | 100,000 | County of San Diego | | Sid Tsoro (San Diego (County) | |
| CI-ECR | Alpine (near) | El Capitan Dam Maintenance | 2,112,000 | City of San Diego Water Dist. | | Rosalva Morales (SDWD) | |
| CI-SVR | Blossom Vly | San Vicente Dam Maintenance | 456,000 | City of San Diego Water Dist. | | Rosalva Morales (SDWD) | |
| CI-SLR | Ramona/Julian | Sutherland Dam Maintenance | 92,000 | City of San Diego Water Dist. | | Rosalva Morales (SDWD) | |
| **South County** | | | | | | | |
| S-CV | Chula Vista | Open Space erosion | | City of Chula Vista | | Dave Byers (City of Chula Vista) | 619-691-5021 |
| S-CVM | Chula Vista | Chula Vista Marina | 300,000 | City of Chula Vista | | | |

**Notes**

Coastal area is defined as WEST of I-15 in San Diego County
Inland area is defined as EAST of I-15 in San Diego County
North is defined as areas NORTH of City of San Diego limits
South County areas are defined as south of City of San Diego limits

# APPENDIX E

# SAMPLE NOTIFICATION REPORT OUTLINE

# SAMPLE PROJECT NOTIFICATION REPORT

# SAN CLEMENTE OPPORTUNISTIC BEACH REPLENISHMENT PROGRAM

## 1. INTRODUCTION

Provide the basic program outline. Specify the permit conditions (USACE, CCC, RWQCB, and SLC). This Project Notification Report will request agency concurrence and a Notice to Proceed from the USACE (See Section 8.1 for further information)

**Proposed Project Limits**

| Placement Site | Maximum Annual Quantity (CY) | Maximum Project Length (ft) | Placement Scenarios (1) | Season | Maximum Percent Fines Allowed | Trucking (Volumes and Timing) | | | | By Rail (Volumes and Timing) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | CY Per Season | CY Per Week | No. of Weeks | No. Days per Week (4) | CY Per Season | CY Per Week | No. of Weeks | No. Days per Week |
| North Beach | 125,000 | 1,500 | a) Berm<br>b) MHT | Fall/Winter (Sept 21 – Mar 21) | 25% | 125,000 | 13,000 | 10 | 6 | -- | -- | -- | -- |
| | | | | Spring/Summer (Mar 21 – Sept 21) | 20% | 41,000 | 10,000 | 4 | 6 | -- | -- | -- | -- |
| Linda Lane | 75,000 | 1,500 | a) Berm<br>b) MHT<br>c) Dike | Fall/Winter (Sept 21 – Mar 21) [2] | 25% | 75,000 | 8,000 | 6.5 | 6 | -- | -- | -- | -- |
| | | | | Fall/Winter (Sept 21 – Mar 21) [3] | 25% | 15,000 | 2,400 | 6.5 | 5 | -- | -- | -- | -- |
| | | | | Spring (Mar 21 – Memorial Day) [2] | 20% | 25,000 | 6,000 | 4 | 6 | -- | -- | -- | -- |
| | | | | Peak Summer (Memorial Day – Labor Day) [2] | 20% | | 4,000 | 4 | 4 | -- | -- | -- | -- |
| T-Street North | 45,000 | 1,000 | a) Berm<br>b) MHT | Fall/Winter (Sept 21 – Mar 21) [3] | 25% | 15,000 | 2,400 | 6.5 | 5 | 45,000 | 18,000 | 2.5 | 6 |
| | | | | Spring (Mar 21 – Memorial Day) | 20% | -- | -- | -- | | 15,000 | 15,000 | 1 | 6 |
| | | | | Peak Summer (Memorial Day – Labor Day) | 20% | -- | -- | -- | | | 12,000 | 1 | 4 |
| T-Street South | 55,000 | 1,200 | a) Berm<br>b) MHT | Fall/Winter (Sept 21 – Mar 21) [3] | 25% | 15,000 | 2,400 | 6.5 | 5 | 55,000 | 18,000 | 3 | 6 |
| | | | | Spring (Mar 21 – Memorial Day) | 20% | -- | -- | -- | | 18,000 | 15,000 | 1.2 | 6 |
| | | | | Peak Summer (Memorial Day – Labor Day) | 20% | -- | -- | -- | | | 12,000 | 1.5 | 4 |

(1) (a) Berm-beach berm on upper beach; (b) MHT-placement below the high tide line; (c) Dike-sand dike along revetment
(2) Trucking from North Beach around Mariposa Point to Linda Lane
(3) Trucking from the Pier at-grade crossing
(4) 4-day workweek = Monday through Thursday only; 5-day workweek = Monday through Friday only; 6-day workweek = Monday through Saturday only. No work will occur on holidays
(5) No work can occur at any site on the holiday weekends of Memorial Day and Labor Day, and weekends adjacent to Independence Day, when Independence Day falls on a Friday or Monday
(6) Construction will not occur on more than two (2) beaches at any one time.

# 2. SOURCE MATERIAL

## 2.1. General Site Location

Include maps, figures, and text description of site location and surrounding areas.

## 2.2. Specific Location of Source Material at Site

Describe where on the site the source material is found

## 2.3. Volume of Material (Total volume and volume proposed for beach placement)

Describe total volume of material available at site and volume that is being proposed for beach nourishment. The disposal method of excess material will be described in this section.

## 2.4. Material Testing

Present the Sampling and Analysis Plan that was prepared for and approved by the USACE as part of their permit conditions. The results will be provided, which will include any chemistry and grain size testing. Figures and tables will be provided.

## 2.5. Debris Management

Describe general content of material with regard to debris. This will include a description of the kinds of debris found in the source material, methods for screening, separating, and/or retrieving the debris, and disposal methods.

An on-site debris monitor will be present during beach replenishment to monitor for the presence of debris in the sandy material. If any debris or non-sandy material is detected, the specific beach replenishment project(s) that was/were using that sand material shall be halted at that site(s). The project(s) shall not continue until a new Project Notification Report with updated information on the composition of the material is submitted and approved by the resource agencies.

# 3. TRANSPORTATION AND PLACEMENT

## 3.1. Site Location And Timing

Describe which beach site will be used and the timing of project. Include projected schedule.

## 3.2. Transportation Method

Describe how the material will get to the beach site (truck or train). Outline trucking routes and provide figures, if needed. Indicate how many trucks/trains and frequency. Specify a traffic control plan from the contractor.

## 3.3. Beach Placement Method

Describe the placement method, including any equipment that may be needed to construct the project. Outline specific public access closures or restrictions. Outline project BMPs, such as flagmen, perimeter fencing, etc. that are proposed.

Construction materials or waste will not be stored where it will could potentially be subjected to wave erosion and dispersion. In addition, no machinery will be placed, stored, or otherwise located in the Intertidal zone at any time, except for the minimum necessary to implement the project.

Construction equipment shall not be washed on the beach or in the beach parking lots. Construction debris and sediment shall be properly contained and secured on site with BMPs, to prevent the unintended transport of sediment and other debris into coastal waters by wind, rain, or tracking. Construction debris and sediment shall be removed from the construction areas as necessary to prevent the accumulation of sediment and other debris which may be discharged into coastal waters. Any and all debris resulting from construction activities shall be removed from the project site within 24 hours of completion of construction. Debris shall be disposed of at a debris disposal site outside the coastal zone.

Plans for the staging and storage of the construction equipment shall be provided by the contractor. Where possible, public parking areas shall not be used for staging or storage of equipment and materials. Where this is unavoidable, the minimum number of parking spaces that are required shall be used.

Access corridors and staging areas shall be located in a manner that has the least impact of public access via the maintenance of existing public parking areas and traffic flow on coastal access routes (e.g., El Camino Real).

### 3.4. Contractor Information

Include Contractor name, address, contact information, etc.

## 4. PUBIC NOTIFICATION PROCESS

This section will outline how the public is being notified of the overall program and this specific project. Each project will be approved by the San Clemente Planning Commission or City Council through a public hearing. This section of the report will include a listing of the local hearing dates and copies of all the local hearing notices. All written correspondence received by the City regarding the project and minutes of the Planning Commission/City Council meetings will be included.

Other proposed public noticing methods may include Coastal Advisory Committee (CAC) Workshops, City Council Meetings, Chamber of Commerce/Downtown Business Association articles, City Publications, Newspaper Articles, Signage, Public Television, or Water Billing notices.

Also, a posting will be placed at each construction site with a notice indicating the project scope, expected dates of construction, and/or beach closure.

## 5. PROJECT MONITORING

This section will outline the pre-, during, and post-construction monitoring plan for the project. This section will also include the reporting protocols for the monitoring efforts as outlined in the CCC, RWQCB, USACE, and SLC permit requirements.

### 5.1. Pre-Construction Monitoring

Describe all pre-construction monitoring and that will be conducted. This will include biological monitoring and physical monitoring (pre-fill profiles and surfing conditions). The description will include what will be monitored, procedures for the monitoring, frequency, who will conduct the monitoring and their qualifications. Figures representing areas, transects, etc., will be included in the pre-construction monitoring.

If pre-construction monitoring identifies potential adverse impacts to coastal resources from the proposed project not identified and addressed in the Mitigated Negative Declaration or within the Resource Agency permits (CCC CDP #5-02-142, USACE #200400838-DPS, RWQCB #02C-059, and SLC #W 25724), the specific replenishment project for which the pre-construction monitoring was being conducted shall be suspended. The monitoring results will be presented to the above mentioned agencies for their review and files.

***Preliminary Surfgrass Survey***

Any project proposed more than one year after the approval date of the CCC permit shall include a preliminary surfgrass survey by a qualified professional at the placement site. The results of this survey will be outlined in this section of the report. This survey will provide site-specific and recent data regarding the presence and location of surfgrass at the placement site.

### 5.2. Construction Monitoring

Describe what monitoring will be conducted during construction, including biological and physical monitoring. This will include monitoring protocol and contingency operations for monitoring of turbidity, sedimentation, surfing effects, and biology at the proposed discharge site and adjacent nearshore and offshore areas. Monitoring personnel will be identified and their qualifications will be provided.

### 5.3. Post-Construction Monitoring

Describe what monitoring will be conducted after construction, including biological and physical monitoring. This will include monitoring protocol and contingency operations for monitoring of sedimentation, biology and effects to surfing at the proposed discharge site and adjacent nearshore and offshore areas. Monitoring personnel will be identified and their qualifications will be provided.

## 6. PREVIOUS PROJECTS IN SAN CLEMENTE

This section will provide a table outlining each placement site and any beach fills that have occurred. A matrix of previous project activity will be provided in the PNR as shown below.

**Previous Projects**

| Site | Dates of Placement | Volume (CY) | Total Volume to Date (CY) | Placement Method | Fill Length | Width (if applicable) | %fines |
|---|---|---|---|---|---|---|---|
| NB | | | | | | | |
| LL | | | | | | | |
| TS N | | | | | | | |
| TS S | | | | | | | |

# 7. SUBMITTALS

This section will outline what submittals are required and when the resource agencies can expect them. This will include notification of any violations to the resource agencies.

## 7.1. Post Discharge Report

Post-Discharge Report will be compiled and submitted to the resource agencies which will include all of the information collected by the City for an individual project, including all preparation testing, volume of material placed at the site, transportation and construction details, finalized project schedule, and monitoring results. An assessment of the project effects, both beneficial and adverse will be presented at the end of every year. This analysis will serve as the basis for any modifications that can be made to optimize the program.

# 8. SPECIAL REQUIREMENTS

## 8.1. Timing Of Submittal And Approval From The Resource Agencies

### *8.1.1. California Coastal Commission (CCC)*

As per the CCC Coastal Development Permit No. 5-02-142, Special Condition No. 6A, the CCC Executive Director shall review the Project Submittal Package within 30 days from receipt, under normal circumstances. The Executive Director shall provide one of the following written responses: (1) approval of the project; (2) a requirement that the project receive a new, separate coastal development permit; (3) a request for additional information; or (4) a statement that additional time to review the project will be necessary. Written approval from the Executive Director is required prior to the initiation of any project construction.

### *8.1.2. Regional Water Quality Control Board (RWQCB)*

The City shall notify the RWQCB at least 30 days prior to the initiation of each fill activity (Permit No. 02C-059 General Condition No. 12).

#### *8.1.3. California State Lands Commission (SLC)*

As per the SLC Lease No. W 25724, Special Provision No. 4, the City of San Clemente will notify the SLC, and all other regulatory agencies having approval authority for the Program, at least 30 days prior to an opportunistic replenishment project. The City is not authorized to proceed with an opportunistic beach replenishment project until the staffs of each of the agencies has provided written concurrence that the material meets the criteria for placement.

#### *8.1.4. U.S. Army Corps of Engineers (USACE)*

As per draft permit conditions from the USACE Application No. 200400838-DPS, Proposed Special Conditions 1, 3, and 4, no discharge of fill material into waters of the U.S. is authorized for any single proposed project until the Corps has provided a written notification to proceed (NTP).

The City is required to submit and receive approval from the USACE for a sampling and analysis plan (SAP) for each proposed use of this permit. Once approved and sampling has been conducted, the results will be submitted to the Corps for review and approval in the form of this Project Notification Report. The Project Notification Report will be submitted to the USACE at least 30 days prior to work in waters of the U.S. and will request an NTP from the USACE. If, based on the SAP results, source and discharge site material are deemed compatible by the USACE, the USACE will issue a written NTP.

### 8.2. Other Permits

Copies of permits from the Coastal Commission, State Lands Commission, Regional Water Quality Control Board, and U.S. Army Corps of Engineers will be attached to this notification report.

### 8.3. Copies of Approvals

Copies of approvals, including the Letter of Permission from the U.S. Army Corps of Engineers will be provided to all agencies once they are received. The project will not commence until approvals from all permitting agencies has been obtained.

### 8.4. Assumption of Risk, Waiver of Liability and Indemnity

The City of San Clemente acknowledges and agrees (i) that the site may be subject to hazards such as erosion and landslides; (ii) to assume the risks to the City and the property that is the subject of this permit of injury and damage from such hazards in connection with this permitted development; (iii) to unconditionally waive any claim of damage or liability against the Coastal Commission, its officers, agents, and employees for injury or damage from such hazards; and (iv) to indemnify and hold harmless the Commission, its officers, agents, and employees with respect to the Commission's approval of the project against any and all liability, claims, demands, damages, costs (including costs and fees incurred in defense of such claims), expenses, and amounts paid in settlement arising from any injury or damage due to such hazards.