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Submitted to: Facilities and Sustainability Committee

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Title: Proposal: Archaeological and Forensic Science Field Laboratory

Overview

This is a proposal for an outdoor field laboratory that will directly support the Anthropology Program and have ancillary opportunities for other natural sciences programs such as Geology, Geography and Forensics. It will provide a space where students can apply lessons from classroom based lectures to tangible scenarios that are experientially based where students are learning by doing. Students will directly visualize how fundamental principles can be applied, essentially bridging theory and practice. The field laboratory will provide a space for the practice of fundamental skills in archaeology, forensic anthropology, and applied anthropology. This space will provide the bases to build a Certificate Program in Cultural Resource Management and Land Survey. It should be noted that the area will not be archaeologically sensitive and considered relatively culturally sterile, the purpose is skill development.

Exercises would include:

- Survey: The use of mapping technologies such as tape/compass, theodolite, total station to understand concepts in spatial arrangements and artifact plotting.
- Excavation: The excavation of test units in a controlled manner to understand the principles of stratigraphy, geomorphology, and gain experience producing stratigraphic schema.
- Documentation: The fundamentals of evidence recording including horizontal/vertical section drawing, artifact and ecofact plotting, and photography.
- Experimental: The creation of short and long-term anthropological experiments to actively practice the scientific method, research design, and the principles of publication-quality report writing

The Field Laboratory's underlying objective is to create an area where fundamental student learning objects can be further reinforced and the achievement of the programs goals are more successful.

Scope

The space can be limited in size occupying a footprint in the range of 25 to 50 meters^2 with an adjoining area for future expansion. It does not necessarily have to be located on level ground and can be positioned in mixed terrain including on a slope or in an area that might be considered undesirable for other forms of infrastructure. Given some of the types of proposed exercises, a location that is near the border with agricultural lands would be preferred and with a buffer away from future development of buildings. Attached is a map (Figure 6) depicting areas of interest which do not conflict with the proposed Master Plan.

Infrastructure

The main infrastructure that would be needed is the placement of a standard 20' metal storage container adjacent or within a short walking distance from the actual Field Laboratory Space. Ideally, this storage container would be near a water source where standard garden type hoses could be attached. Some of the exercises would include the screening of soil using low pressure water with the excess water being directed toward a natural drainage point. Access does not necessarily require a developed or permanent road way.

- 20' Storage container
- Access to water
- Near water drainage.

Courses that would benefit: ANTR 1L, 2, 2L, 13

Student Learning Objectives (ANTR 1L, 2, 2L, 13)

Students will be able to:

- Apply the scientific method to research in anthropology.
- Use theory to interpret archaeological data.
- Demonstrate the sequence and procedures for archaeological field survey and excavation.
- Apply the methods, tools, and technical skills of archaeological research.
- Collect, measure, photography, and curate common archaeological materials and artifacts.
- Demonstrate the procedures involved in field survey and excavation within a forensic investigation.

Activities, Exercises and Experiments

There would be three main types of activities that will be performed within and around the Field Laboratory Space: Survey, Excavation, and Experimental.

1. **SURVEY -** Survey related exercises would be considered non-intrusive with the goal of training students in spatially related problem solving. In groups students conduct mock crime scene and archaeological surface surveys (Figure 1). Students would use GPS units and Laser Survey equipment to understand the process of documenting topographical features, slope analysis, and artifact distribution (Figure 2).
2. **EXCAVATION -** The second would include targeted sub-surface excavation mimicking common practices in archaeology and environmental science where limited areas (.25m by .25m; 1m by 1m; 1m by 2m) test units are excavated by hand to a depth not greater what is defined as a safe standard by OSHA of approximately 1 meter, often approximated as waist height (Figure 3 and Figure 4). The initial goal would be to understand the fundamentals of soil analysis, stratigraphy, and geomorphology. After completion, these would be enlarged and backfilled with differing layers of soil types, student manufactured artifacts, and naturally occurring ecofacts (naturally occurring botanical, lithic, and faunal remains). In sub-sequent years, these test units will become experiments for future students to test. Students would re-excavate these areas and compare their results with previous backfill records.

3. **RESEARCH** - The third type of exercises would be related to short term and long term experiments. In the short-term, this would may include the re-production of pre-historic and historic artifacts such as basketry, flint stone, ground stone, and adobe block. Students would learn to manufacture items commonly found in the archaeological record in a controlled environment. Long term projects would involve better understanding the taphonomic process that affect an artifact from the time it is made and discarded to its eventually recovery. This would include the burying or leaving items exposed to understand the process of decomposition for organic materials. Other experiments will be forensic related where animal remains are buried or left exposed to the elements; these would be periodically monitored to understand how the microclimate and ecology of the Livermore area influences rates of decay and dispersal of remains.

Activities by Themes

- Survey and GIS
- Soils, Stratigraphy and Geo-morphology
- Taphonomy
- Forensic Survey and Crime Scene Documentation
- Archaeological Methodology
- Decomposition and Scavenger Dispersal Patterning

Examples of Survey Exercises

Figure 1 –Students conducting a line search of a mock crime scene, marking potential items with pin flags.

Figure 2 Students plotting the position of items found with a Laser Total Station during a mock crime Scene exercise.

Examples of Excavation Exercises

Figure 3 This image captures the main elements that are involved in excavating a 1m by 2m Test Unit commonly used in academic archaeology and Cultural Resource Management.

Figure 4 An example of a Surface Transect Unit, seen here as a small shallow test unit designed to rapidly understand the subsurface over a broad area.

Figure 5 above is a student using a twist auger to remove a soil core sample for screening, color, and composition testing.

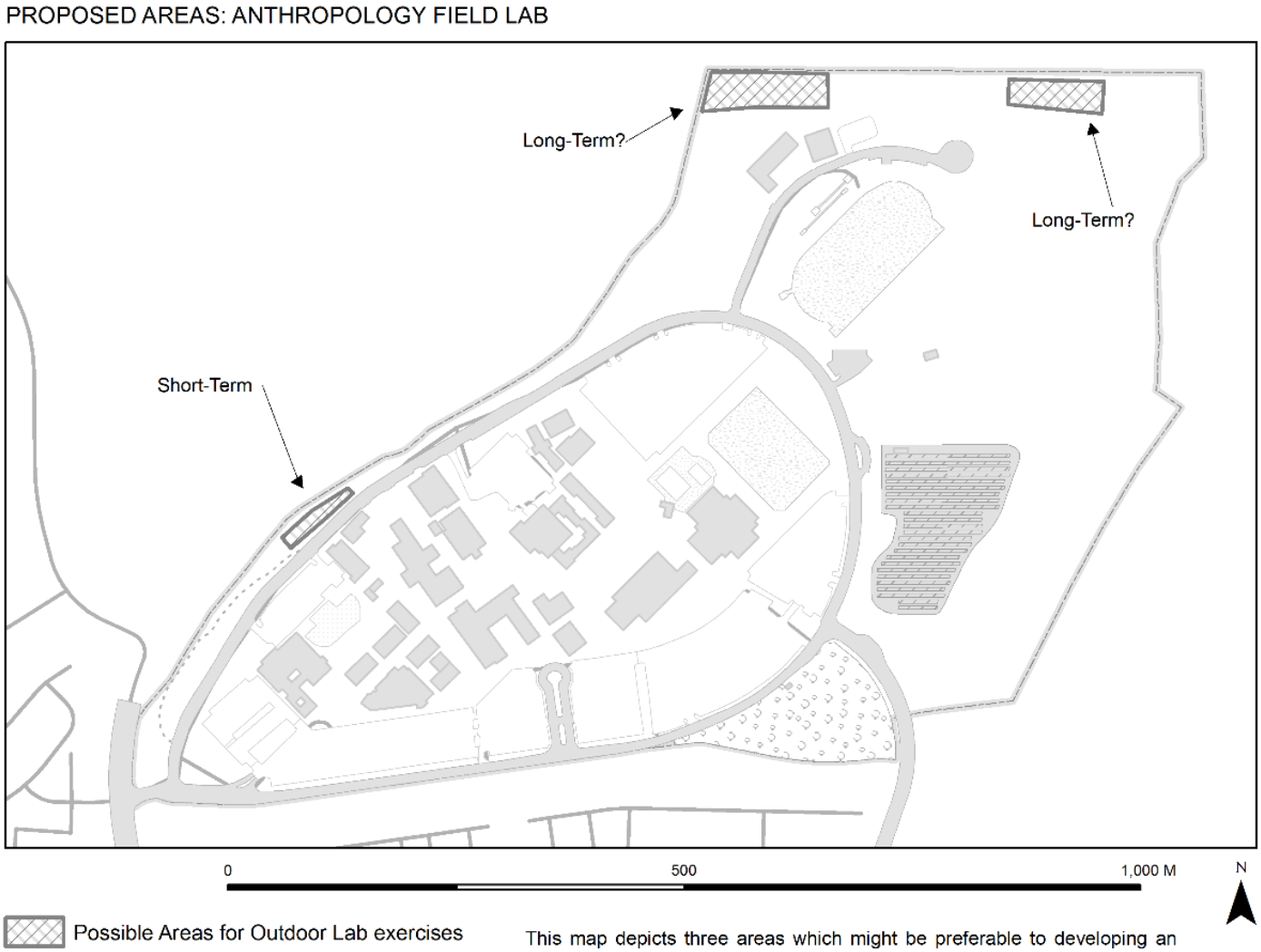

Figure 6- Potential Areas for Outdoor Field Laboratory