ENVIRONMENTAL HEALTH COUNCIL

Soil Evaluation of the School Grounds of
Educational Institution N° 20068 Daniel Alcides Carrión
Pomamayo Population Center, Oyón District and Province, Lima Department, Peru

Sample Collection Date: July 9, 2025

Report of Results and Recommendations
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The Environmental Health Council (EHC) is a U.S.-based nonprofit organization dedicated to identifying, evaluating, and remediating the effects of environmental toxins on affected communities. We work through a combination of scientific assessment, advocacy, and collaboration with communities and authorities to promote environmental and public health.

Within the framework of the Environmental Health Council's objectives, the soil of the school grounds of Educational Institution N° 20068 Daniel Alcides Carrión, located in the Pomamayo population center, Oyón District and Province, Lima Department, Peru, was analyzed and evaluated. This school is located approximately 500 meters from two abandoned furnaces in neighboring Bellavista.

Objectives

The technical evaluation aimed to:

1. Determine whether contamination from historic mining operations—including mineral processing and refining activities dating from the 18th century to the present—has left heavy metal pollution (*legacy contamination*).
2. Quantify concentrations of heavy metals—specifically lead (Pb), mercury (Hg), and arsenic (As)—that may affect primary and secondary school children and staff.
3. Compare these concentrations with the Environmental Quality Standards (ECAs) established by the Peruvian government (*Supreme Decree N° 011-2017-MINAM*) for residential/park soils.
4. Identify any critical areas within the school requiring attention, assess potential health risks to the student and staff community, and propose technical recommendations based on the findings.

Sampling and Methodology

Five soil samples (POMA-R-5, POMA-R-6, POMA-R-7, POMA-R-8, and POMA-R-9) were collected from specific school areas where exposed soil remained. To ensure representativeness, samples were taken from the following locations:

1. Garden play area
2. Natural wall of the terrain
3. Adjacent to the bio-garden

4. Veggie garden
5. Bio-garden under construction

The analysis was conducted using a portable X-ray fluorescence (XRF) spectrometer (SciAps model X550), with results expressed in parts per million (ppm or mg/kg) to evaluate the presence of lead (Pb), mercury (Hg), and arsenic (As).
The ECAs for residential/park soils are:

- Arsenic (As): 50 mg/kg (ppm)
- Mercury (Hg): 6.6 mg/kg (ppm)
- Lead (Pb): 140 mg/kg (ppm)

Arsenic (As)

- Range of sample results: 14 to 68 ppm
- 1 of 5 samples exceeded the ECA (50 ppm)
- Critical finding: POMA-R-5 with 68 ppm (1.4 times the ECA)

Mercury (Hg)

- Range of sample results: not detected to 19 ppm
- 1 of 5 samples exceeded the ECA (6.6 ppm)
- Critical finding: POMA-R-5 with 19 ppm (2.9 times the ECA)

Lead (Pb)

- Range of sample results: 14 to 367 ppm
- 2 of 5 samples exceeded the ECA (140 ppm)
- Critical findings:
    - POMA-R-5 with 367 ppm (2.6 times the ECA)
    - POMA-R-7 with 205 ppm (1.5 times the ECA)
    -

Areas of Concern

The results reveal varying levels of contamination within the school grounds, including:

1. Contamination hotspot:
    - Sample POMA-R-5 (Garden play area) shows the highest contamination, exceeding the ECA for all three metals analyzed.
    - This area is of greatest concern because it coincides with the main recreational zone for students.
2. Localized contamination:
    - Soil contamination is not uniform. Contamination may extend beyond the area of assessment.
    - POMA-R-5 and POMA-R-7 show significant contamination.
    - POMA-R-6 and POMA-R-9 are within safe limits.
3. Health risk to students:

- The garden play area (POMA-R-5) has concerning lead levels (367 ppm), far above the ECA.
- Lead, arsenic, and mercury exposure in children can cause irreversible neurological damage, attention deficits, reduced IQ, and cause other physiological disorders.

Conclusions

1. Areas were identified within Educational Institution N° 20068 Daniel Alcides Carrión that exceed the ECAs established in *Supreme Decree N° 011-2017-MINAM* for residential/park soils.
2. The garden play area (POMA-R-5) is of highest concern, with elevated levels of all three metals analyzed, requiring immediate action by the appropriate authorities to protect the health of children, adolescents, and the wider community.
3. Significant health risks exist for primary and secondary students using the school's facilities and grounds.

Recommendations

1. Restrict access to:
    - The contaminated garden play area (POMA-R-5).
    - The contaminated area adjacent to the bio-garden (POMA-R-7).
2. Conduct additional evaluation of the soils in and around the school and wider community.
3. Remove contaminated soil and dispose following appropriate disposal requirements or cover the contaminated areas with clean materials, applying layers of clean soil and geotextile fabric, followed by grass, to prevent direct contact and dust generation.

Attachments

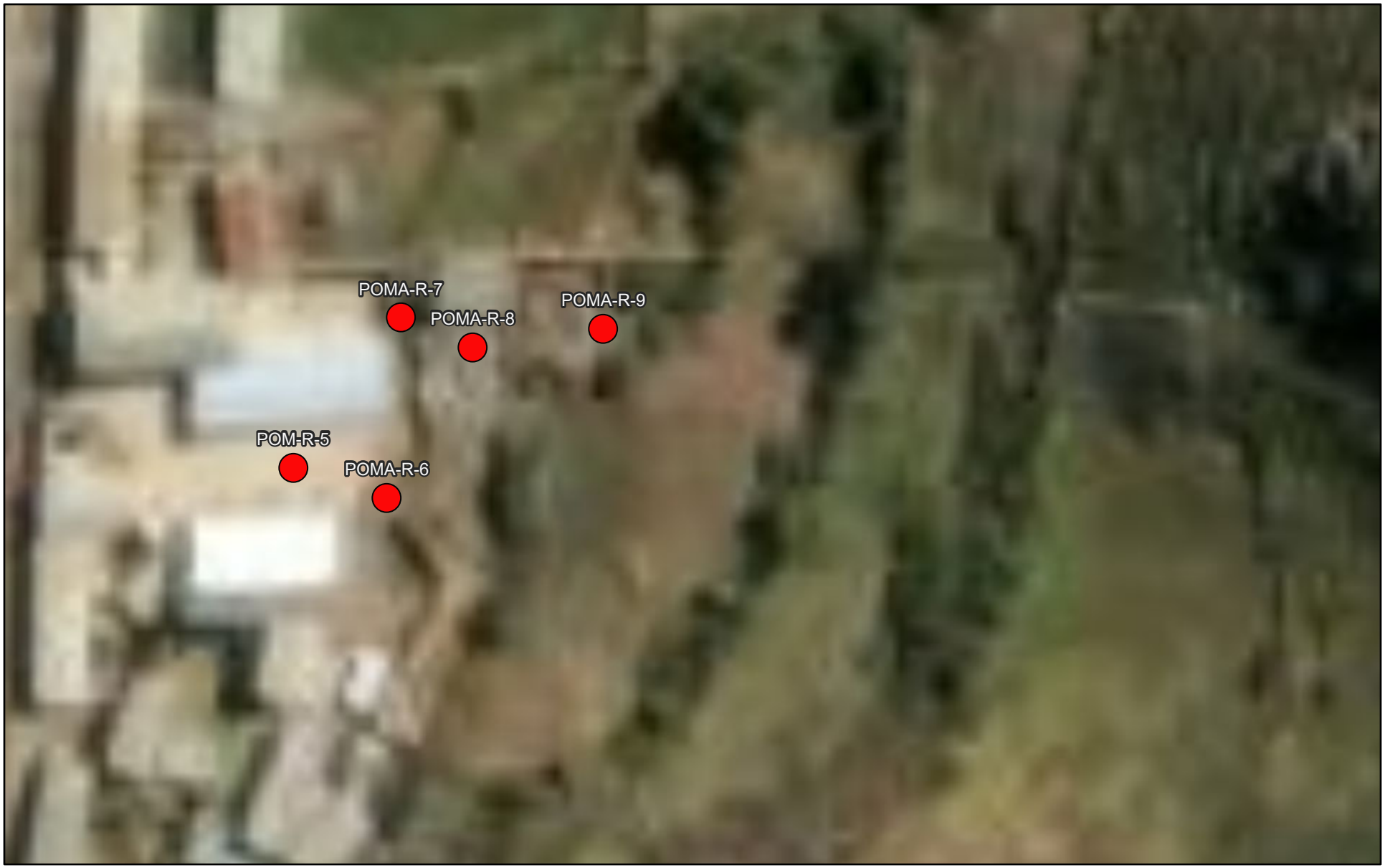
Table – Soil Results
Figure – Sampling Locations

Table of Soil Sample Results
Daniel Alcides Carrión School
Oyon, Peru

Sample	Sampling Location	As (ppm)	Hg (ppm)	Pb (ppm)
POMA-R-5	Garden play area	68	19	367
POMA-R-6	Natural wall of terrain	18	ND	14
POMA-R-7	Adjacent to bio-garden	44	6	205
POMA-R-8	Veggie garden	14	ND	65
POMA-R-9	Bio-garden under construction	14	ND	29
ECA		50	6.6	140

Note:
ppm - parts per million or milligrams per kilogram (mg/kg)
ECA - Environmental Quality Standard per MINAM, Supreme Decree No. 011-2017
ND - Not detected
Red shaded cells indicate that the sample result is above the respective ECA

Daniel Alcides Carrion School



11/7/2025

Peru Colonial Site Assessment

World Imagery

Low Resolution 15m Imagery

Citations

1:600

0 0.01 0.01 0.02 mi

0 0.01 0.01 0.03 km

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

The EHC