

University of California, Berkeley Global Campus at Richmond Bay
Imported Soils
Sampling and Analysis Requirements to Assess Contaminant Concentrations

Introduction

UC Berkeley's Richmond Field Station (RFS) Site portion of the Berkeley Global Campus at Richmond Bay (BGC) is subject to site investigation and cleanup under the State of California Department of Toxic Substances Control (DTSC) Order Docket No. IS/E-RAO 06/07-004 (September 15, 2006). Due to the DTSC order, all fill materials to be imported for use at the RFS must be selected and tested with approval by the UC Berkeley Office of Environment, Health & Safety (EH&S), DTSC, and potentially other regulatory agencies (for example the Regional Water Quality Control Board and the Army Corps of Engineers). All soils brought to the RFS for use as fill or for temporary storage must be sampled to demonstrate that the soils are clean. This guideline presents procedures that must be followed and criteria met to obtain University and agency approval for contaminant concentrations to insure that ecological and human receptors are not exposed to harmful levels of pollution or that site investigations and remediation activities completed to date are not adversely affected by import of contaminated media (soil, water, pavement, etc.).

Regulatory Guidance

- 1) DTSC Information Advisory, Clean Imported Fill Material, October 2001
- 2) DTSC Interim Guidance, Evaluation of School Sites with Potential Soil Contamination as a Result of Lead From Lead-Based Paint, Organochlorine Pesticides from Termiticides, and Polychlorinated Biphenyls from Electrical Transformers, June 9, 2006
- 3) Other- marsh fill and other open space areas may require compliance with US Army Corps of Engineers Dredging and Dredged Material Management Guidelines and/or the San Francisco Bay Regional Water Quality Control Board's SF Bay Plan.

Procedures

Borrow Area Assessment- In order to minimize the potential for introducing contaminated fill onto a site, it is necessary to verify through documentation that the fill source is appropriate for use at the RFS. Documentation required to be provided to the University should include detailed information on the previous land use from where the fill is taken. Proper documentation should include detailed information regarding the former land use, previous environmental site assessments, and the results of any testing performed.

In addition to source assessment documentation, the University requires that soils be sampled at a minimum frequency required in the DTSC Regulatory Guidance for imported fill material and analyzed for target compounds according to this guidance. Additional analyses may be required depending on the borrow source site history (for example, soils from LBNL must be analyzed for tritium). Soil imported for use in surface water or marsh restoration projects may also require review and approval by the San Francisco Bay Regional Water Quality Control Board, the US Army Corps of Engineers, and other agencies.

Sampling Method

Incremental sampling collection methods following the ITRC Incremental Sampling Methodology are highly preferred by UC Berkeley to discrete samples. Discrete samples will only be accepted based on a thorough documentation of borrow area history and soil pile appearance (high heterogeneous soils may be rejected if not adequately assessed for soil contaminant variability).

Material Sampling Schedule

Area of Individual Borrow Area	Sampling Requirement
2 acres or less	4 samples minimum
2 to 4 acres	1 sample every ½ acre minimum
4 to 10 acres	8 samples minimum
Greater than 10 acres	Minimum of 8 locations with 4 subsamples per location
Volume of Borrow Area Stockpile	Samples per Volume
Up to 1,000 cubic yards	1 sample per 250 cubic yards
1,000 to 5,000 cubic yards	4 samples for first 1,000 cubic yards+ 1 additional sample per each additional 500 cubic yards
Greater than 5,000 cubic yards	12 samples for first 5, 000 cubic yards + 1 sample per each additional 1,000 cubic yards

Laboratory Analyses

All soil sampled should be analyzed by a state certified analytical laboratory for the following target compounds using the required test methods.

Analyte	Method
Heavy metals	EPA methods 6010B and 7471A
Petroleum	TPH modified EPA method 8015
PCBs	EPA method 8082
Polyaromatic Hydrocarbons (PAHs)	EPA method 8270C SIM Method
Organochlorine Pesticides	EPA method 8081A
Volatile Organic Compounds	EPA method 8260

In additions, if soil is being collected from an area known to contain natural serpentine soils it must be analyzed for asbestos by polarized light microscopy. Other analyses may be required depending on the site environmental history and planned use for the soil (for example, radioactive materials, plant pathogens [such as Sudden Oak Death], etc.).

University Approval Process

The following required documentation must be provided to the campus Office of Environment, Health & Safety at least two weeks prior to proposed import for review.

1. Borrow source site history.
2. Soil sampling plan (note, it is preferred that proposed sampling plans be submitted to EH&S for review and approval prior to sampling)
3. Certified Laboratory Analytical Results

Note- if sampling plans appear to be inadequate or improper or insufficient laboratory analyses have been performed, the University may require additional laboratory analyses.

RFS Criteria Imported Soil (effective June 2016)

The following chemical criteria apply to RFS soil imported for use as clean fill material:

Arsenic: site specific concentration of 16 mg/kg

Radioactive materials: Indistinguishable from background

All other chemicals: the Soils Management Plan (July 18, 2014 and any most recent SMP updates) will be used to compare to Category I and Category II acceptance criteria (SMP Table C1) for all Research, Education, and Support designated areas of the BGC (as described in SMP Section 4.2.2 Determination of Soil Management Action). Natural Open Space soil criteria will be based on these SMP categories as well as ecological soil screening levels for plants, invertebrates, birds, and mammals using the EPA's Ecological Soil Screening Levels (Eco-SSL) or the Oak Ridge National Laboratory (ORNL) phytotoxicity and earthworm toxicity benchmarks.

Note that site use may also require specific testing of sources for geotechnical, plant pathogens, and soil nutrients requirements of specific projects.